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—ROBERT B. CIALDINI, IN CONVERSATION WITH JENNIFER L. EBERHARDT, PAGE 8
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THE 7 UNIVERSAL PRINCIPLES OF INFLUENCE

Jennifer L. Eberhardt and Robert B. Cialdini explore the power of influence and the importance of “shipping” psychological science to address real-world challenges.

APS President Jennifer L. Eberhardt is Morris M. Doyle Centennial Professor of Public Policy and Faculty Co-Director of Stanford SPARQ. She studies race and inequality in a wide variety of places, including law enforcement agencies, courts, schools, neighborhoods, and workplaces. She is the author of Biased: Uncovering the Hidden Prejudice That Shapes What We See, Think, and Do. Eberhardt may be contacted at president@psychologicalscience.org.

EBERHARDT: So many of us conduct research in the laboratory or, more recently, online. Talk about the importance of adding participant observation and field research to the suite of methodological approaches we use in the discipline.

CIALDINI: When I was a relatively young researcher, I thought I saw myself moving away from examining the true sources of human behavior and relying instead on studies that my colleagues and I had done to refine the understandings of that behavior. We were passing information back and forth about how we had studied the behavior and increasingly moving away from the source of the behavior itself. I thought it was important to get back to what I call the “streets,” where the behavior occurs. To maintain the metaphor, I felt that I needed to step away from the “avenues” where I was working and get into the streets more often. We work in a very ordered and structured environment that doesn’t always keep us in touch with the raw goods of human behavior.

So I did two things. One was to engage in a participant-observation project where I became integrated into a setting where the behavior of interest was unrolling naturally. Because I study social influence, I began to enroll, incognito, in the training programs of as many influence professions as I could get access to. I learned how to sell insurance, portrait photography, automobiles, and nutritional supplements. I joined these training programs to learn what worked well in each of these jobs to get people to comply with requests. I did the same within training programs for marketers, fundraisers, and recruiters.

The plan was to take this information from the streets back to the traditional research avenues where I could unpack it in an ordered and logical way. That way, I could use the evidence of the streets to decide which influence practices were reliable and robust enough to warrant studying them, and to understand why they worked so well.

EBERHARDT: Yes, I know you immersed yourself in these training programs for 3 years. How did you choose the different programs, and were there commonalities across them?

CIALDINI: I just answered ads for trainees. Merchandisers were looking for salespeople, marketers, advertisers, recruiters, and so on. All I had to do was enter their training programs to see what they said worked best and to look for the commonalities among the various professions. I expected that this was going to send me back to the laboratory to understand why those particular practices worked as effectively as they did.

But something else arose. Midstream, I said to myself, “Wait a minute, there’s a book here. Surely people other than my fellow academics would be interested in knowing the principles of influence that work across the widest range of influence professions, practitioners, audiences, and settings.” That recognition is how my first book, Influence, emerged. It was an accurate recognition, as the book remains popular.
EBERHARDT: It was 1984 when you published *Influence: The Psychology of Persuasion*. It’s sold over 5 million copies. Did you imagine the book would be that wildly popular? And you followed this up with a new and expanded version just last year. Why?

CIALDINI: First of all, I wrote it for a nonacademic audience because it seemed to me that we researchers are partners in a contract with the citizenry who pay for the research we do. People pay for our research with their taxes and their donations to our universities, and they’re entitled to know what we’ve found with their money. But, at the time, no social scientists were writing for nonacademic audiences. There’s a quote by the legal scholar James Boyle that I think explains why that was the case: “You have never heard true condescension until you have heard academics pronounce the word ‘popularizer.” Fortunately, that has changed now.

The reason I wrote a new version of *Influence* last year is that we’ve learned a lot more about the influence process. That new information deserved a place in the book, so I’ve added 120 pages.

EBERHARDT: Wow! What are some of the takeaways? What principles, if you will, did you find across all these different settings and influencers that people really need to know about?

CIALDINI: I now count seven universal principles. One is reciprocation: People give back to those who have first given to them. The second is liking, no surprise. People want to say yes to those they like, and there are two very simple things that professional influencers are trained to do to generate liking: (1) to identify genuine similarities, because we like those who are like us, and (2) to give genuine praise, because we like those who do like us and say so. This brings us to the third principle, social proof: People want to follow the lead of those around them, who are like them. Doing so reduces their uncertainty of what they should do in the situation.

A fourth principle is authority. To reduce uncomfortable uncertainty, we don’t only look at what our peers are doing and recommending, we also look at what the authorities, the experts, are doing and recommending. Fifth is scarcity: We want more of the things we can have less of. Sixth is commitment and consistency: We want to be consistent with what we have already said or done.

Finally, there’s a new principle that I call unity. We prefer to say yes to people who we consider one of us, who share a membership in a category that is related to our personal or social identity.

EBERHARDT: Do you think the importance of those principles varies across time? In certain eras, are there certain principles that seem more important than others?

CIALDINI: I would say certain principles are employed more than others at different times. Right now, the big one is social proof—the tendency to follow what your peers are doing. Because of the internet, we have access to information about all kinds of other people who have tried certain products or engaged in certain services or exposed themselves to certain ideas. We can see what they have said about those things, how they’ve rated them, and so on. I saw an article that said 97% of people who regularly buy products and services online first consult reviews. 97%! We can’t get 97% of the people in the world to believe the earth is round. But 97% will seek out social-proof-based information because it is so available. I would say social proof is now the dominant way that people are moved to change in a particular direction.

EBERHARDT: You are fond of saying that influence professionals know what practices work in their own world, but they don’t always know why they work. And you see the job of discovering “why” as the job of behavioral scientists. But it seems to me that some professionals may not really care about discovering why. So I’m wondering, why should they care about the “why”?

APS Fellow Robert B. Cialdini is Regents’ Professor Emeritus of Psychology and Marketing at Arizona State University. He has been elected to membership in the National Academy of Science as well as to the American Academy of Arts and Sciences. Cialdini’s book *Influence*, which was the result of a 3-year program of study into the reasons that people comply with requests in everyday settings, has sold more than 5 million copies and appears in numerous editions and 44 languages. His recent book Pre-Suasion was an immediate New York Times, Wall Street Journal, and Publisher’s Weekly best seller.
[Among influence professionals], unethical operators do sometimes win in the moment; but they undermine the quality of the relationship with the recipients of their requests. In the long term, that’s a wrongheaded approach. The ethical person maintains the quality of the relationship so that the recipient of the appeal wants to continue to interact with that source of information.

— Robert B. Cialdini

**CIALDINI:** I think it’s the difference between a cook and a chef. The cook only wants the recipe: Just tell me what to do here, and I’ll get it right. The chef thinks about combinations of ingredients, textures, and flavors that allow them to create new recipes, to develop new dishes. This is why the “why” is so important. It allows people to understand the building blocks that lead to good choices and to bring that understanding to novel situations. I think that a consideration of the whys of human behavior is one aspect of the book that has led to its popularity. People want that information—at least those who aspire to be chefs of influence.

**EBERHARDT:** Your work is not just about the power of influence but also the routes to ethical influence. What do you mean by ethical influence, and why has that been a central concern in your work?

**CIALDINI:** I think it’s very important that if we are going to reveal the secrets of influence professionals, we should talk about the consequences of being influential as ethical operators versus unethical operators. Unethical operators do sometimes win in the moment; but they undermine the quality of the relationship with the recipients of their requests. In the long term, that’s a wrongheaded approach. The ethical person maintains the quality of the relationship so that the recipient of the appeal wants to continue to interact with that source of information. The way that I define an ethical approach is in terms of the universal principles of influence. That is, is the principle we plan to use an inherent and common part of the influence situation? If so, as an influence agent, you are allowed to point to it. That way, you are informing your audience into assent, rather than fabricating or counterfeiting the presence of the principle.

Let’s take, for example, the principle of authority. Providing evidence of true and representative authority recommendations on a choice strikes me as ethically commendable. Not only isn’t it objectionable to use the authority principle in this fashion, I think it’s admirable. We don’t simply move people in the right direction; in addition, we do so as educators. We’re not manipulating them, we’re enlightening them. And that seems to me to be the ethical route.

**EBERHARDT:** Right. And it gives them more control and power to a certain extent.

**CIALDINI:** That’s a bull’s-eye insight.

**EBERHARDT:** You also have said you believe we’re living in a golden age of behavioral science. What do you feel brought us to this point?

**CIALDINI:** Well, it’s interesting that *Influence* had very poor sales for the first 3 or 4 years, and then it moved into the best-seller list, where it’s stayed ever since. I think what changed was the times. That is, in the 1980s, the idea of evidence-based decision-making was gaining traction in all the major institutions of our society: government, business, fundraising, sports. Evidence-based decision-making became something that everybody who was an important decision-maker was expected to engage in. And scientifically derived findings were widely considered one trusted source of such evidence. The book *Influence* benefited because there was a lot of scientific evidence on the topic available in it. Jennifer, I am concerned that science’s validity is being eroded these days. A toxic fog of anti-science is rolling across the earth. People are choosing to decide based on what they prefer to believe, rather than what the evidence—as manifested in scientific research—has demonstrated to be true. I’m more than a little worried about this. Therefore, I think it is healthy that behavioral scientists are now speaking to the nonacademic community about their valuable science-based findings in all kinds of formats that didn’t always exist then, including blogs, podcasts, and popular-press behavioral science books.

**EBERHARDT:** For sure. A longtime colleague, Lee Ross, was famous for saying that we need to get more of our science into the world and more of the world into our science. Throughout your career, you’ve managed to do both across many different areas of inquiry. Let’s talk about your long-standing interest in the environment. One of your most memorable series of studies for me in this area was where you encouraged people to reuse their towels in hotels. I wonder if you could walk us through the logic of that classic work.
CIALDINI: Sure. I should take a step back and say that at about the midpoint in my career as a persuasion and influence researcher, I recognized that perhaps the biggest question for us to answer was how to influence people to take environmentally protective and promotive action. So I turned my research to that question. One of the things we looked at was the option in hotels to either reuse one’s towel or get a fresh one. I remember being in a hotel and seeing one of these cards asking me to reuse my towels. You’ve probably seen signs reading, “This space available for rent” or “This space available for lease”—well, I looked at that card and said to myself, “This space available for test.” What could we put on the card that would spur people into greater conformity with the pro-environmental choice?

