

# Observer

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## A PRESCRIPTION FOR CHANGE

RESEARCH ON LEARNING IS TRANSFORMING  
THE SCIENCE OF ADDICTION

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- Linda B. Smith: What Babies Have That Computers Don't
- Attitudes About Accents
- Reviving the Cognitive Revolution
- The Science of Behavior Change

# Observer

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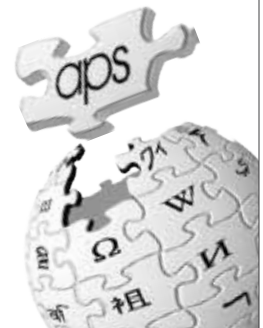


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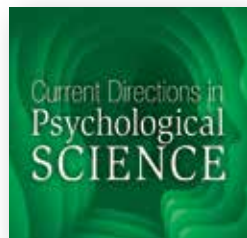
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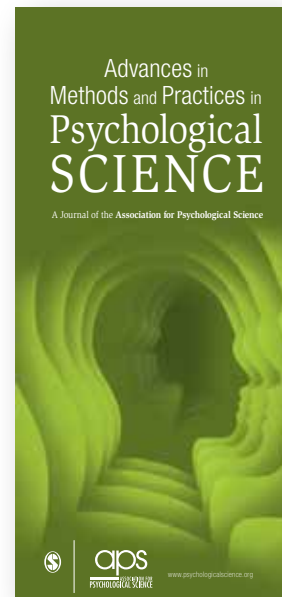
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# Philosophy and Psychological Science: Let's Revive the Cognitive Revolution!

*Valeria Giardino is the ultimate multi-multi-multi. Or inter- inter- inter-. She is multi-disciplinary, multi-national, multi-lingual, an Italian philosopher who collaborates with psychologists, a CNRS researcher in Nancy (France) at the Henri Poincaré Archives, University of Lorraine, with previous research positions in the US, the UK, Spain, and Germany. Characteristically, she has brought that breadth and depth to bear on broad issues of interest to both philosophy and psychological science: philosophy of science, logic, epistemology, and mathematics. She has put forth a new vision and new approaches to the study of scientific, especially mathematical, reasoning. Her work has elegantly shown ways in which mathematical reasoning relies on nonverbal tools for thought, in particular, diagrams and gestures. Her vision and insights and prolific output have made her a popular speaker at academic meetings.*



Valeria Giardino

-Barbara Tversky  
APS President

There are many views today about what the relationship between philosophy and psychological science is and about what this relationship (if any) ought to be. Be that as it may, it is a fact that philosophy and psychological science have already been in close contact in the development of cognitive science. That history can teach us something. Given my background and despite the fact that I am aware that other topics may be relevant as well, I will focus in particular on the philosophical research that has been devoted to the nature of (scientific) thinking.

As it is well known, at the turn of the 20th century, philosophers aimed at identifying the laws of thought; in fact, many argued that the tool that had just been invented at the time — contemporary logic — did just that. It should be noted that this approach, starting from the work of the German philosopher Frege, was based on a strong anti-psychologism: objectivity of thought had to be preserved and therefore could not be based on any kind of singular subjective representation that psychology was in the position to study; only an appropriate artificial language devoid of ambiguities could capture the nature of the (human, rational, linguistic) mind. But then came the 1950s, the years of the “Cognitive Revolution.” As Bruner summed up years later, this revolution focused upon the *symbolic* activities that human beings employ in “constructing and in making sense not only of the world, but of themselves” (Bruner, 1990, p. 2). It was a time when sister disciplines had to join their forces: psychology and the human and social sciences had seats next to each other in an interdisciplinary cognitive perspective. However, according to Bruner, at some point the attention shifted from the *construction* of meaning to the *processing* of information. The key factor in the shift was the introduction of computation as the ruling metaphor and of computability as a necessary criterion of a good theoretical model: the computational theory of the mind

became the paradigm. First apart, then together, then apart again: philosophy and psychology did have a complicated relationship! It should be noted though that for the hero of computability, Turing, the hope was that one day humans would be able to build machines that would eventually “compete with men in all purely intellectual fields” (Turing, 1950, p. 460). I bet that he would have wanted the sister disciplines to stay together.

What happened next? More changes. In psychology, the computational theory of the mind has revealed its limitations. As Hutchins (1995) pointed out, in the same spirit as Bruner, originally the object of study was a cognitive system that involved a person *visually* and *manually* interacting with a *material* world of symbols to manipulate; Turing’s great discovery was that such embodied actions and the world on which to act can be *idealized*, so that they can both be eliminated. In Hutchins’ words, the brain was removed and replaced with a computer and the surgery was a success; what remained was the application of rules to strings of symbols, with an apparently unintended side effect: “the hands, the eyes, the ears, the nose, the mouth, and the emotions all fell away” (Hutchins, 1995, p. 363). The subsequent decades saw a growing feeling that these exact elements needed to get back in the picture. Psychological science expanded, by returning to examine the roles of spatial cognition, vision, and action for thinking. To give just a few examples, pioneering work was done in the study of the cognitive — but not necessarily linguistic — bases of mathematical knowledge (e.g. Dehaene, 1997; Butterworth, 1999; Lakoff & Nunez, 2001), of the role of gestures for thinking (e.g. Goldin-Meadow, 2003), or of spatial thinking for representing time (e.g. Clark, 1973; Casasanto & Borodistky, 2008). Around the same time in philosophy, a “practical turn” occurred, in contrast to the linguistic turn at the beginning of the 20th century. Starting in the 1970s, philosophy of science moved away from the definition of abstract and general theories of sci-





Both communities are interested in the study of advanced practices of thought, and their work can be conceived as complementary; the effort is to find a good compromise between the philosophers' urge for generality and encompassing paradigms and the psychological scientists' careful investigation of the processing details. ”

entific knowledge towards the investigation of the concrete work that scientists are engaged in everyday. Philosophical analyses became less abstract, in a search for the building blocks necessary to more complex practices and for possible cognitive invariances across them. For example, some scholars began to give a role to a cognitive agent in the epistemology for mathematics (see for reference Giaquinto, 2007 and Ferreirós, 2015).

Now let me return to the question I began with. What ought to be the relationship between philosophy and psychological science now? There are good reasons to believe that this is the time for renewed cooperation. In fact, it is already happening, with important results, notably showing the limits of approaches to complex practices of thought by focusing only on their neurological underpinnings. Recently, some theoretical frameworks are working to specify the claim that cognition must be regarded as an “extended” process going beyond the limits of our brain.

For example, according to Menary's *cognitive integration* view, the emergence of abstract symbolic thought in humans should be explained by giving an evolutionary and developmental case for the plasticity of the brain in redeploying older neural circuits for new, culturally specific functions, following a process of enculturation (Menary, 2015). In her forthcoming book, Tversky (2019) argues that motion, actions, and bodies are fundamental to the way we think.

What's next? What should be done in order to nurture this cooperation? Both communities are interested in the study of advanced practices of thought, and their work can be conceived as complementary; the effort is to find a good compromise between the philosophers' urge for generality and encompassing paradigms and the psychological scientists' careful investigation of the processing details. There are (at least) two conditions for a successful interaction. First, philosophers should engage more with empirical research and psychological scientists with the definition of bigger pictures. Second, we need to secure a shared terminology and a common set of problems in order to start any fruitful dialogue. The challenge is to unveil the cognitive underpinnings of human concrete practices, and interaction should be (also institutionally) encouraged. The hope is that this would result in blurring away disciplinary borders and getting once more to true cognitive science. To sum up in a motto: Let's renew the Cognitive Revolution! ●

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## Insights From High-Risk Fields Can Help Minimize Mistakes in the Lab

Everyone makes mistakes, including psychology researchers. Small missteps, such as typing a name incorrectly or forgetting to write down an important piece of code, can have significant and frustrating consequences for identifying research mistakes and eliminating them before a manuscript is submitted for publication. In an article published in *Advances in Methods and Practices in Psychological Science*, researcher Jeffrey Rouder of the University of California, Irvine and colleagues use principles drawn from high-risk fields to propose best practices for minimizing mundane mistakes in psychology labs.

In the article, the authors emphasize that although mistakes may seem inconsequential compared with other methodological issues, researcher error should be taken seriously. First, mistakes are important because they are common. One analysis of the psychology literature found that about half of the articles published over a 30-year period had at least one inaccurately stated statistical test result, meaning that the test statistic and degrees of freedom did not match the  $p$ -value. Second, simple errors may produce a bias in the literature, as researchers may tend to check their work for mistakes more rigorously when the results of a study do not support the original hypothesis than when they are in the anticipated direction.

The authors suggest that best practices for curtailing mistakes can be borrowed from high-reliability organizations in high-risk fields such as aviation and medicine. Errors made in these lines of work can have drastic consequences, and researchers have dedicated considerable time and attention to preventing such errors. Although psychology labs may not have the same high stakes as a setting like a nuclear power plant, the principles — and applied practices — that originate in high-reliability organizations are still informative.

Using high-reliability organizations as a guide, the authors outline principles for reducing mistakes, along with practices that can help researchers apply the principles in a lab setting.

One key principle is a preoccupation with failure. In a high-risk field, organizations try to identify future failures and potential mistakes and analyze how to avoid them. Labs can adopt this convention by treating near misses as seriously as full-blown mistakes and taking a proactive approach to anticipate failures.

One practice that can help authors apply this principle in analyzing and displaying their data is using a code-based system.



Some analysis software is menu-driven, such as Excel, which means that researchers have to make successive choices when running an analysis or creating a graph, including selecting an option in a menu and copying and pasting cells. A menu-based system doesn't record those actions, meaning that lab members may be unable to recreate the analysis or graph in the future. To improve reliability, research teams can use a software program that either has a code-based system or both menu- and code-driven analyses. In systems like SPSS, code can be saved and shared so that other researchers can replicate all steps of the analysis. ●

*Learn more about principles and practices for minimizing mistakes in the full article.*

### Reference

Rouder, J. N., Haaf, J. M., & Snyder, H. K. (2019). Minimizing mistakes in psychological science. *Advances in Methods and Practices in Psychological Science*. <https://doi.org/10.1177/2515245918801915>

### SOUND BITE

"I don't think there's a shred of free will out there. From spending my decades thinking about behavior and the biological influences on it, I'm convinced by now free will is what we call the biology that hasn't been discovered yet. It's just another way of stating that we're biological organisms determined by the physical laws of the universe."

APS Fellow **Robert Sapolsky**, Stanford University, in an interview for *The TED Radio Hour*.

## Nora S. Newcombe, Linda B. Smith Receive SEP Awards



Nora S. Newcombe



Linda B. Smith

The Society of Experimental Psychologists (SEP) has awarded its most prestigious honors to APS William James Fellows **Nora S. Newcombe** and **Linda B. Smith** in recognition of their pioneering achievements in experimental psychology.

Newcombe, editor of *Psychological Science in the Public Interest* and a professor of psychology at Temple University, has received the 2019 Howard Crosby Warren Medal for “her distinguished research contributions on fundamental aspects of cognition and development, with emphasis on spatial cognition and the development of memory.” The Howard Crosby Warren Medal recognizes outstanding achievement in experimental psychology, and was the first major award in American psychology when it was established in 1936. Newcombe APS’s highest honor, the William James Fellow award, in 2014, in recognition of her lifetime of contributions to basic science.

Her highly influential research on the development of spatial cognition has demonstrated how both children and adults can improve these skills through training and play, and that some of these abilities, such as using maps, develop even earlier than once thought. Newcombe’s adaptive combination model of the development of spatial cognition has shed light on how information sources are combined through psychological mechanisms that prioritize sources based on their potential usefulness.

In the realm of memory research, Newcombe has proposed that the hippocampal maturation necessary to support explicit episodic memory may not occur until around 2 years of age. Later in life, this early absence of specific memories may then lead to “infantile amnesia,” a phenomena in which our earliest memories become impossible to retrieve as older children and adults.

In 2014, Newcombe presented her neoconstructivist approach to cognitive development (<https://www.psychologicalscience.org/observer/exploring-infant-cognition>) as part of her APS William James Fellow Award Address at the 26th Annual APS Convention in San Francisco.

Linda B. Smith, a professor of psychological and brain sciences at Indiana University, Bloomington, has received SEP’s 2019 Norman Anderson Lifetime Achievement Award for “her

groundbreaking theoretical and empirical work on cognitive development, including comprehensive theories based on dynamic systems, and how the infant’s natural predispositions and visual world interact to guide object name learning.” She is a 2018 recipient of the APS William James Fellow award.

Smith’s model of perceptual classification has provided an essential framework for conceptualizing the developmental shift from the tendency to classify objects by overall similarity as very young children to classifying objects according dimensional identities — such as color, size, or shape alone — as adults. Smith collaborated with developmental scientist Esther Thelen to establish a dynamic systems theory of early human development. This theory draws on a mathematical approach to the study of change to link the processes of exploration and selection to the development of self-organizing perception-action categories.

Smith’s work on the shape bias in young children has also significantly advanced psychological science’s understanding of language acquisition. Her research in this area has demonstrated that children of 2 to 3 years in age will extend a novel name for one object to other objects of the same shape — for example, “tractor” to John Deeres, ride-on mowers, and antiques — regardless of variation in texture and size. This and other mechanisms support children’s ability to learn large numbers of words very quickly.

