

Observer

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PSYBER SECURITY

Thwarting Hackers With Behavior Science

a publication of

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ASSOCIATION FOR
PSYCHOLOGICAL SCIENCE

FEATURED SPEAKERS



Fred Kavli Keynote Address

LYNN NADEL

The University of Arizona

Making and Remaking Memory: Past, Present, and Future

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



Presidential Symposium

Memory: From Neurons to Nations

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

SUPARNA RAJARAM (Chair)

Stony Brook University, The State University of New York

DORTHE BERNTSEN

Aarhus University, Denmark

CHARAN RANGANATH

University of California, Davis

QI WANG

Cornell University

HENRY L. ROEDIGER, III

Washington University in St. Louis



Bring the Family Address

JENNIFER RICHESON

Yale University

Jennifer Richeson will deliver the 2018 Bring the Family Address. She has received numerous honors and awards for her research focusing on the social psychological phenomena of cultural diversity and social group membership. A Guggenheim Fellow and a MacArthur Genius Fellow, Richeson has used a broad range of empirical methods to examine the potential cognitive "costs" and mutual misperceptions associated with intergroup interactions.



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Correction: According to Daphné Bavelier, having people play action video games for as few as 5 hours per week may cause vision improvement. The number of hours per week was misstated in the October *Observer* in the article "Better Minds Ahead: Understanding Cognitive Enhancement." We regret the error.

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FEATURES



PSYBER SECURITY

Thwarting Hackers with Behavior Science

From viruses to ransomware and password phishing scams, cyber fraud and other digital security threats are escalating worldwide — learn how psychological scientists help safeguard data.

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Presidential Column

Finding Our Fundamentals

APS President **Suparna Rajaram** talks about curiosity and the drive to learn, improve, and change as the key ingredients in a long and thriving career in science.

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Variations of Loneliness



Scientists from around the world, including APS Board Member **Stacey Sinclair**, discuss their research on the origins, varieties, and consequences of loneliness.

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Bringing Precision Treatment to Mental Health Care



APS James McKeen Cattell Fellow **Robert J. DeRubeis** is applying actuarial modeling to mental health care to improve treatment selection and ensure that patients receive care that meets their individual needs.

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15 *Société Française de Psychologie*

The Société Française de Psychologie shares its efforts to settle misunderstandings, build trust, and foster collaboration between researchers and practitioners.



29 *Remembering Annette Karmiloff-Smith*

A renowned developmental neuroscientist and APS Past Board Member is celebrated for her influential studies on the mechanisms that foster developmental change — and her passion for bringing that science to the public.



45 *A Conversation With Nour Kteily and Emile Bruneau*

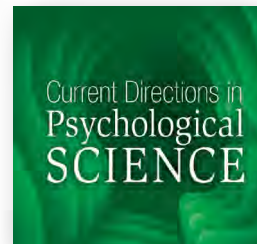
A heavy empirical focus on implicit forms of bias has overlooked the blatant forms of dehumanization that are now generating tragic headlines, say these psychological scientists.



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Teaching Current Directions in Psychological Science



“Not Quite Human: Teaching Students Why Blatant Dehumanization Exists” by C. Nathan DeWall



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“Say It Out Loud: The Production Benefit in Human Memory” by Cindi May and Gil Einstein

Finding Our Fundamentals

I want to really understand the fundamentals of programming.

-Masako Wakamiya



Photo credit: Jeanne Neville

Suparna Rajaram

Stony Brook University

Curious to know who Masako Wakamiya is? After retiring from her job as a bank clerk in Japan, Masako Wakamiya decided to learn programming and, at age 82, is now the world's oldest app developer. Her app creation, a game called *Hinadan*, earned her a recent invitation to Apple's prestigious Worldwide Developers Conference, as well as an introduction to Apple CEO Tim Cook.

Wakamiya's success is just one of many inspiring examples that caught my recent attention. I also see it in a sport I love, tennis. Since bursting on the professional tennis scene 20 years ago, the Williams sisters, Serena and Venus, continue to dominate the game by adapting to new playing styles and a fresh crop of opponents. With a staggering haul of 30 singles Grand Slam championships between them, they remain trailblazers, redefining athleticism and accomplishment.

How do they all do it? There is rarely a single answer, but the ones that stand out for me are curiosity and the drive to learn, improve, and change.

This got me thinking about academic life. Being curious and being willing to learn, improve, and change are essential elements of any college experience. And these elements also characterize the process of teaching and research. Curiosity helps redirect the questions to ask, learn new methodology and analyses, change the way one writes, choose the different conferences to attend, catch talks outside one's own specific area, seek collaborators who have different expertise, and so on. The list is long and fun. As I look back, I realize that

Being willing to learn, improve, and change are essential elements of any college experience. And these elements also characterize the process of teaching and research. Curiosity helps redirect the questions to ask, learn new methodology and analyses...

these opportunities in academia have helped me dig deep into questions that go from an inward study of how memory works by testing the explicit versus implicit nature of memory to exploring the social transmission of memory.

But I reach out not just to students who are contemplating teaching and research careers. A majority of you might not continue in academia. Instead, you will take your all-around training in psychological science to a number of different applied settings, and as you make this transition, formal infrastructures of learning and teaching would likely disappear. Yet it becomes quickly obvious that there is learning involved everywhere and there is a need to constantly reinvent oneself in these times. Staying curious and being willing to learn and change might just be the key to remaining motivated, improving,

and above all, continuously enjoying it all from the very start and for the long haul.

In her absolutely fascinating *Inside the Psychologist's Studio* video interview recorded at the 2012 APS Convention, Professor Brenda Milner, the pioneering neuroscientist and an iconic inspiration, advises students and budding scientists on the importance of being willing to change directions so as to play to one's strengths. One can imagine that for Masako Wakamiya this meant the need to understand the fundamentals of programming. Equipped with a lively curiosity and a willingness to learn, you will keep finding your new fundamentals well after your college life, whether in academia or beyond.

One final note: If you're interested in learning what our science has to say about curiosity, check out this collection of articles on APS's "Research Topics" page at psychologicalscience.org/topics/curiosity. ●

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



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Program Highlights

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

Simine Vazire: Teaching Psychology during the Replicability Crisis

Michael Gazzaniga: The Consciousness Instinct

Denise Park: Fragile Minds: Predicting Who Will Age Well

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

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Remembering APS Past President Elizabeth Capaldi Phillips

APS Past President **Elizabeth (Betty) Capaldi Phillips**, most recently provost and executive vice president at Arizona State University (ASU), passed away September 23, 2017, after a difficult illness. She was 72.

Phillips was APS President from 1999 to 2000, after having served as a member of the APS Board of Directors. In all of these roles, she remained a fiercely dedicated advocate for the advancement of psychological science in all its forms.

As APS President, Phillips focused on efforts to transcend disciplinary and departmental boundaries, a theme that carried over into much of her work in university administration. During her time at ASU, for example, the university developed a system for interdisciplinary academic advising. She also helped to devise systems for supporting faculty who teach and work across disciplinary boundaries.

Although much of Phillips's professional career was spent as an academic administrator, she applied her skills and training as a psychological scientist throughout her many endeavors. Originally a math major, she fell in love with psychology research after taking an undergraduate course on animal learning.

"Betty was a tireless advocate for APS and for psychological science," said **Sarah Brookhart**, APS Executive Director. "She never forgot her scientific roots even when she was serving at the highest levels of university leadership. And her ability to combine perspectives from all of the domains she was involved in — science, education, academic

administration — led to innovations and progress in all of those areas. We have lost a good friend and a great leader."

Phillips received a PhD in experimental psychology from the University of Texas at Austin in 1969. She was a professor of psychology at Purdue University and served as chair of the Department of Psychological Sciences there. She later served as provost and psychology professor at the University of Florida and at the University at Buffalo, The State University of New York. In 2003, she was named vice chancellor and chief of staff of The State University of New York system.

Phillips's research focused on understanding on how and why we develop preferences for certain foods and, more generally, on investigating how motivation can be learned. She authored many chapters, articles, and books over her career, in addition to co-authoring an introductory psychology textbook and editing two books on the psychology of eating.



Paluck Named 2017 MacArthur Fellow

Princeton University psychological scientist **Betsy Levy Paluck**, known for her innovative research investigating behavior change in social groups, has been named to the 2017 class of MacArthur Fellows.

Paluck's research focuses broadly on the powerful influence of social norms and perceptions that drive human behavior.

In experimental fieldwork, she has traveled to postconflict areas, including postgenocide Rwanda, to study how prejudice and conflict may be reduced. In her work in Rwanda, Paluck tested whether messages disseminated through mass media — in this case, a radio soap opera — might change how listeners perceived social norms related to interethnic relationships. She found that listening to a radio story featuring an interethnic couple led people to view such relationships as normative within a societal context. This perceived social norm, in turn, seemed to guide their behavior without necessarily altering their personal values and beliefs.

Paluck has also researched social networks in public schools, collecting data from about 25,000 students in New Jersey. Looking at students' existing social networks, she found that anti-prejudice ideas quickly diffused throughout groups based on a few peers with the most perceived social influence.

More recently, Paluck and coauthor **Margaret Tankard** studied the link between institutional policies and the social attitudes

and behaviors within a population. This research, published in *Psychological Science*, found that the legalization of same-sex marriage by the US Supreme Court was associated with increased public support of gay marriage based on perceived change in social norms.

Among the 24 MacArthur Fellows chosen this year, Paluck will receive a \$625,000 stipend, which she says will help her to continue training the next generation of psychology researchers in conducting field experiments and investigating social behavior in the real world.

Paluck received her PhD from Yale University. She is currently a professor of psychology and public affairs at Princeton University and the Deputy Director of the Kahneman-Treisman Center for Behavioral Science and Policy. She serves on the Advisory Council for the newest APS journal, *Advances in Methods and Practices in Psychological Science*.



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Cognitive Development
RIKEN Brain Science Institute, Japan*



Frans B.M. de Waal

*Department of Developmental
and Cognitive Neuroscience
Emory University, USA*

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Dweck Receives Yidan Prize for Growth Mindset Research

APS James McKeen Cattell Fellow **Carol Dweck** has been named a recipient of the inaugural Yidan Prize, which recognizes her influential scientific work exploring mindsets and their impact on student achievement. Dweck, a professor of psychology at Stanford University, was selected as one of the first recipients of the award, the largest international prize in education research and development.

“I’m thrilled and honored to be the inaugural recipient of this amazing prize,” Dweck said in a statement. “It will allow us to take our work forward and continue to innovate — to develop even more effective interventions for students and more effective materials for teachers to use in classrooms. I couldn’t be more excited.”

Dweck’s work spans the fields of developmental, social, and personality psychology and has contributed to a shift in how psychological science approaches the study of learning and academic success. Her empirical research on the growth mindset has shown that thinking about learning (and other efforts) as a work in progress, rather than the result of a fixed attribute such as intelligence, can significantly enhance a person’s ability to master new skills.

Growth mindset research is currently being used to develop more effective education interventions that help improve students’ academic outcomes. The National Science Foundation, the Bill & Melinda Gates Foundation, and the Hewlett Foundation have also invested in further research in this field.

This framework has also been applied both in and outside the classroom to address issues of willpower, racial prejudice, gender gaps, adolescent aggression, and even conflict resolution in the Middle East. Dweck has also written

several books on the subject, including *Mindset: The New Psychology of Success*, which aims to make mindset research accessible to a general audience. She has been elected as a member of the American Academy of Arts and Sciences and the National Academy of Sciences, and has received the Atkinson Prize in Psychological and Cognitive Sciences from the National Academy of Sciences, among other honors.

The Yidan Prize, founded by Chinese philanthropist Charles Chen Yidan, includes a \$1.9 million cash prize in addition to \$1.9 million in funding toward Dweck’s future education initiatives. Dweck will also receive a gold medal alongside recipient Vicky Colbert, founder of Fundacion Escuela Nueva in Colombia, in an official ceremony in Hong Kong this December.

“To witness the level of innovation and dedication shown by the inaugural laureates in their work and the breadth and depth of the impact they have made is humbling,” said Yidan in a statement announcing the recipients. “The Yidan Prize was founded to shine a light on education that is transformative, sustainable and addresses the world’s needs as we look to the future.”



AT RANDOM

“One of the major influences the internet is having on the way we communicate is by manifesting a preference for text over speech.”

-APS Past President **Morton Ann Gernsbacher**, University of Wisconsin–Madison, in a September lecture on the psychological effects of the internet.

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Nobel Prize Highlights Psychological Science

The Nobel Prize in Economic Sciences awarded to economist Richard H. Thaler has its roots firmly planted in psychological science, particularly in the groundbreaking research of APS William James Fellows **Daniel Kahneman** and **Amos Tversky**.

The Royal Swedish Academy of Sciences announced the award October 9, 2017 in Stockholm, citing Thaler's pioneering work showing how human behavior consistently defies economic theory. His findings have inspired many governments and organizations to inject more behavioral research and economics into policymaking efforts.

"In total, Richard Thaler's contributions have built a bridge between the economic and psychological analyses of individual decision-making," the Academy said in a statement. "His empirical findings and theoretical insights have been instrumental in creating the new and rapidly expanding field of *behavioural economics*, which has had a profound impact on many areas of economic research and policy."