So my team, featuring Noah Goldstein and Vlad Griskevicius, started working on that question in hotel guestrooms. With the cooperation of the hotel’s manager, we were able to vary what such a card said and then to see how many people actually did reuse their towels, depending on the message. By far, the most powerful message used social proof. It conveyed that the majority of hotel visitors recycle their towels during their stay. We then did a follow-up study that elaborated on that and generated even more recycling by saying, “The majority of guests who’ve stayed in this room have recycled their towels.” So it wasn’t just most people, it was comparable others who were the most likely to spur conformity in their direction.

EBERHARDT: And now it seems that reusing hotel towels is part of the culture. It’s become common.

CIALDINI: What I liked about that research opportunity was that it was in a real-world situation—a field-research setting where naturally occurring human behavior takes place and where there was a behavioral measure of persuasive success that we could register.

EBERHARDT: It’s classic and cool research for sure. You’ve also looked at the same kind of issue in households—how to reduce household energy consumption. Talk about how you managed that work, including partnering with the private sector in an effort to scale up your effects.

CIALDINI: Yes, this was research conducted in the San Diego area and was led by my colleague Wes Schultz. We went to homes and attached door hangers with different messages as to why residents should reduce their consumption of energy. Of course, we had control groups, too. Some people didn’t get any message at all. Some people got a message that implored them to reduce energy but didn’t provide a reason. And others got one of four reasons for conserving energy. The first was the common theme of doing something for the environment. A second message was about social responsibility: Do it to benefit the society. A third message asked residents to conserve energy for their own economic benefit, to reduce their power bill. And the fourth one was a social proof message—essentially, that the majority of your neighbors do take daily steps to reduce their energy consumption. Participants got one or another of those door hangers every week for a month.

We then looked at their power usage for that month. The door hanger that said that your neighbors are conserving was clearly most effective. It reduced energy consumption 350% more than the others. This showed the motivating power of social proof: what the people around me, like me, are doing.

I was then approached by a pair of young entrepreneurs with a start-up company called Opower that planned to send energy-conservation messages to the customers of various utility companies. I worked with them for 3 years. We designed messages as well as a report that informed householders where they stood relative to their neighbors in energy conservation. Cumulatively, the results have been astounding. In the 10 years that Opower operated (they were later bought by Oracle), the reports saved 36 billion pounds of carbon dioxide from entering our environment. That’s a lot of consequence.

I have to say that because I’m a social scientist, I never expected I’d get involved with the private sector. But I needed the private sector to escalate our findings to the societal level. My university couldn’t have scaled up our results to anything like what Opower did. The government wouldn’t succeed at that kind of escalation, either, because it’s hindered by political and administrative

The door hanger that said that your neighbors are conserving was clearly most effective. It reduced energy consumption 350% more than the others. This showed the motivating power of social proof: what the people around me, like me, are doing. — Robert B. Cialdini
constraints. But Opower did it. There are now over 100 utility companies that send these reports to their customers, who are saving something like $750 million a year on their utility bills.

**EBERHARDT:** Wow. As a discipline, we don’t always keep track of the impact our work has. And oftentimes we don’t even have the metrics for doing so, like you did in this particular case. The metrics we typically use to gauge impact really have more to do with impact on the discipline rather than the world. But your work reminds us that both are important. As a discipline, I wonder if there are ways that we can start to think about metrics that help us to understand the effect our science is having on the world.

**CIALDINI:** I think it’s incumbent on us, whenever possible, to choose to measure an activity that nonacademic individuals would have experience with in a naturally occurring situation. Such as whether to conserve household energy or to hang up towels or recycle trash. If those activities are in our studies from the outset, and we use true behavioral measures, then the results become perceived as much more valuable by the people we need to convince about the value of science in their lives.

**As a discipline, we don’t always keep track of the impact our work has. And oftentimes we don’t even have the metrics for doing so. The metrics we typically use to gauge impact really have to more to do with impact on the discipline rather than the world. But your work reminds us that both are important.**

— Jennifer L. Eberhardt

**EBERHARDT:** Let’s talk about COVID for a minute. I think many people were surprised at the degree of resistance to COVID vaccines once they were made available to the public. Were you surprised, and should we as behavioral scientists have anticipated this?

**CIALDINI:** We should have anticipated it based on the influence principle of unity. What has happened is the politicization of what constitutes correct behavior. If you are in a particular political party or have a particular political stand, correct behavior is heavily influenced by what the leaders of that party are saying and what other party members are doing. So in terms of mitigating the problem of people not choosing to be vaccinated, I think we first have to segment the resisters. There are some who are resistant just because they’re uncertain of whether it is the right thing to do. In their case, we can show them evidence that fits with the latest research in persuasion. And that is the impact of trends. For example, showing resisters the increasing trend of those like them who are receiving the vaccination is much more effective than just giving them a number, like 67%. That’s a statistic. Showing people a trend leads them to think it will continue—in other words, to expect even greater social proof. So for resisters who are just uncertain, we can reduce their uncertainty by showing them that more and more people are moving in that direction.

As for people who are strong resisters, you can’t give them any facts that they will incorporate into their decision-making. Here’s where I would use something called the convert communicator strategy. You give them examples in multiple testimonials from people who used to believe exactly what the strong resisters believe but have changed their minds because of something that happened inside their family or friendship network, or perhaps to them. It’s very hard to dismiss such people. They are not different from you; they are of you, and they have a piece of information that you don’t have. The convert communicator can puncture resistance through social comparison rather than facts.

**EBERHARDT:** I wonder also about people in both groups who feel that they have the facts and are following the science. They are staunchly against vaccination, but they also claim that they have this scientific information that other people don’t know about. It seems like there’s almost a battle between mainstream science and messages that are masquerading as science.

**CIALDINI:** I think we have to move to a playing field based on social comparison, where influence comes from whom you follow, not from the facts. So we have to move to the playing field where the facts aren’t relevant, but social comparison is—namely, “What are the people around me, like me, doing?” It’s not logical proof; it’s not empirical proof; it’s social proof, which is the only proof we can offer to persuade people who are not susceptible to facts.

**EBERHARDT:** Yeah. Even with social proof, though, there are people in different pockets of the country who are saying that this doesn’t matter, this isn’t going to affect them, they don’t need to be vaccinated.

**CIALDINI:** Right. So we can intervene with the message, “But look at the increasing trend of people who weren’t vaccinated who are now becoming vaccinated.” And with convert communicators, we can bring together the
I think it’s incumbent on us, whenever possible, to choose to measure an activity that nonacademic individuals would have experience with in a naturally occurring situation — Robert B. Cialdini

testimonials of people who used to believe what they believe and who provide a new, contrary point of view based on their own experiences. You’re right that there will continue to be pockets of resistance, but what we can do is talk about true trends and converts within those pockets.

EBERHARDT: That makes sense. So, given that we’re living through this golden age of behavioral science, were you surprised that the government didn’t turn more to behavioral scientists to involve us in their COVID mitigation strategies? Were you consulted by officials on what could and should be done around this?

CIALDINI: There were some opportunities that I engaged in and offered ideas. As well, a lot of other prominent behavioral scientists sent messages to the government about what research indicates is likely to be effective. But politicians listen to political voices, including advisors and campaign personnel who aren’t trained in behavioral science. They’re trained in a different kind of discipline, in politics and public administration.

EBERHARDT: Do you feel there’s more understanding now of the importance of behavioral science as a critical part of health policy and strategy?

CIALDINI: Yes. I’ve seen that recognition grow over the last decade or decade and a half. But again, I’m worried that there is this counterforce now toward anti-science that is undercutting those gains.

EBERHARDT: And how do you deal with that counterforce?

CIALDINI: I think we have to go back to the issue of how we, as researchers, gain the confidence and trust of the people who might not be compelled by science. We should do our research in settings and with measures that show them the value of science in the places where they live—in the experiences that they have on a daily basis. If we can honestly say to them, “Look what we’ve found that you can use to enhance your life,” we’d increase the odds of bringing them onto the side of science.

EBERHARDT: What’s next for you? Do you have any new, exciting major projects on the horizon?

CIALDINI: Well, I’m retired, so I don’t have the same ability to do research. But I think I want to write another book that comes from the stories that people have shared with me about everyday occurrences in which they witnessed the influence process operating to a remarkable degree. I will try to analyze each story in terms of the psychological dynamics that would produce these notable effects. The working title, in fact, is Incidents of Influence. Evidence from Life.

EBERHARDT: I like that. Thanks so much for taking the time to speak to the APS membership. We really appreciate all that you do, including taking our field in new directions and addressing some of the world’s biggest challenges. I know you’re famous for saying “if psychological science were a business, we’d be known for having great research and development units, but no shipping department.” But I feel like because of the trail you’ve blazed, that’s all changing. We’re developing a shipping department to get the wares and the goods out to the people who really need it.

CIALDINI: I enjoyed this.

See previous issues of the Observer for conversations between APS President Jennifer L. Eberhardt and Jennifer A. Richeson (January/February 2022), Laura L. Carstensen (November/December 2021), Linda R. Tropp (September/October 2021), and Hazel Rose Markus and MarYam Hamedani (July/August 2021).
**Time to Pay Attention? Information Search Explains Amplified Framing Effects Under Time Pressure**  
Ian D. Roberts, Yi Yang Teoh, and Cendri A. Hutcherson

Different framing of the same choice problem can lead to different choices, an effect that time pressure can increase. Roberts and colleagues tracked participants’ eye gaze and found that time pressure produced shifts in visual attention toward reward-predictive cues (e.g., in graphics, colors associated with higher gains) that increased framing effects. Their findings were contrary to an influential explanation for the amplification of framing effects in which time pressure leads individuals to rely on automatic emotional responses. Instead, they suggest, time pressure may lead individuals to strategically allocate their attention in an adaptive strategic behavior.

*Psychological Science*  
https://doi.org/10.1177/09567976211026983

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**Frequent Interpersonal Stress and Inflammatory Reactivity Predict Depressive-Symptom Increases: Two Tests of the Social-Signal-Transduction Theory of Depression**  
Annelise A. Madison et al.