Most recently, Smith has been using head-mounted cameras and eye trackers to study how infants’ view of the world contributes to cognitive and visual development. Her studies in this area link vision and machine learning, and are among the first to connect infants’ unique visual environment to object name learning.

Smith spoke on the relationship between infant and machine learning during her APS William James Fellow Award Address at the 30th APS Annual Convention in San Francisco in 2018. She was also a keynote speaker at the 2017 International Convention of Psychological Science in Vienna, where she highlighted the intersection of object identification and linguistic learning in children (<https://www.psychologicalscience.org/observer/perception-and-play-how-children-view-the-world>).

Established in 1904 by the British psychologist Edward Bradford Titchener, SEP is the oldest, most prestigious honor society dedicated exclusively to psychology. The society’s purpose is to honor its members and gather for annual research presentations by its fellows. SEP membership, currently totaling 220 individuals, is by invitation only. ●

See page 15 of this issue to read about Smith’s APS William James Fellow Award address.

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## Trigger Warnings Do Little to Reduce People's Distress, Research Shows

Trigger warnings that alert people to potentially sensitive content are increasingly popular, especially on college campuses, but research suggests that they have minimal impact on how people actually respond to content. The findings are published in *Clinical Psychological Science*.

"We, like many others, were hearing new stories week upon week about trigger warnings being asked for or introduced at universities around the world," says psychology researcher Mevagh Sanson of The University of Waikato, first author on the research. "Our findings suggest that these warnings, though well intended, are not helpful."

Trigger warnings may be increasingly prevalent, but there has been almost no research actually examining their effects.

It's possible that they function the way they're meant to, helping people to manage their emotional responses and reduce their symptoms of distress. But it's also possible trigger warnings could have the opposite effect, influencing people's expectations and experiences in ways that exacerbate their distress.

"We thought it was important to figure out how effective these warnings are," says Sanson. "This is the first piece of empirical work directly examining if they have their intended effects."

To resolve the question, the researchers conducted a series of six experiments with a total of 1,394 participants.

Some participants — a combination of college students and online participants — read a message about the content they were about to see, for example: "TRIGGER WARNING: The following video may contain graphic footage of a fatal car crash. You might find this content disturbing." Others did not read a warning. All participants were then exposed to the content.

Afterward, the participants reported various symptoms of distress — their negative emotional state, and the degree to which they experienced intrusive thoughts and tried to avoid thinking about the content.

The results across all six experiments were consistent: Trigger warnings had little effect on participants' distress. That is, participants responded to the content similarly, regardless of whether they saw a trigger warning.

The format of the content also did not make a difference: Trigger warnings had little impact regardless of whether participants read a story or watched a video clip.



Could it be that trigger warnings are specifically effective for those people who have previously experienced traumatic events? The data suggested the answer is no: There was little difference between groups. In other words, individuals with a personal history of trauma who received a trigger warning reported similar levels of distress as did those who did not receive a warning.

The researchers note that it remains to be seen whether these results would apply to individuals who have a specific clinical diagnosis such as anxiety, depression, or posttraumatic stress disorder. However, these findings indicate that trigger warnings are unlikely to have the meaningful impact they're typically assumed to have.

"These results suggest a trigger warning is neither meaningfully helpful nor harmful," says Sanson. "Of course, that doesn't mean trigger warnings are benign. We need to consider the idea that their repeated use encourages people to avoid negative material, and we already know that avoidance helps to maintain disorders such as PTSD. Trigger warnings might also communicate to people that they're fragile, and coax them to interpret ordinary emotional responses as extraordinary signals of danger." ●

### Reference

Sanson, M., Strange, D., & Garry, M. (2019). Trigger warnings are trivially helpful at reducing negative affect, intrusive thoughts, and avoidance. *Clinical Psychological Science*. <https://doi.org/10.1177/2167702619827018>

You can find news coverage of this research in *The New York Times* and other outlets at [www.psychologicalscience.org/news/releases/trigger-warnings-distress.html](http://www.psychologicalscience.org/news/releases/trigger-warnings-distress.html)

# 2019 APS MENTOR AWARDS

*Four APS Fellows have been selected to receive the APS Mentor Award, given each year in recognition of APS members who masterfully help students and others discover their own research and career goals. Beyond their individual contributions to diverse areas of research, such as the science of motivation, memory, social and cognitive learning, and education, these scholars' dedication to their students and colleagues has fostered a thriving community of psychological scientists.*



**Carol S. Dweck**  
*Stanford University*

An APS James McKeen Cattell Fellow, Carol Dweck has dramatically advanced the study of motivation and resilience. What most characterizes her research, in addition to theoretical depth and methodological rigor, is its origins in a vibrant and collaborative laboratory that propels researchers to become leading scholars both within and

beyond academia.

Her mentees appreciate Dweck for her openness to ideas as well as her razor-sharp focus on identifying students' skills gaps and training them to improve these areas. APS Fellow Kristina Olson of the University of Washington remembers the invaluable writing help she received from Dweck.

"When Carol returned papers to me she didn't just make corrections or re-write sentences, rather Carol filled the pages with comments about why my writing was working or wasn't (yet) working in particular places," Olson, who last year [became the first](#)

[psychological researcher to win the prestigious Alan T. Waterman Award](#), writes in a letter supporting Dweck's nomination.

Dweck's famous scientific insights into growth mindset, the useful belief that achievements can be borne of hard work and learning (as opposed to fixed, natural gifts), are applied in real time in her lab, her mentees say. She pushes her lab members to set the standard for evaluating the reliability and replicability of findings and corrects the record when the research is oversimplified or misinterpreted, they say.

"She has an unbelievable gift in her ability to offer strong critiques (I cannot count the times in lab someone got stopped on a title slide for a correction) yet not do so in a way that feels as though one is being torn down — instead one feels stronger and smarter (in a non-fixed way)," psychological scientist Aneeta Rattan of London Business School writes in her letter nominating Dweck for the award.

Regardless of other demands, she is known for making time to regularly meet with her students, offering them her total attention and focus. She encourages them to pursue "risky research" that has high potential for theoretical and societal impact. Many of her students identify her as the most influential person in their career path.



**Marcia K. Johnson**  
*Yale University*

APS William James Fellow Marcia K. Johnson is a prolific contributor to cognitive psychology and cognitive neuroscience. She has explored aspects of memory and is best known in the scientific community for her influential source-monitoring framework, which seeks to explain how humans distinguish between the sources of their memories —

including dreams, imagination, and reality.

Among her many former students around the world, however, she is best known for her inexhaustible generosity as a mentor. They extoll the way she nurtured them not only as scholars, but also as whole people. Her mentoring style is described as reflecting an evolving relationship with each student. She begins as their tutor, providing opportunities to collaborate while modeling professionalism and perseverance. Gradually, she assigns new responsibilities, giving them space to grow but coming to the rescue when necessary. Later, she fosters collegiality based on

mutual respect, inspiring self-confidence as students leave to pursue their own aspirations.

"To be honest, one of my strongest motivations for earning my doctorate was to honor Marcia's confidence in me," psychological scientist John A. Reeder of Simmons University writes in his nomination letter. "Seventeen years later, she's still mentoring me whether she knows it or not."

Through it all, Johnson instills in her students a fundamental respect for the scientific method. She is particularly adept at encouraging her students to achieve broad interests and deep analytical skills through collaboration with colleagues and lab mates.

"On a given day she'd have me brainstorming with the rest of her team to ensure the cohesiveness of the lab's multifarious projects, collaborating one-on-one to revise a manuscript or design a new experiment, visiting a colleague's lab to format data tables for a joint grant application, analyzing data for my dissertation, and trying to stay awake in an fMRI scanner for a middle-of-the-night research session," Reeder recalls.

Johnson's scholarly renown is illustrated by her long list of prestigious awards, but her legacy as a mentor, her former students say, is the one that seems most important to Johnson herself.



# 2019 APS MENTOR AWARDS



## Geraldine Downey *Columbia University*

APS Fellow Geraldine Downey studies the psychological impact of personal and status-based rejection — how rejection relates to intimate relationships, child development, academic achievement, violence, personality disorders, and reentry following incarceration. In addition to producing creative and highly regarded research, Downey has

transformed the nature of mentoring in science, focusing on students from groups that have a history of being marginalized in society.

Downey stands out as a mentor based on the institutional structures she has established. She proposed, developed, funded, and ran a postbaccalaureate program in Columbia's psychology department, providing college graduates with help to prepare for graduate school. She also founded Columbia's Center for Justice, a project that harnesses education, research, and policy to promote

alternatives to mass incarceration and that provides college courses in prisons and jails. At the Center, she has brought together people returning from incarceration, Columbia students, community members, and policymakers to create mentoring opportunities.

Her graduate students over the years have said that they appreciate her for setting high standards and for encouraging them to think not only about basic empirical questions but also about the value, impact, and importance of their research to society at large.

Many of Downey's students have become preeminent scholars at the world's most prestigious universities, but her mentees also include professional football players, social workers, students who left academia to have a direct social impact, and leaders in criminal justice reform.

"The fact that she has earned the trust of so many under-represented students," says APS Fellow Rodolfo Mendoza-Denton, a former student of Downey's who is now a professor at the University of California, Berkeley, "is a testament to her success in connecting students to their interests, providing them with sustained, warm, structured mentorship, and importantly, making sure that they see their projects through."



## Mark H. Johnson *Birkbeck, University of London, and University of Cambridge*

APS Fellow Mark H. Johnson's innovative research includes paradigm-changing work on how genes shape the development of neural networks early in life, as well as in-depth study of how the brain guides social and cognitive learning in typically and atypically developing children. Over

30 years, Johnson has mentored 38 PhD students, 33 postdoctoral researchers, and 10 independent research fellows.

But Johnson's mentoring impact does not stop at graduate students and postdocs. He has also advised new faculty on how to balance teaching, research, and administrative responsibilities to promote their own professional development and well-being. In nominating Johnson for the APS Mentor Award, APS Fellow Denis Mareschal says Johnson stands out as someone who listens to the needs of individuals and astutely helps them see what is in their best interest.

"He is able to give bad news (advice that we don't want to hear) as well as good news (advice that we are all too happy to hear)," Mareschal, Johnson's colleague at Birkbeck, writes. "He is also acutely aware that good people do not like to stand still. Mark was always looking to see how he could make people's careers continue to develop and move forward. This made him an invaluable mentor, but also an invaluable colleague who could help propel your career forward."

Johnson's colleagues and mentees say his remarkable scientific achievement may be outshined by his lasting achievements in fostering so many careers.

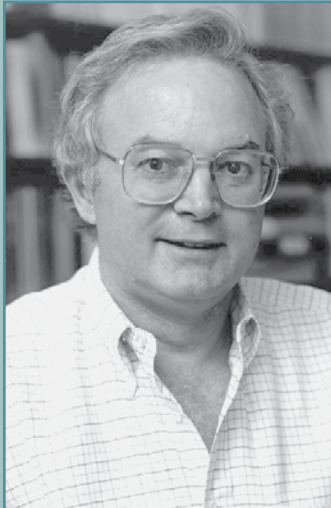
"Mark's scientific achievements are notable and praiseworthy in their own right, but to me his most important and lasting achievements lie in fostering the careers of so many, many others," says Rick O. Gilmore, who worked with Johnson as a graduate student and now sits on the faculty at Penn State University. "Mark Johnson is a towering intellect, a scientific leader, innovator, and entrepreneur, but he is also (and more importantly) a kind, thoughtful, and generous soul who has helped students and colleagues find their own voices and discover their own varied research and career goals." ●



*Geraldine Downey, Carol Dweck, and Marcia Johnson will reflect on their experiences as mentors during a panel discussion at the APS Annual Convention, May 23-26 in Washington, DC. Mark Johnson is unable to attend the convention, but will be with us in spirit.*

# Honoring John M. Darley

*The Princeton University faculty recently adopted a memorial resolution honoring APS Past President and William James Fellow John Darley, who passed away in August 2018. Darley served on the Princeton faculty for 44 years. He is widely known for his research, in collaboration with Bibb Latané, on bystander behavior in emergencies, and for his contributions to science across a vast range of areas, including morality and the law, the function of punishment, and energy conservation. The Princeton faculty resolution, passed by unanimous vote, is below:*



**John M. Darley**  
April 3, 1938 – August 29, 2018

This Memorial Resolution prepared by a special committee, was approved by unanimous rising vote at the meeting of the Princeton University Faculty on December 3, 2018 and ordered spread upon the records of the Faculty.

## **John M. Darley**

April 3, 1938 – August 29, 2018

John M. Darley, the Dorman T. Warren Professor of Psychology emeritus and Professor of Psychology and Public Affairs emeritus passed away on August 29, 2018. He was 80 years old.

A beloved colleague and mentor, John was one of the foremost scholars of social psychology in his or any generation. He came to Princeton from NYU in 1968 as an untenured associate professor and remained an active faculty member at Princeton for the next 44 years, transferring to emeritus status in 2012.

The theme of Darley's research was to understand how ordinary people deal with moral issues. He received international attention for his groundbreaking work on the factors that lead ordinary people to help — or not help — others in distress. Inspired by news reports that 38 witnesses had observed the murder of Kitty Genovese in New York City but none intervened to help, Darley set out to understand the social factors that led to such seemingly immoral unrespon-

siveness. He had an unparalleled knack for understanding the central issues in human decision-making and behavior and bringing those issues into the laboratory for scientific study. In a series of brilliant experiments at NYU and Princeton, Darley's work demonstrated that ordinary people, including college students, will accept the moral responsibility to intervene to help a person in need if they believe that they are the only witness to the emergency but will look the other way if they are in the presence of others. His decision tree theory of helping remains the seminal view of people's decisions to help those in need.