The work of Tversky, who passed away in 1996, and Kahneman, who himself received the Nobel Prize in Economics in 2002 and the Presidential Medal of Freedom in 2013, shaped much of Thaler's work. In fact, Thaler collaborated with both of them. In one experiment, for example, Thaler and Kahneman showed that individuals place a higher value on their own possessions compared with other people's items. In the study, the researchers randomly distributed coffee mugs to half of the students in a classroom setting, and then asked the entire class to place a value on the items. Students who were given a mug assessed it as being twice as valuable as did their mug-less classmates.

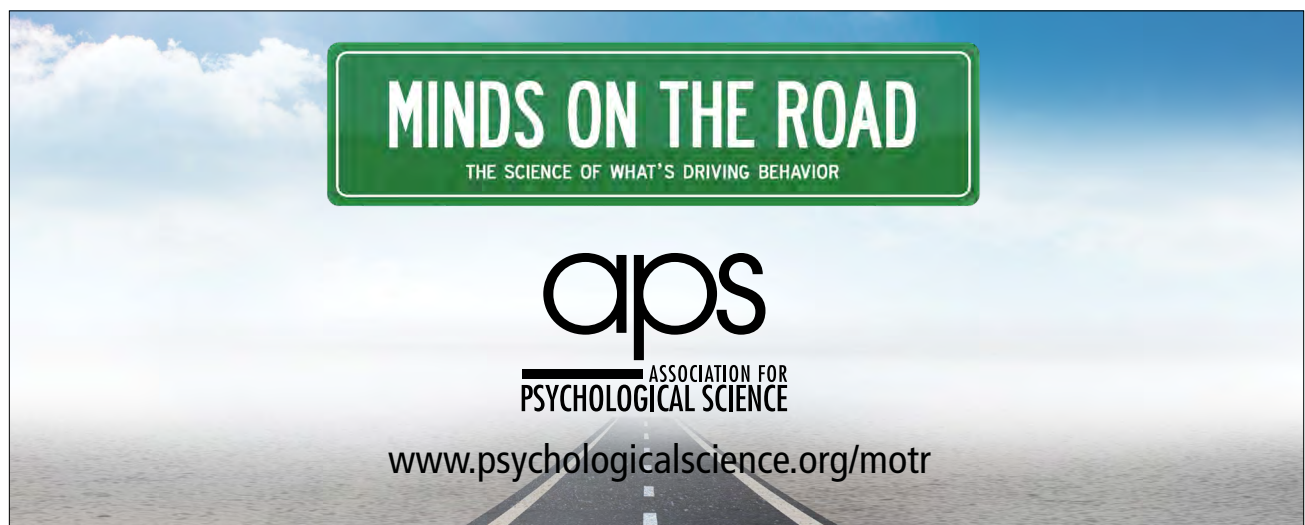
A professor at the University of Chicago Booth School of Business, Thaler is particularly known for developing "nudge" theory — the idea that positive reinforcement and indirect suggestion better influence behavior than do laws

and edicts. Much of his work builds on Kahneman's and Tversky's groundbreaking research showing that irrational decision-making stems from a human tendency toward certain cognitive biases, including status-quo bias and loss aversion. Thaler and Kahneman talked extensively about this line of research in 2008 for APS's *Inside the Psychologist's Studio* video series.

This body of work has had a profound influence on policymaking over the last decade. In 2010, then-Prime Minister David Cameron of the United Kingdom set up the Behavioural Insights Team (BIT), headed by experimental psychologist **David Halpern**. In 2014, the White House launched the Social and Behavioral Sciences Team (SBST) to help the US federal government apply behavioral science findings to practical problems ranging from delinquent student-loan payments to wasteful energy consumption.

In a 2017 study in *Psychological Science*, Thaler and coauthors found that nudges often yield particularly high returns at a low cost when it comes to boosting retirement savings, college enrollment, energy conservation, and vaccination rates.

Thaler was an integral participant in a 2013 forum on psychological science and behavioral economics, co-sponsored by APS, the White House, and the National Institute on Aging. The event brought together psychological scientists, behavioral economists, and government leaders in Washington, DC, to discuss how to incorporate behavioral empiricism into policymaking. The workshop included presentations from some of the leading figures in psychological science and behavioral economics, including Kahneman; APS Past Presidents **Walter Mischel**, **Susan T. Fiske**, **John T. Cacioppo**, and **Elizabeth Phelps**; and APS Fellows **Robert Cialdini** and **Laura Carstensen**.



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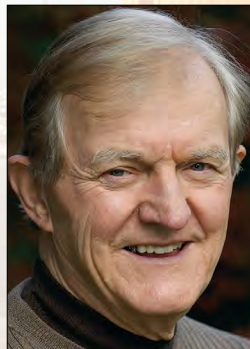
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Mentor Award winners will be featured in the APS Observer.

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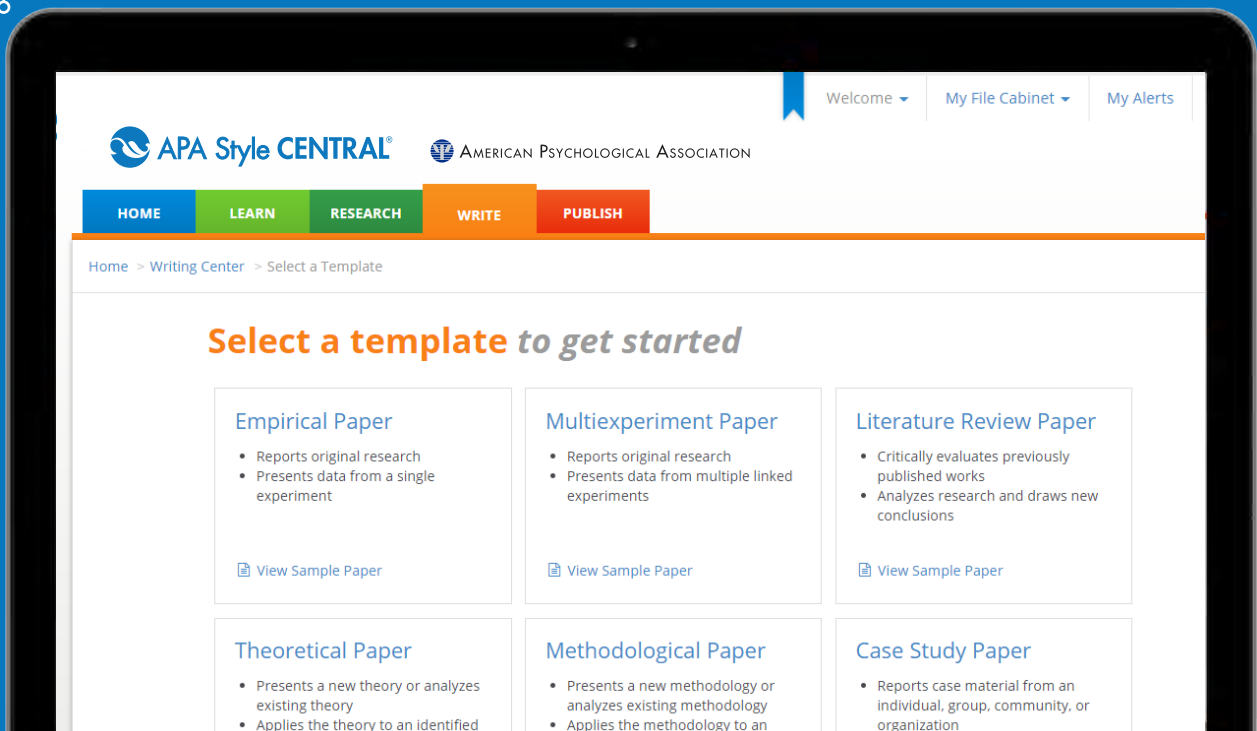
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The awardees will be recognized at the 30th APS Annual Convention
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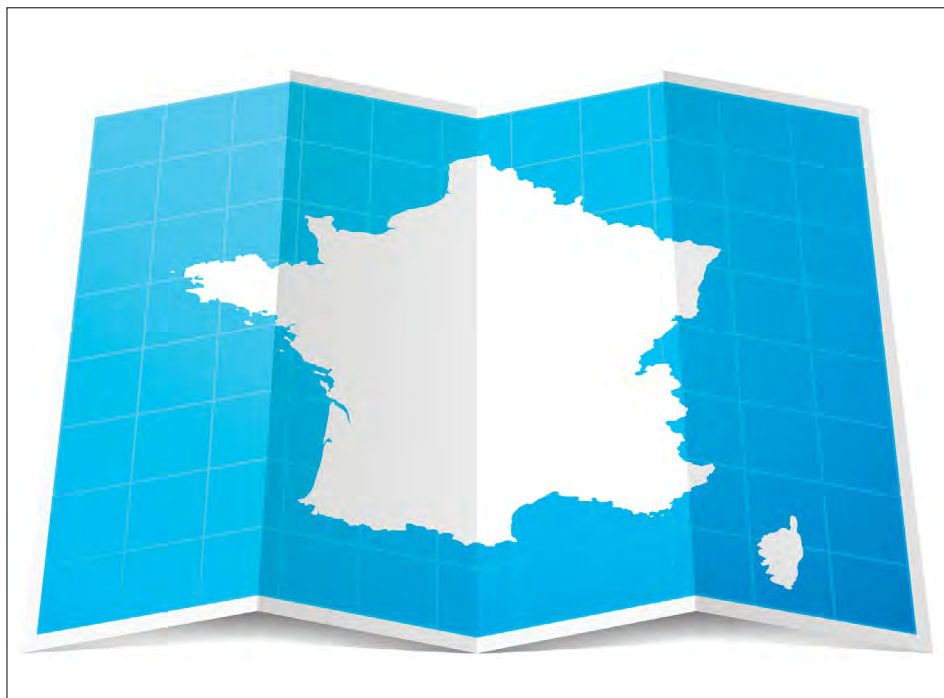
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Société Française de Psychologie Fosters Science–Practice Links

The Société Française de Psychologie has been undertaking initiatives emphasizing a dialogue between the scientific community and practitioners of psychology. The Observer recently interviewed the Society's leadership about its history and its activities.

What is SFP's mission?

Our main objective is to promote the research and practice of psychology with respect to scientific and ethical principles. Our society seeks to 1) contribute to the advancement of fundamental and applied knowledge in psychology; 2) promote a diverse range of psychological study and foster its application in all areas of social life; 3) encourage exchanges within the community of researchers and practitioners; 4) contribute to the training of practitioners and young doctors; and 5) take a position and intervene in all situations concerning research and practice in psychology and its ethical dimension.



When was the organization created and how has it evolved?

Pierre Janet founded SFP in the beginning of the 20th century. He, along with Georges Dumas, also founded the *Journal de Psychologie Normale et Pathologique* in 1904. The society was originally composed of researchers in philosophy, physiology, and medicine who conducted research in experimental psychology, physiology, and psychiatry. The first objective of the society was to defend and foster the scientific study of mental phenomena. In 1961, the SFP's constitution was reformulated, and the first article stated that the Society “brings together psychologists of all specialties in order to support the development of studies and research in psychology, and help to solve theoretical and practical problems related with scientific progress of psychology and its applications.” In 1991, the SFP modified its structure into a Research Department and a Practitioners Department. From this date, SFP began to foster collaboration between researchers and practitioners in order to address the issues faced by psychological science.

Describe how SFP has kept its scientific orientation as it's brought practitioners into the membership. Has that been an easy process or a challenging one?

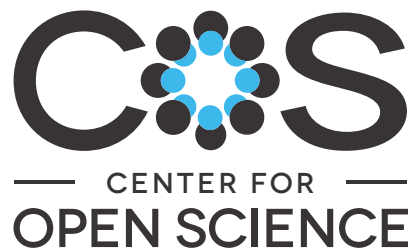
Both researchers and practitioners seek to promote and defend the use of valid methods and practices through shared ethical principles. Yet practitioners and researchers sometimes use different methods to obtain and handle their data. Additionally, some researchers want to promote more fundamental knowledge by providing a deeper insight into the nature and the functioning of psychological processes, while practitioners are more interested in knowledge that provides innovative treatment or intervention methods for their patients and clients.

These differences can lead to some conflicts. For example, researchers now widely agree that our articles must be published in international journals and in English. Journals published by SFP were originally in French, but our Research Department decided that articles in English and French

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should be welcomed in our journals. Some practitioners did not share this point of view, and we finally figured out that this disagreement was partly due to differences in what people perceived to be the objective of our journals. But by enabling a discussion between practitioners and researchers, we were able to ensure that the journal remained dedicated to the practice of psychology (i.e., *Pratiques Psychologiques*) by continuing to address issues related to the use of scientific knowledges and methods in practice.

This example illustrates that practitioners and researchers do have some misconceptions about each other and that we could solve many of our disagreements by establishing a mutual dialogue and trust.

How many people typically attend the Annual Congress?

The SFP hosts a yearly congress in a different city in France, with 300 to 600 people in attendance. This congress remains a challenge for our society because it must be well-suited to the changing needs of our colleagues and the discipline as a whole. Experimental psychologists and, more broadly, researchers in psychology have identified our congress as an opportunity to present their research and discuss science-related issues. Yet we still need to promote the view of our conference as a scientific event where practice issues can be addressed. For this purpose, we also set up events addressing the practice issues surrounding scientific principles.

What are some of the most significant issues facing psychological scientists today, both in France and in the European Union as a whole?

We believe there is a need to promote scientific principles and methods to address various societal needs. There is a need to prevent and treat behavioral, developmental, and neurological disorders, which constitute a major challenge for sustainable development. We also feel that the reinforcement of collaborations among psychological organizations around the world would help address these issues by supporting prevention and treatment using scientifically validated methods. In France, there is still a need to formulate recommendations regarding the use of scientific methods and tools in practical training programs — most notably in clinical training programs.