According to the social-signal-transduction theory of depression, people who experience ongoing social stress that triggers an elevated inflammatory response are at higher risk for depression. Madison and colleagues found support for this theory in two studies of healthy adults and breast cancer survivors. Participants who reported more frequent interpersonal tension, more loneliness, or less social support had higher depression symptoms one year later, especially when they also showed a higher inflammatory response (measured by blood inflammatory markers) to a laboratory social stressor the year before. These findings suggest the effectiveness of depression treatments that target social stress and inflammation.

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**Scene Context Impairs Perception of Semantically Congruent Objects**  
Eelke Spaak, Marius V. Peelen, and Floris P. de Lange

A toilet-paper roll might be more easily processed when seen in the kitchen than in the bathroom—that is, a visual scene might minimize the processing of objects that are congruent with it, compared with incongruent objects. Spaak and colleagues found support for this counterintuitive result in change-detection tasks. When the object was congruent with a scene, participants’ perception of the object was impaired (e.g., they took longer to notice that it was missing in a change-detection task). Stimulus confounds, response biases, and search strategy did not explain these “congruency costs.”

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**Teacher Mindsets Help Explain Where a Growth-Mindset Intervention Does and Doesn’t Work**  
David S. Yeager et al.

Growth-mindset interventions teach that intellectual abilities can grow. Yeager and colleagues examined how teachers’ mindsets may shape the success of growth-mindset interventions. The study delivered short growth-mindset interventions to math students in their first year of high school. Results indicated that the interventions led to better math
Where the Blame Lies: Unpacking Groups Into Their Constituent Subgroups Shifts Judgments of Blame in Intergroup Conflict
Nir Halevy, Ifat Maoz, Preeti Vani, and Emily S. Reit

This research suggests that people might assign more blame for intergroup conflict to groups that are presented as subgroups rather than as single, unified entities. In five experiments, Halevy and colleagues tested how different group presentations influenced the percentage of blame participants assigned to each group across three intergroup conflicts: the Israeli-Palestinian conflict, racial tensions between White people and Black people in the United States, and the gender gap in wages in the United States. Results indicated that how the groups are presented can shape moral judgments about intergroup conflict.

https://doi.org/10.1177/09567976211026983

Neural Representations of the Committed Romantic Partner in the Nucleus Accumbens
Ryuhei Ueda and Nobuhito Abe

This research suggests that neural activity patterns in the nucleus accumbens, a brain region involved in the processing of rewards, pleasure, and addiction, differently represent romantic partners and nonpartners. Forty-six men romantically involved with female partners performed a task in which a successful response triggered a photo in which their partner or unfamiliar women showed a happy expression and gesture. Using functional MRI to scan participants’ brains during the task, Ueda and Abe found that the spatial patterns of activity in the nucleus accumbens discriminated between romantic partners and unfamiliar women, regardless of their attractiveness.

https://doi.org/10.1177/09567976211026983

Climate Change and Children’s Mental Health: A Developmental Perspective
Francis Vergunst and Helen L. Berry

Vergunst and Berry review research indicating that threats associated with climate change might increase risk to healthy human development from the point of conception. They suggest that these nefarious effects on physical and mental health (e.g., famine, anxiety) are already occurring and that monitoring and mitigating them is a matter of social justice as well as crucial for developmental health. Highlighting the need for well-controlled studies, Vergunst and Berry discuss the conceptual and measurement challenges inherent in studies of climate-change-related exposures and children’s mental-health outcomes. They also describe priority research areas that would clarify the mechanisms through which climate changes influence psychological health and well-being throughout development.

https://doi.org/10.1177/09567976211026983

A Person-Centered Analysis of Craving in Smoking-Cue-Exposure Research
Michael A. Sayette, Madeline E. Goodwin, Kasey G. Creswell, Hannah J. Esmacher, and John D. Dimoff

Sayette and colleagues analyzed data from 672 daily smokers who were deprived of nicotine for 5 to 12 hr before participating in one of seven studies in which they reported their urge to smoke before and during exposure to cues associated with cigarette use (e.g., lighting a cigarette). Sixty-nine percent of participants reported a greater urge during cue exposure. However, 31% of participants reported maximal urge before cue exposure, which would result in their classification as nonresponders in traditional cue-reactivity analyses. These results suggest that analyses centered on mean levels of cue reactivity may underestimate cue-reactivity effects.

https://doi.org/10.1177/09567976211026983

Education, Financial Stress, and Trajectory of Mental Health During the COVID-19 Pandemic
Yanping Jiang, Samuele Zilioli, Rhonda N. Balzarini, Giulia Zeppolati, and Richard B. Slatcher

Jiang and colleagues explore how financial stress and educational disparities affected mental health in the initial months of the COVID-19 pandemic. They analyzed data from 2,204 participants in spring 2020. At the beginning of the pandemic, they found a relationship between lower education and worse mental-health outcomes mediated by increased financial stress. However, these relationships did not change over time. These findings indicate that addressing financial stress associated with pandemics might mitigate the relationship between educational disparities and mental-health outcomes.

https://doi.org/10.1177/21677026211032646
Integrating Insights About Human Movement Patterns From Digital Data Into Psychological Science
Joanne Hinds et al.

Digital data generated via smartphones and social-media interactions can provide information about people’s movements and locations. Although research has used these data to detect movement patterns, Hinds and colleagues suggest that it has not integrated these data with psychological science, which could allow for a better understanding of thoughts, feelings, behaviors, and attitudes associated with movement. Hinds and colleagues argue that combining approaches from psychological and data science can improve researchers’ and policymakers’ predictions about individuals’ and groups’ movement patterns, with several potential applications (e.g., predicting the spread of disease).

Field Experiments on Social Media
Mohsen Mosleh, Gordon Pennycook, and David G. Rand

Studying online behavior can further our understanding of misinformation and political psychology. Mosleh and colleagues discuss the strengths, weaknesses, and ethical constraints of two approaches to studying online behavior: hybrid lab-field experiments and field experiments. In hybrid lab-field studies, researchers can control and randomize participants’ exposure to social media content in the lab and then, in the field, observe participants’ behaviors and beliefs as well as observe their online behavior. In field experiments, researchers can use the online environment to manipulate social media exposure (e.g., via private messages or public posts) without disclosing their research and then observe the effects of the manipulation on participants’ online behavior.

CURRENT DIRECTIONS IN PSYCHOLOGICAL SCIENCE
Daylong Mobile Audio Recordings Reveal Multimodescale Dynamics in Infants’ Vocal Productions and Auditory Experiences
Anne S. Warlaumont, Kunmi Sobowale, and Caitlin M. Fausey

Warlaumont and colleagues review recent research about how infants’ vocal productions and auditory experiences are organized over a day, with implications for development. Everyday vocalizations appear to be clustered hierarchically in time (e.g., there is more difference in vocalization quantity from one hour to the next hour than from one 5-min interval to the next). Vocalizations also appear to be a type of exploratory foraging for social responses, with patterns of vocal exploration changing as children develop. Regarding the sounds infants encounter, different musical frequencies may foster learning about category generalization.

What’s to Come of All This Tracking “Who We Are”? The Intelligence Example
Wendy Johnson

Despite increased requirements and encouragements to track what we do and how we do it in different areas of our lives, from job performance to sleep and diet, evidence suggests that constant tracking might not help that much with health and well-being and instead might have dire social consequences. Johnson uses human intelligence, which has been the object of efforts to track for more than 100 years, as an example of tracking’s social consequences. For instance, intelligence tracking exacerbated social differences between those tracked and those untracked. The author suggests the potential for tracking activities to lead society into a dystopian future, much like the one portrayed in Aldous Huxley’s Brave New World.

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https://doi.org/10.1177/09567976211026983
**RECENT RESEARCH: RESEARCH BRIEFS**

**Mediation Analysis: A Design-Based Alternative**

**John G. Bullock and Donald P. Green**

Mediation analysis quantifies the extent to which a variable participates in the outcomes of a treatment. Bullock and Green explain how the common way of measuring mediation, in which outcomes are regressed on treatments and mediators to assess direct and indirect effects—measurement-of-mediation analysis—is flawed. The researchers propose that scholars instead use an approach rooted in experimental design. In implicit-mediation analysis, features of the treatment are added and subtracted in ways that implicate certain mediators and not others. The researchers describe this approach and the statistical procedures implied, and they illustrate it with examples from recent literature.

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**Dismissing “Don’t Know” Responses to Perceived Risk Survey Items Threatens the Validity of Theoretical and Empirical Behavior-Change Research**

**Erika A. Waters, Marc T. Kiviniemi, Jennifer L. Hay, and Heather Orom**

Waters and colleagues describe a decade-long research program that investigates the possibility that some people might genuinely not know their risk of even well-publicized hazards—thus, ignoring their “don’t know” responses on perceived-risk surveys might threaten the applicability of risk and behavior-change research. “Don’t know” responses are prevalent in the U.S. population, especially among marginalized groups, and appear to be associated with fewer health-protective behaviors. The prevalence of “don’t know” responses about certain risks might reveal populations that need targeted interventions to change their behaviors to promote health and protection from hazards.

[https://doi.org/10.1177/09567976211017860](https://doi.org/10.1177/09567976211017860)

**ADVANCES IN METHODS AND PRACTICES IN PSYCHOLOGICAL SCIENCE**

**The Failings of Conventional Mediation Analysis and a Design-Based Alternative**

**John G. Bullock and Donald P. Green**

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**Good Theories in Need of Better Data: Combining Clinical and Social Psychological Approaches to Study the Mechanisms Linking Relationships and Health**

**Allison K. Farrell, Sarah C. E. Stanton, and David A. Sbarra**

Farrell and colleagues draw on the science of behavior change and discuss methodologies across psychological science fields that may stimulate the study of the mechanisms linking relationships and health. These methodologies should provide researchers with a better causal understanding of the mechanisms underlying the connection between relationships and health. The authors warn that these methods are most effective when used together and within a program of research or teams of collaborators. To foster collaborations across research groups, they recommend that researchers who have data on this area submit them to the Love Consortium data-science initiative (https://www.theloveconsortium.org).