As his career progressed, Darley focused his attention on people's responses to wrongdoing by others. This led him to investigate the causes and consequences of wrongdoing in organizations and industry. It also led him to a multi-decade research program dedicated to understanding lay people's conception of the law and punishment. He argued that, in order to be effective, the legal system's use of incarceration for transgressions must be based on society's underlying moral motivations for punishing transgressors. Darley, along with his students and colleagues, devised innovative methods to increase our understanding of lay people's underlying motivations for punishment. He wrote persuasively on the need to establish new legal codes for wrongdoing that are consistent with how people view the purpose of legal punishment.



Although Darley was justifiably proud of his research accomplishments, he was especially proud of his role as a mentor and advisor to students and new faculty. He made it a priority to mentor his graduate students about science, about psychology, and about life. He spent countless hours with students, counseling them toward the PhD and beyond. He was a guiding hand nurturing them throughout their careers. As one of his former students phrased it, "He was a giant in the field but never made me feel small and he managed to balance the roles of friend and mentor perfectly." As a mentor to new faculty, he offered guidance with his characteristic humor and humility. Whether that guidance was about how to get to the heart of a theory, how to help a journal editor see the merits of a manuscript, or even how to help a baby sleep through the night, Darley clearly enjoyed the chance to help young faculty establish their careers — and their lives beyond them.

John Darley was born on April 3, 1938, in Minneapolis, Minnesota. After completing his BA at Swarthmore College, Darley entered the psychology department at Harvard University, receiving his MA in 1962 and his PhD in 1965. His first academic position was as assistant professor at New York University. It was there that he began his classic research studies on bystanders' responsiveness to others in need.

Darley's work justifiably earned him numerous awards. He received the Distinguished Scientist Award from the Society of Experimental Social Psychology and the William James Lifetime Achievement Awarded for Basic Research from the Association for Psychological Science. His appearances explaining his research on programs such NBC's *Dateline*, ABC's *20/20*, and on the BBC earned him the American Psychology Foundation Media Award for Distinguished Contributions in Communicating Psychology to the Public. Darley was elected Fellow of the

American Academy of Arts and Sciences, the Association for Psychological Science, the American Psychological Association, and the Society for the Psychological Study of Social Issues. In 2001, he served as President of the American Psychological Society.\*

At Princeton, Darley was the innovator of the modern social psychology program. He oversaw its development as it grew into one of the world's most prestigious programs. Darley served as Chair of the Psychology Department from 1980 to 1985.

John is survived by his widow, Genevieve Pere, his former spouse, Susan Darley, and two daughters, Leah and Piper, of whom he was immensely proud. He is also survived by his sister, Janet Griffith, and by three wonderful grandchildren.

Mr. President: For the Committee I move that this Resolution be spread on the records of the Faculty; that a copy be sent to his widow, Dr. Genevieve Pere, his former spouse, Dr. Susan Darley, his children, Lea Darley and Piper Darley, his sister, Janet Griffith, and to the Archivist of the University.

Respectfully Submitted by,

Joel Cooper  
Professor of Psychology

Sam Glucksberg  
Professor of Psychology, Emeritus

Stanley N. Katz  
Lecturer with the rank of Professor in Public and International Affairs,  
Woodrow Wilson School

Emily Pronin  
Associate Professor of Psychology and Public Affairs, Woodrow  
Wilson School

\* The former name of the Association for Psychological Science

*In 2001, John Darley authored an article for Current Directions in Psychological Science, reviewing his own and others' research on people's perceptions of justice. Below is an excerpt.*

“Fundamental questions often emerge as a research project progresses, and this happened in our work on the citizen's sense of justice. Why is it, when an actor knowingly commits an offense, that an observer feels the punishment is objectively required? What is the justification for punishment? Psychologists have been quite silent about this, although philosophers have suggested answers ... But what does the ordinary citizen take to be the justification for punishment of wrongdoing? This is perhaps the most intriguing remaining question about retributive justice.”

**Reference:**

Darley, J.M. (2001). Citizens' sense of justice and the legal system. *Current Directions in Psychological Science*, 10 (1), 10-13.



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## APS Award Address

# What Do Babies Have That Computers Don't?

*Linda B. Smith Explains What Infant Learning Could Mean for Machine Learning*

**T**echnology breakthroughs have enabled machines to recognize and respond to our voices, identify our faces, and even translate text written in another language. Despite all the research funding and venture capital that have been poured into these advances, artificial intelligence is still easily stymied in novel situations and remains limited in its grasp of natural language.

APS William James Fellow Linda B. Smith believes machine learning could transcend some of these shortcomings by mimicking the learning processes of infants and toddlers.

So what does a child have that a computer lacks? In her 2018 award address at the 30th APS Annual Convention in San Francisco, Smith explained how the sophistication of human visual learning enables babies to grasp the names and categories of objects in ways that are thus far unmatched in the world of artificial intelligence.

To illustrate, she used the example of a 2-year-old child seeing a John Deere tractor operating in a field for the first time.

"If the child watches that tractor work and is told, 'It's a tractor, it's a tractor, it's a tractor,' it's highly likely that from that point forward that 2-year-old will recognize all varieties of tractors — Massey Fergusons, antique tractors, ride-on mowers — but will not consider a tank or a backhoe to be a tractor," she said.

In developmental psychology, this phenomenon is known as the shape bias — the tendency to generalize information about objects by their shapes rather than by their colors, sizes, or other physical attributes. In the machine-learning literature, that same phenomenon is known as one-shot category learning — the ability to take information about a single instance of a category and extrapolate it to the whole category.

Children are not born with this one-shot ability; they learn it within their first 30 months of life, developmental studies have demonstrated. Smith, principal investigator at Indiana University Bloomington's Cognitive Development Lab, is among researchers who have studied training exercises that can encourage the shape bias to emerge 6 to 10 months earlier than normally expected.

The exploration of early language development, Smith explains, centers on the two parts of the learning process: the training data and the mechanisms that do the learning.

"The data for learning, the experience on which visual category learning occurs in infants, is fundamentally different from the experiences that are used in machine learning to train



The data for learning, the experience on which visual category learning occurs in infants, is fundamentally different from the experiences that are used in machine learning to train computer vision — and from the experiences that are used in experimental psychology studies of learning.



Linda B. Smith

computer vision — and from the experiences that are used in experimental psychology studies of learning," Smith said.

Those differences, she said, may help explain why the human visual system is so sophisticated, and why babies "can learn object names in one shot."

### From the Eyes of Babes

Smith has employed a variety of methods to study linguistic development and object learning. But one of her best-known approaches is the use of head-mounted video cameras, eye trackers (typically embedded in a hat or headband), and motion sensors to view a child's visual world from his or her own point of view. The bulk of this work is being conducted through the Home-View Project, an initiative that Smith and her Indiana University colleague Chen Yu developed with support from the National Science Foundation.

The Home-View Project has collected nearly 500 hours of video involving more than 100 babies, who range in age from 3 weeks to 24 months, as they go about their daily lives at home. The data collected to date show that babies learn a massive amount of information based on just a few faces, objects, and categories, with that learning changing at different points in time. They generate their own data for learning based on how



they move and position their bodies. In the first few months of life, when they possess little control of the head and body, they're mainly seeing the faces of their parents and caregivers. But as they approach their first birthday, they focus more of their attention on hands and objects.

In all these domains, they learn a lot about a few specific things — their mother's face, their sippy cup, the family dog. At the same time, they're learning “a very little about lots and lots of other stuff,” Smith said.

Her recent experiments indicate that babies learn the names of objects based on the prevalence of those objects in their visual world. In one study, the results of which were published in 2016, Smith and her team of researchers examined videos that showed the visual field of babies ages 8 to 10 months. The children wore the cameras at home for an average of 4.4 hours per day.

The researchers focused their observation on hours of mealtime scenes, Smith explained.

“We counted as mealtime any event that had food or dishes in it,” she said. “If a dog was eating, that's a mealtime. Cheerios on the living room floor — mealtime.”

Although most scenes were cluttered, a few objects (e.g., a chair, a spoon, a bottle) were the most frequent items in the child's visual experience. And with this approach, the researchers could identify when the children learned names for object categories and individual objects. Results showed that the first nouns the children learned centered on the objects they saw most consistently.

“This suggests to us that visual pervasiveness itself — day in, day out, hours upon hours, from many different viewpoints — may be critical to visual learning about objects, to building segmentation, to finding things in clutter, to building strong

visual memories so that you can eventually get a word attached to them,” Smith says.

## The World in Their Hands

Her experiments are also examining how babies' visual experiences with contrast and light change over time, and how the eventual experience of engaging objects with their hands factors into their object-name learning. By the time infants reach their first birthday, they're beginning to control what they see by handling objects, not just looking at them.

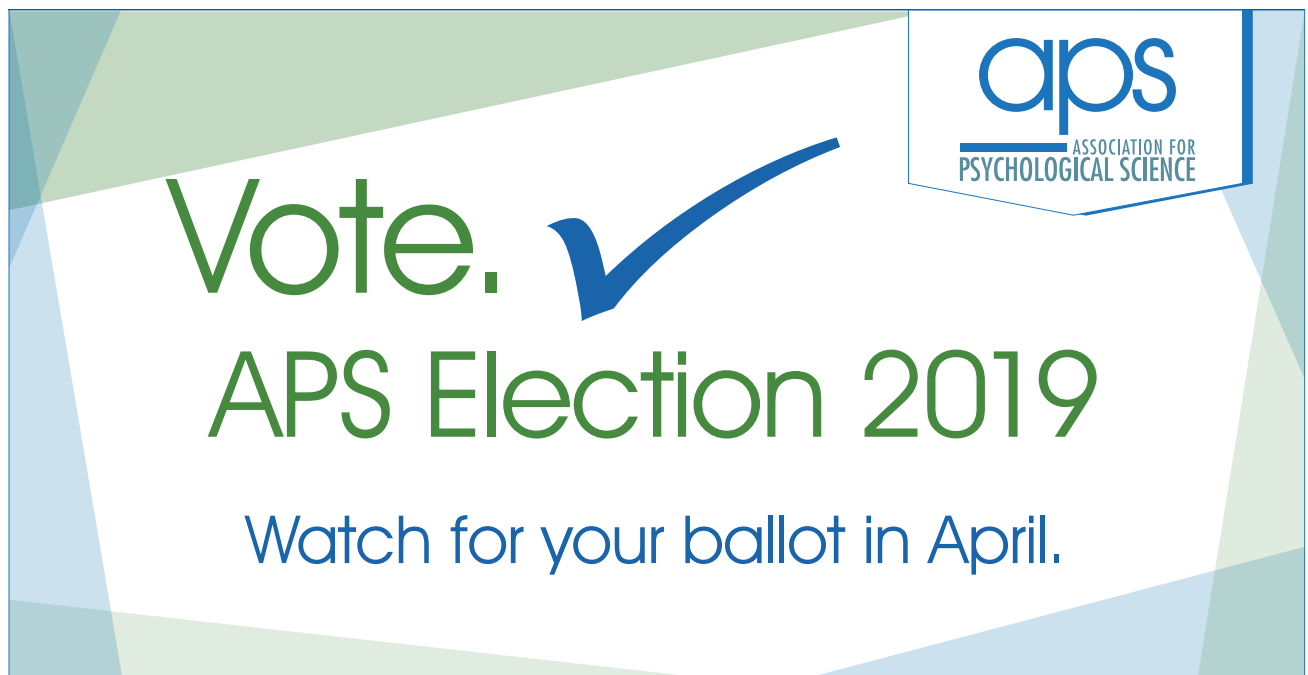
“By holding [an object], looking at it, and mom naming it for them, toddlers create clean images of single objects that dominate in the scene,” Smith said. “When parents name objects at those clean moments, the child is much more likely to learn the object name.”

Smith's research is now examining the roles that culture and socioeconomics play in these processes. A parallel Home-View Project in India, for example, is working with children in a remote village that lacks electricity.

The research has left Smith confident that machines may indeed become one-shot category learners if they're simply fed infant head-camera images. Understanding the roles of environment and visual experiences also could lead to new interventions for children with conditions such as autism spectrum disorder, which are associated with language and visual learning deficits.

“Could we alter the developmental outcomes for children,” she asked, “by providing differently structured day-in and day-out data for learning, giving them a workaround if something's amiss?” ●

To see a video of Linda B. Smith's Award Address, go to <https://www.psychologicalscience.org/lindabsmith>



The banner features a white background with green and blue geometric shapes. The text is centered and reads: "Vote. ✓ APS Election 2019 Watch for your ballot in April." In the top right corner, there is a logo for the Association for Psychological Science (APS) with the text "aps ASSOCIATION FOR PSYCHOLOGICAL SCIENCE".