The promotion of scientific psychology could benefit from international exchanges about a number of issues related to the practice of research (e.g., ethical principles and their applications). Scientific studies that produce nonsignificant results and results that replicate previously published findings significantly inform the future directions of scientific research. Yet it remains difficult to publish such results. We believe that psychological scientists and organizations that

support psychological science should figure out how to put pressure on publishers and journal editors to accept these kinds of results for publication.

Some major scientific progress has resulted from interdisciplinary research, and organizations should also promote and support such collaborations. A major challenge for our discipline, for example, is the estimation of properties of psychological processes. A large number of studies use behavioral and verbal outcomes as proxies for psychological processes. The latter are inferred from responses to psychometric measures or from behavioral and physiological changes in response to environmental demands. Many psychological studies and academic training programs are based on this view of psychology research. The application of mathematical models in many sciences has helped significantly to account for complex phenomena like psychological processes. Scientific psychology organizations could also help forge new directions for research by hosting and supporting interdisciplinary panels dedicated to these issues. Such work would benefit not only research but also the development of innovative academic trainings.

Finally, psychological science remains unfamiliar to many citizens, employers, and students entering our academic training. This has a deleterious effect on our discipline and the practice of psychology. Students in high school typically do not have access to courses about scientific psychology, and this prevents them from formulating an accurate idea of what psychology really is. We think that we should address this issue in order to promote the view of psychology as a scientific discipline among students prior to their entry into university and in society as a whole.

Describe some of the Society's current initiatives.

The ethics of research is one major challenge we are currently facing in psychology, and more broadly in the social sciences. In France, we mainly use medical ethical principles and, therefore, our research has to adopt some medical methods to receive a positive evaluation. Though psychologists share some common ethical principles with medical and biological sciences, our disciplines differ with respect to our methods and objects. Therefore, medical ethics are not always well-suited to our research, and SFP has initiated a national dialogue on the ethics of research in social sciences. For this purpose, we collaborate with a number of other scientific societies in the social sciences, which has included organizing a panel of scientific societies on this issue during our national congress last September. Our objective is to formulate and use a commonly accepted set of ethical rules throughout the social sciences. This work should help to promote the view of psychology as a discipline using specific valid and rigorous methods. ●

CALL FOR APPLICATIONS

James McKeen Cattell Fund Fellowship

Presented in partnership with
Association for Psychological Science

Application deadline: January 15, 2018

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To be eligible for this year's awards, candidates must not be on sabbatical at any time during the Academic Year 2017–18. Sabbaticals must be for the Academic Year 2018–2019.

The deadline for submissions is January 15, 2018.

Applications may be submitted online: www.cattell.duke.edu/cattappl.html.



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

APS Award Address

Bringing Precision Treatment to Mental Health Care

Ours is the era of customization — the idea that goods and services should be tailored to individual needs is woven into our daily lives. The most competitive employers now emphasize job crafting and flexible work arrangements to recruit top talent and ensure a good fit. And medical practitioners are paying increasing attention to individual differences, down to the genetic level, to maximize treatment benefits.

Only now are researchers discovering how much of an impact this individual-differences approach could have in treating mental health. APS James McKean Cattell Fellow Robert J. DeRubeis (University of Pennsylvania) detailed his cutting-edge investigations into the factors that affect mental health treatment outcomes in his award address at the 2017 APS Annual Convention in Boston.

Across several decades, DeRubeis and colleagues have carefully unpacked several assumptions that have long prevailed in the clinical world. To do this, they start by asking a simple question: If this assumption is actually true, how would we know? This methodical approach has led them to some critical discoveries, including the idea that a steady trajectory of symptom improvement doesn't necessarily lead to the best outcomes.

Examining patients who received cognitive therapy to treat depression, DeRubeis and then-graduate student Tony Tang found that some patients remained fairly stable across several treatment sessions and then showed sudden and noticeable improvement — a phenomenon the researchers called “sudden gain.” When they listened to audio recordings from the treatment sessions, they found that patients began talking about how they were reconsidering things and taking a different perspective in the sessions right before this sudden gain.

Although patients may have relatively similar scores on the Beck Depression Inventory at the end of treatment, additional findings revealed that those who showed a sudden gain were more likely to sustain those gains and even show further improvement compared with those who followed a steadier trajectory.

Another study showed that the severity of a patient's symptoms also plays a role in whether a treatment is effective. Comparing medications with placebo, DeRubeis and coauthors found that medications worked well for patients who had severe symptoms, in line with previous research. But medications and placebo appeared to be similarly effective for the patients who are most likely to show up at a clinic seeking treatment: those with moderate symptoms.

The findings, published in *JAMA* in 2010, upended the popular notion that medications are necessarily beneficial in treating depression. The paper garnered considerable press, and DeRubeis

even received threatening emails from doctors and patients who believed the findings should not have been published.

Despite this, the researcher has continued to push the boundaries of clinical science.

Clinical research has historically been focused on main effects, either of a treatment or a patient group, investigating which treatment is most effective or which patient group will fare best. Often, these main-effects studies indicate that two treatments produce very small differences in outcomes or that specific therapy mechanisms appear to have a tiny effect.

These findings could be due to problems with treatment delivery or outcome measurement — or it could be that our intuitions about the processes involved are just wrong. But an equally likely explanation, DeRubeis said, is that our intuitions don't account for variation between patients.

Data show that, in a given population, some patients spontaneously remit and others have symptoms that seem intractable. The type of treatment these patients receive will matter little if at all — strong and weak treatments will be similarly effective or similarly ineffective.

Between these two extremes lie so-called “easy patients,” “pliant patients,” and “challenging patients.” The easy patients inevitably will show some improvement and will reach maximum improvement if they receive a minimal treatment. Pliant patients, on the other hand, mirror their treatment: They show no improvement if left untreated, moderate improvement with weak treatments, and maximum improvement with strong treatments.

Recognizing these different response patterns is essential in drawing conclusions about treatment effectiveness. Using computer simulations, DeRubeis and colleagues have shown that the distribution of these types of patients in a study comparing two treatments makes a huge difference in the study's results.

Imagine, for example, that a hypothetical strong treatment produced a 55-point change on some outcome measure, on average,



Identifying the best mental health treatments for patients requires clinical researchers to pay attention to a variety of individual differences, says **Robert J. DeRubeis**.

and a hypothetical weak treatment produced an average change of 45 points. If you were to compare the two treatments, with 60 patients in each group, you would expect a standardized mean difference of 10 points and a pooled standard deviation of 15 — a study with these basic features would yield a sizeable effect of $d=.67$.

But when DeRubeis and colleagues simulated a total of 1,000 studies, using different patient distributions, the results varied wildly.

In a study with patients who are all pliant, for example, the difference in outcomes between a strong treatment and a weak treatment remained clear, producing an effect size of $d=.67$.

Clinical practices will never have a pool of all-pliant patients, however. When the researchers shifted the distribution so that it contained predominantly pliant patients with some other patients mixed in, they saw the effect size decrease to $d=.48$. With a more skewed sample, the effect size dropped further, to $d=.24$.

“With .24, you probably don’t get that study published,” DeRubeis noted. “First of all, because it’s not going to be significant. And you’re going to look and say, ‘Well, those treatments are pretty much the same — .24, who cares?’”

Another study with actual patient data showed that these findings aren’t merely hypothetical. In collaboration with Dutch researchers Annemieke van Straten (VU Amsterdam) and Bea Tiemens (Radboud University), DeRubeis and then-graduate student Lorenzo Lorenzo-Luaces examined data from a randomized-control trial of depression treatments that was conducted in community settings.

At the aggregate level, the treatments appeared to be similarly effective.

The team then constructed a multivariable model in which they quantified different response patterns as a dimension that incorporated individual-level factors such as employment status, recurrence of major depression, and sleep quality.

As they predicted, the interaction between response type and treatment type *was* significant. For those patients who seemed relatively well-off on the response-type dimension, the mode of treatment didn’t seem to matter. But for those who were faring the worst on that dimension, cognitive behavior therapy was noticeably more effective than the other treatments.

This shows, in pretty unequivocal terms, that “it really does matter who the patients are, not just what the treatments are,” said DeRubeis.

In general, this actuarial approach entails examining a dataset, identifying multiple potential moderators, and using those moderators to generate and test predictive models. Building on previous work, DeRubeis and colleagues have developed a “personalized advantage index,” or PAI, which quantifies different interactions between treatment options and patient characteristics. The researchers take care to avoid overfitting these models, and they aim to include only those moderators that make sense from a clinical perspective.

With the PAI, the researchers can identify patients who are predicted to show very different outcomes on different treatments. It also can identify those who are predicted to show fairly similar outcomes across different treatments. Examining data from a study whose main findings were published in 2016, DeRubeis and frequent collaborator APS Fellow Steven D.

Hollon (Vanderbilt University) found that the PAI approach can generalize across patient samples.

In this study, the researchers wanted to identify those patients who would benefit most from adding cognitive therapy to their existing medication-based treatment plan.

“Most guidelines say that the combination treatment is really needed for patients with severe symptoms,” DeRubeis said. “We were interested in whether we could do better than that with a multivariable profile.”

DeRubeis, Hollon, and colleagues developed a model using data from patients in Nashville and Chicago. Included in the model were factors that generally reflect the difficulty of a case, such as number of prior episodes, early onset, and loss of interest. The question was: Would the model work for a separate group of patients in Philadelphia?

Some patients had low scores on the Hamilton Depression Inventory (HDI) and were also identified by the model as needing less-intensive treatment. The study results showed that these patients improved without adding cognitive therapy to their treatment plan. Other patients had high HDI scores and were identified as faring poorly — and these people showed noticeable improvement when they started receiving cognitive therapy.

But the most interesting outcome occurred when a patient’s depression score and the model prediction indicated different treatment approaches.

The data revealed that patients who had a severe HDI score but were predicted to improve by the model showed no benefit from the additional cognitive therapy. And patients who had a lower HDI score but were predicted to fare poorly showed a huge benefit from combining cognitive therapy with medication.

These data show “the promise of putting information together,” DeRubeis said. “We’re finding that it’s not just trivial. There are these differences that would be helpful in directing patients to the better treatment.”

This is especially important given that some treatment options are much more intensive or more costly than others. Knowing that a more accessible approach — such as starting with lifestyle changes or e-therapy — can be effective for some patients can help clinicians in devising appropriate treatment plans.

DeRubeis continues to expand the scope of this work, reaching out to and collaborating with researchers around the world. And he hopes to put these actuarial models to the most rigorous test by conducting prospective studies.

Previous work “gives us confidence that these things aren’t just going to wash away when we transport them,” he said. “But the real test — and the one that’s going to make it so that health systems might even think about implementing these kinds of things — is the one where we would test these things prospectively and preferably in a site other than the ones where they’ve been developed.” ●

-Anna Mikulak

To watch video of Robert J. DeRubeis's award address, visit psychologicalscience.org/r/individual-differences.



Integrative Science

Variations of Loneliness

Examining the Underpinnings of Isolation

When picturing someone “lonely,” you might imagine a solitary figure walking down a dark street at night or someone sitting at home with nowhere to go and no one to see. We often equate loneliness with being alone, but it’s just as much an emotion as a physical state.

Four scientists discussed what author Janet Fitch calls “the human condition,” including its origins, varieties, and consequences, at the 2017 International Convention of Psychological Science in Vienna, Austria.

APS Board Member Stacey Sinclair, an experimental social psychologist at Princeton University, and her collaborator, Drew Jacoby-Senghor at the Haas School of Business, University of California, Berkeley, study a unique basis of social exclusion among Whites: implicit anti-Black bias. This phenomenon, called “implicit homophily,” may foster problematic social interactions whereby individuals from minority groups, and even their White friends, are excluded from certain situations. Sinclair noted that forging interpersonal connections is linked with positive mental and physical health outcomes. And, she argued, “a central way we achieve this connection is by being drawn to people who are similar to us.”

To examine this idea, Sinclair, Jacoby-Senghor, and colleagues conducted a set of online experiments using Mechanical Turk to see whether White participants’ implicit bias would affect how they reacted to other Whites who were friends with Blacks.

They asked study participants to complete two Implicit Association Tests (IATs) designed to measure anti-Black bias. Afterward, they assigned each person to rate how much they liked a White person in photos of a White person paired with a person of varying ethnicity, always of the same gender. Individuals were told they were rating either a friend of or a stranger to the White person. The result: The higher participants scored on the anti-Black bias IATs, the less they liked a White person who had a Black friend — however, participants had no negative opinions when they believed they were rating individuals who did not know each other.

Because people also communicate their social preferences through nonverbal means, the research team designed another study to determine whether such nonverbal behaviors affected anti-Black bias. Participants again completed IATs, and then watched videos of a White person interacting with either another White person or with a Black person. In some videos, the White person displayed body language signaling ease; in others, the White person was visibly uncomfortable. Participants rated how much they liked the White person in each interaction.

Sinclair and her colleagues found that the more implicit anti-Black bias a participant had based on the IAT, the less they liked a White person who appeared to be comfortable interact-

ing with a Black person. They found no effect of implicit bias, however, for the uncomfortable condition; the raters disliked all situations in which the White person appeared uncomfortable.