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**Unstandard Deviation: The Untapped Value of Positive Deviance for Reducing Inequalities**

**Kai Ruggeri and Tomas Folke**

Studying individuals who emerge from disadvantaged circumstances to experience better outcomes than the average outcomes of their group (i.e., show positive deviance) may help to inform public policies aimed at reducing inequalities. Ruggeri and Folke use examples from the real world and experiments to illustrate how studying the behaviors and outcomes of positive deviants can reveal how they depart from their groups and overcome inequalities. The authors propose that understanding these individuals’ trajectories can help to inform interventions that are population-relevant and have a higher likelihood of benefiting individuals in adverse circumstances.

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**Perspectives on Psychological Science**

**Unstandard Deviation: The Untapped Value of Positive Deviance for Reducing Inequalities**

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BREAKING THE “CURSE OF KNOWLEDGE”: OLDER ADULTS’ SUPPOSEDLY REDUCED THEORY OF MIND MIGHT REFLECT EXPERIMENTAL DEMANDS

The things we should have said or done in a given situation—or, more often, the things other people should have said or done—often seem obvious in hindsight, but when faced with a tough choice, we rarely have access to all of the same information that may come to light after the fact. This “curse of knowledge” can interfere with how we interpret other people’s thoughts and feelings, an ability known as theory of mind, and can therefore prevent us from accurately considering another person’s perspective.

Theory of mind, a complex and essential social function, is made possible by numerous lower-level processes including executive functioning, working memory, and attentional skills. These abilities have been shown to be reduced in older adults, whether as a result of healthy aging or neurodegenerative disease. However, new research published in Psychological Science suggests that the curse of knowledge may not weigh much more heavily on the old than the young.

“Prior studies may have overestimated the decline of [theory of mind] in healthy aging because of experimental demands that are not essential for a functioning [theory of mind]. This information could inform support for older adults’ psychological functioning,” according to Foyzul Rahman (Aston University) and colleagues.

Theory of mind allows us to model how other people’s knowledge and perspectives might differ from our own, the researchers continued. This modeling requires us to overcome three sources of potential conflict: our own knowledge of reality (i.e., the “curse of knowledge”) and two types of differences in how one or more people might perceive a situation. Rahman and colleagues explored how age might influence our ability to manage these theory-of-mind conflicts through a study of 100 adults, half of them ages 18 to 29 and half ages 60 to 79. Each participant completed basic tests of their neurocognitive abilities, including reaction time, working memory, and attentional skills, in addition to a false-belief task. This task, designed to measure the accuracy of participants’ theory of mind when other people’s perspectives conflicted with their own, involved making judgments about a ball hidden under one of three cups. Overall, participants of all ages responded more slowly when they did not know where the ball actually was. They also responded more slowly and less accurately when their own knowledge of the ball’s actual location conflicted with another person’s belief.

Older adults, who performed worse on measures of neurocognitive ability, responded more slowly and less accurately than younger adults across conditions. But contrary to previous findings, older adults’ existing knowledge of the ball’s location did not appear to influence their speed and accuracy any more than it did for younger adults. They did make significantly more errors, however, when managing perspectives that conflicted with their own or that of another person.

“Our data show unexpected similarity between age groups when people are representing a belief incongruent with their own,” Rahman and colleagues wrote. “Given the association identified between age, cuing, and working memory, limits on processing speed, which declines with age, may explain this pattern of behavior.”

Previous findings related to older adults’ reduced theory-of-mind abilities may at least partially reflect the cognitive demands of certain study designs, the researchers explained. For example, the ball-and-cup task used in this study requires participants to shift attention between multiple locations (the three cups) while simultaneously holding information about how multiple people’s beliefs map onto each location in working memory. The ability to keep track of all that information, while helpful, is not necessarily essential to having a functioning theory of mind.

See the full article online, with references, at psychologicalscience.org/publications/observer/obsonline.
NEW RESEARCH ON REFUGEE INTEGRATION AND WELL-BEING

As of December 2021, a record 82.4 million people have been forced to flee their homes to escape war, violence, or persecution (United Nations High Commissioner for Refugees, 2021). Increasing numbers of such refugees pose challenges that psychological science can help to answer, including those related to the morality of war. One of the most immediate challenges is how to adequately support refugees as they enter a new country, such as through integration, support for trauma recovery, or other interventions. Here’s a look at some recent research (2017–2021) on refugee integration and well-being from Psychological Science, Clinical Psychological Science, and Perspectives on Psychological Science. See this article online for much more.

RECENT RESEARCH: OBSERVATIONS

Mindfulness-Based Trauma Recovery for Refugees (MBTR-R): Randomized Waitlist-Control Evidence of Efficacy and Safety
Anna Aizik-Reebs et al., 2021

Following traumatic events and chronic stressors, refugees and asylum seekers often suffer from trauma- and stress-related mental health problems. The researchers developed a mindfulness-based group intervention for refugees and asylum seekers that appears to improve trauma recovery and mental health.
https://doi.org/10.1177/21677026219998641

Ideological Extremism Among Syrian Refugees Is Negatively Related to Intentions to Migrate to the West
Katarzyna Jasko et al., 2021

Westerners often fear that refugee immigrants might endorse ideologically extreme views or harbor negative sentiment toward the West. However, these fears appear to be unfounded. In a survey of 1,000 Syrian refugees residing in Jordan, Lebanon, Turkey, and Iraq, most did not intend to emigrate to Western countries, and those most interested in doing so were the least likely to endorse Islamist extremism or to have negative sentiments toward the West. The more ideologically extreme refugees said they would rather move back to their home country than move to the West.
https://doi.org/10.1177/0956797621996668

Support for Resettling Refugees: The Role of Fixed Versus Growth Mind-Sets
Shilpa Madan et al., 2019

Resourceful Actors, Not Weak Victims: Reframing Refugees’ Stigmatized Identity Enhances Long-Term Academic Engagement
Christina A. Bauer et al., 2021

How refugees see themselves might play a role in how well they integrate in receiving countries and how well they succeed in academia. Narratives that emphasize refugees’ strength, resourcefulness, and ability to thrive might counteract stigmatizing narratives that associate refugees’ identities with victimization and weakness and could serve as efficient interventions to boost their academic achievements.
https://doi.org/10.1177/09567976211028978
RECENT RESEARCH: OBSERVATIONS

What distinguishes individuals who support resettling refugees in their own countries from those who oppose it? It appears to depend in part on their beliefs in individual characteristics as either malleable (i.e., a growth mind-set) or fixed (i.e., a fixed mind-set). Across six experiments, the researchers showed that individuals with a growth mind-set were more likely to support their country’s acceptance of refugees.

https://doi.org/10.1177/0956797618813561

After Aylan Kurdi: How Tweeting About Death, Threat, and Harm Predict Increased Expressions of Solidarity With Refugees Over Time
Laura G. E. Smith et al., 2018

In 2015, 3-year-old Alan Kurdi drowned in the Mediterranean Sea while trying to escape from Syria to the European Union. A photo of the dead boy made global headlines and was shared on social media platforms, allowing researchers to study how engagement with this type of imagery could influence solidarity with refugees. Smith and colleagues analyzed a total of 41,253 tweets posted either 1 week before the images emerged, the week they emerged, or 10 weeks afterward. Tweeting about Kurdi was associated with prorefugee sentiment 10 weeks later, a link that was mediated by discussions of threat to refugees (as opposed to threat posed by refugees).

https://doi.org/10.1177/0956797617741107

Psychological Antecedents of Refugee Integration (PARI)
Gerald Echterhoff et al., 2020

How can refugees be successfully integrated in receiving countries? One first step to answering this challenge is understanding psychosocial barriers to integration among refugees and residents in receiving countries, as well as the needs and concerns of both groups. Echterhoff and colleagues developed a model of the psychological factors that are critical for successful integration of refugees—Psychological Antecedents of Refugee Integration, or PARI.

https://doi.org/10.1177/1745691619898838

Exploring the Potential Distinction Between Continuous Traumatic Stress and Posttraumatic Stress in an East African Refugee Sample
Tobias Hecker et al., 2017

The term “continuous traumatic stress” was coined to describe exposure to life threats with no foreseeable end experienced by people living in unsafe conditions. When removed from such conditions, sufferers can experience a decrease in posttraumatic stress—or, on the contrary, they may experience continued symptoms. Hecker and colleagues tested refugees from the Democratic Republic of the Congo who were living in a refugee camp in Uganda. The researchers conducted semistructured interviews assessing lifetime exposure to potentially traumatizing events, current exposure to family and community violence, and more. Results indicated a link between current exposure to violence and concerns about recurrent violence only among refugees who had experienced a decrease in symptoms.

https://doi.org/10.1177/2167702617717023

Impact of Cognitive Reappraisal on Negative Affect, Heart Rate, and Intrusive Memories in Traumatized Refugees
Angela Nickerson et al., (2017)

Cognitive reappraisal—changing how one thinks about a situation to alter its emotional impact—is a promising strategy for managing emotional responses to traumatic events. Nickerson and colleagues assessed 80 refugees and asylum seekers living in Australia who had come from countries including Iran, Afghanistan, Sri Lanka, Iraq, Bangladesh, and Pakistan. They measured refugees’ trauma exposure, PTSD symptoms, trait (i.e., stable or characteristic) suppression of internal experiences, and trait reappraisal. The participants then had their heart rates monitored while they completed a task in which they used either reappraisal or suppression to manage the emotions elicited by trauma-related images. Participants with high levels of PTSD symptoms who used reappraisal in the task reported fewer memory-related intrusions 2 days later and less negative affect than those who used suppression. However, participants with lower trait suppression benefited the most from using reappraisal.

https://doi.org/10.1177/2167702617690857

Replicability and Generalizability of Posttraumatic Stress Disorder (PTSD) Networks: A Cross-Cultural Multisite Study of PTSD Symptoms in Four Trauma Patient Samples
Eiko I. Fried et al., 2018

What can network-model studies of clinical disorders tell us about posttraumatic stress disorder (PTSD) symptoms in refugees who have experienced trauma? Fried and colleagues examined four large samples of patients who had experienced trauma. Network models revealed some consistent connections across the samples, such as a strong connection between nightmares and sleep problems and a moderate connection between detachment and emotional numbing.

https://doi.org/10.1177/2167702617745092

See the full article online, with references, at psychological science.org/publications/observer/obsonline.
People with social anxiety disorder (SAD) often hold negative beliefs about their own attributes and abilities. These beliefs can contribute to an intense fear of being evaluated and rejected by friends, family, and acquaintances—and some people are affected more severely than others. Research suggests that SAD may present differently in people who experienced emotional abuse and neglect during childhood, which can influence how self-beliefs are processed in the brain.