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## PLENARY SESSIONS

MUST-SEE SCIENCE — ONLY AT APS

### Fred Kavli Keynote Address

Becoming Human:  
A Theory of Ontogeny



**Michael Tomasello**

Duke University and the Max Planck Institute  
for Evolutionary Anthropology, Germany

### Saturday Keynote Address

How to Change Norms,  
and Why We Should



**Betsy Levy Paluck**

Princeton University

## Register Today

### Presidential Symposium

Psychological Science Overlaps the Arts



**Barbara Tversky (Chair)**

Teachers College, Columbia University  
and Stanford University

**Jonathan Berger**  
Stanford University

**Andrea Kantrowitz**  
State University of New York at New Paltz

**David Kirsh**  
University of California, San Diego

**Jeffrey M. Zacks**  
Washington University in St. Louis

# CROSS-CUTTING THEME PROGRAMS



## ARTIFICIAL INTELLIGENCE AND PSYCHOLOGICAL SCIENCE

**Leslie Kaelbling**  
Massachusetts Institute of Technology

**David Sussillo**  
Google Brain

**Nikolaus Kriegeskorte**  
Columbia University

**Josh Tenenbaum**  
Massachusetts Institute of Technology



## ME, MY PHONE, AND I

**Tracy A. Dennis-Tiwary**  
Hunter College, The City  
University of New York

**Eiman Kanjo**  
Nottingham Trent University,  
United Kingdom

**Arko Ghosh**  
Leiden University, Netherlands

**Ethan Kross**  
University of Michigan



## PSYCHOLOGICAL SCIENCE AND POLICY

**David Clark**  
University of Oxford, United Kingdom

**Karina Davidson**  
Columbia University

**Christina A. Roberto**  
University of Pennsylvania

**Linda Steg**  
University of Groningen, Netherlands

**Elke Weber**  
Princeton University

**David Yokum**  
Brown University

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# AWARD PROGRAMS

## James McKean Cattell Fellow Award Addresses



**PTSD, Resilience, and Everything in Between: Mapping the Heterogeneity of Potential Trauma**

**George A. Bonanno**  
Columbia University



**Sensory Technology as Target and Tool for Applied Psychological Science**

**Roberta L. Klatzky**  
Carnegie Mellon University



**What I've Learned About Psychology by Collaborating With Non-Psychologists**

**Robert J. MacCoun**  
Stanford Law School

## William James Fellow Award Addresses



**Prisoners of Now: Prospection, Presentism, and the Allocator's Illusion**

**Daniel T. Gilbert**  
Harvard University



**Taking James Seriously: The Implications of Multiple Memory Systems**

**Lynn Nadel**  
The University of Arizona



**The Impact of Everyday Emotion**

**Elizabeth A. Phelps**  
Harvard University



**How Babies Begin Learning Their Native Language**

**Janet F. Werker**  
University of British Columbia, Canada

## APS Mentor Awards and Panel Discussion on Mentoring

Chair: Robert W. Levenson,  
University of California, Berkeley

### 2019 APS Mentor Awardees:



**Geraldine Downey**  
Columbia University



**Carol S. Dweck**  
Stanford University



**Marcia K. Johnson**  
Yale University



**Mark H. Johnson\***  
University of Cambridge and Birkbeck  
University of London, United Kingdom

\*Mark H. Johnson is unable to attend the Convention

## APS Janet Taylor Spence Award Symposium

Chair: Lisa Feldman Barrett  
Northeastern University

The new class of Spence Award recipients will receive their awards during this symposium. The event will also feature presentations by the following past Spence Award recipients:

**Catherine Hartley**  
New York University

**Kurt Gray**  
University of North Carolina at Chapel Hill

**Iris-Tatijana Kolassa**  
University of Ulm, Germany

**Thomas L. Griffiths**  
Princeton University

# SPECIAL EVENTS



**Lee D. Ross**  
Stanford University

**Interviewed by: Andrew Ward,**  
Swarthmore College

One of the world's leading scientific authorities in the field of human inference, judgment, and decision making will look back on his distinguished career in an interview with his former student, Swarthmore College professor Andrew Ward. Be part of the live studio audience for this special event.

## Clinical Science Forum

Organized by the Psychological Clinical Science Accreditation System (PCSAS) and the Academy of Psychological Clinical Science (APCS)

- [The Rising Stars of Depression Research](#)
- [Cutting-Edge Training in Clinical Science](#)
- [New Developments in the Clinical Science of Behavior Change](#)

### Organizers:

**Alan Kraut**  
Psychological Clinical Science  
Accreditation System

**Robert W. Levenson**  
Psychological Clinical Science  
Accreditation System and the  
University of California, Berkeley

**David A. Sbarra**  
Academy of Psychological  
Clinical Science and the  
University of Arizona

## PSPI Symposium\*

### Increasing Vaccination: Putting Psychological Science Into Action

**Valerie F. Reyna (Chair)**  
Cornell University and Editor:  
*Psychological Science in the Public Interest*

**Noel T. Brewer**  
University of North Carolina

\* This annual symposium features recent reports  
in the APS journal *Psychological Science in the Public Interest*.

**Gretchen B. Chapman**  
Carnegie Mellon University

**Melinda Wharton**  
Centers for Disease Control and Prevention

**William M. Klein**  
National Cancer Institute

## Hackathon

### Best Research Practices Made Easy

**Kelci Harris**  
Washington University in St. Louis

**Emorie Beck**  
Washington University in St. Louis

**Lorne Campbell**  
University of Western Ontario, Canada

**Jessica Flake**  
McGill University, Canada

**Eiko Fried**  
Leiden University, Netherlands

## How People Learn II: Learners, Contexts, and Cultures

### Consensus Study Report of the National Academies of Sciences, Engineering, and Medicine

**Margaret E. Beier**  
Rice University

**Robert Goldstone**  
Indiana University

**Arthur C. Graesser**  
University of Memphis

**Ruth Kanfer**  
The Georgia Institute of Technology

**ZewelANJI N. Serpell**  
Virginia Commonwealth University

## SPECIAL EVENTS

### APS-David Myers Distinguished Lecture on the Science and Craft of Teaching Psychological Science

Leading Students Toward  
Contribution to Society  
Carol S. Dweck  
Stanford University



## STUDENT EVENTS

Meet fellow student scientists, converse with leaders in the field, and get guidance on the next steps of your budding career in psychological science. Learn more at [www.psychologicalscience.org/studentevents](http://www.psychologicalscience.org/studentevents)

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### The Naked Truth Part II: Surviving Graduate School

Learn the necessary survival skills to succeed in graduate school.

### The Naked Truth Part III: Navigating the Job Market After Graduate School

Get answers to your questions about finding your first post-grad position.

### The Naked Truth IV: You're Working Where?

Hear from psychological scientists who pursued careers off the beaten path of academia.

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A unique opportunity for students to talk in an informal setting with some of the most respected and well-known scientists in psychology.

### How to Get Published

Editors from top journals will give valuable advice and be available to answer questions.

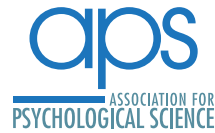
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# A PRESCRIPTION FOR CHANGE

## RESEARCH ON LEARNING IS TRANSFORMING THE SCIENCE OF ADDICTION

**A**midst the ongoing opioid epidemic in the United States, the assertion that “addiction is a disease” continues to dominate the public discourse surrounding substance use and drug policy. While the brain disease model of addiction is often credited with clearing the way for a more empathetic approach to treating and policing drug use, the work of many psychological scientists suggests that addiction may arise from the same basic psychological mechanisms that allow us to discover a passion for jogging, adapt to our environment, and feel loved.

When studies conducted in the 1960s indicated that lab rats would self-administer drugs even until death, many researchers took it as evidence of the inexorable appeal of substances like morphine and heroin. A decade later, Bruce Alexander’s series of “rat park” experiments at Simon Fraser University in British Columbia, Canada would turn this claim on its head.

Alexander’s rats, which were kept isolated in small metal

cages with little else to do beyond sleep, eat, and wait, also filled their time by consuming large quantities of drugs. Not so for rats raised in a less traditional lab environment, however. Free to roam within the walls of a large plywood box painted with a forest scene and filled with others of their kind, more often than not the rats chose running in an exercise wheel, climbing wooden towers and tin cans, mating, and bonding with offspring over the temptation of a morphine drip. And when they did choose to partake, the social rats consumed far less than their isolated counterparts.

“They forgot to tell us the importance of the environment,” behavioral neuroscientist Carl Hart, chair of the Department of Psychology at Columbia University, said of earlier addiction studies. “They forgot to tell us that the rats or primates only had that lever leading to the drug administration, and if that’s the only thing they have in that cage, why are we surprised that’s the activity in which they engaged?”

Since learning about the findings of these early addiction studies as an undergraduate student at the University of Maryland

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By **Kim Armstrong**, *APS staff writer*

## The Learning Model of Addiction

Changing the way society conceives of drug use requires dismantling the popular notion of addiction as a disease, Hart said. And Marc Lewis, professor emeritus of developmental psychology at the University of Toronto, agrees.

The moral model of addiction, which depicts addiction as a self-indulgent character flaw, dominated Western society's conceptualization of addiction throughout much of the 1900s, Lewis explains in his book, *The Biology of Desire: Why Addiction Is Not a Disease*. When Alcoholics Anonymous was founded in 1935, a comparatively compassionate framework began to take root: "addiction was a malady rather than a personal failing."

Contemporary supporters of the disease model of addiction — including neuroscientist Nora Volkow, director of the National Institute on Drug Abuse — suggest that addiction is not so different from other medical conditions, such as heart disease and lung cancer. All of these conditions have physiological manifestations that can, at least in part, be addressed by adopting a healthier lifestyle.

Addictive substances hijack the reward system of the brain, Volkow said during a 2018 debate with Lewis at the University of Amsterdam, by artificially increasing the supply of dopamine to the nucleus accumbens and related regions, creating the pattern of conditioned responses that we know as addiction. This causes neurobiological changes in brain circuits involved in processing reward value and emotion, just as heart disease results in physiological changes to patients' cardiovascular systems, she continued.

The disease model of addiction has played an essential role in the creation and passage of public policies such as the Mental Health Parity and Addiction Equity Act of 2008, Volkow and colleagues wrote in *The New England Journal of Medicine*.

While the disease model may help reduce the stigma surrounding substance abuse and lower the barriers to treatment, the concept that addiction arises from pathological dysfunction in the brain remains problematic, Lewis wrote recently, also in *The New England Journal of Medicine*.

According to the learning model of addiction, Lewis explained, addiction is an unintended consequence of normal, adaptive brain processes.

Difficult circumstances such as living in poverty, experiencing childhood neglect, and going through unemployment or a painful divorce — all correlated with addiction — can make people vulnerable to taking substances that offer immediate rewards and intense emotional experiences, he continued. Over time, this bias toward short-term rewards outweighs the perceived value of more abstract long-term rewards.

"It's this kind of closing in to the immediate space, what's right here and right now," Lewis said.

## Drug Use as Motivated Behavior

Two years into retirement, Lewis — who quit using opioids himself over 30 years ago — continues to hear from people who have stopped using drugs or alcohol. Instead of viewing themselves as in remission from the lifelong disease of addic-

in the 80s, Hart — an advocate for science-based drug policy who's appeared everywhere from "Real Time with Bill Maher" to "The O'Reilly Factor" — has extended Alexander's rat park findings to human participants. When offered a choice between \$5 at the end of a study and a hit of crack cocaine worth more than \$5 right then and there, only half of people known to be addicted to cocaine chose the drug, Hart said. In a similar study of 13 recreational methamphetamine users, participants abstained at even higher rates, choosing \$5 over self-administering drugs 59% of the time over the course of five 2-day trials. When the incentive was raised to \$20, they chose the substance over cash in just 17% of trials.

These findings, while observed in a small pool of participants, suggest that providing people with attractive alternatives removes much of the incentive to use, Hart said. Extrapolated to the real world, alternatives might not only increase access to meaningful employment and mental healthcare for individuals with substance use issues, but could also change the way society conceives of drug use.



Understanding why people use drugs — identifying the function they serve for a specific person in a given moment — is central to creating more effective prevention and intervention strategies. ”

Cătălina Köpetz

tion, a label that carries its own stigma, many former addicts tell Lewis they would rather think of themselves as being free, often through their own efforts and empowerment. Addiction is no longer a prominent feature of their identity, and they do not see themselves as having to work to control it.

Subjective experience has a meaningful role to play in informing the psychological and neurobiological understanding of addiction, he said.

Cătălina Köpetz, a professor of psychology at Wayne State University who began studying addiction as an extension of her basic research on self-regulation, agrees.

“My greatest inspiration came from talking to people, real addicts with real problems. Drugs were rarely their problem,” she said.

One interesting aspect of behavior is that, over time, activities that are initiated because they serve a goal might become goals themselves. If someone starts running with the goal of losing weight, for example, the act of running itself can become and remain a desirable end state even after the original goal of losing weight has been achieved. Similarly, one might start smoking or using drugs to fit in with a social group or to alleviate negative affect. If the behavior is perceived as instrumental to achieving a goal, the person will continue to engage in it every time the goal is active and important. Over time, the behavior becomes associated with positive affect and can drive the behavior in the absence of the original goal.

Although the pharmacological properties of many drugs may cause this transfer of properties from means to goals to happen

more quickly, Köpetz explained, addictive behavior is generated the same way.

“Other than that, I don’t see any difference between drug use and other motivated behavior,” Köpetz said.