The research team wanted to see if these results would hold up outside their virtual lab, so they asked the college students who had completed the IAT for permission to examine their Facebook profiles and delve into their social networks. They examined the top 10 friends of each student, as well as the top 10 friends of *those* individuals. Sinclair and her colleagues found that White females with higher implicit bias scores were less likely to be friends with White people who had Black friends compared with those who scored low on implicit bias. For men, however, there was no relationship between implicit bias and social connections. Some research on friendships, Sinclair said, would seem to support this, suggesting that women’s friendships are based primarily on similarities such as face-to-face talking and sharing values, whereas men’s are focused more on shared activities.

“This desire to connect with others, which leads us to gravitate toward people who are similar, is a means by which we get homophily in our social networks,” she concluded. “It’s not only demographics of homophily — this suggests the possibility of ideological homophily as well ... on this dimension that you aren’t even able to articulate that you have.”

APS Fellow Frosso Motti-Stefanidi of the National and Kapodistrian University of Athens hopes her research can inform policymaking in her home country of Greece. In particular, her work seeks to identify the factors that put migrant youth at risk for exclusion in classroom settings.

Motti-Stefanidi and her research group are conducting a longitudinal project, the Athena Studies of Resilient Adaptation (AStRA), which includes two cohorts totaling more than 2,000 immigrant adolescents and their nonimmigrant classmates.



Stacey Sinclair says a phenomenon called “implicit homophily” may foster problematic social interactions whereby individuals from minority groups, and even their White friends, are excluded from certain situations.

The psychological scientists follow these children across their 3 years of middle school, from ages 12 through 15. One of the advantages of the project, said Motti-Stefanidi, is that the team started collecting data before Greek economic crisis began and continued through the crisis (the first wave was conducted from 2005 through 2007; the second from 2013 through 2015).

For migrant youth, the school is an acculturative arena, Motti-Stefanidi said, so it is particularly important that they feel included: “This is where youth are exposed to the host culture, so being accepted by their nonimmigrant and immigrant peers may have consequences for youths’ sense of belonging and adjustment in school. Discrimination and rejection, on the other hand, has negative consequences for acculturation, for well-being, and for adaptation.”

To determine the factors that help or hinder migrant youths’ ability to adjust to their new country, Motti-Stefanidi and her colleagues used AStRA to examine three groups of immigrants — Albanian, Pontian Greeks from the former Soviet Union, and other ethnic groups not included in the former two categories — and their relations with peers within classrooms.

“How well relations are formed and how well they’re developed is consequential for youth adaptation and well-being,” Motti-Stefanidi explained. “If you feel rejected, friendless, or victimized, this makes school a less-than-desirable context, and in such cases, the school may become a place that is unlikely to promote learning and well-being.”

In one study, the psychological scientists investigated acceptance and rejection of immigrant youth by nonimmigrant peers. Using a social metric technique, they asked all students to write down the names of the three peers they liked most and the three they liked least.

Results showed that immigrants in classrooms with equal numbers of immigrants and nonimmigrants were less accepted by their classmates than those in classrooms with higher percentages of immigrants; when immigrants comprised 66% or more of a class, they were more accepted by classmates than were Greeks. Over time, immigrant students in classrooms with few immigrants became increasingly accepted by their Greek peers.

The researchers also found that at first contact, immigrants were more rejected than Greeks. Over time, however, immigrants were significantly less rejected by their peers, and were actually rejected only as often as their Greek counterparts. These results show, said Motti-Stefanidi, that “increasing familiarity through intergroup contact with immigrant classmates decreased, over time, the prejudice of Greek students.”

Motti-Stefanidi conducted a second study examining the “crisis cohort” of students who were in middle school from 2013 through 2015. Using data from teachers, school records, and self-reports, she and her team looked at how peer acceptance of immigrant and nonimmigrant students by Greeks and immigrants related to self-esteem and depression.

They found that, while Greek students’ well-being did not vary according to whether their classmates accepted them, immigrants’ self-esteem and depression levels were more affected by Greek students’ opinions than by those of fellow immigrants. Interestingly, however, this was only true for Greek majority classrooms. “The moment [ethnic] heteroge-

neity increases, this effect falls apart,” Motti-Stefanidi said. “Thus, effects of peer pressure on self-esteem and depression were found only in ethnically more homogeneous classrooms, and only for [immigrant] preference by Greeks.”

The outcomes of these two studies, she added, “produce a double-edged sword: Classrooms with high immigrant composition may promote positive development ... however, at the same time, they work against immigrant youth acculturation, because you

don’t have enough exposure to the host culture. In contrast, classrooms with low immigrant composition may promote positive acculturation but present a risk for immigrants’ development and psychological well-being.”

It is up to educational leaders such as teachers and principals, therefore, to design classrooms that strike a balance between promoting immigrant self-esteem and acculturation, as well as taking into account the needs of Greek students, Motti-Stefanidi concluded.

Taciano L. Milfont, Victoria University of Wellington, New Zealand, hopes to create a new typology of loneliness by examining the kinds of people who are likeliest to feel lonesome.

“Researchers have argued that loneliness is a perception of social relationships as deficient or unsatisfying,” he explained. “So feeling lonely is distinct from the objective reality of being alone. You might be among a lot of people, and loving people, but you still feel loneliness.”

To tease out the types of loneliness that might exist in the New Zealand population, Milfont and colleagues analyzed data from more than 18,000 participants in the New Zealand Attitudes and Values Study (NZAVS), a 20-year nationwide survey led by Chris Sibley of the University of Auckland. As part of the study, participants rated the veracity of three statements designed to assess how much they felt accepted and cared for: “I know that people in my life value and accept me,” “I feel like an outsider,” and “I know that people around me share my values and beliefs.” The study was led by clinical psychologist Hannah Hawkins-Elder and also included social psychologist Matt Hammond.

From these data, the psychological scientists identified four distinct loneliness categories: High loneliness, low loneliness, “appreciated outsiders” (e.g., those who found appreciation in close personal relationships because they were valued and accepted despite feeling like outsiders in general), and “superficially included” (e.g., those who didn’t feel like outsiders but also didn’t feel valued and accepted by others in meaningful ways).

The results showed that people in the high-loneliness category had the lowest levels of well-being of the four groups. This falls in line with previous studies that have linked loneliness with severe



Frosso Motti-Stefanidi is leading a longitudinal study of more than 2,000 immigrant adolescents in Greece, with the aim of identifying factors that put migrant youth at risk for exclusion in classroom settings.

physical health problems — such as nausea and headaches, poor sleep, increased alcohol consumption, and increased likelihood of smoking — and mental health problems, such as depression and anxiety. These consequences can create a negative feedback loop, Milfont says, leading people who are already feeling isolated to sink deeper into loneliness. If a person is already feeling tired or depressed, for example, they may be unlikely to make an effort to connect with others. Longitudinal studies like the NZAVS, he argues, can help illuminate this link.

Interestingly, appreciated outsiders scored almost as high as did the nonlonely on measures of well-being. This suggests, Milfont said, that it is better to have a few close relationships than many surface-level ones. It also may explain why people who already feel lonely tend to have negative experiences with social media, which often fosters casual connections rather than deep or meaningful relationships.



Taciano L. Milfont believes longitudinal studies, such as the 20-year New Zealand Attitudes and Values Study, are essential to developing a typography of loneliness.

Indeed, other researchers have used NZAVS data to examine the interplay between loneliness and social media usage over time. Their findings suggest that participants' Facebook habits were not uniformly negative or positive — rather, the relationship between Facebook use and loneliness over time seemed to depend on individual personality traits.

Milfont hopes this ongoing line of research will help the government of New Zealand better understand social exclusion and develop

new interventions for loneliness. The study is now in press at the *Australian and New Zealand Journal of Psychiatry*.

Alan Teo, US Department of Veterans Affairs and Oregon Health & Science University, studies the implications that social connections have for clinical issues, focusing specifically on depression and suicide prevention. Teo's interest has a personal origin: When he began working in this field, he treated a young man who had been in extreme withdrawal from the outside world for several years and who lacked even rudimentary social connections. Through their interactions, Teo realized that “we really need primary prevention strategies, particularly for conditions like depression.”

Teo, like Milfont and Motti-Stefanidi, advocated using longitudinal data to track individuals' behavioral development across extensive periods of time. For one study, Teo drew on Midlife in the United States, a nationally representative sample of American adults, to determine how social relationships correlate with individuals' chances of developing depression.

The scientist and colleagues identified those participants whose quality and quantity of social relationships were measured in the 1990s and looked at the 10-year follow-up survey to see who had developed depression. Not only did they find a connection between

social connections and depression, they established that the quality of people's social relationships was actually the factor most strongly linked with depression development, even across a time span of 10 years.

Echoing Milfont, Teo emphasized that it is the quality of prosocial relationships that boosts individuals' well-being, not their frequency of contact or number of friends. In fact, the data indicated that negative social connections increased people's absolute risk for depression, raising it from 7% to 14%.

In a second study, Teo explored how different modes of social interaction — virtual or electronic contact versus face-to-face conversation — affected the risk of developing depression among older adults. Examining data from the Health and Retirement Survey (2004–2010) for adults aged 50 and above, he and colleagues discovered that in-person contact was the only clear predictor of mental well-being. The findings indicate that such in-person contact may provide a buffer that counteracts the risk of developing depression.

In addition, supportive family and friends can act as “gatekeepers” who help connect a person with formal mental health services in times of need. This role is not without challenges, however, Teo noted.

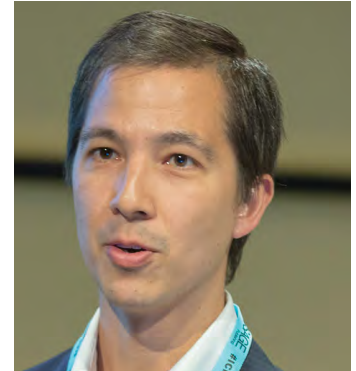
“It's not a God-given skill to be a good gatekeeper,” he explained. “It doesn't matter how good of a friend you are; if I put you on the spot right now and said, ‘Imagine you bumped into a friend today and they seemed to be in crisis: What would you do?’ It's easy to say that we might do this and that, but again, when we're actually put in a real-life situation, it's a lot harder.”

Fortunately, gatekeeping is a skill that can be fostered, the scientist said. In a study in which he partnered with a specialty clinic for Japanese patients at the University of Michigan, Teo and colleagues provided two community events designed to encourage participants to seek and promote mental-health-care services. The first event was a multimodal intervention with a film screening, gatekeeper training, and an expert panel; the second involved only a lecture on a related topic and an expert panel.

The results were clear: The event with the gatekeeper training significantly improved people's intended gatekeeper behavior, while the other did not. Teo clarified that this does not necessarily mean individuals followed through on their gatekeeping training, but said it was a positive sign nevertheless.

“One of our challenges,” Teo closed, “is, how can we have mental health interventions that work within our natural social network — those close relationships that do seem to matter for depression, suicide, and other things?” ●

—Mariko Hewer



Drawing from data gleaned across 10 years, **Alan Teo** has found that the quality of people's social relationships is the factor most strongly linked with depression.



PSYBER SECURITY

Thwarting Hackers with Behavior Science

The email included a seemingly normal request from toymaker Mattel's new CEO, Christopher Sinclair, requesting that a vendor in China be paid. Compliantly, the executive who received the email wired more than \$3 million to a Chinese bank. But when she later mentioned the payment to Sinclair, he was shocked. He hadn't made the request.

Mattel was a victim of a cyber threat known as the fake CEO scam — a form of electronic fraud that has, according to the US Federal Bureau of Investigation, cost organizations billions in losses over the past 3 years.

From viruses to ransomware and password phishing scams, cyber fraud and other digital security threats are a major worldwide concern. In the month of September alone, some of the biggest names in business — Yahoo!, Equifax, Virgin America, Deloitte — disclosed major data breaches and hacks that affected hundreds of millions of consumers. Now, governments and organizations around the globe are turning not just to computer scientists, but also to psychological scientists to keep their data safe.

Human behavior, just as much as technology, is at the crux of cybersecurity. Hackers and scammers target computer systems, but many of them also attack our biases and cognitive vulnerabilities.

Cyber Inception: Deceiving the Deceiver

The year 2006 marked a major turning point in cybersecurity attacks; spies hacked into military contractor Lockheed Martin's computers and made off with millions of proprietary documents pertaining to the Pentagon's F-35 Joint Strike aircraft. This style of attack, dubbed an Advanced Persistent Threat (APT), has been dramatically increasing and characterizes many of the most high-profile cyberattacks of the past few years.

There isn't an exact definition for an APT, but what these breaches have in common is a diverse set of tactics aimed at incessantly targeting a specific victim — a company, an organization, or even a government. One characteristic that makes these attacks particularly pernicious is their exploitation of our cognitive weaknesses: Unlike some other forms of cyberattack, these onslaughts often rely on simple acts of deception and social manipulation rather than cutting-edge technology.

By Alexandra Michel



Psychological scientist **Nancy Cooke**, left, is part of a team that is utilizing behavioral research findings, computer systems engineering, and game theory in an innovative development of defensive strategies against cyber attacks.

Most APT attacks are unleashed when a single individual unwittingly opens a “contaminated” link or a document that delivers customized malware to infect the entire computer network. Once an organization’s network is compromised, the attackers can then attempt to access files and data stored on the network. Typically, APT attacks are stealthy — attackers use methods that keep a low digital profile to avoid detection, and malicious code may stay hidden in systems for months or even years, providing attackers with a steady stream of information. Organizations often aren’t even aware of the attack until it’s too late.