“Childhood emotional trauma may significantly affect an individual’s emerging self-concept and may bias learning such that negative feedback from others becomes more salient than positive feedback—a pattern observed in SAD,” wrote Anat Talmon (Stanford University) and colleagues in Clinical Psychological Science. “This may create a perpetuating effect, leading to a predominantly negative self-concept.”

Talmon and colleagues began investigating the relationship between early life experiences and self-beliefs through an initial study of 95 patients with SAD and 43 control participants without this condition. Participants completed measures of well-being and reported how frequently they had experienced different kinds of abuse and neglect as children.

These self-reports were accompanied by a self-referential encoding task, in which participants sorted a set of positive and negative social traits according to whether or not they would use each trait to describe themselves. In control trials, each participant simply judged if the traits were written in upper- or lowercase text.

Finally, the researchers observed activity in the default-mode network (DMN) of each participant’s brain using functional MRI. Previous studies have found activity in the DMN to be associated with self-referential processing. Analysis of the results revealed two subgroups of people with SAD. The researchers referred to these as the “negative-self” and “positive-self” clusters, though they stressed that the labels were relative: Self-concepts among participants with SAD in the two clusters were all more negative than those of participants without SAD, but participants in the positive-self cluster had less negative self-concepts than those in the negative-self cluster.

Participants in the negative-self cluster reported more severe symptoms of SAD, more negative self-beliefs in the encoding task, lower life satisfaction, and higher stress than participants in the positive-self cluster. These participants also reported more frequent emotional abuse and neglect—but not more physical or sexual abuse—during childhood than those in the other cluster. Additionally, those in the negative-self cluster were found to have higher DMN activation during negative-trait and self-belief judgments in the encoding task than participants in the positive-self cluster.

Talmon and colleagues successfully replicated most of these results in a second sample of 97 people with SAD and 34 control participants. Participants in the negative-self cluster were not found to have more severe symptoms of SAD in this sample, however.

Overall, the results suggest that there could be two distinct clusters of patients within the larger SAD diagnosis. “Early life adversity is associated with the specific presentation of SAD later in life,” Talmon and colleagues wrote.

These findings may help inform treatment options for SAD. Estimated to affect 12% of people over their lifetime, SAD is the most common anxiety disorder, making it a valuable target for more precise treatment, the researchers noted.

See the full article online, with references, at psychologicalscience.org/publications/observer/obsonline.
STORYBOOKS COULD BE AN EARLY SOURCE OF GENDER STEREOTYPES FOR CHILDREN

Studies have shown that by age 2, children have already started to develop beliefs about gender, including stereotypes—for instance, that boys are better at math and girls are better at reading. However, a new study in *Psychological Science* examines a different, potentially underrecognized source of gender stereotypes and associations: popular children’s books. “We found that many popular children’s books often read to young children, like *Curious George* and *Amelia Bedelia*, contain rich information about gender that is presented in subtle ways,” said lead author Molly Lewis (Carnegie Mellon University). “In some cases, the stereotypes in these books were stronger than in books targeted at adults.”

Previous research on children’s books and gender stereotypes has relied mostly on content analysis. Lewis and her team took a different approach. They collected a corpus of 247 books commonly read to children ages 5 and under and asked adults to rate on a 5-point scale how strongly they associated the books’ text with masculinity and femininity. An overall gender bias score was calculated for each book.

Books with the highest feminine-bias scores included *Chrysanthemum*, *Brave Irene*, and *Amelia Bedelia*, according to the study. Those with the highest masculine-bias scores included *Curious George*, *Dear Zoo*, and *Goodnight, Goodnight Construction Site*. The *Polar Express*, *In the Night Kitchen*, and *Hippopotamus Go Berserk* were rated as “neutral.”

The researchers also used “word embeddings,” a machine learning method, to measure words’ gender associations beyond the adults’ ratings. This approach identified patterns in gender-related “word neighbors,” which are terms that typically appear together across large bodies of text, such as “merry” and “Christmas” in American English. The analysis showed that children’s books vary widely in the amount of gendered content they contain, from strongly male to strongly female.

Machine learning was also used to examine whether gender stereotypes that social psychologists have uncovered in past behavioral experiments appeared in children’s books. “For instance, we found that the statistical patterns of words in these books reflected the stereotype that boys are good at math, while girls are good at reading,” Lewis said.

“Another unexpected result was that children tended to be exposed to books that conveyed gender stereotypes about their own gender—girls tended to be read books about girl characters; boys tended to be read books about boy characters,” Lewis said. “These findings are important because they suggest that books may be inadvertently teaching young children about gender stereotypes.”

One unanswered question the research identified is how children learn stereotypes about other genders when they’re more commonly read books with stereotypes of their own gender. The researchers suggest that children garner this information from media depictions and personal interactions. And, since many kids receive more information about their own gender, they may have “less precise intuitions” about the stereotypes of other genders.

Overall, there were more female biases across the corpus than male biases. However, the research also revealed that gender portrayals vary across the books studied.

“One implication of this finding is that parents may be able to influence children’s development of beliefs about gender through their choice of books,” Lewis said.

An encouraging finding, she added, is that not all storybooks contain gender stereotypes, and some feature gender information contradicting many of the stereotypes. “We also found hints of historical change in how gender was depicted in children’s books. More recently published books were more likely to have female main characters and main characters without obvious gender associations.”

See the full article online, with reference, at psychologicalscience.org/publications/observer/obsonline.
Returning to school after time spent in a juvenile detention facility can be a daunting prospect. Not only may students have fallen behind in their education, but many educators may doubt these students’ potential to succeed in the classroom, putting them at further disadvantage, according to research published by Gregory M. Walton (Stanford University) and colleagues in *Psychological Science*.

“When reentering school, youths have already been told that they do not belong, stereotypes are palpably on the table, and trust has been broken. Even if students approach an educator with a positive mind-set, they may not be well received,” Walton and colleagues explained.

This lack of social support—paired with experiences of violence and trauma, increased rates of mental health issues, discrimination, and other challenges—can contribute to a cycle in which previously incarcerated students, and particularly students of color, are more likely to drop out of school or be reincarcerated going forward.

However, encouraging young people returning from juvenile detention to share their goals for the future with an educator could help them break through these biases to make the connections they need to stay in school and out of the criminal justice system.

“Unlike past interventions, this approach focuses on students and educators simultaneously in an integrated manner,” Walton and colleagues wrote. “Thus, we aimed to support (a) students’ belief in the value and possibility of cultivating positive relationships with educators as well as (b) educators’ receptiveness to those efforts. We targeted the relationship, not either person alone.”

Walton and colleagues explored the value of this intervention through a study of 47 young people, most of them African American boys, returning to mainstream middle and high school over a period of 2 years in Oakland, California. While a third of students received a control intervention focused on study skills, the remaining youths participated in a one-on-one social-belonging intervention that emphasized the importance and possibility of forming relationships with educators at their school. This involved reflecting on personal values related to education, reading stories from older students who had returned to school from juvenile detention, and recording their own advice to students who might participate in the program in the future.

Each student who received this intervention was also asked to write a letter to an educator of their choice, such as a teacher or principal, in which they could request help with achieving their goals for returning to school. Half of these letters were shared with the educators before the students returned to the classroom.

By the end of the 2-year study period, just 29% of students whose letters were delivered had returned to juvenile detention, compared to 69% of students in the control group and 64% of students whose letters were not delivered.

“Only when students and educators were both oriented toward positive relationships with each other did recidivism drop significantly,” Walton and colleagues wrote. “This response is particularly significant given how readily teacher–student relationships become self-fulfilling, especially in contexts of stereotypes and stigma.”

See the full article online, with reference, at psychologicalscience.org/publications/observer/obsonline.
The death throes of a dying star. Expansive clinical trials of potentially lifesaving drugs. Proteins folding into fantastically complex patterns. These and other amazing scientific findings can change what we know about the natural world, potentially treat devastating diseases, and shed new light on the working of the human brain.

However, deciphering the raw data that underlie these discoveries, which are often presented as complex charts and graphs, can be a daunting challenge for students, policymakers, the general public, and others in the scientific community.

In a recent issue of *Psychological Science in the Public Interest*, a team of researchers explored how well-designed visualizations succeed at conveying information and how poorly designed figures create confusion and misunderstanding, undermining not only comprehension but also trust in science.

“Thinking and communicating with data visualizations is critical for an educated public,” said Steven L. Franconeri, lead author on the report and professor of psychology at Northwestern University. “On the other hand, ineffective visualization designs lead many viewers to struggle to understand these otherwise powerful thinking tools. Our paper reviews evidence-based guidelines for how to effectively design visualizations that communicate data to students and the general public.”

Franconeri and his colleagues synthesized guidelines that have been otherwise scattered through multiple research literatures and obscured by jargon. Their paper also describes guidelines for communicating data using visualizations, provides examples of good and bad visualizations, and highlights tools and strategies to improve data visualizations.

Their paper recommends that scientists should:

- Visualize data with easily grasped representations such as histograms and scatterplots rather than presenting statistical summaries alone.
- Consider common visual illusions and confusions. For example, starting axes at zero might not always be the best option, as it can lead viewers to overestimate differences.
- Attempt to use visualizations that audiences are familiar with and respect common associations (e.g., “up” and “darker” mean “more”).
- When communicating confidence to a lay audience, avoid error bars and instead show examples of discrete values.
- When communicating risk to audiences who may have a lower ability to work with numbers and mathematics, rely on absolutes instead of relative rates and convey probabilities (e.g., 3 out of 10) instead of percentages (e.g., 30%).

“Well-designed visualizations amplify our ability to reason about the real-world phenomena data represent, making it possible for us to grasp regularities and variation we might otherwise miss,” said coauthor Jessica Hullman, a professor of computer science at Northwestern University.

The authors concluded that following the guidelines in this review—aided by an understanding of the evidence that motivates them—should lead to far more effective visualizations across public policy, education, journalism, and research.

See the full article online, with reference, at psychologicalscience.org/publications/observer/obsonline.
Which countries produce the largest amounts of research and development (R&D)? A new landmark report from the National Science Foundation’s National Center for Science and Engineering Statistics (NCSES) explores this and other aspects of the world’s scientific landscape, including trends in science leadership among countries.