In a study of 66 people with symptoms of depression who wanted to quit smoking, Köpetz and colleagues investigated how individuals addicted to nicotine could find alternative means for satisfying the goal of improving their mood. Participants in all conditions viewed 200 images and phrases that were either related to smoking, contained neutral content, or represented alternative activities (such as playing with a child).

In the experimental condition, participants learned to “avoid” smoking related images by pushing a joystick away from themselves and to “approach” images of alternative activities by pulling the joystick toward them. For those in the control group, the direction in which they moved the joystick was not contingent on the type of activity.

At the end of the study, the researchers asked the participants to quit smoking. At a follow-up appointment 30 days later, smokers who were trained to activate alternative means of coping with negative affect were 12% less likely to have relapsed; those who did relapse reported smoking fewer cigarettes and a longer cessation period.

Addictive substances, as Lewis said, may lead to a closing in on the “neural now” of instant gratification, but Köpetz’s participants were able to achieve observable, if modest, success at cutting back on smoking by weakening the function that smoking was presumably serving and replacing it with alternative activities.

Understanding *why* people use drugs — identifying the function they serve for a specific person in a given moment — is central to creating more effective prevention and intervention strategies, Köpetz said.

“In my experience, people use drugs to achieve fundamental goals: to fit in, to alleviate social and physical pain,” Köpetz said. “What we need to do is to help people find other ways to achieve these goals by establishing meaningful social connections or by engaging in activities that would provide a meaning in life, a way to feel significant and appreciated so that they don’t end up resorting to drug use.”

As long as scientists, practitioners, and policymakers continue to treat addiction as an aberrant phenomenon by pathologizing it as a disease rather than acknowledging its behavioral functionality, Köpetz said, prevention and intervention strategies will continue to be ineffective.

## A Delicate Balance

Designing effective prevention programs is uniquely challenging given legitimate and “off-label” use of opioids such as Vicodin, OxyContin, and Percocet, said Genevieve Dash, clinical psychology researcher at the University of Missouri.

For pediatric patients, opioids are considered approved treatments for sickle cell disease, postoperative pain, and pain due to cancer. A nationally representative survey of 7,374 participants found that almost 20% of high school students had received an opioid prescription by their senior year, Dash and coauthors Anna Wilson, Benjamin Morasco, and Sarah Feldstein Ewing of



Oregon Health & Science University note in an article published in *Clinical Psychological Science*.

The survey data, collected by Sean Esteban McCabe (University of Michigan) and colleagues as part of the annual Monitoring the Future study, suggests that nearly one out of four US students surveyed between 2007 and 2009 had used prescription opioids for medical or nonmedical purposes by the time they were ready to graduate from high school. And other data suggest that usage may be much higher in some areas — in a study of the Detroit metropolitan area, for example, 49% of high school students reported medical opioid use in their lifetime.

Initiating opioid use under the assumption that it is safe because the drug is provided by trusted adults (e.g., doctors, parents) and because it is endorsed as a necessary or routine part of medical treatment can create the perception that opioids are low-risk substances, increasing the potential for future misuse even among youth who report strongly disapproving of drug use in general, Dash said.

Older, insured, European-American youths whose parents report them as being in fair to poor health receive the most opioid prescriptions, she continued. In the Monitoring the Future study, about 23% of White students had been prescribed opioids in their lifetime compared with just 7% of African American students and 7% of Hispanic students, with reported rates of misuse mirroring these percentages.

This may be due in part to the erroneous yet persistent perception that African American individuals have a higher pain threshold and have less need for pain relief, as well as implicit bias on the part of healthcare providers, she said.

Providers have to strike a balance between effective pain management and undertreatment of pain, which can lead patients to seek out illicitly obtained opioids and other alternatives for pain relief, such as alcohol, she said. Educating patients (and their parents) about nonpharmacological pain management strategies, as well as how to taper opioid use and the risks of saving leftover medication “just in case,” offer additional avenues for reducing opioid misuse.

“Psychologists working in medical settings are in a unique position to provide input on policies and guidelines that can reduce risk for misuse and abuse,” Dash and colleagues wrote.

When considering treatment options, it’s also important to understand the role that naturally-occurring opioids play in brain function, said Tristen Inagaki, a professor of psychology at the University of Pittsburgh.

In one study highlighted in *Current Directions in Psychological Science*, 31 participants took naltrexone, an opioid inhibitor used to reduce cravings in people recovering from addiction, and placebo. While on each drug, the participants read loving messages from friends and family, and completed daily reports on their feelings of social connection.

Participants reported fewer feelings of connection — in response to the loving messages and in their daily lives — on naltrexone than on the placebo, suggesting that opioid activity in the brain may be at least partially responsible for the pleasur-

able feelings associated with social bonding, Inagaki explained.

Given that social stressors are among the most common causes of addiction relapse, she said, this may have implications for the clinical use of opioid inhibitors in addiction recovery programs.

“Socially supportive relationships are really important for helping recovery and maintaining abstinence, but if an unintended side effect of pharmacological treatment is also reducing how connected you feel to those people or how supportive you perceive them to be, that’s introducing potentially a significant additional barrier to recovery,” Inagaki said.

It’s not clear if opioid drugs themselves enhance or simply replace those feelings, she continued, but treatment programs that employ pharmacological interventions like naltrexone may need to address how people in recovery can maintain feelings of social connection while their opioid activity is repressed. ●

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# Unearthing Interdisciplinary 'Gems' in Addiction Research

**A**t a time when legislators are questioning the extent to which state appropriations should be covering the costs of higher education, an innovative research program at Indiana University (IU) is demonstrating the role university-generated scientific research can play in addressing important real-world issues. IU's Responding to the Addictions Crisis Grand Challenges are bringing the work of psychological scientists out of the ivory tower and into scientists' communities, said APS Fellow Bill Hetrick, chair of IU's psychological and brain sciences department.

The \$50 million partnership between IU and the Indiana governor's office was announced in October 2017. Since then, the first phase of the Grand Challenges has funded a range of projects focused on data analysis, education, policy, addiction science, and community development. Highlights include a series of policy simulations modeling the impact of potential legislation on substance abuse and a social network analysis of doctor shopping designed to identify narcotic "hubs" where doctors may be inappropriately dispensing addictive compounds.

"It's very important for universities to position themselves to make sure the intellectual capital of the university can be, at least in part, captured to effect change and progress on major societal problems," said Hetrick, a member of the Grand Challenges steering committee who studies the cognitive neuroscience of schizophrenia and substance use.

The opioid epidemic is central to the addiction crisis gripping the United States, said Hetrick, but it's far from the only issue in play — in many states, including Indiana, cigarette smoking, alcohol abuse, methamphetamine use, and the possibility of legalizing marijuana for medical and recreational use are all grabbing attention.

## Across the Campus and State

These interdepartmental and interdisciplinary collaborations involve contributors from across IU's schools of medicine, informatics and computer science, law, public health, and education, as well as healthcare practitioners and criminal justice professionals throughout Indiana, and more than a few psychological scientists.

"It's great to have new faces at the table and at the same time it's a challenge to bring them up to speed with regard to the addiction literature," Hetrick said. "There's a lot of learning, a lot of being willing to sit down and work through differences in order to work effectively together to address a pressing societal challenge."

In one of these collaborations, APS Fellow Brian D'Onofrio, a professor of psychology and director of clinical training at IU,

works with colleagues at IU and the University of Chicago to test an online substance use and mental health-risk screening tools in courts, hospitals, and mental health facilities throughout Indiana. In contrast to a set questionnaire, computer-adaptive testing allows an algorithm to select the best questions to use in an assessment based on each user's previous responses.

People with conditions such as depression, anxiety, and existing substance-use disorders are more likely to receive a long-term prescription for chronic pain or injury, D'Onofrio explained. Providing doctors with a fuller picture of their patients' mental health can help them tailor treatment based on addiction risk.

Additionally, he noted, the digital interface can help reduce staff burden because it can be administered online or via a tablet instead of face-to-face by a practitioner.

D'Onofrio, whose previous research has focused on the role of childhood adversity and genetics in developmental psychopathology, said the Grand Challenges have opened up a new line of research for him.

"I'm coming to a realization that we need to start intervening and doing better assessment in real-world settings if we really want to reduce the burden of behavioral health problems," D'Onofrio said. "The problems are so large that we are going to need a multifaceted approach."

## Research in the Fast Lane

In addition to offering opportunities for cross-collaboration and graduate training, the Grand Challenges allow researchers to dive into the research process much more quickly than they would if they were funded by more traditional grants, said Ken Mackie, a professor of psychological and brain sciences at IU. Mackie, who researches how the social and therapeutic use of cannabis influences the endocannabinoid system of the brain, serves on the Grand Challenges scientific leadership team, cochairing the basic, applied, and translational research pillar.

In the traditional grant application process, he said, going from idea to grant submission to funding in 9 to 10 months is considered swift progress. On the other hand, researchers who submitted applications for the first phase of Grand Challenges funding in June 2018 were funded in October — a 4-month turnaround.

The Grand Challenges also offer an opportunity for researchers to propose ideas that are "a little more out of the box," Mackie said.

"Not everything is going to be successful, but out of some of those things you're going to find real gems," he said. ●

# Harnessing the Power of the Mind for Pain Relief

**H**umans are hardwired to avoid and escape pain. It's there to help us survive, signaling an imminent threat that we need to evade.

But when pain becomes chronic, those danger signals don't stop ringing. People aren't born equipped to manage that kind of daily distress — making opioids an attractive, and often necessary, option. But research by psychological scientist Beth Darnall suggests that we may be able to learn to dampen these alarms ourselves through cognitive behavioral therapy (CBT).

Pain is both a sensory and an emotional experience, says Darnall, a professor of anesthesiology, perioperative and pain medicine at Stanford University. Persistent, negative cognitive responses to actual and anticipated pain have been shown to directly amplify pain processing in the brain, she explains, and can actually cause the nervous system to become more sensitive to pain over time.

But CBT, an established treatment for anxiety and depression with a robust evidence base, can also be employed to help patients curb the brain's natural tendency to focus on pain. This tendency, coupled with a sense of helplessness, can cultivate neural patterns that exacerbate experiences of pain, a phenomenon known as "pain catastrophizing."

Darnall's ongoing Effective Management of Pain and Opioid-Free Ways to Enhance Relief (EMPOWER, <https://empower.stanford.edu/>) study aims to cut patients' prescriptions in half, but reducing opioid use is just the beginning — more importantly, she wants to equip patients with the tools to master chronic pain and regain control of their lives.

After receiving \$8.8 million in funding for the EMPOWER study from the Patient-Centered Outcomes Research Institute (PCORI) in September of 2017, Darnall and her team began recruiting chronic pain patients interested in voluntarily reducing their use of opioids.

## Personalized Tapering

Unlike the forced opioid tapering patients are sometimes faced with in clinical settings, the EMPOWER study asks participants to gradually reduce, but not eliminate, opioid use over a 12-month period. All participants, including those in the control group, work with an EMPOWER prescriber to develop a personalized prescription opioid tapering plan for their pain condition, whether it be low back pain, fibromyalgia, migraines, or any other pain condition.

Meanwhile, those randomized to the two experimental groups receive either 8 weeks of pain-CBT led by mental health-care professionals or participate in 6-week chronic pain self-management groups led by peer leaders who have experienced chronic pain themselves.

By 2022, nearly 900 patients across six sites in California, Arizona, Utah, and Colorado are expected to have participated in the EMPOWER study, but they're far from the only people with chronic pain involved in the project, Darnall said. As a PCORI funded trial, the EMPOWER study has people with lived experience with chronic pain on its leadership team and study advisory board, and has involved patients throughout the study design process, from selecting the study outcomes to crafting weekly and monthly questionnaires that track participant well-being.

"The benefit of integrating the patient voice so carefully and strongly into the study is that we believe it will best assure that our results will be meaningful to patients," Darnall says. "Our methods will be broadly acceptable to patients, and therefore more widely adopted."

## Reframing the Pain

The EMPOWER study builds on a series of uncontrolled pilot studies, including a 2014 trial of 57 patients at the Stanford Pain Management Center. There, Darnall and colleagues offered participants a clinician-led 2-hour single session of pain-CBT consisting of two parts: First, participants were taught how pain functions as a "sensopsychological experience," and then they were taught skills that can be used to self-treat it. These skills included techniques to restructure and reframe pain catastrophizing thoughts, deep breathing exercises, and progressive muscle relaxation.

Compared with baseline, patients surveyed at 2 and 4 weeks post-intervention reported significantly lower levels of rumination, magnification, and helplessness on the pain catastrophizing scale, a measurement that helps quantify an individual's pain experience. This suggests that even a single session of pain-CBT may offer chronic pain patients some measure of relief, Darnall wrote in the *Journal of Pain Research*. Darnall is currently investigating the efficacy of single-session pain-CBT in a randomized controlled trial, which is set to be completed in 2020.

In another study of 51 patients with chronic pain, Darnall found that patients were able to reduce their daily opioid dose from an average of 288 mg to 150 mg after just 4 months on an individualized prescription-tapering plan, without an increase in their self-reported pain intensity. Patients worked closely with their physician to address any anxiety or fear about tapering. The methods of this pilot suggest that outpatient opioid-tapering outcomes are enhanced by patient-provider partnerships that carefully attend to patients' needs, such as pausing the taper if desired.

The EMPOWER study aims to test these findings over the long-term by harnessing the power of the placebo effect — a term Darnall said is unfairly maligned.