Behavioral scientists Cleotilde (Coty) González and Nancy Cooke are part of a major new research effort to study the psychology of deception in order to counter APT attacks. They are members of an integrative team that was recently awarded a \$6.2 million Multidisciplinary University Research Initiative grant from the US Department of Defense. The team will be utilizing research from behavioral science, computer systems engineering, and game theory as part of an innovative effort to develop active defense strategies against APT attacks.

The researchers’ ultimate goal is to thwart cyberattacks by learning how to “deceive the deceivers.”

González is a Professor of Decision Sciences and the founding director of the Dynamic Decision Making Laboratory at Carnegie Mellon University, where she conducts studies using cognitive computational models to support decision-making in dynamic environments. Cooke is a cognitive psychologist in the Human Systems Engineering program in the Ira A. Fulton Schools of Engineering at Arizona State University and studies teamwork and human performance in complex environments. Her lab will gather and evaluate data from teams of participants engaged in an advanced cyberattack simulation.

“Advanced persistent threats originate from humans,” Cooke explained. “These threats can therefore only be understood and mitigated through understanding of humans and human factors.”

González and her team will develop cognitive models of attackers based on Instance-Based Learning Theory, which draws from memory research, decision science, and machine learning. When a person assesses a situation in which they must make a decision, they retrieve memories of past events and experiences and compare them with the current situation. This process has some memory biases that defense mechanisms can take advantage of in order to deceive the attackers.

In the example of a cyberattack, experiences and memories of past threats determine how aggressively a security analyst might respond to the ambiguous early signs of danger. In APT campaigns, attackers are persistent and likely to learn and adapt to defenses over time. González, Cooke, and colleagues will focus on developing their own deceptive tactics that are just as adaptable and versatile. They call this methodology Cyber Inception.

“This new approach to cybersecurity will exploit the psychology of deception to lure attackers into believing that they have successfully compromised a system, while keeping our systems safe,” González said.

Eventually, the data from behavioral experiments and cognitive models will be used to fine-tune sophisticated algorithms capable of detecting APT attacks.

Computer Scientists Embrace Social Psychology

By training, Jason I. Hong is a computer scientist. He helped found a startup cybersecurity company called Wombat Security Technologies, and his Computer Human Interaction: Mobility Privacy Security lab at Carnegie Mellon University researches

usable privacy and security. However, he's recently been at the helm of a fascinating series of large-scale social psychology experiments.

"The 'light bulb' moment for me happened one day at my startup," Hong explained. "Two women were talking to each other about a recent event. One said, 'Did you hear what happened to Moe? He slipped on the ice [and dropped his laptop], and now can't access the files on it.' The other women said, 'I'm going to back up my data right now.' And she did!"

"It immediately struck me that this was a positive example of social influence and behavior change for cybersecurity. I had heard my colleagues in the behavioral sciences talk about concepts like social proof, commitment, and reciprocity for years, and it all crystallized in my head based on this one event that we could also use these kinds of techniques to solve hard problems in cybersecurity."

Hong's interest in social psychology emerged from working as an associate professor in the Human Computer Interaction Institute at Carnegie Mellon University.

"Psychologists, designers, and computer scientists are all sitting next to each other," Hong said. "So over the past few years, I've slowly absorbed many of the theories and methods used by these other disciplines."

With a recent grant from the National Science Foundation (NSF), Hong and Laura Dabbish are the principal investigators on a project exploring the use of social influence to encourage safer cybersecurity behaviors.

And Hong and colleagues collaborated with social media giant Facebook on a massive experiment inspired by social-proof research from APS Fellow Robert Cialdini.

In his 2006 book *Influence: The Psychology of Persuasion*, Cialdini explains how social influences play a vital role in how we make decisions. When we are unsure of the appropriate course of action — say, adopting a security feature versus using a stronger password — we look to people around us for what Cialdini has dubbed "social proof." One of the biggest challenges in convincing people to adopt safer cybersecurity practices is that people simply don't have much opportunity to observe each other's behavior.

"Our experiment with Facebook was based on two insights," Hong said. "The first is that cybersecurity has low observability. I don't know how good your passwords are or what security settings you have, and vice versa. This lack of observability makes it hard for good practices to diffuse through a social network.

"The second is that we could use social proof to positively influence people's awareness, knowledge, and motivation to be secure. Facebook already had data about who was using various security features."

Facebook's Site Integrity team wanted to encourage users to take advantage of more of the platform's security features, such as activating Login Notifications, Login Approvals, and Trusted Contacts.

A team led by Hong's student, Sauvik Das, wanted to see whether increasing the observability of cybersecurity social norms could persuade more users to adopt these security features. The research team showed a sample of 50,000 active Facebook users one of eight possible security announcements prompting them to adopt these security features.

The seven social-proof messages informed users that their Facebook friends were already using these security features. These messages varied in specificity and phrasing — from showing the exact number of friends to just saying "some" friends. A control group received a message without any social-proof framing (i.e., "You can use security settings to protect your account and make sure it can be recovered if you ever lose access").

"We found that while all of our social-proof-based interventions were effective, simply showing people the specific number of their friends that used security features without any subjective framing was most effective — driving 37% more viewers to explore the promoted security features compared to the non-social announcement," the researchers wrote.

Over the following 5 months, both conditions continued to generate more views of the security features compared with controls.

Interestingly, getting people to click through to the promoted features didn't necessarily mean that people were ready to adopt them: There was no difference in the actual adoption rate of those who viewed a social prompt compared with a nonsocial announcement.

A follow-up survey confirmed that the social announcements raised viewers' awareness of available security features. However, individuals in the control condition who clicked through for more information may have had higher intrinsic motivation for using security features, the research team points out.

Personality Traits and Risk

We are all vulnerable to cybersecurity attacks, but research indicates that a small segment of the population appears to be particularly at risk. Carl Weems, a professor of human development and family studies at Iowa State University, is part of an integrative team investigating whether certain personality traits predispose individuals to higher risk of careless cyber behaviors.

Weems's main research area is emotional development and traumatic stress, but he has always been interested in the translation of basic psychological science into answering important applied questions. Along with University of New Orleans computer science professors Irfan Ahmed and Golden Richard III, Weems recently received a grant from the NSF to investigate personality factors in cyber security.

"The goal of this project was to utilize the methods of psychological science to build a platform and techniques for predicting secure versus insecure cyber behavior," Weems said.

Weems and colleagues collected an initial set of psychometric data from a socioeconomically and ethnically diverse sample of 210 adults. Participants reported how often they carried out 20 security-related tasks drawn from a pool of cybersecurity recommendations.

The researchers found that most participants seemed highly engaged in security-enhancing behaviors, while only a few reported engaging heavily in the kinds of practices that compromise security.

Participants also completed a series of personality measures. As might be expected, highly conscientious people were less likely to engage in insecure behaviors. However, contrary to their hypothesis, the researchers found no link between high neuroti-

THE DOT-PROBE TASK

In the dot-probe task, participants viewed a pair of emotionally evocative images or words presented simultaneously. The stimuli were then immediately removed, and a probe replaced one of the images on the screen. Participants were instructed to hit the computer key that corresponded to the probe as quickly as possible. The faster individuals respond, the more likely it is that they have been paying attention to the image that was located in same position as the probe.

Weems and colleagues found that individuals with trait anxiety tended to respond to a probe more swiftly if the previous stimuli suggested threat (e.g., the word “fear”), whereas callous–unemotional individuals tended to detect the probe more quickly following images of pain, distress, and suffering.



cism scores and secure behaviors. Participants scoring high on aggression, depression, and trait anxiety also scored significantly higher on the insecure behavior scale.

Weems and colleagues have been developing a highly customizable research tool that other researchers can use to study the relationship between personality traits and cybersecurity behavior. The Software Package for Investigating Computer Experiences is a script-based product that provides an easily modified platform for analyzing security behavior and personality. It's designed to capture data detailing the personality traits and cyber behaviors of a large population of users, and to create data sets for studying the variations of cyber behavior across different personality types.

To start, Weems and colleagues have been examining the link between risky cyber behavior and both trait anxiety and the callousness–unemotional trait. The researchers are using a standard cognitive assessment — emotional dot-probe tasks (see sidebar) — to assess the personality traits.

After completing the personality trait assessment, participants engage in a realistic scenario, assuming the role of a new employee at an accounting firm. As they complete mundane office tasks like reading emails, checking stocks, and completing accounting math problems, they're simultaneously prompted with realistic decisions about cybersecurity: phishing emails, software update requests, and antivirus scanning.

This multitasking environment allows researchers to collect fine-grained data on what people actually do when faced with cybersecurity decisions.

Weems and colleagues deliberately made it easy to modify the contents and manage the flow of different events in the scenario, allowing other researchers to highly customize their own experiments.

“An important initial step in actualizing the benefits of psychological research on cybersecurity is to empirically establish

the ability to measure the dependent variable of secure and insecure behavior so that typical cognitive and behavioral experiments on predictors can be conducted,” Weems said. ●

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Remembering Annette Karmiloff-Smith

By Susan Goldin-Meadow and Mark Johnson

Annette Karmiloff-Smith passed away on 19 December 2016, and psychological science lost a brilliant developmental neuroscientist. Unfailingly generous with her time and ideas, Annette inspired generations of students and colleagues not only to challenge accepted ideas, but also to replace those ideas with creative new ones. The two of us bracket Annette's career as a psychologist — Susan was there at the beginning, and Mark at the end.

Susan first met Annette in 1969, when they were both students at the University of Geneva. It was a life-changing time. Annette hadn't yet decided to commit to studying psychology — she had been a simultaneous interpreter at the United Nations in Geneva but found that the job was not intellectually stimulating, and a chance encounter with Jean Piaget at a bookstore had led her to dabble in psychology (she completed her license, essentially a master's degree, at the University of Geneva in 1970). Susan was doing her junior year abroad from Smith College and hadn't committed to anything yet. The two partnered on a project for Mimi Sinclair exploring whether Piaget's theory had anything to say about children's acquisition of the relative clause — they found that it did. But the truly important aspect of the experience for Susan was that she got to work with Annette, who was (even then) a gifted researcher. And she got to watch firsthand as Annette managed being a young mother and a student and did it with her characteristic excellence. It was the beginning of one of the important themes in Annette's life — achieving a sensible work–life balance.

Piaget, Bärbel Inhelder, and Sinclair were inspiring — so inspiring that, after spending 2 years in Beirut, Annette returned to Geneva to do her doctorate in *psychologie genétique et expérimentale*. But for Susan, it was working with Annette, who, by example, convinced her to go on to graduate school and become a developmental psychologist, studying language no less (but not relative clauses). The two remained close friends and colleagues for the next 47 years, including such unforgettable moments as when Susan's husband (a Jewish boy from New York with limited French) became le Père Noël for Annette's two

girls. It was a lifetime of love and respect — but it wasn't enough time.

After finishing her doctorate, Annette became a Research Associate at the University of Geneva, working in the labs of Piaget, Inhelder, and Sinclair. Annette's big break came in 1977, when she delivered a well-received address at a conference at Stirling University, “Be-



yond Description in Human Language.” From there, Annette became a Visiting Scientist at the Max Planck Institute for Psycholinguistics in Nijmegen (1981–1982); a Senior Scientist at the MRC Cognitive Development Unit in London (1982–1998); and Head of the Neurocognitive Development Unit at the Institute of Child Health in London (1998–2006), until UCL forced her to retire at 65. But Annette never really retired, and from 2006 until her too-early death, she served as a Professional Research Fellow at Birkbeck, University of London, where she did some of her very best work.

Annette appreciated Piagetian theory but never shied away from challenging it. In fact, she used it as a stepping stone to build her own view of how development works, which was the core of her book, *Beyond Modularity: A Developmental Perspective on Cognitive Science*, published in 1992. Annette viewed modularization as a process (which she called representational redescription), one that results in (rather than begins with) successively more developed and modularized knowledge representations. Modularization of knowledge need not be innate, but instead can be an emergent product of learning and development.

Annette also argued forcefully for the importance of studying developmental disorders, not as broken processes, but as developmental trajectories that take different paths from the typical and, as a result, provide unique insights into the mechanisms that foster developmental change in all children. And she backed up her arguments with insightful studies of individuals with Williams syndrome, Down syndrome, and Alzheimer's disease, the project on which she was working when she died. Annette noted that, on autopsy, the brains of most individuals with Down syndrome have the signature characteristics of Alzheimer's disease. But not all of these individuals displayed the cognitive deficits typical of Alzheimer's. The question is why — is there a protective factor that prevents these

APS Immediate Past President **Susan Goldin-Meadow** is the Beardsley Ruml Distinguished Service Professor in the Department of Psychology and Committee on Human Development at The University of Chicago.

APS Fellow **Mark Johnson** is Co-Director of the Centre for Brain and Cognitive Development at Birkbeck, University of London, and Professor of Experimental Psychology and Head of the Department of Psychology at the University of Cambridge.

particular individuals from displaying the cognitive deficits associated with Alzheimer's disease and, if so, can we exploit this factor in our treatments of the illness? Tying a disease of aging to a developmental phenomenon exemplifies Annette's willingness — and ability — to think outside of the box.

Annette was extraordinary in many ways, but one of her little-known passions, which is only now becoming a focus for many researchers, was to bring science to the general public. As she would often remind us, it's not as simple as it looks — it is a significant challenge to translate science into easy-to-understand language and not violate the science. Her rule of thumb was to be simple, yet not simplistic. And she practiced what she preached. As one example, Annette was the scientific consultant on the Emmy-award-winning TV series "Baby It's You," and was author of the best-selling tie-in book of the same name.