A highlight from the 2022 “State of U.S. Science and Engineering” report is the concentration of global R&D performance in a just few countries: the United States (27%), China (22%), Japan (7%), Germany (6%), and South Korea (4%). That concentration is shifting, however, from the United States and Europe to countries in East and South Asia. At the same time, middle-income countries, including China and India, are experiencing growth in science-and-engineering realms such as publishing and patenting, distributing science and technology capabilities throughout the globe.

The report also explores how doctoral students in the United States receive financial support for their education. The figure displayed above shows that only a small portion of students in psychology and the social sciences—3,500 individuals, or 7%—received funding from the U.S. government for their education in 2019. Instead, students were primarily supported through their home institution. In other scientific fields such as engineering, biology, biomedicine, and earth and physical sciences, the proportion of students receiving federal funding is significantly higher. (Not shown in the figure is that psychology students are approximately twice as likely as social science students to receive funding from the federal government or to pay for their education themselves.)

The report also contains details on myriad other domains, such as collective trust in science. For instance, recent U.S. survey data show that most individuals believe that scientists act in the best interests of the public. However, approximately 20% of those with a high school diploma or less education have no or little such confidence in scientists. This pattern is not limited to people with low educational attainment; about 1 in 10 college-educated individuals endorse a similar perspective.

For a deep dive into this report— including a political analysis from the U.S. National Science Board, which oversees the National Science Foundation’s activities—view a special recorded briefing on the report on YouTube at the following link: youtube.com/watch?v=SjW2TBRgGlQ.

APS’s government relations team will continue to monitor NCSES’s reports as they are released throughout the year, focusing on critical information relevant to psychological science.

— Andy DeSoto

APS Director of Government Relations
Congratulations APS Rising Stars

The APS Rising Star designation is presented to outstanding psychological scientists in the earliest stages of their post-PhD research careers.

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On his last day in office, Francis Collins, the retiring director of the U.S. National Institutes of Health, said that the United States had "underinvested in research on human behavior" in relation to the COVID-19 pandemic. For many social scientists, it was obvious from the outset of the pandemic that social science would, in some respects, be as important for the outcome of the pandemic as medical sciences have been. Reducing infections requires rapid behavioral change and, hence, efficient communication; increasing vaccinations requires combating vaccine hesitancy and misinformation; and managing tensions during a massive crisis requires dealing with fatigue, polarization, and discontent.

At the same time, Collins’s remarks sparked debate among social scientists about whether their sciences really had anything to offer. This was reminiscent of exchanges early in the pandemic, when some researchers pointed to literature within the social sciences as relevant to the pandemic while others argued that the state of social scientific knowledge was too uncertain and ridden with replicability issues to be useful for decision-makers.

I am a Danish political science professor, and the pandemic turned my professional life upside down. In March 2020, I took on the task of providing scientific advice to Danish decision-makers regarding the behavioral aspects of the pandemic, initially on an ad hoc basis and later as member of the Danish government and health authority's key advisory scientific groups. Further, I have been directing the largest Danish research project on the societal aspects of the pandemic, which also made me one of the most frequently consulted experts in Danish media on the pandemic. Between March 2020 and December 2021, I had more than 2,000 unique media appearances.

So, for better or worse, I have had to balance the uncertainty inherent in many social science studies and decision-makers' need to act with my clear obligation—as a publicly funded researcher—to contribute to both decision-making and public understanding. On the basis of my experiences over the last 2 years, I offer three principles for navigating this dilemma when engaging in scientific advising:

1. **Focus on decision-makers' mental models.** Decision-makers’ mental models of people matter hugely. If decision-makers think of citizens as panic-prone, they will downplay dangers. If decision-makers think of citizens as ignorant, they will downplay complexities.

Elinor Ostrom forcefully made this point in the 1990s, in her criticism of rational choice theory. She wrote that the theory helped facilitate an understanding among decision-makers that citizens are cynics who don’t trust each other, and that this understanding became a self-fulfilling prophecy because of the policies such a mental model gave rise to. In the 2020s, my own concern is less with rational choice theory and more with behavioral economics’ emphasis on biases, which indeed could lead decision-makers to think of citizens as both panic-prone and ignorant.

Accordingly, my focus in providing advice has been less on concrete findings from specific studies and more on shaping decision-makers’ overarching mental models: How should they think about their audience when making and communicating decisions? These mental models should be grounded in not just a few studies but a whole line of research and should, on average, be less prone to replicability issues.

In particular, I have found it useful to consistently refer to research on crisis behavior that speaks against the notion of a panic-prone public, to collective-action theory that encourages the prioritization of trust, to protection-motivation theory on the importance of empowering people rather than simply speaking to their fears, and to procedural-fairness research on the importance of impartiality in decision-making and prioritizing the transparent sharing of information, whether good or bad.

This focus on the mental models of decision-makers has opened my eyes to a neglected research topic. We know a
lot about laypeople’s understanding of and assumptions about human nature. But what are decision-makers’ mental models of human nature, and how are these models shaped by widely covered research—such as, for example, behavioral economics?

2. Focus on blind spots. When providing scientific advice in a health crisis, it is natural to focus on health aspects and to consider how the social sciences can support policies in this regard. For example, how should compliance with the advice of health authorities be encouraged? How can we communicate effectively about vaccines? But while policymakers and epidemiologists—in my experience—see the relevance of social sciences in this regard, you should consider yourself a broader representative of your field and ask if there are challenges that other disciplines, including health research, may be blind to. If so, there is no one but you to bring it to the table. For example, it is clear from a social science perspective that many interventions against disease spread may fuel political discontent and have unintended negative effects on people’s well-being. In Denmark, reliance on interdisciplinary scientific advice, for example, led to the recommendation of a pandemic management strategy that not only focused on infection spread but explicitly tried to balance four factors: infections, the economy, well-being, and the democratic rights of citizens.

3. Focus on data that help identify problems. Decision-makers around the world have focused on data relating to cases, deaths, and emerging variants. What the social sciences have to offer in this regard is data on the behavioral antecedents of infections—for example, mobility and survey data. Are people motivated to comply with advice, do they worry about the spread of the virus, and do they feel capable of protecting themselves and others? In addition, the project that I am directing has been collecting survey data on fatigue, well-being, trust in the authorities and the government, and public support for different interventions. We have shared descriptive analyses of these data on a weekly basis, and sometimes even more frequently, with government, authorities, the media, and the public. Although such data do not show how to solve problems, they can help identify problems such as waning compliance, trust, and support.

These data can also help—and, I believe, have helped—facilitate more balanced interventions against infection spread. If decision-makers receive evidence that citizens are motivated to comply, they can opt for softer recommendations rather than stricter policies. In this way, social science data can move pandemic management more toward a coproduction process in which citizens’ voices—both their frustrations and their support—are channeled directly to decision-makers. Such data also can stir public debate in more productive directions, as those who engage in the debates do not need to assume (sometimes self-servingly) what the majority standpoint is.

Of course, such data require significant resources. First, the key for providing valuable data in an ever-changing crisis is continuous collection, week after week, and rapid analysis and sharing. Second, it requires the prioritization of data quality with regard to representativeness. For example, estimating public support for a set of restrictions often requires better data than the more common research task of deriving a generalizable estimate of the association between two variables.

Just as decision-makers need to reveal uncertainties when communicating with the public, scientific advisors need to be acutely aware of uncertainties surrounding their advice when communicating with decision-makers. In this regard, I believe that people who doubt the utility of social science research during the pandemic have rightly pointed to the uncertainties that surround many concrete studies. These uncertainties relate to issues raised during the replicability crisis and to the inherent difficulty of whether findings generalize across time and space. Again, however, this does not make the social sciences useless.

The social sciences might have less to offer than the health sciences on a tactical level during a pandemic, but I believe they have a lot to offer on the strategic level. Although the social sciences may not have concrete recipes for solutions to behavioral problems such as vaccine hesitancy (unlike recipes for creating the actual vaccines), they can strengthen pandemic management by broadening the set of factors that decision-makers consider, removing incorrect and unhelpful assumptions about public behavior among decision-makers, and providing evidence-based assessments of the magnitude of problems facing decision-makers. Indeed, this may be all that we—as citizens—would like from social science advisors. After all, almost all concrete policy decisions during a pandemic involve political trade-offs that are outside of scientists’ purview. Should vaccine mandates be introduced? Should we close schools or shops? Facing such political questions, the best social science can offer is to sharpen decision-makers’ understanding of the relevant trade-offs. By doing so, social science will make those decisions better.
GOVERNMENT RELATIONS: INSIDE GRANTS

NATIONAL SCIENCE FOUNDATION
EAGER GRANT

Emily Balcetis shares her experiences responding to the 2020 “Strengthening American Infrastructure” program initiative.

A premier funder of basic research, the U.S. National Science Foundation (NSF) comprises seven directorates that provide critical support to psychological scientists, including the Directorate for Social, Behavioral, and Economic Sciences and the Directorate for Education and Human Resources. In 2020, NSF’s budget was $8.3 billion.

In 2020, NSF launched the Strengthening American Infrastructure (SAI) program to stimulate research to strengthen U.S. infrastructure in the physical, cyber, and social domains. The program supports interdisciplinary research that incorporates scientific insights about human behavior and social dynamics to better create, rehabilitate, and maintain strong and effective American infrastructure. The EAGER (Early-concept Grants for Exploratory Research) mechanism supports exploratory research in its early stages. Researchers are encouraged to propose projects that apply different approaches, apply new expertise, and engage interdisciplinary perspectives.

Emily Balcetis is a social psychologist and associate professor of psychology at New York University. She focuses on how people’s motivations, emotions, needs, and goals impact the ways they perceive and interpret information around them. Her work explores motivational biases in visual and social perception and their consequences for behavior and navigation in the social world. She received an EAGER grant from NSF, awarded via the SAI program, for a project titled “Understanding Misperceptions of Cyber Risks to Model and Secure Transportation Infrastructures.”

Grant Information
• Country/Region: United States
• Organization: National Science Foundation
• Grant Mechanism: EAGER—Strengthening American Infrastructure
• Amount: $300,000

Emily Balcetis
What are you researching?
I partnered with a data scientist in electrical and computer engineering, Quanyan Zhu, and a professor in planning and public administration, Rae Zimmerman, to understand cyber risks to the U.S. transportation system that are affected by people’s inability to determine the risks posed by their choices online.