“There’s a negative connotation around placebo as if it means ‘fake,’ but that’s not actually what it means,” she says.

While the term is often used to dismiss untested, if not predatory, “alternative” medical practices, the placebo effect really just refers to a patient improving because they believe something, whether a sugar pill or a therapeutic intervention, will be beneficial, Darnall explained. Similarly, a patient in the same circumstances as another on paper can experience a nocebo effect if they perceive an element of their treatment to be harmful.

For chronic-pain sufferers who are considering tapering off opioids, these kinds of “nonspecific factors” could mean the difference between making an empowered choice or being backed into a corner.

“When patients believe and trust and feel supported, they do better,” Darnall says, “and at the end of the day that is what we care about.”

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# The Science of Behavior Change

Behavioral factors are central to many public health challenges, including tobacco use, obesity, and cancer, so it's no surprise that changing behavior has the potential to improve health. But what are the scientifically proven ways to encourage that behavior change? Scientists will share answers to that question at the APS Annual Convention in Washington, DC in an event organized by the Science of Behavior Change Research Network (SOBC).

SOBC, an initiative funded by the National Institutes of Health (NIH), is coordinated by the Columbia University Medical Center, which oversees participating sites located across the United States. Representatives from NIH, Columbia, and participating sites will lead a special session on Friday, May 24 highlighting the mechanisms of self-regulation and behavior change.

“Attendees from all stages of career development — from students to senior faculty — will find something to glean from attending the SOBC research symposium and round table

event,” says psychological scientist Jennifer Sumner, SOBC co-investigator and co-chair of the special event.

“During the research symposium, scientists will describe how they are using the SOBC experimental medicine approach to engage mechanisms of self-regulation in order to promote successful behavior change. These ‘lightning talks’ will distill key aspects of this research and provide attendees with rich snapshots of these innovative research projects. Then, during the round table event, attendees will get to hear perspectives from a variety of key players in the SOBC Research Network, including scientists and NIH representatives,” says Sumner.

Attendees interested in learning more about how to incorporate the SOBC method and resources into their research will have a chance to talk individually with scientists and NIH program officers following the round table.

**2:30 PM - 4:30 PM | Friday, May 24**

## Mechanisms of Self-Regulation and Behavior Change

Psychological scientists are increasingly adopting mechanism-focused approaches to behavior change science in order to address the substantial disease burden caused by maladaptive behaviors. This symposium features talks from leading scientists on mechanisms of self-regulation and how they can be engaged to induce sustainable behavior change, followed by a panel discussion.

### Chairs:

- Lis Nielsen, National Institute on Aging
- Jennifer Sumner, Columbia University Medical Center

### Speakers:

- Alison Miller, University of Michigan
- Karolina Lempert, University of Pennsylvania
- Patrick Bissett, Stanford University
- Jeff Stein, Virginia Tech
- Karen Seymour, Johns Hopkins

**4:30 PM - 5:30 PM | Friday, May 24**

## How to Promote Lasting Change: A Round Table Discussion on the NIH Science of Behavior Change (SOBC) Common Fund Program

NIH encourages the use of a mechanism-focused experimental medicine approach to identify and engage mechanisms underlying behavior change. In this informal, interactive roundtable event, NIH representatives and researchers discuss this approach and highlight future directions. Those wishing to incorporate behavior change tools, methods, or principles into their research should attend.

### Chairs:

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### Speakers:

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- Jeff Stein, Virginia Tech
- Karen Seymour, Johns Hopkins University
- Jonathan King, National Institute on Aging
- Janine Simmons, National Institute of Mental Health
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# Where Psychology Majors Work

By Tyler S. Lorig

All of us involved in undergraduate education go to great lengths to ensure our curriculum provides training in the content, methods, critical thinking, and communication skills appropriate for a major in the science of psychology. But despite that training, neither employers nor psychology students presume they have the skills important for success in the world of work. In a 2012 paper, educational psychologist Todd Haskell (Western Washington University) and colleagues pointed out how this irrational belief persists, with negative consequences for our field and our students — particularly when it comes to their career choices and the opportunities they seek. According to the Bureau of Labor Statistics, the five most common jobs for bachelor-level psychology graduates age 35 and under are (most to least): social work, elementary/middle school teaching, counseling, management, and nursing.\*

Those jobs are essential in our society, and we need to continue serving students with those interests. But there are so many other types of jobs for which our students are well prepared. Why aren't they being employed based on the many skills they have developed as a psychology major? For instance, few undergraduate majors on any campus require more preparation in statistics or questionnaire development than psychology. Those skills are highly valued by any employer with a website. Why aren't our students getting jobs that make greater use of those skills?

In fact, many new types of jobs would benefit substantially from the skills of our psychology majors. Here are a few:

- **Consumer Science:** I would certainly prefer to see our majors using their knowledge to make up the hundreds of satisfaction surveys that I'm asked to complete each year. They might even provide good data to improve those products and services. Relatedly, each year I attend a meeting of researchers in smell and taste that is also frequented by the many companies that use our research to create products. These companies need research technicians by the hundreds to inform product testing. A psychology major who understands preference testing can find their way to a career in a massive industry that has trillions of dollars of annual revenue in the United States alone.
- **Software Design:** Wouldn't it be great to see our majors working to improve software design even if they never double majored in computer science? Someone with an understanding of the human side of the interface would be a tremendous boon to the industry and society, whether they were designing the interface or just making error messages that users can actually understand.
- **Nudge Science:** It has now been 10 years since Nobel laureate Richard Thaler and legal scholar Cass Sunstein introduced the rest of the world to the impact behavioral science can have on health, compliance, and productivity in work that draws directly on decades of psychological science. Increasingly, we are seeing our graduates involved in the public policy arena and other areas where evidence-based interventions are effective for achieving changes that benefit individuals and society.
- **Social Media:** A student who has a good grasp of statistics and social behavior would be a tremendous asset to the burgeoning social media industry. We train thousands of students with those skills. Why aren't they being hired in those roles in greater numbers?
- **Data Science:** This is the current "hot" career pursuit on many campuses. Psychology majors are trained extensively in the applied statistics that underlie this field and could function competently in many entry-level positions or use their major as a stepping stone to an advanced degree in this science.
- **Safety Science:** You may not have heard of safety science, but you are familiar with many of its products: reducing distracted driving, improving safety in stadiums and other places attracting thousands of people, keeping pilots and drivers awake when they need to be awake and asleep when they need to sleep. This is a huge new industry and it is an obvious place of employment for new graduates trained in our programs.

There are many more examples of areas where psychology majors' training in project and data management, research design, collaboration techniques, understanding of human behavior, and other skills make them a good fit for entry-level positions. Even so, most employers in these fields don't explicitly seek out psychology majors to fill their jobs. Furthermore, these are not the types of jobs our students imagined when they selected psychology as a major. We may not like it, but most people — including our students early in their training — do not view our discipline as a science or see it connected to more than mental health (Lorig & Dragoin, 2015).

Public perception has not kept pace with the robust growth of neuroscience, cognitive science, and social and developmental psychology in the past 20 years. Those fields have branched out to collaborate with engineering, economics, decision science, business, public policy, education, medicine, policing, law, and community planning. Psychological science, which has always been a broad field of study, is now even broader and it is being applied to real-world problems in many more ways and with

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far more success. That application has the potential to make life better across our planet, but few people outside of psychology departments know it.

When we identify our field as “psychology,” it brings about a very specific set of expectations for students, employers, and others. That is a problem for those students who want to pursue these “new” jobs and would never imagine psychology was the right place for them. Likewise, employers may hire psychology majors to work in call centers or in the complaints departments but would never realize that a psychology major would be a good match for their social media research unit.

The challenge, then, is to increase the public’s awareness of the full breadth of psychology as a science and applied discipline. As a first step, maybe it’s time to make it clear to prospective students and our academic colleagues in other departments that our field has many parts, each with important scientific findings and applications that include, but are not limited to, mental health. The National Science Foundation took this step almost 30 years ago by creating the Social, Behavioral and Economic Directorate. Perhaps it is now time for departments to choose a name that conveys and includes *all* of what we do. My university has just taken this step. After a unanimous vote of the full faculty, our department, formerly the Department of Psychology, is now the Department of Cognitive and Behavioral Science. Maybe this way we can stop talking

about non-traditional careers in psychology and begin to discuss the many typical careers for someone with training in behavioral science. ●

*\*This report considers all bachelors-level psychology majors as members of the liberal arts no matter the Carnegie classification of the college from which they graduated.*

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# Educating Students on the Psychology of Sustainability

**P** psychology courses have long served to open undergraduate students' eyes to many issues critical to modern society: racial bias and gender bias, cultural diversity, aging, principles of learning and education, intergroup conflict, stress and coping, mental illness, and brain disorders including Alzheimer's disease. Conspicuously absent from this list, though, is the human impact on the natural environment.

The changing environment is one of the gravest challenges facing us in the 21st century. The 2018 Intergovernmental Panel on Climate Change report (<https://www.ipcc.ch/sr15/>) underscores the perilous situation we are in with regard to climate change, and it highlights the need for aggressive action. With effects of climate change already evident in many areas globally, the report urges "rapid and far-reaching transitions in land, energy, industry, buildings, transport, and cities" to limit warming to 1.5° C. Many other environmental challenges loom as well, including waste management and air and water pollution. Another of these is overpopulation, which can lead to disease, conflict, migration, degradation of natural resources, and loss of biodiversity.

As we educate our students to be informed citizens and future leaders, they must be prepared to take on these challenges. Problems related to the environment are usually addressed in university curricula only in areas such as earth and environmental sciences or civil and environmental engineering. Courses in these areas reach only a small fraction of college students. Equally problematic is the fact that such courses only address part of the puzzle. All human-caused environmental problems are, by definition, rooted in human behavior. It is human ways of living that create excessive carbon dioxide emissions, pollution, waste, over-harvesting, population growth, and so on.

Because human behavior is at the root of these environmental problems, science and technology alone cannot create the solutions we need. Behaviors that affect the environment are driven by human perceptions, attitudes, beliefs, values, communications, motivations, choices, and decisions. To create solutions, there must be a belief in the need for change, the will to make and sustain change, and effective means of creating change. This point is made salient as current United States political leadership at the highest levels deny the problems caused by climate change (De La Garza, 2019; Greshko et al., 2019).

In short, the root causes of environmental problems lie squarely within the domain of psychological science, as do

their solutions. Psychology departments must play a key role in preparing students to lead the world toward a more sustainable future.

So why has the environment been so absent from undergraduate education in psychology? Deborah Winter published the first text on the topic in 1996 (*Ecological Psychology: Healing the Split Between Planet and Self*), but few other materials existed to provide a foundation for psychology courses. Fortunately, the situation has now changed. A rich research literature has developed in the areas of cognitive, behavioral, social, personality, and motivation psychology, and the meta-discipline of conservation psychology, aimed at understanding determinants of pro- and anti-environmental behaviors.

In addition, researchers have investigated the therapeutic effects of interactions with nature and other aspects of the human connection to nature. The growth of these research literatures has, in turn, allowed for the development of more textbooks. Together, these resources will aid those who wish to develop teaching materials appropriate for any level of coursework.

A course on the psychology of sustainability can be constructed that covers contributions across areas within psychology. Alternatively, a course in a traditional area such as social psychology can adopt an environmental theme. Such courses have the potential to attract not only psychology majors but students from environmental science, environmental studies, and environmental engineering who otherwise lack exposure to the psychological dimensions of environmental issues. Sustainability can also be readily integrated within courses that retain most of their traditional content (e.g., social or cognitive psychology surveys) by incorporating a unit on sustainability, and sustainability topics can be introduced in methodology courses to illustrate research methods and statistical analyses or provide the focus for experiential learning projects.

With these varied opportunities, every department can ensure that students complete their undergraduate experience with an understanding of how principles of psychological science feed into environmental problems and solutions. ●

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# Resources for Educators

## Textbooks

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## Online Materials

Scott and Koger's "Teaching Psychology for Sustainability" website provides many valuable resources, including course syllabi with diverse emphases: <https://www.teachgreenpsych.com/>

Association for the Advancement of Sustainability in Higher Education (AASHE): <https://www.aashe.org/>

## Research Articles

The major journals in cognitive, social, personality, and motivation psychology, along with those aimed at broad audiences, such as *Psychological Science* and *Perspectives on Psychological Science*, are outlets for much recent research.

*Environment and Behavior* and *Ecopsychology* are specialty journals in the area, and psychological research also appears in journals such as *Climate Change* and *Nature Climate Change* as well in journals on risk analysis and communication.

## Further Reading

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Edited by C. Nathan DeWall and David G. Myers

Teaching *Current Directions in Psychological Science* offers advice and guidance about teaching a particular area of research or topic covered in this peer-reviewed APS bimonthly journal, which features reviews covering all of scientific psychology and its applications. Visit this column online for supplementary components, including classroom activities and demonstrations:

[www.psychologicalscience.org/publications/teaching-current-directions](http://www.psychologicalscience.org/publications/teaching-current-directions).

## Building Better Decisions Through Choice Architecture

By Beth Morling

**Basu, S. & Savani, K. (2019). Choosing among options presented sequentially versus simultaneously. *Current Directions in Psychological Science*, 28(1), 97–101.**

**S**omeday your students may sit in a human resources (HR) office choosing a health insurance plan. Such plans vary on copays, deductibles, mental health care coverage, prescription drug prices, maternity benefits, and more. It's a complex choice that people don't always get right. Should HR officers show each plan's website one at a time? Or create a table in which employees can consider the plans simultaneously?