Annette met Mark when they worked together at the MRC Cognitive Development Unit, another life-changing time, one that shaped the rest of her intellectual and personal life. A shared perspective on developmental science and mutual respect blossomed into a personal relationship, and later, marriage. When Mark moved to Carnegie Mellon University, Annette came out for a year, during which she wrote her book *Beyond Modularity*. A variety of factors brought the couple back to the MRC Cognitive Development Unit until its closure in 1998. Annette and Mark collaborated on a number of empirical and theoretical projects over the years, perhaps most notably as coauthors (with Jeff Elman and others) of *Rethinking Innateness*, an influential volume that married a constructivist view of human development with connectionist modeling and developmental neuroscience.

While methodologically rigorous, Annette's style of doing science was very much person-centered. She played an inspi-

rational role in nurturing, advising and, collaborating with undergraduate and postgraduate students, research fellows, and junior faculty throughout her career, often also advising on personal and domestic problems surrounding life-work balance. This person-centered approach also extended to the many families of children with Down syndrome or Williams syndrome in her studies that she helped over the years, frequently giving up her time in the evenings and weekends to offer extra advice and assistance.

Annette was the recipient of numerous awards and honors, but was perhaps most proud to meet the Queen and be bestowed the honor of CBE ("Commander of the British Empire"). Notably, she was also the first woman scientist to be awarded the Latsis Prize (sometimes called the "European Nobel") in 2002. A lecture series at Birkbeck for women in psychological science has been named after her. During her last days, strong medication made her confused, and she earnestly requested that Mark help her prepare to give a lecture. Sadly, we will never now hear that last lecture. ●

A full remembrance, organized by Goldin-Meadow and Johnson, is online at psychologicalscience.org/r/Karmiloff-smith. Other contributors include Daniel Ansari, Maggie Boden, Jean-Paul Bronckart, BJ Casey, Jeff Elman, Kang Lee, Dan Slobin, and Michael S.C. Thomas.

To watch video of Annette Karmiloff-Smith's "Inside the Psychologist's Studio" interview, visit bit.ly/2xvJUHw.



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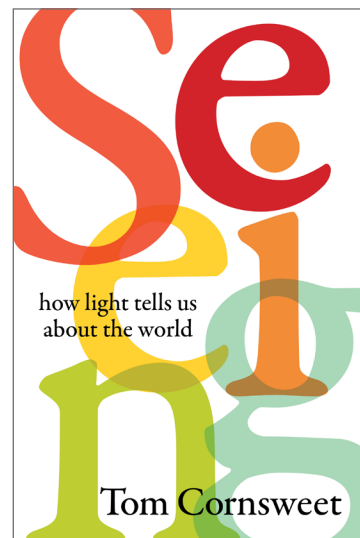
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Edited by C. Nathan DeWall and David G. Myers

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

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

Not Quite Human: Teaching Students Why Blatant Dehumanization Exists

By C. Nathan DeWall

Kteily, N. S., & Bruneau, E. (in press). Darker demons of our nature: The need to (re-)focus attention on blatant forms of dehumanization. *Current Directions in Psychological Science*.

From ancient Egypt to the Holocaust and the Rwandan genocide, people have dehumanized others. Across human history, blatant dehumanization has fueled war, genocide, enslavement, and torture. In recent years, psychological scientists have assumed that few people explicitly endorse dehumanizing attitudes, which has led to the widespread study of subtle and implicit forms of dehumanization. What few people realize, according to Nour Kteily and Emile Bruneau (2017a), is that modern life still contains widespread blatant dehumanization.

Blatant dehumanization begins when people rob others of traits and abilities that separate lower-level animals from fully

evolved humans: the ability to plan, to think logically, or to have human-specific traits and emotions (e.g., shame, guilt; Leyens et al., 2000; Haslam, 2006; Waytz, Cacioppo, & Epley, 2014). Stripping people of their humanity makes it easier to harm them. Blatant dehumanization of Muslims and Mexican Americans, for example, predicts greater acceptance of policies that harm members of both groups: a Muslim travel ban and building a wall between the United States and Mexico (Kteily, Bruneau, Waytz, & Cotterill, 2015; Kteily & Bruneau, 2017b).

What factors increase blatant dehumanization? Kteily and Bruneau (2017a) identify several factors:

- *Status*. People who lack social status (e.g., Muslims, Black Americans, Roma) suffer the greatest risk of blatant dehumanization.
- *Threat*. Compared with those who make us feel safe, people who seem to threaten our safety or resources appear less than human. For example, blatant dehumanization toward Arabs increased in the wake of the Boston Marathon attack (Kteily et al., 2015).
- *Individual differences*. Socially dominant and authoritarian individuals are most likely to perceive others as subhuman (Kteily et al., 2015; Linden, Bjorklund, & Backstrom, 2016).



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To bring this cutting-edge research into the classroom, instructors can complete the following activities. In the first activity, ask students to guess in which year each of the following statements were made. Please warn students that each statement conveys the dehumanization of members of certain groups. These statements are offensive and are only included to educate students about blatant dehumanization. Assure students that participation is voluntary.

Activity No. 1: When Did They Say It?

Statement 1:

“The personification of the devil as the symbol of all evil assumes the living shape of the Jew.”

-Adolf Hitler, leader of Nazi Party, former Chancellor of Germany

- A) 1915
- B) 1925
- C) 1945
- D) 1905

Statement 2:

“They are devils. They are subhuman.”

-Ramzan Kadyrov, Head of Chechen Republic, describing gay people living in Chechen Republic

- A) 1947
- B) 1977
- C) 2007
- D) 2017

Statement 3:

“To me, they’re not even people.”

-Eric Trump, describing people who criticize his father, US President Donald J. Trump

- A) 2010
- B) 2012
- C) 2015
- D) 2017

Statement 4:

“We’re showing this parasitic class of antiwhite vermin that this is our country.”

-Robert Ray, reporter, *Daily Stormer*, describing his goals for participating in the Charlottesville demonstration

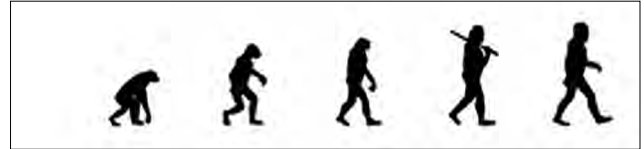
- A) 1865
- B) 1877
- C) 2007
- D) 2017

Instructors then can share the answers with students: *B* (Quote from Hitler’s book, *Mein Kampf*), *D* (Quote from interview on “HBO Real Sports”), *D* (Quote from interview on “Fox News with Sean Hannity”), and *D* (Quote from interview on “HBO VICE”). This activity illustrates the thrust of Kteily and Bruneau’s (2017a) argument: Blatant dehumanization is still rampant today.

Activity No. 2: Test Yourself

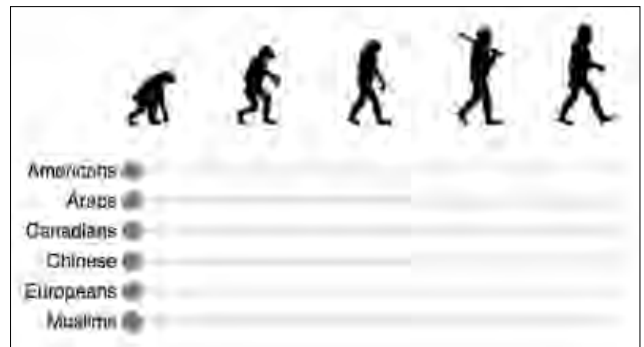
Is it possible to measure blatant dehumanization? Kteily, Bruneau, and their colleagues developed a simple, ingenious measure to do so (Kteily et al., 2015, 2016). In this activity, students will complete this measure of blatant dehumanization toward members of various groups.

First, show students the common Ascent of Man figure (see below, from Kteily et al., 2015, Figure 1).



Next, ask students to read and respond to the following instructions (modified slightly from Kteily et al., 2015):

Instructions: People can vary in how human-like they seem. Some people seem highly evolved, whereas others seem no different than lower animals. Using the image below, indicate how evolved you consider the average member of each group to be (0=left, least evolved to 100=right, fully evolved):



Ask students to form pairs and discuss their responses. Why would any group receive a rating of less than 100? What does that say about how we view members of other groups? How might you rate people who are Nazis, serial killers, members of a terrorist organization, or convicted child abusers? How might you rate people who have physical or intellectual disabilities, who often experience discrimination and exclusion because others dehumanize them (Sherry & Neller, 2006; Taylor, 2011)?

At its best, psychological science operates outside of political preference. Psychological scientists who identify as liberal, libertarian, conservative, or independent use the same scientific method to sift intuitive fiction from empirical fact. It’s true that the world has never been so peaceful (Pinker, 2011). But we must also accept the evidence that our peaceful world still contains — and, in some ways, encourages — the blatant dehumanization of certain groups. This puts us on a path of digression, rolling us back to a civilization where people opt for conflict rather than cooperation. Members of all groups are fully evolved humans. Recognizing each other’s humanity will help turn the tide of blatant dehumanization that threatens to devastate the peaceful world we have worked so hard to create. ●

Say It Out Loud: The Production Benefit in Human Memory

By Cindi May and Gil Einstein

MacLeod, C. M., & Bodner, G. E. (2017). The production effect in memory. *Current Directions in Psychological Science*, 26, 390–395.

Memory defines human identity. Memory enables our knowledge of who we are and how we are linked with other people and places. Memory begets our sense of personal continuity from day to day, even moment to moment. Small wonder that scientists have sought to understand memory and to identify strategies for enhancing it.

One such strategy, largely ignored until recently, is the production effect. It was first discovered by Ronald Hopkins and Richard Edwards (1972) and later named and popularized by APS Fellow Colin MacLeod, Nigel Gopie, Kathleen Hourihan, Karen Neary, and Jason Ozubko (2010). The production effect refers to a simple, robust, and long-lasting psychological process: Producing words — by speaking them aloud, writing them, or even simply mouthing them — yields better memory than does reading them silently.

To demonstrate the production effect with students, show them the following list of 20 words one at a time for 2 seconds each, with half printed in blue ink and half printed in black ink:

truck pencil heart apple poster glass trash horse
bridge stove shadow doctor engine friend market
letter radio nature pasta office

Instruct students to read silently the words printed in blue ink, and to mouth silently the words printed in black ink (to include a methodological component to the lesson, instruct half the class to do the reverse). Then test students on their memory for the entire list. The production effect will be evident when students recall more of the words that they mouthed than the words that they read silently.

Next, ask students what other manipulations might yield a similar effect. Recent studies indicate that memory improves not only when

words are spoken aloud or silently mouthed, but also when they are handwritten, typed, sung, or spelled out (e.g., Forrin, MacLeod, & Ozubko, 2012; MacLeod, Gopie, Hourihan, Neary, & Ozubko, 2010; Quinlan & Taylor, 2013). Even just imagining typing a word can produce better memory than simply reading it (Jamieson & Spear, 2014). The production effect also extends beyond single words to textbook passages and spoken dialogue. In addition, production need not be self-production, as a small but reliable benefit occurs when the words are spoken by someone else (MacLeod, 2011). As students generate possible alternative manipulations for creating the production effect, ask them to consider why they think their manipulations would improve memory. Review the existing findings and have students generate hypotheses about the potential mechanism(s) underlying the effect.

This exercise helps to remind students that psychological science is an investigative pursuit. Memory researchers are not merely interested in identifying strategies for boosting memory performance — they want to understand what these strategies reveal about why we remember what we do.

The production effect disappears when recall is compared for a list in which all the words are spoken versus a list in which all the words are silently read (that is, a between-list rather than a within-list manipulation). Thus, if half the class reads an entire list out loud, and the other half reads the same list silently, free recall of the list will be equivalent across groups (Forrin & MacLeod, 2016). These recall data suggest that one potential mechanism contributing to the production effect is relative distinctiveness: The act of producing a word may create a distinctive memory that makes the word more memorable relative to a word that was not produced. Of course, relative distinctiveness is only possible in a within-list design; in a between-list design, all of the words in a given list are produced, so none is more distinctive than the others, thus eliminating the production effect.

As is the case with many psychological phenomena, the story is not quite that simple; relative distinctiveness cannot fully account for all the extant data. For example, the production effect is evident, albeit reduced, in a between-list design when a recognition test rather than a recall test is used (Forrin & MacLeod, 2016). This example creates a useful opportunity to discuss the different processes that may underlie recall versus recognition, and the need for multiple dependent measures when trying to understand human memory. Ask students to generate additional explanations that could contribute to the production effect and that might differentially influence recall and recognition.

Finally, encourage students to propose future directions for research that might inform our understanding of the production effect and, more generally, of human memory. What



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other behavioral studies might shed light on the mechanism(s) driving the production effect? How might scientists use neuroimaging techniques like fMRI and ERP to understand production effects? Given the known limitations for the effect, is the production effect something that teachers or students could harness to improve learning?

From the moment we awaken until we fall asleep at night, memory drives our understanding of the world and our place in it. Further study of the production effect may allow us to apply the effect in everyday settings, and to shed light on the processes underlying human memory. ●

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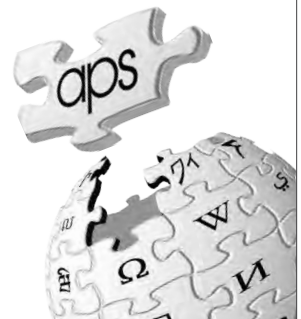
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Influencing Evidence-Based Policy as a Graduate Student

by Amy Heard Egbert

Few processes impact the lives of everyday people as strongly as the creation of public policy. Public policy may be defined concretely as specific legislation, or it may be thought of more abstractly as the social principles upon which the law is based (McKnight, Sechrest, & McKnight, 2005). In both cases, it aims to impact human behavior to satisfy the greater good of society. Given that the study of human behavior is the foundation of psychological science, psychologists have a unique role in shaping public policy.