For example, vehicles commonly feature network-connected entertainment and communication systems. If people’s personal information such as passwords become compromised, attackers can gain access to accounts that interface with their cars and control essential automotive functions. This can result in disruption of communication or denial of service within connected vehicles, congestion, collisions, injury, or even death. In other words, keeping passwords to digital music streaming services safe might help prevent events like multicar pileups! This project tests vulnerabilities in cybersecurity for individual users, their connected devices, and the transportation infrastructures to which those devices are linked.

How has the NSF SAI program supported your research and training?
The funding allowed our team to use eye-tracking technology that monitors where people are looking without their awareness. The goal is to understand why people sometimes fail to understand the degree to which their choices jeopardize their own and their communities’ cybersecurity, but also really to understand why those mistakes happen. For example, companies commonly employ scare tactics to teach individuals about cybersecurity. They might say things like, "Clicking on a link from a person you don’t know poses a risk, and about half the people in your firm have done it." This kind of base-rate information could be useful.

Keeping passwords to digital music streaming services might help prevent events like multicar pileups!
to know, because it could signal that I have a one-in-two chance of doing something dangerous. But our early results show that people do not use this kind of base-rate information when they’re thinking about their own risk. In fact, eye-tracking technology shows us that people don’t even really look at those kinds of statistics.

Our current work will expand on these early findings to determine who does find these informative base rates useful and if these base rates do improve their risk determinations. I’ll also rely on my engineering and public-planning collaborators to create computational models to simulate human risk behaviors and study their effects on transportation infrastructure. Without actually posing any risk to people or their communities, we can use statistical modeling based on the actual judgments of drivers in Manhattan’s Lower East Side to explore the impact of their errors in risk assessment. We can estimate the likelihood that they might have credentials stolen and study the potential consequences, including road accidents and congestion, if an attacker were to take control of a connected automotive vehicle. The project leverages knowledge of individuals’ attitudes to better calibrate risk, reduce the odds of attack, and protect the transportation infrastructure. By integrating behavioral data and computer science, the project aims to improve the security of the U.S. national transportation infrastructure.

What was the application process like?
The EAGER mechanism requires researchers to generate their proposal quickly. The acronym implies this urgency. NSF wants to use this mechanism to address problems facing society now, using research teams who are ready to tackle the problems. So, the program officers were quick to offer feedback and move forward with our proposal.

What advice do you have for researchers applying for EAGER grants?
Generate a one-page pitch of your idea that sells the theoretical advances, broader impacts, and nature of the team you’ve created to test the idea. Send that one-pager to a program officer who oversees a program that seems to best match with your research goals. If they don’t see potential, you can ask other program officers, but you’ll need to disclose the fact that another program officer saw the one-pager and did not think it a good fit.

Why is psychological science research important for programs such as Strengthening American Infrastructure? And what can other psychological scientists do to get involved?
Infrastructure is a multifaceted term that fundamentally relies on and exists because of the human experience. Understanding the individuals who create, contribute to, and shape the development of infrastructure is critical to determining its strengths and weaknesses. If you want to know why a camera embedded in a driverless car can’t identify a visual object as a person, yes, you can look at whether the camera’s lens is cracked... but you should also look deeper at the biases of the people who created the algorithms. That understanding will give you greater leverage in solving the problem than simply looking at the technology itself.

Learn more about the NSF Strengthening American Infrastructure program: beta.nsf.gov/funding/opportunities/strengthening-american-infrastructure-sai

interested in learning more about funding opportunities for psychological scientists? Visit the Funding and Policy page on the APS website (psychologicalscience.org/policy) for updates.

QUOTE OF NOTE

“Look, you know, we ask cops to do everything, including be psychologists and social workers. Guess what? They need psychologists and … social workers. No, I mean it. Not a joke. So they can hire more social workers—folks trained in mental health…”

— U.S. President Joe Biden at the U.S. Conference of Mayors 90th Annual Winter Meeting, Jan. 21, 2022
PLEASE

AGAIN

TRY

The science of behavior change
In recent years, deaths by drug overdose have spiked in many countries, a result of the growing availability of fentanyl—a powerful synthetic opioid often used to treat pain—along with stresses of the global COVID-19 pandemic, including job losses and lockdowns that may have had a disproportionate impact on many drug users.

These casualties hit all-time highs in the United States, where an estimated 93,331 people died from drug overdoses during 2020, up 29.4% from the 72,151 deaths estimated in 2019, according to the National Center for Health Statistics. Of all the drug-related deaths in 2020, 75% were overdoses from opioids, including natural and synthetic opioids such as prescription pain medication.

“This is the highest number of overdose deaths ever recorded in a 12-month period, and the largest increase since at least 1999,” Nora Volkow, director of the National Institute on Drug Abuse, told National Public Radio in July 2021.
These rising drug overdoses aren’t unique to the United States. According to the World Health Organization, about 36.3 million people worldwide suffered from drug use disorders in 2019. A growing proportion of them used prescription opioids, which are quickly catching up to heroin and illicitly manufactured opioids in popularity. For instance, the United Nations’ 2021 World Drug Report pointed to alarming increases in opioid use in Africa, which were mainly driven by nonmedical use of pharmaceutical opioids such as tramadol, a substance largely available in the region and not under international control.

The global scope of opioid addiction and its interconnection with pain management make it hard to tackle. Here’s a look at some insights from psychological science on how to change individual and collective behaviors to prevent and treat this problem.

Treating chronic pain: Psychological alternatives
A major impetus for the development of pharmaceutical opioids is persistent—sometimes lifelong—pain. Around 1997, however, opioid prescriptions for chronic pain management began increasing alongside a dual epidemic of heroin use and nonmedical use of pharmaceutical opioids. Between 1997 and 2005, the number of opioid prescriptions in the United States increased more than 500%, resulting in easy access to opioids that were considered safer than heroin, given their reliable quality and potency, and also carried less stigma (Mars et al., 2014). More recently, a retrospective study of opioid users indicated that 75% of those who began their opioid abuse in the 2000s had been introduced to opioids through prescription drugs (Cicero et al., 2014).

This state of affairs indicates the need for approaches to chronic pain management that do not rely on prescription opioids. In a 2021 article in Psychological Science in the Public Interest, a group of researchers and practitioners led by Mary A. Driscoll (Yale School of Medicine and VA Connecticut Healthcare System) examined psychological interventions for the treatment of chronic pain. Such interventions could improve functioning and quality of life among individuals with chronic pain while decreasing overreliance on opioids or invasive procedures such as surgeries that may pose more risks than benefits, the researchers proposed.

Driscoll and colleagues’ proposal aligned with the National Pain Strategy, published by the U.S. Department of Health and Human Services in 2016, which recommended the dissemination of psychological interventions to treat chronic pain. Related to this strategy, the U.S. Centers for Disease Control and Prevention also published a guideline for prescribing opioids for chronic pain (Dowell et al., 2016), which specified a preference for nonpharmacological and nonopioid pharmacological treatments.

In their article, Driscoll and colleagues highlighted the biopsychosocial model of chronic pain, proposed in 1978 by George Engel, which addresses the complexities of chronic pain and is recognized as the principal model informing the study of pain and pain management. This model highlights the interrelatedness of biological factors (e.g., tissue damage, physical health, genetic vulnerabilities), psychological factors (e.g., attention, attitudes, catastrophizing), and social factors (e.g., cultural influences, social learning) in the context of health and illness, including pain and pain management.

The role of those psychological factors in chronic pain implies that psychological interventions capable of modifying the psychological processes that underlie or contribute to pain, distress, or disability might serve as strong alternatives to medication. In fact, there is “overwhelming evidence for the effectiveness of psychological interventions in the management of chronic pain,” Driscoll and colleagues wrote. They identified a number of psychological interventions that are...
Psychological Interventions for Pain Management

The following psychological interventions are among the most widely accepted within the pain-care community, according to Mary A. Driscoll and colleagues (2021):

- **Supportive psychotherapy:** Emphasizes unconditional acceptance and empathic understanding.
- **Relaxation training:** Uses breathing, muscle relaxation, and visual imagery to counteract the body's stress response.
- **Biofeedback:** Uses biofeedback equipment to monitor physiological responses to stress and pain (e.g., heart rate, sweating) and teaches how to down-regulate the body's physiological responses.
- **Hypnosis:** Involves a clinician's hypnotic suggestion to reduce pain and incorporates relaxation training.
- **Operant-behavioral therapy:** Seeks to replace maladaptive behaviors consistent with the “sick” role with healthier “well” behaviors.
- **Cognitive-behavioral therapy:** Identifies and seeks to change maladaptive thoughts about pain that cause distress and unhelpful behaviors, such as isolation and withdrawal; promotes the development of helpful behavioral coping strategies (e.g., relaxation).
- **Acceptance and commitment therapy:** Encourages acceptance of chronic pain and focuses on strategies for identifying and reinforcing behaviors consistent with desired goals.
- **Mindfulness-based interventions:** Aim to disentangle physical pain from emotional pain via increased awareness of the body, breathing, and activity.
- **Emotional-awareness and expression therapy:** Highlights the interconnectedness of brain regions responsible for processing physical pain and emotions; encourages confronting avoided emotions to reduce the connection between emotions and pain.
- **Psychologically informed physical therapy:** Integrates physical therapy and cognitive behavioral therapy.
A Public Health Approach to Addiction Treatment

Treatment approaches to addiction are heterogeneous; there does not appear to exist a single approach that most experts endorse. The difficulty starts with the lack of understanding of why some individuals become addicted, whereas others can consume opioids without developing an addiction. As an example, a 1975 study indicated that about 90% of the American servicemembers who became addicted to opioids in Vietnam stopped using or became controlled users when they returned to the United States (Robins et al., 1975). Some researchers think of opioid addiction as a chronic, relapsing disorder that will last for an individual’s lifetime, whereas others see it as a disorder with high remission rates (Heyman, 2011).

Regardless, public health approaches to drug policy have proved effective in reducing addiction rates and preventing drug-overdose deaths. In 1999, for example, Portugal’s National Strategy for the Fight Against Drugs introduced a vast program of harm-reduction efforts and doubled investment in drug treatment and prevention services while restructuring the legal framework around minor drug offenses. This strategy was a departure from the country’s previous drug demonization campaigns, which were akin to “the war on drugs” in the United States and similarly unsuccessful.