The way decisions are presented (for example, sequentially or simultaneously) is called “choice architecture” (Johnson et al., 2012). But which choice architecture helps employees to pick the best health care plan for them?

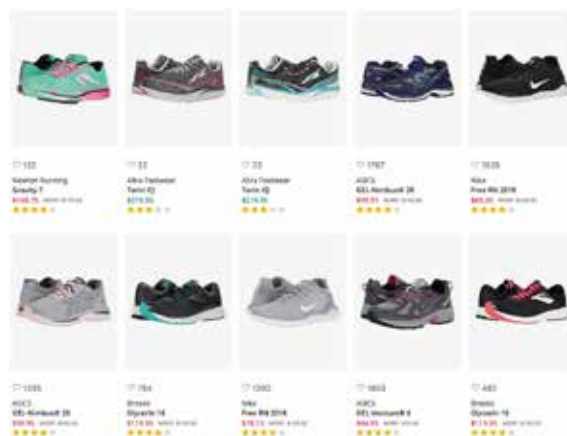
According to Shankha Basu and Krishna Savani (2019), we make better choices when we consider our options simultaneously. When choices are structured simultaneously (for example, viewing four cell phones), we process their features more in-depth, compared to sequential presentations (“here's the first phone....”).

When viewing sequentially (such as when we browse products on a website), we may also compare each option to an ideal “dream” choice. We're dissatisfied with our choice later on, because none of the options lived up to that hoped-for standard. In contrast, when we view simultaneously, we compare options



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Figure 1



to each other — not to our imagined ideal — and we end up happier (Molinger, Shiv, & Iyengar, 2013).

Students are likely to love the variety of applications that follow from choice architecture research.

Open a lesson on this topic with a vivid example from online retailer Zappos.com. Show a screenshot of pairs of running shoes (as in *Figure 1*) and ask students to contrast this presentation with viewing only one pair of shoes at a time. Which choice architecture would lead to the best decision?

Next, try this demonstration based on Basu and Savani's own research (2017). Randomly assign students to two groups. One sees options simultaneously, and the other sequentially. You can prepare index-card-based handouts or use an online system. (I made Google Form versions of [simultaneous](#) and [sequential](#) forms.) Remember that when presenting options sequentially, you should allow students to go back to previously presented options.

**Problem 1:** You're a buyer for an organic baking company that makes specialty pies and cookies. You need to pick a supplier for their organic ground cloves. Which of these five suppliers should your company use (*Table 1*)? (Some students see the full table; others view only one option at a time.)

**Table 1**

Supplier A	680 g for \$93.60
Supplier B	1049 g for \$151.70
Supplier C	595 g for \$84.00
Supplier D	1162 g for \$164.00
Supplier E	936 g for \$102.30

**Problem 2:** You're in the market for a new laptop. You want one with the best combination of features. Which laptop should you buy (*Table 2*)?

**Table 2**

Model	Battery	Processor	RAM	Storage	Warranty
A	7h	2.1 Ghz	4 GB	500 GB	2 yrs
B	7h	2.4 Ghz	4 GB	500 GB	1 yr
C	5h	2.4 Ghz	6 GB	500 GB	1 yr
D	7h	2.4 Ghz	6 GB	750 GB	2 yrs
E	5h	2.1 Ghz	4 GB	750 GB	2 yrs
F	5h	2.1 Ghz	6 GB	750 GB	1 yr

Each scenario has an objectively "best" choice (i.e., cloves supplier E and laptop model D). Did your students select the correct one? Did accuracy depend on choice architecture?

These real-world scenarios introduce further applications and strategies. After modeling the first two together, assign students to discuss the rest in small groups.

**Scenario 1:** You are a hiring manager interviewing candidates for a sales position. Obviously you can only interview one job candidate at a time. Each interview takes about an hour and you've scheduled four candidates over the course of 1 day. How might you change the choice architecture in this case to make it more likely your company will select the best candidate?

*Answer:* You need to turn this sequential task into a simultaneous one. After the interviews are over, make a table summarizing data on all of the candidates. Or, place all resumes on the table and consider them all together.

**Scenario 2:** A friend is giving up his off-campus apartment. It's close to campus, has free parking, and the rent is in your price range. Internet access and utilities are extra, but the apartment is gorgeous. The landlord is willing to give you first dibs on the place; should you take him up on it?

*Answer:* You might be happy in your friend's apartment, but why not be sure you're making the best choice possible? Ask yourself, what are *all* of the apartments we could consider?

**Scenario 3:** You're scrolling on Instagram when you see an amazing vacation deal: The Bahamas for only \$1,200 per person, all-inclusive! The photos of the resort look beautiful, and you'd love to get away with your sweetheart. You're tempted to purchase the deal right away. What should you do?

(Answers should be similar to Scenario 2: Ask, what are *all* the vacations we could consider?)

**Scenario 4:** Imagine you're a judge on the TV program *The Voice*, where each performer sings a different style of music, showing their own unique stylistic choices. How can you pick the best singer fairly?

(Answers might resemble Scenario 1, creating a simultaneous table of performers)

**Scenario 5:** Imagine your company has a special opportunity to expand into a special market in Eastern Europe. Should your company make the investment, or not?

(Answers should be similar to Scenario 2: Ask, "What are *all* of the potential markets we could expand into?")

**Scenario 6:** You're shopping for a new dining set with your partner. You'll visit three furniture stores before making your decision. How can you make the best choice?

(Answers might resemble Scenario 1, creating a simultaneous table of tables.) ●

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### QUOTE OF NOTE

"[T]he French speakers and Spanish speakers were very much telling the story in chronological order — vivid events illustrated with gestures. The Hindi and Mandarin speakers were much more focused on why the events in the story happened."

Psychological scientist **Elena Nicoladis**, University of Alberta, Canada on findings from her study on gesture and story-telling style.

# The Art of Memory: Drawing Can Improve Memory

By Gil Einstein and Cindi May

**Fernandes, M. A., Wammes, J. D., & Meade, M. E. (2018). The surprisingly powerful influence of drawing on memory. *Current Directions in Psychological Science*, 27(5), 302–308.**

Leonardo da Vinci, Isaac Newton, and other great thinkers often represented their ideas visually. Rather than scribbling in sketchbooks, today's students typically paraphrase or verbally summarize the concepts they learn. Does drawing concepts produce advantages relative to conventional notetaking? Myra Fernandes, Jeffrey Wammes, and Melissa Meade (2018) make a compelling case that drawing powerfully affects memory.

To orient students to this effect and the general procedure for studying it, try the following demonstration. Present the 20 words below one at a time for 6 seconds each, with half the items in black font and the other half in red font.

*glove butterfly banana carrot boot corn beetle coat  
strawberry pineapple hammer pear cow airplane desk  
lemon door scissors lamp kite*

Ask half of the class to draw an image of the object that the word represents for words appearing in black font and to write the word as many times as they can for words appearing in red font. Reverse this instruction for the other half of the class. After the last item, ask students to turn over their notes and have them count backwards from the number 694 for 30 seconds. Then give them 2 minutes to recall as many words as they can.

You should find that students recall more of the drawn items, despite equal processing time for both sets of items. Indeed, in a study using similar conditions (except that the list consisted of 60 words), participants recalled about five times more drawn items (Wammes, Meade, & Fernandes, 2016).

In discussing their impressions of this drawing effect, critical students may mention that the control task (copying the word) is relatively weak in the sense that it encourages

little meaningful processing. The effect, however, turns out to be robust. Drawing produces better memory than other effective encoding strategies such as semantic elaboration (listing semantic features of words) and forming images. Also, the benefits of drawing occur with short and longer lists, fast (4 second) and slower (40 second) presentation rates, and with unmixed as well as mixed lists (Wammes et al., 2016). Moreover, drawing improves memory even for individuals who score low in imagery ability and who have little artistic background or ability (Fernandes et al., 2018).

At this point, you could encourage students to think about why drawing has potent effects on memory. Fernandes et al. (2018) believe that drawing leads to a richer and integrated memory trace that includes meaningful elaboration (drawing requires you to think about the features of the object), motoric information (the movements made to create the drawing), and pictorial information. In support of this explanation, Wammes, Jonker, and Fernandes (2018) report results showing that drawing, which includes all three of these components, produces better memory than encoding tasks that include only two of the components (such as tracing a picture of an item, which includes only the motoric and pictorial components).

Remind students that another goal of psychological science is application. Encourage them to think about the potential benefits of drawing in real-world settings. One possibility is that drawing might be a useful technique for improving remembering in populations that show memory decline. Along these lines, Meade, Wammes, and Fernandes (2018) have shown that drawing reduces typical age-related memory deficits. Fernandes et al. (2018) also report unpublished data indicating that dementia patients show memory benefits from drawing. Perhaps you could help people with severe memory problems remember their daily tasks (e.g., sweeping the room) by drawing pictures of themselves performing those tasks.

Another potential application is in educational settings. When taking notes, students might think about drawing the concepts they learn rather than describing them verbally. In support of this view, Wammes, Meade, and Fernandes (2017) found that drawing out the definition of academic terms (e.g., lymphocyte) produced better memory for the definitions relative to verbatim (but not paraphrased) notetaking. The research on drawing with more complex educational materials (e.g., texts), however, is mixed. Some studies have found that drawing enhances memory relative to traditional notetaking whereas others have not (see Van Meter & Garner, 2005, for a review).



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Understanding the conditions under which drawing improves memory with educationally relevant materials and outcomes is a promising and important direction for future research. You could challenge students to generate moderator variables that may influence the extent to which drawing improves memory. It may be, for example, that drawing is an effective encoding strategy with certain types of materials (e.g., concrete concepts) but not others. With more complex learning materials and longer retention intervals, perhaps drawing ability (i.e., the ability to represent the concepts accurately) is relevant.

Successful students have agency over their learning (Hacker, Dunlosky, & Graesser, 2009). Effective agency involves learning powerful strategies for producing good learning and memory as well as knowing how and when to use them. This research suggests that students should think about drawing as another useful tool for encoding and remembering the concepts they are learning. ●

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# MINDS ON THE ROAD

AN APS BLOG ON THE SCIENCE OF WHAT'S DRIVING BEHAVIOR

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# Diverse Opportunities for Students in Psychological Science

By Heather Han

**W**hen the weather starts to get chilly and the leaves start to fall, students begin the application process for graduate school. Starting with writing and revising their resumes, students gather all the information that will strengthen and support their applications. Although a high GPA is widely perceived as a determining factor for graduate school entrance, there are other significant factors that can help students' applications stand out as well. These include involvement on campus and with professional organizations, leadership positions, research experiences, mentoring experiences, and internships.

## Campus Leadership

Being involved in different sub-organizations in the psychology department at the State University of New York at Fredonia (SUNY Fredonia) allowed my colleagues and I to feel a sense of belonging. SUNY Fredonia students' involvement with Psi Chi and psychology club has allowed them to build meaningful connections. By attending regular club meetings, students feel connected to one another and learn more about psychology outside of the classroom. In addition, planning various events challenges students to be more creative, diverse, and skillful and strengthens their ability to collaborate and network with other students. You may choose to be executive members of student organizations, which can be appealing to graduate school admissions and future employers, as it demonstrates leadership experience and commitment to psychological science. It also allows you to build an academic community by taking on more responsibilities and working with like-minded student leaders and professors.

As a student committee member, you also learn how to interact with professors in professional settings outside of the classroom and develop leadership skills by being active members of the committee as well as the community. For instance, the Recruitment Committee for the psychology department at SUNY Fredonia allows students to assist in the recruitment of new students by composing letters to prospective students. As representatives for the Office of Student Creative Activity and Research (OSCAR), students review travel fund requests and help organize the annual Student Research and Creativity Exposition in the spring semester. This helps you learn how to develop supervisory skills and manage university funds.

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**Heather Han** is a senior psychology and music therapy student at the State University of New York at Fredonia. She is currently involved in various campus organizations and is conducting research on the perceptions of altruistic acts under the supervision of Jack Croxton, PhD.

## Professional Organizations

In addition to campus organizations, being involved in professional organizations, such as the Association for Psychological Science (APS) and the APS Student Caucus (APSSC), helps you expand your connections nationally and internationally. There are also applications and websites that help students match up with mentors who are either graduate school students or professionals working in the field. Building relationships like this allows students to meet and interact with diverse groups of people and feel included and accepted in the field. Attending conventions hosted by these organizations can also help you learn more about the field you are going into while building professional connections and uncovering new career and educational options.

## Internships

Internships support your personal growth by offering an opportunity to get hands-on experience while receiving feedback from professionals in the field. Students build meaningful relationships with the people at internship sites, including supervisors, fellow interns, and the clients. Those who are looking to be a counselor or a therapist can further benefit from the relationship they develop with the clients. This prepares them for graduate programs that are geared towards teaching students to be helpers. Furthermore, students often receive recommendation letters from the supervisors for graduate school applications.