Although influencing governmental decisions may seem intriguing, such work also might feel daunting to students: Many are still developing their own lines of research and may not feel as though their work is important enough to impact society at large. While it is true that students rarely are called on to be policy advisors and cabinet members, the skills that psychology students gain, especially through PhD programs, allow us to make a significant impact in the public policy sector. For those interested in policy work, there are several ways to get started:

Strategic Science

Good public policies are evidence-based. Although the role of evidence-based policy is different in every political administration, learning how to explain the relevance of your research to someone who is not an academic is an important step to becoming involved in the policy-making process. While conducting “strategic science” involves designing research that addresses information gaps that are relevant to policy

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decisions, it also means learning how to communicate that research outside of the academic community (Brownell & Roberto, 2015). To do this, you need to think outside of the box of a research article. Write an Op-Ed to a local newspaper. Consider submitting to a journal that accepts policy briefs on topics relevant to your research. Create summaries of your existing research that can be easily understood by someone outside of your field. Be creative!

Although this article will largely focus on more formal ways to become involved in policy, it is critical to remember that policymakers will not turn to science to inform their work if they cannot understand why the science is relevant. Because of this, it is important to learn how to communicate your work. Additionally, conducting strategic science in your own work will likely make you more competitive for formal public policy programs.

Policy Fellowship Programs

For those wishing to gain formal experience in public policy work, there are several fellowships geared toward students

and early-career professionals. These programs often select a small number of individuals to travel to government hubs (such as Washington, DC) and experience firsthand what it is like to work at the intersection of science and policy. Formal programs can be a great opportunity for students who are considering careers in public policy, as well as a good resource for future psychological scientists who are curious about jobs outside of academia. Some organizations that offer fellowships include:

- **The National Academies of Science, Engineering, and Medicine** (students and early-career professionals). The Christine Mirzayan Science & Technology Policy Graduate Fellowship Program provides graduate students, post-doctoral fellows, and recent graduates the opportunity to travel to Washington for 3 months and learn about the role of science and engineering in policy work;
- **The American Association for the Advancement of Science** (recent graduates of PhD programs and master's-level graduates with at least 3 years of experience). AAAS Science and Technology Fellowships place recent graduates in executive, judicial, or legislative fellowships to contribute scientific expertise to the public policymakers and federal agencies for one year;
- **The Presidential Management Fellows Program** (recent graduates of master's or PhD programs). This program places recent graduates in 2-year entry-level positions in various federal agencies and allows them the opportunity to rotate through more than one agency; and
- **The Society for the Psychological Study of Social Issues** (undergraduate seniors, graduate students from underrepresented minorities, and recent graduates of PhD programs). The Society offers several policy fellowships ranging in length that provide students and postdoctoral fellows the opportunity to incorporate psychological science into policy work.

Advocacy Through Professional Organizations

Many scientific and professional organizations organize advocacy groups to visit state or national legislatures to inform and advise lawmakers on important issues. These membership opportunities are often especially relevant for clinical psychological scientists, as many groups have formal programs that advocate for awareness, funding, prevention, and treatment programs for mental health care.

Additionally, given the proposed budget cuts to a number of scientific organizations, psychological scientists from all disciplines have the opportunity to advocate for government support of both evidence-based policy and scientific research in general.

Program Evaluation

In addition to public policy initiatives on a national level, it is also important to consider local policy initiatives. One

way to become involved on a local level is through program evaluation. Many community organizations are interested in tracking the impact and assessing the effectiveness of their programs. Organizations may use this information when applying for public and private grants to support the work that they are doing. For graduate students, working on program evaluation for community groups can be a good way to network with key players who are active in the community. It also may be a way to gain experience with those outside of academia, while learning how to present research in a clear and understandable way. Such partnerships provide benefits for all parties involved — they let you engage in research with a unique population, help community members gain access to more effective programming, and allow community groups to run more efficiently by identifying strength and growth areas.

Of the policy options discussed in this article, working with community partners may be one of the most difficult. Starting new research projects involves consent, institutional approval, and faculty support. This can be a lot of work for an already-busy graduate student. However, working with local groups also can be one of the most rewarding ways to become involved in your community and, by extension, to help inform public policy.

Public policy work comes in all shapes and forms, but it represents a key area where psychological scientists — including students — can become involved. We can use the skills that we spend so many years learning, skills that allow us to conduct rigorous research, to inform public and private programs, laws, and discourse. No matter how divisive the political climate, standing up for science and helping to support evidence-based policies is a worthy pursuit that you can begin now. ●

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Reliability in Psychology: Means Versus Ends

While riffing on our field's "replication crisis" in a recent *Observer Forum* piece, "Taking Responsibility for Our Field's Reputation," two of my favorite psychologists posed a challenge: "Anyone who views the field's problems as exaggerated needs to explain ... how we could possibly be getting reliable one-shot findings given the malign combination of low power, publication bias, *p*-hacking, and the evidently low bar of our conventional threshold of 5% significance" (Pashler & de Ruiter, 2017, p. 10). Darn it: I had been hoping to keep my head down and continue watching this conversation play out from the sidelines, but I must admit that I fall into this camp: Though an enthusiastic supporter of several of Pashler and de Ruiter's specific exciting proposals, I do also worry that we have been exaggerating the scope of our problems in at least one important and underdiscussed way. Pashler and de Ruiter argue that I have a responsibility to explain, which seems fair.

A Vision of Psychological Reliability

I identify in part as a vision scientist, and from this perspective our field's crisis can feel a bit odd. After all, one of the core problems fueling this turmoil (and the first one mentioned in the quote above) is low power: We have too often drawn conclusions from lightweight studies testing barely a dozen subjects. But visual psychophysics is built (both historically and still today) on a foundation of experiments that routinely feature just two or three observers (often with an implicit feeling that one or two of them may be gratuitous). Yet vision science doesn't seem to be suffering to the same degree that some other subfields of our discipline are. At least, I would characterize the reaction of many of my psychophysicist colleagues more in terms of puzzlement than panic. It may be a bit harder to highlight high-profile replication failures in this area. (Should we be worried that visual crowding may not be real? Or motion adaptation? Or the Muller-Lyer illusion? Or motion-induced blindness? These phenomena have been studied extensively, but rarely with direct replications across labs.) And we now know, as those of us who teach lab classes have long suspected, that at least some effects in the wider neighborhood of cognitive psychology are rather impressively robust (e.g. Zwaan et al., in press).

No doubt there are several independent reasons for this state of affairs. For one, in vision science those two or three observers are often completing hundreds or thousands of trials each — something not always taken into account when calculating "power." Second, such effects are often large and robust (with " $p < .001$ " not being at all uncommon). Third, statistics aren't our only source of evidence in the study of perception: We also sometimes rely on compel-

ling subjective demonstrations. (In our lab, we strive not just for $p < .001$, but also for $p < \text{"Holy cow: look at that!"}$) Here, however, I'd like to focus on a fourth reason — one that underlies why our field's replicability crisis strikes me as perhaps inflated in some discussions.

Preregistration and "Postregistration"

How might some studies manage to avoid collapsing even with (what is in one sense) low power and few cross-lab direct replications? You might think that the answer would have to involve preregistration. After all, preregistration is nearly universally hailed these days as The Answer, and it is rewarded accordingly. It is "the *only* way for authors to irrefutably demonstrate that their key analyses were not *p*-hacked" (Simmons et al., in press; emphasis added). It is required for what Pashler and de Ruiter call Class 1, the "highest credibility category" into which we can place a research finding. It can earn you visible respect in the form of a nifty badge, initially at *Psychological Science*, and now in other APS journals. It can even net you a share of \$1 million, as in the "Preregistration Challenge" from the Open Science Framework (cos.io/prereg/).

Still, preregistration seems to be spreading into vision science a bit more slowly than in some other subfields — and of course none of the older foundational work in psychophysics was preregistered. So what has kept it from collapsing?

An important part of the answer, I think, is that studies in this area of our field are frequently "postregistered." This is a term that I like to use for papers that include internal replications of their primary effects — in separate samples of identical size, explored via identical analyses, with identical exclusion criteria, etc. This is not at all uncommon for papers in our field, which often feature multiple independent experiments which each replicate the basic effect in question, often while also controlling for a different possible confound or comparing the basic effect to a different variant.

Such internal replications provide an independent test of nearly all of the "researcher degrees of freedom" that may otherwise plague us. Worried that a sample size was *p*-hacked? You may worry less if multiple internal replications are constrained to have the same sample size. Worried about suspiciously baroque analyses or exclusion criteria? You may worry less if the internal replications are constrained to have the same analyses and exclusion criteria. Of course, this is even more true when there isn't much nuance at all — e.g., when simply comparing two distributions with a single test, without any exclusions. I present these as subjective impressions, but of course this help can be quantified: If an initial sample size or analysis plan suffers from *p*-hacking, what is the probability that a second (and

AT RANDOM

"Whether we like it or not, these people really do control our society. The kids who test in the top 1% tend to become our eminent scientists and academics, our Fortune 500 CEOs and federal judges, senators and billionaires."

-Psychological scientist **Jonathan Wai**, Duke University, talking with *Nature* about longitudinal data demonstrating a link between early cognitive ability and adult achievement.

third, and fourth) internal independent replication that is constrained to be identical in these respects will also demonstrate the effect?

Critically, this sort of “postregistration” can help to ensure reliability *even when the study wasn't explicitly preregistered*. Indeed, in some ways this underdiscussed solution to our problems may even be better than preregistration (though of course they are not mutually exclusive!). Such constraints can ensure that the internal replications cannot have been *p*-hacked, whereas there is nothing to stop an unscrupulous researcher from preregistering several different variants of a study (e.g., with different sample sizes) and then only linking to the one that ended up working. (Tools such as *aspredicted.org* have some built-in protections against this, but that still can't stop someone from preregistering different versions across different sites.) And this approach can also save time and words in an exposition. With just a single study, you may need the preregistration, perhaps along with a careful and explicit autobiographical motivation for how you generated your sample size (as *Psychological Science* requires). But with multiple internal replications, you don't need to worry so much about where the sample size came from, as long as it is identical in all of the internal replications.

This approach also helps to protect against the file-drawer problem: With just one experiment, perhaps a researcher actually ran four variants (each separately preregistered?), and then only reported the one that worked. This concern becomes less realistic for a study with several internal replications, all with the same parameters. (Do you really think that the researcher ran 16 variants and then only reported the quartet that worked?)

Multiple Paths to Credibility?

The reason I worry that our field's problems may have been exaggerated in some contexts is thus that so many recent discussions have focused only on one sort of solution to the underlying problems of low power and *p*-hacking, with the implication that studies that have not been preregistered can't count as having the “highest credibility” (per Pashler & de Ruiter's proposal). And this thought also fuels suggestions that somehow the entire literature pre-2010 should be viewed with skepticism, given that approximately none of it was preregistered. But preregistration simply isn't the only way for Odysseus to tie himself to the mast and thus avoid the sirens of *p*-hacking: He can also constrain himself to employ the same methods and analyses and sample sizes (etc.) in multiple internal replications when publishing papers. (Ironically, this point was explicitly noted in some of the earlier discussions of the replicability crisis, but they seem to have been forgotten. For example: “Even if we got a study to work only after 44 attempts, there is still just a 5% chance of it working again under the null: replication *p* values are kosher”; Simonsohn, 2012, p. 597.)

This sort of practice is relatively common in vision science and cognitive psychology. It far predates our field's current turmoil, and the relative frequency of this practice may help to explain the possibly uneven profile of reliability across our field (e.g., Zwaan et al., in press). When you recognize the utility and the frequency of this approach, things may not look quite so bleak — at least in some subfields. In any case, this has been a genuine attempt to accept the charge that those of us who feel that our field's problems may

have been exaggerated have a responsibility to explain why. I hope that these thoughts don't count as “quick and facile defenses” that “carry no weight” (Pashler & de Ruiter, 2017, p. 10) and that are part of the problem; instead, I hope that they too might be part of the (multifaceted) solution. At any rate, it bears remembering that many of our field's findings are not in fact “one-shot.” Rather, they are multiple-shot findings, even within individual papers, with those shots all sharing many of the same key properties.

A Badge-Oriented Coda: Rewarding Means Versus Ends

To be clear: None of this provides any reason not to preregister a study. As many have pointed out, the cost of doing so (for producers of science) is close to nil, and the advantages are legion (e.g., Lindsay, Simons, & Lilienfeld, 2016; Wagenmakers & Dutilh, 2016). But this is all the more reason not to oversell preregistration by claiming that any study that isn't preregistered is automatically more suspect, or that (for consumers of science) this approach is the only sign of credibility.

In the end, what we should care about is reliability, regardless of the specific means by which we got there. So while I applaud the many benefits of “preregistered” badges in our journals (see Lindsay et al., 2016), I also find them misguided in a way. I hope that we don't start taking the absence of such a badge as necessarily reflecting unreliability, and what I really wish we had was a badge for the ends, and not just one particular means: *<This study — in one way or another! — has a built-in guard against researcher degrees of freedom.>* If those sorts of badges existed, perhaps their frequency might help us to more accurately characterize the reliability of our field — even if preregistration is still the only way to earn your share of a million bucks?