## Research Experience

Working on research projects with professors gives students the opportunity to gain research experience, which can help prepare them for graduate school. Student researchers learn how to ask meaningful questions and develop hypotheses. They also learn how to write documents to get their study approved by an institutional review board and how to conduct safe and ethical research. Most psychology graduate programs require research as a part of their curricula, and getting involved as an undergraduate helps prepare students for forming professional relationships with coauthors and professors, knowing how to conduct a research project, and presenting research or getting the research published. Being involved in the research process also shows that students are strong graduate-school prospects, as there are often heavy research readings in graduate level courses. Becoming familiar with the research process, specifically with the scholarly review process, trains students to be fluent in research language as well.




## Peer Mentorship

As a peer mentor, you learn how to communicate with others, build personal relationships, and gain skills, such as listening skills, to assist other students. At SUNY Fredonia, all incoming psychology students are assigned a peer mentor who can help them adjust to their new academic environment. A mentor's job is to check up on the new students, send out informational emails or texts about different campus activities, and help answer questions about academics, adjustment to campus, and overall psychological and physical wellness as a college student. Through weekly contacts and meetings with mentees, mentors develop personal relationships with their mentees while developing active listening skills and establishing instructional skills. Reflecting in weekly journals and receiving feedback from supervising

professors can also highlight potential avenues for personal growth. Additionally, by being a mentor, students learn how to be engaged in a professional relationship with their mentees, which allows students to be prepared to have a mentor when they go to a graduate school or start their careers.

## Conclusion

In sum, getting involved on campus as an undergraduate student not only prepares you to be a well-rounded grad school or job applicant, but allows you to become an active part of the campus community. Whatever the next step in your career path, consider working as a mentor, joining a professional and/or campus organization, completing an internship, or conducting a research project to widen your horizons. ●



# THE APS METHODOLOGY CENTER

Articles, tutorials, and other resources for enhancing  
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[www.psychologicalscience.org/career-resources/methodologycenter](http://www.psychologicalscience.org/career-resources/methodologycenter)

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**Kevin Arceneaux**, Temple University, *The Atlantic*, February 14, 2019: Liberals and Conservatives React in Wildly Different Ways to Repulsive Pictures.

**Lisa Feldman Barrett**, Northeastern University, NPR, February 22, 2019: What an Insect Can Teach Us About Adapting to Stress.

**Alia Crum**, Stanford University, NPR, March 1, 2019: Could Your Mindset Affect How Well a Treatment Works?



**Frans B.M. de Waal**, Emory University, *The New York Times*, February 25, 2019: Frans de Waal Embraces Animal Emotions in 'Mama's Last Hug.'



**Corey Fincher**, University of Warwick, United Kingdom, *The Atlantic*, February 14, 2019: Liberals and Conservatives React in Wildly Different Ways to Repulsive Pictures.

**Karen Fingerman**, The University of Texas at Austin, *The New York Times*, March 13, 2019: Young Adulthood in America: Children Are Grown, but Parenting Doesn't Stop.

**Roberta M. Golinkoff**, University of Delaware, *The Washington Post*, February 12, 2019: 6 Ways Parents Can Help Kids Strike a Balance Between Screen Time and the Real World.

**John Gottman**, The Gottman Institute, Inc., *The Wall Street Journal*, February 8, 2019: The Math Behind Successful Relationships.

**Adam Grant**, University of Pennsylvania, *The Washington Post*, February 22, 2019: Power Doesn't Corrupt. It Just Exposes Who Leaders Really Are.



**Jonathan Haidt**, New York University, *The Atlantic*, February 14, 2019: Liberals and Conservatives React in Wildly Different Ways to Repulsive Pictures.



**Hal Hershfield**, University of California, Los Angeles, *The Atlantic*, February 21, 2019: How Much Leisure Time Do the Happiest People Have?



**Michael Kardas**, University of Chicago Booth School of Business, NPR, February 11, 2019: Close Enough: The Lure of Living Through Others.

**Richard Lerner**, Tufts University, *The Wall Street Journal*, January 30, 2019: Don't Think the Worst About Your Teenager.

**Daniel Levitin**, McGill University, Canada, CNN, February 8, 2019: How Music Can Change the Way You Feel and Act.



**Josh Miller**, University of Georgia, *Science*, March 12, 2019: Does a 'Dark Triad' of Personality Traits Make You More Successful?



**Ed O'Brien**, University of Chicago Booth School of Business, NPR, February 11, 2019: Close Enough: The Lure of Living Through Others.

## Shining a Light on the 'Dark Triad'



A growing body of research, pioneered by APS Fellow **Delroy Paulhus** and others, is probing the "dark triad" of personality traits: Machiavellianism, narcissism, and psychopathy. But psychological scientists should proceed with caution when we encounter claims about how the dark triad relates to real-world outcomes, says APS Fellow **Josh Miller** in an article forthcoming in *Current Directions in Psychological Science*.

Science Magazine

March 12, 2019



**Delroy Paulhus**, University of British Columbia, Canada, *Science*, March 12, 2019: Does a 'Dark Triad' of Personality Traits Make You More Successful?



**Michael B. Petersen**, Aarhus University, Denmark, *The Atlantic*, February 14, 2019: Liberals and Conservatives React in Wildly Different Ways to Repulsive Pictures.



**David Pizarro**, Cornell University, *The Atlantic*, February 14, 2019: Liberals and Conservatives React in Wildly Different Ways to Repulsive Pictures.

**Eva Pomerantz**, University of Illinois at Urbana-Champaign, *The Wall Street Journal*, January 30, 2019: Don't Think the Worst About Your Teenager.

**Suparna Rajaram**, Stony Brook University, The State University of New York, *The New York Times*, February 13, 2019: Can Big Science Be Too Big?



## For Innovative Science, Think Small



Large-scale international, interdisciplinary efforts have been hailed as allowing researchers to dive deeper into some of the most pressing questions in psychological science. However, research from APS Immediate Past-President **Suparna Rajaram** and colleagues suggests that bigger teams aren't always better if the goal is to generate innovative ideas.

The New York Times

February 13, 2019

**More APS Members  
in the news online at**  
[www.psychologicalscience.org/  
MembersInTheNews](http://www.psychologicalscience.org/MembersInTheNews)

**Paul Rozin**, University of Pennsylvania, *The Atlantic*, February 19, 2019: How to Stop Hating Your Least Favorite Food.



**Mark Schaller**, University of British Columbia, Canada, *The Atlantic*, February 14, 2019: Liberals and Conservatives React in Wildly Different Ways to Repulsive Pictures.

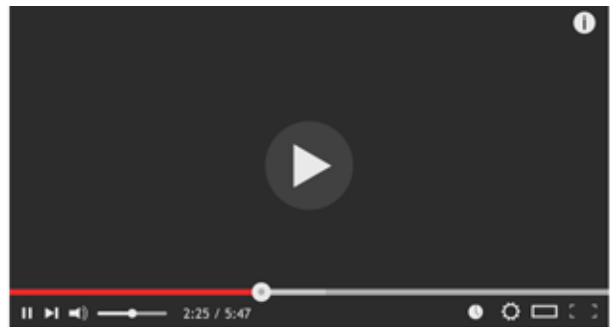


**Simone Schnall**, University of Cambridge, United Kingdom, *The Atlantic*, February 14, 2019: Liberals and Conservatives React in Wildly Different Ways to Repulsive Pictures.

**Laurel Trainor**, McMaster University, Canada, CNN, February 8, 2019: How Music Can Change the Way You Feel and Act.

**Philip Zimbardo**, Stanford University, *The Washington Post*, February 22, 2019: Power Doesn't Corrupt. It Just Exposes Who Leaders Really Are.

## Instant Skills, Just Add Video



Social media has made it easier than ever to find people who make their unique talents look easy — and that may be a problem for the rest of us. Researchers **Ed O'Brien** and **Michael Kardas** have found that watching others perform a skill, whether throwing darts or pulling off the “tablecloth trick,” can lead us to seriously overestimate our own abilities.

NPR

February 11, 2019

 Coverage of research from an APS journal



Podcast included in coverage



Video included in coverage



**2019 APS Convention Speaker**

Washington, DC, USA, May 23–26, 2019

# ANNOUNCEMENTS

Send items to [apsobserver@psychologicalscience.org](mailto:apsobserver@psychologicalscience.org)

## GRANTS

### Russell Sage Foundation Programs Accepting Letters of Inquiry

The Russell Sage Foundation is currently accepting letters of inquiry for programs and initiatives in the following categories: Behavioral Economics; Race, Ethnicity, and Immigration; Social, Political and Economic Inequality; Decision Making and Human Behavior in Context; Immigration and Immigrant Integration; Social, Economic, and Political Effects of the ACA.

The Russell Sage Foundation was established by Mrs. Margaret Olivia Sage in 1907 for “the improvement of social and living conditions in the United States.” The foundation now focuses exclusively on supporting social science research in its core program areas as a means of examining social issues and improving policies. Grants are available for research assistance, data acquisition, data analysis, and investigator time for conducting research and writing up results. Budget requests are limited to a maximum of \$175,000 (including overhead) per project (max. 2 years). A detailed letter of inquiry must precede a full proposal.

See <http://www.russellsage.org/how-to-apply>.  
Questions should be sent to [programs@rsage.org](mailto:programs@rsage.org).  
**Deadline:** May 23, 2019

### Russell Sage Foundation Visiting Scholars Fellowship

The Visiting Scholars Program provides a unique opportunity for select scholars in the social, economic, political and behavioral sciences to pursue their research and writing while in residence at the foundation in New York City. The foundation annually awards up to 17 residential fellowships to scholars who are at least several years beyond the Ph.D. Visiting Scholars typically work on projects related to the foundation’s core programs and special initiatives.

The fellowship period is September 1, 2020 through June 30, 2021. Scholars are provided with an office at the foundation, computers, library access, supplemental salary support, and some limited research assistance. Scholars from outside NYC are provided with a partially-subsidized apartment near RSF.

See <http://www.russellsage.org/how-to-apply/visiting-scholars-program> for more info. Questions should be directed to James Wilson, Program Director, at [programs@rsage.org](mailto:programs@rsage.org).  
**Application deadline:** June 27, 2019

## MEETINGS

### Society of Australasian Social Psychologists (SASP) Conference

April 25–27, 2019  
Sydney, Australia  
<https://sasps.org.au/>

### 31st APS Annual Convention

May 23–26, 2019  
Washington, DC  
[psychologicalscience.org/convention](http://psychologicalscience.org/convention)

### 13th Biennial SARMAC Meeting

June 6–9, 2019  
Brewster, Cape Cod, Massachusetts, USA  
[www.sarmac.org](http://www.sarmac.org)

### Conference on Children and Youth 2019

July 4–5, 2019  
Columbo, Sri Lanka  
[youthstudies.co](http://youthstudies.co)

### European Conference for Cognitive Science 2019

September 2–4, 2019  
Bochum, Germany  
<https://www.ruhr-uni-bochum.de/philosophy/EuroCogSci2019/home>

### Society for the Study of Human Development Biennial Meeting

October 11–13, 2019  
Portland, Oregon  
<http://support.sshdonline.org/>

### 2019 Behavior, Energy & Climate Change Conference

November 17–20, 2019  
Sacramento, CA  
<http://beccconference.org>

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# ATTITUDES ABOUT ACCENTS



Psychologist scientist **Karolina Hansen** of the University of Warsaw in Poland investigates the assumptions and biases we harbor toward foreign and native accents.



Karolina Hansen

## How did you become interested in studying linguistic biases?

It all started with a cognitive psychology lecture. The whole lecture was interesting, but what especially attracted my attention was the Sapir-Whorf hypothesis about linguistic relativity. I found it a fascinating and intuitively true idea that people who speak different languages will see the world differently.

## Have any surprising or counterintuitive findings come out of your research on accent attitudes?

Oh, definitely! I read a lot and thought a lot about how people may react to others who look like an immigrant, but speak like a native. Still, when I first saw results showing that a Turkish-looking person speaking standard German is evaluated as more competent than a German-looking German speaker, I was surprised. You expect something based on a theory, but still, when it really comes it can be surprising.

## Have you found distinct differences (or similarities) about attitudes toward accents across different countries and cultures?

Oh, yes. In the US, UK, or in Germany people expect others to speak English or German; this is the default. A nice surprise is that when an immigrant speaks without a foreign accent, this is valued. But in Poland, a country with few immigrants and a language spoken only there and not in other parts of the world, people are happy when a foreigner speaks Polish at all. They don't care about the accent.

## What do you plan to study next in this area of research?

I want to look more into the cross-cultural differences in perceptions of accented speakers. Also, I think and I already see in my data that with time and growing awareness of different kinds of discrimination, people might be less willing to admit their prejudice. I want to study this aspect, too.

## What have been your own experiences with accent biases? Are there any accents that you have specific attitudes about?

People in the US tend to say they don't know where my accent is coming from. Some say Germany, some say France, and some just don't have a clue. That's probably because I spent time in Germany and some time in other countries, often speaking English with an international crowd. In an academic context I don't feel discriminated against and I'd rather see people's curiosity about where I come from.

As to my own perception of other people's accents, it was fascinating to notice when I started hearing differences between accents that I hadn't heard before. When I arrived in Germany, I struggled a bit with the language at first, but I got better over time. After 2 years, there was this sad and magic moment in my research when I noticed "Oh, this accent sounds funny, but incompetent." This was an important moment for me, to see the phenomenon that I study in myself and also to see it emerge in a relatively short period of time. ●

To read the full text of this interview, go to [www.psychologicalscience.org/accents](http://www.psychologicalscience.org/accents).

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