—Brian Scholl

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Dave Paunesku, Stanford University, *The New York Times*, September 2, 2017: Don't Suspend Students. Empathize.


 **Jennifer Richeson**, Yale University, *The New York Times*, September 18, 2017: Whites Have Huge Wealth Edge Over Blacks (but Don't Know It); *The Washington Post*, September 14, 2017: This Is What Happens When Americans Are Told About Rising Inequality.

Todd Rogers, Harvard University, *The New York Times*, September 2, 2017: Don't Suspend Students. Empathize.

Gregory Walton, Stanford University, NPR, September 14, 2017, If You Think Everyone Else Has More Friends, You're Not Alone; *The New York Times*, September 2, 2017: Don't Suspend Students. Empathize.

  **Daniel Willingham**, University of Virginia, *Science Friday*, September 1, 2017: The Myths That Persist About How We Learn.

aps Coverage of research from an APS journal

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CALIFORNIA

University of California, Santa Barbara Department of Linguistics

Tenure Track Assistant Professor

The Linguistics Department of the University of California, Santa Barbara seeks to hire a specialist in children's language acquisition. The appointment will be a tenure track position at the Assistant Professor level, effective July 1, 2018. The ideal candidate will have primary expertise in first language acquisition grounded in empirical linguistic research on any language(s). The specific area of specialization is open. The ability to contextualize the process of first language acquisition with respect to the discourse functional theoretical orientation of the department is an important priority. We especially encourage applicants with expertise in multiple methodologies, which may include longitudinal, experimental, field and/or ethnographic approaches, and the ability to contribute to important departmental foci, such as corpus linguistics, understudied languages, and/or language socialization. The candidate should have the potential to link the theoretical implications of their research to other subdisciplines in linguistics, and to interact with colleagues and students across disciplinary boundaries at UCSB. Candidates must have demonstrated excellence in teaching and will be expected to teach a range of graduate and undergraduate courses in language acquisition and general linguistics and to contribute to the department's undergraduate major in Linguistics as well as the minor in Speech-Language Sciences and Disorders. For more information on the department, see www.linguistics.ucsb.edu. A Ph.D. in linguistics or a related field is expected by the time of appointment. To ensure full consideration, all application materials, including letters of reference, should be received by November 4, 2017. The position will remain open until filled. Applicants must complete the online form at <https://recruit.ap.ucsb.edu/apply/JPF01039> and must submit online the following in PDF format: letter of application, statement of research interests, teaching statement, diversity statement (optional), curriculum vitae, and 2 writing samples. Applicants should request at least 3 academic letters of reference to be sent directly to <https://recruit.ap.ucsb.edu/apply/JPF01039> by the November 4 deadline. Inquiries may be addressed to the Search Committee at Acquisitionsearch@linguistics.ucsb.edu. Selected applicants will be interviewed via Skype. Our department has a genuine commitment to diversity, and is especially interested in candidates who can contribute to the diversity and excellence of the academic community through research, teaching and service. The University of California is an Equal Opportunity/Affirmative Action employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability status, protected veteran status, or any other characteristic protected by law.

University of California, Santa Barbara

Department of Psychological & Brain Sciences

North Hall Endowed Chair

The Department of Psychological & Brain Sciences invites applicants for the North Hall Endowed Chair in Psychological & Brain Sciences. Ideally, appointment will be made at the tenured associate or full professor rank, but exceptional junior candidates close to tenure will also be considered. Applicants should have an appropriately distinguished record for an endowed chair, and be able to contribute to the excellence and diversity of our academic community through research, teaching/service. To meet basic qualifications, candidates must submit all required application materials and have completed the requirements necessary to have a Ph.D. conferred in Psychological and Brain Sciences or a related discipline by the time of appointment. For primary consideration, apply on or before December 1, 2017, for a July 1, 2018 appointment. The position is open until filled. The position is open until filled. Applicants must submit a cover letter, current C.V., representative publications, statements of research, teaching, and service accomplishments, and a list three references to UC Recruit at: <http://apptkr.com/1077187>. The position is open to exceptional candidates in all fields of Psychological & Brain Sciences. We are especially interested in hiring a colleague whose scholarship focuses on stereotyping, discrimination, race, ethnicity, or inequality. Examples of research areas include, but are certainly not limited to, social interactions between and among ethnic majority and minority groups, the neurobiological systems involved in the categorization, perception, and evaluation of race, the evolutionary or developmental underpinnings of coalition formation and dominance hierarchies, the effects of conscious and unconscious biases in social systems and institutions, or how biological systems are affected by discrimination. This position is one of four North Hall Chairs being recruited at UCSB. The North Hall Chairs were created to bring to campus ladder-rank faculty whose research, mentorship, and leadership will further UCSB's commitment to diversity. The endowed chairs were named in recognition of the role that black students' takeover of North Hall in 1968 played in the establishment of the Black Studies Department and the Center for Black Studies. Competitive applicants for the position will have demonstrated a commitment to providing academic mentoring to, and supporting the research of undergraduate and/or graduate students from diverse backgrounds, including those from minority groups underrepresented in the sciences. The successful candidate is expected to facilitate the academic support of African American students and undergraduate student research as well as forge interdisciplinary scholarly connections across disciplines, especially with the other North Hall Endowed Chairs. The Department is especially interested in candidates who can contribute to the diversity and excellence of the academic community through research, teaching and service. The University of California is an Equal Opportunity/Affirmative Action Employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability status, protected veteran status, or any other characteristic protected by law.

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TENNESSEE

Vanderbilt University

Department of Psychology

Tenure-Track Assistant Professor of Clinical Sciences

The Clinical Psychology Program at Vanderbilt University in the Department of Psychology invites applications for a tenure track position as an Assistant Professor in clinical psychology. The Vanderbilt Clinical Psychology Program is internationally recognized for its strength in experimental psychopathology, affective science, intervention research, and clinical neuroscience. We seek an exceptional individual who has a strong record of creative, methodologically rigorous research that is conceptually driven, who has strong potential for obtaining extramural funding, and who has demonstrated the potential for effective teaching. A Ph.D. in the clinical sciences or related field is required, and completion of an APA-accredited internship is preferred but not required. We have strong collaborative relations with the Department of Psychiatry and other departments affiliated with the Vanderbilt University Medical Center. Institutional resources are outstanding and include the Vanderbilt Institute of Imaging Science, the Vanderbilt Brain Institute, and the John F. Kennedy Center for Research on Human Development. For information about the faculty, department, and interdisciplinary opportunities, please see: https://www.vanderbilt.edu/psychological_sciences/. Vanderbilt University has a strong institutional commitment to recruiting and retaining an academically and culturally diverse community of faculty. Minorities, women, individuals with disabilities, and members of other underrepresented groups, in particular, are encouraged to apply. Vanderbilt is an Equal Opportunity/ Affirmative Action employer. Applicants should submit a cover letter, curriculum vitae, up to 3 representative publications, a statement of research and teaching interests, and at least three letters of reference electronically via Interfolio at this link: <http://apply.interfolio.com/44123>. Review of applications will begin immediately. To receive full consideration, applications should arrive by December 1, 2017.

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ANNOUNCEMENTS

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GRANTS

NIH Postdoctoral Research Fellowship Opportunity

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

NIH Funding Opportunities in Health & Behavior

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

Social Policy Scholarship

The Horowitz Foundation for Social Policy is accepting applications from current PhD candidates seeking funding for projects that address contemporary issues at the local or global level including criminal justice, health and welfare, international relations, ethics, and other areas of the social sciences. Grants total \$7,500 each in addition to special awards for outstanding research, with the full amount available upon completion of the project. Applicants must be current PhD candidates, but may be from any country or university in the world. The deadline to apply is December 1, 2017. For more information, visit horowitz-foundation.org.

SRCD seeking applicants for 2018–2019 Federal Policy Fellowship

The Society for Research in Child Development (SRCD) is seeking applicants for SRCD Federal Policy Fellowships for 2018–2019. There are two types of federal fellowships: Congressional and Executive Branch. Both types of fellowships provide researchers with exciting opportunities to come to Washington, DC, and use their research skills in child development to

inform public policy. Fellows work as resident scholars within congressional or federal agency offices. Fellowships are full-time immersion experiences and run from September 1, 2018, through August 31, 2019. Following a 2-week science policy orientation program sponsored by the American Association for the Advancement of Science, fellows receive an orientation to child development and public policy. The SRCD Policy and Communications Staff facilitate the fellowship experience and are available as a resource throughout the year. Applicants must have a doctoral-level degree in a relevant discipline (e.g., PhD, MD, EdD), must demonstrate exceptional competence in an area of child development research, and must be a member of SRCD. Both early-career and more advanced professionals are encouraged to apply. The deadline to apply is December 15, 2017. For more information, visit srcd.org/policy-media/policy-fellowships-federal.

MEETINGS

58th Annual Meeting of the Psychonomic Society

November 9–12, 2017

Vancouver, Canada

psychonomic.org/page/2017annualmeeting

2018 Anxiety and Depression Conference

April 5–8, 2018

Washington, DC, USA

adaa.org/resources-professionals/conference/registration

2018 Cognitive Aging Conference

May 3–6, 2018

Atlanta, Georgia, USA

cac.gatech.edu

7th International Congress on Interpersonal Acceptance and Rejection

May 15–18, 2018

Athens, Greece

isipar2018athens.panteion.gr

30th APS Annual Convention

May 24–27, 2018

San Francisco, California, USA

psychologicalscience.org/convention

25th Annual RAND Summer Institute

July 9–12, 2018

Santa Monica, California, USA

rand.org/labor/aging/rsi.html

3rd International Convention of Psychological Science

7–9 March 2019

Paris, France

icps2019.org

A CONVERSATION WITH

NOUR KTEILY | EMILE BRUNEAU

Northwestern University | *University of Pennsylvania*

Nour Kteily and Emile Bruneau are authors of the article “Darker Demons of our Our Nature: The Need to (Re)Focus Attention on Blatant Forms of Dehumanization” in the October 2017 issue of Current Directions in Psychological Science.

In your article in Current Directions, you suggest that psychological research has focused heavily on implicit forms of dehumanization and overlooked the more overt or blatant forms of it. Why do you think this has happened?

Although dehumanization has been a central topic of interest in social psychology since at least the horrors of World War II, the empirical study of dehumanization in psychology only really began in earnest around 2000. At that time, a number of researchers noted that some forms of discrimination, such as employment discrimination, remained constant over time even as self-reported prejudice decreased. This sparked a wave of research on implicit bias and aversive racism. Relatedly, societal norms about the open expression of hostile intergroup attitudes in the United States and much of Europe shifted, particularly on college campuses, where most psychological research has been conducted. The literature on dehumanization followed this trend, focusing on implicit and unconscious measures of the phenomenon, presumably under the assumption that overt or blatant forms were largely a thing of the past or driven under the surface by political correctness norms.

What types of methods/tools have you used to measure individuals' tendency to dehumanize certain groups?

Our research began with the Ascent Dehumanization measure, in which people report how “evolved” the average member of a given group is by placing them on the Ascent of Man diagram often used colloquially to capture notions of progression and advancement (see p. 34). Although this figure is an inaccurate depiction of the way evolution actually works, it does appear to effectively tap into individuals' lay perceptions of advancement. We have since supplemented the scale with trait-based measures of blatant dehumanization, in which people rate a target group on a range of relevant traits (e.g., “advanced,” “civilized,” “savage,” “barbaric,” “backward,” “lacking in self-control”). Our most recent efforts have employed the reverse correlation technique, in which pairs of identical base images are overlaid with random noise and presented to participants in a forced-choice task. If we ask people to choose the image in the pair that looks more like a given target group and iterate the task over several hundred trials, we can generate at the end a composite “mental model”



Nour Kteily



Emile Bruneau

of the ingroup and outgroup. These representations can then be assessed on how human they look by a new sample of participants who are blind to how the images were generated.

What led you into this line of research?

One important factor was our experiences growing up. Having spent time growing up in the Middle East, the types of dehumanization Nour had seen and encountered were anything but subtle. Similarly, Emile spent substantial time in conflict regions such as Northern Ireland, Sri Lanka, and South Africa near the end of apartheid, which also importantly shaped his view of the world. We had independently begun to think about blatant dehumanization, and since we had been looking for an excuse to work together for a couple of years, this was the perfect opportunity.

Another precipitating factor was a conference in 2013 organized by the nongovernmental organization Beyond Conflict that brought dehumanization scholars together with community members who had deep personal experience with dehumanization. What we observed at that meeting was that the scientific community was focused on subtle and implicit measures of dehumanization, whereas the people from marginalized groups expressed regularly experiencing dehumanization that was quite overt. We reasoned that the way we as a scientific community were measuring dehumanization might not fully capture some of the important ways in which dehumanization is regularly experienced around the world.

To read the full conversation with Kteily and Bruneau, visit psychologicalscience.org/r/kteily-bruneau.

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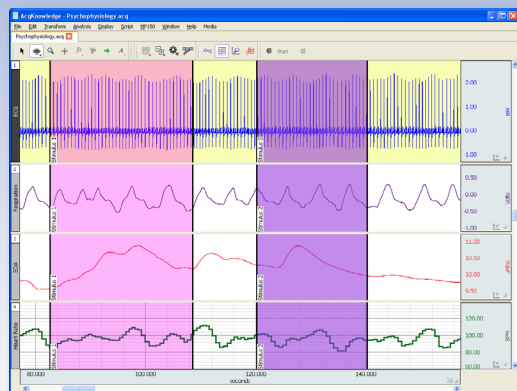
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