In the 1990s, Portugal had an estimated 100,000 heroin users out of a population of about 10 million and the highest rate of HIV transmission among drug users in the European Union. “It was completely transversal,” cutting across all layers of society, said João Castel-Branco Goulão, the Portuguese national coordinator for drugs and drug addiction and the general director of the Service for Intervention and Ethics Behaviors and Dependencies in Portugal’s Ministry of Health, in a 2021 webinar. Goulão, a medical doctor by training, is the most visible face of the country’s National Strategy for the Fight Against Drugs.

In 2000, the Portuguese parliament approved a new legal framework suggested by this multidisciplinary team, stating that:

- A drug user is a person in need of health and social care.
- Dissuasion intervention provides an opportunity for an early, specific, and integrated interface with drug users.
- Dissuasion intervention is targeted at each drug user’s characteristics and individual needs.

The country decriminalized (but still prohibited) the consumption, acquisition, and possession of any type of drug, meaning that drug users no longer had a criminal record that would extend for life and stigmatize them. As a result, users were—and remain—able to seek medical and psychological treatment without fear of incarceration. This strategy was made easier because of the health care system in place in Portugal. “We have a universal health system for free, easily accessible for everybody without difficult issues of insurances and coverages,” Goulão said in the 2021 webinar.

Under this model, when police officers discover that someone is taking a drug or possesses an amount considered acceptable for personal use (i.e., below a threshold specified by law), they are referred to a multidisciplinary commission composed of a psychologist, a social worker, and a lawyer—a Commission for Dissuasion of Drug Addiction. Within 72 hours, they must meet with the team, which seeks to understand their individual needs and circumstances; if the team determines that the person needs treatment, the members invite (but do not obligate) them to have facilitated access to treatment. A network of methadone clinics, needle exchange programs, programs encouraging small businesses to hire addicts in treatment, and support teams of psychologists, social workers, medical doctors, and peers (many of them former drug users) ensures integrated care and emphasizes social reintegration.

This approach, focused on health and not punishment, led to a drop in the rates of drug-overdose deaths and new HIV infections attributed to injection drug use. It also moved Portugal from the top of the ranking of European Union countries by overdose deaths to the bottom. In...
This approach, focused on health and not punishment, led to a drop in the rates of drug-overdose deaths and new HIV infections attributed to injection drug use. It also moved Portugal from the top of the ranking of European Union countries by overdose deaths to the bottom.

2019, Portugal counted 6 deaths per million among people aged 15 to 64, whereas the European Union averaged 23.7 deaths per million.

Will other countries shift to similar models? In 2021, the administration of President Joe Biden released its strategic drug policy plan for the United States, which focuses on enhancing evidence-based harm-reduction efforts, expanding access to treatment, and eradicating racial, gender, and economic inequities that currently exist in the criminal justice system. The U.S. President also stated that “people should not be incarcerated for drug use but should be offered treatment instead.” This program might mark a turning point away from the war on drugs in favor of an approach favoring drug treatments and prevention as well as harm reduction.

References


Understanding addiction
In a 2019 article in Psychological Science in the Public Interest, Antoine Bechara (University of Southern California) and a team of researchers reviewed theories of addiction aimed at explaining both why people seek drugs in the first place and why some people who use drugs eventually become addicted.

Theories of addiction fall into four major categories, according to the researchers:

- **Traditional explanations** based on pleasure and withdrawal emphasize the euphoria caused by drugs (i.e., positive reinforcement) and the need to alleviate distress or withdrawal (i.e., negative reinforcement).

- **Habit explanations** emphasize the repetition of drug use, which can make drug-use routines become automatic.

- **Incentive-sensitization explanations** emphasize the excessive intensity of addictive cravings even after withdrawal ends, due to dopamine-related sensitization.

- **Cognitive-dysregulation explanations** emphasize loss of self-control as a result of disruptions in the brain systems involved in cognitive control.

Each type of explanation is backed by psychological and neuroscience research, and all may apply to a degree, Bechara and colleagues wrote. However, some may be better than others for explaining why particular drug users ultimately become addicted, they added.

Proposing a neurobehavioral approach to addiction, Bechara and colleagues described how addiction could result from abnormal functioning in three brain systems: the amygdala-striatum (the “impulsive” system), the prefrontal cortex (the “executive” system), and the insula (an area involved in urges and cravings). Individual differences in both brain functioning and societal circumstances can also influence addiction and patterns of recovery and might explain why some opioid users never become addicted.

Treating addiction at the individual level
Bechara and colleagues proposed the competing-neurobehavioral-decision-systems (CNDS) approach, which links mechanisms of addiction and treatments, to treat addiction at the individual level. According to the CNDS, a person’s choices result from the interaction between their impulsive-decision system and their executive-decision system (i.e., a more controlled system). Among people with addiction, the impulsive-decision system tends to predominate. Hence, any intervention that restores balance between the two decision systems, either by weakening the impulsive-decision system or strengthening the executive-decision system, may reduce substance abuse.
There is “overwhelming evidence for the effectiveness of psychological interventions in the management of chronic pain.”  
—Driscoll et al. (2021)

For instance, interventions such as episodic future thinking (mentally simulating future events), transcranial magnetic stimulation of the prefrontal cortices (TMS; noninvasive brain stimulation that can have analgesic effects), and working memory training might increase the dominance of the executive-decision system. TMS can also reduce the dominance of the impulsive-decision system by reducing activation of the dopamine circuit, which is associated with cravings.

Other researchers have also emphasized an individualized approach. In a 2021 article in Current Directions in Psychological Science, Kathleen M. Carroll (Yale School of Medicine) wrote that the heterogeneity of substance use disorders calls for individualized treatment plans. In these, researchers and practitioners identify the features driving addiction in particular individuals and create a wider range of interventions that target the core mechanisms of addiction as well as co-occurring problems.

A 2020 article in Current Directions in Psychological Science outlined an individualized treatment approach that, although not specifically aimed at opioid addiction, could potentially be used to automatize new inferences and behaviors that replace the habitual behaviors involved in addiction. The approach uses ABC training, in which patients are trained in the context of personal antecedents (A) to make behavioral choices (B) according to their goals and in light of potential consequences (C). Reinout W. Wiers (University of Amsterdam), Pieter Van Dessel (Ghent University), and Catalina Köpetz (Wayne State University) suggested the use of ABC training in cognitive-bias modification, a commonly used approach to addiction: implications for the opioid epidemic and the psychology of addiction. Psychological Science in the Public Interest, 20(2), 96–127. https://doi.org/10.1177/1529100619860513


CONGRATULATIONS, NEW APS FELLOWS

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The decisions leading up to a person’s death by suicide are made under conditions unlike almost any other. Although we may spend weeks or even months considering whether to purchase a home, change jobs, or get married, the decision to attempt suicide is often made in the spur of the moment amid a crush of emotions, according to Brian W. Bauer and Daniel W. Capron (University of Southern Mississippi). A person may live with suicidal thoughts for years, yet anywhere from 25% to 40% of suicide attempts may take place less than 5 minutes after the individual decides to take their life, Bauer and Capron wrote in a 2020 *Perspectives on Psychological Science* article.

These circumstances make people experiencing suicidal ideation uniquely vulnerable to common cognitive biases that can result in irrational decision-making, causing them to act against their own self-interest. We are particularly bad at predicting how our emotional state may change in the future and tend to value short-term relief over long-term outcomes, Bauer and Capron noted. Both of these tendencies can contribute to the decision to end severe psychological pain through suicide despite the strong possibility that those feelings will change given time.

Nudges could offer some hope to people in crisis. Based in behavioral economics, these microinterventions are de-
signed to push people toward making choices that align with their own self-interest, such as conserving energy or getting vaccinated, by providing easily digestible information about the benefits of those choices (e.g., stickers on washing machines reading “Fuller laundry loads save water”) or even removing barriers to making those choices (e.g., offering walk-in vaccinations instead of requiring appointments).

Nudges have been used in mental health contexts to help people cut back on their drinking and enroll in treatment programs. In the case of suicide prevention, pre-crisis interventions can occur at several levels, Bauer said in an interview with the Observer.

Public safety campaigns, for example, might advise gun owners to store their firearms and ammunition separately, creating a barrier to impulsive self-harm, and encourage them to save the number for a local crisis hotline in their phone. In clinical care settings, reframing education on coping skills as a way to assist peers, rather than oneself, may increase patients’ willingness to complete safety plans and participate in suicide prevention workshops. And for individual patients, smartphones may offer an avenue for effective “just-in-time” interventions.

Unfortunately, no nudge is a one-size-fits-all solution, Bauer said.

“One thing that is important for this area of research is to keep in mind that people have different needs,” he noted. “For some, what would be most helpful are reminders about skills to use during a crisis, whereas others may benefit more from caring messages from family members, and yet for others each of these may increase emotional distress. This is because nudges likely work differently from person to person, so figuring out what nudges will work best for each person will be critical for optimizing just-in-time nudges.”

The potential for each of these nudges to save lives may seem small, but it is important to remember that most survivors, according to self-reports, regret attempting suicide almost immediately, Bauer and Capron stressed in Perspectives. Numerous studies, the researchers added, have found that 75% of people who survive a suicide attempt don’t make another attempt in their lifetime, and 90% of survivors do not go on to die by suicide.

This suggests that if people can make it to the other side of suicidal crises, they are likely to escape the fog of cognitive biases and go on living.

Studies have found that 75% of people who survive a suicide attempt don’t make another attempt in their lifetime. This suggests that if people can make it to the other side of a suicidal crisis, they are likely to escape the fog of cognitive biases and go on living.

The World Health Organization (WHO) estimates that more than 700,000 people globally died by suicide in 2019, making it a more common cause of death than malaria, HIV/AIDS, or breast cancer.

Stifling socioeconomic conditions and experiences of violence and discrimination, particularly among people who are LGBTQ or of indigenous descent, can significantly increase suicide risk, the WHO noted. Among the most affected countries are Kiribati, Micronesia, and South Korea, with people in lower-income countries experiencing the highest rates of suicide.

The loss of loved ones and livelihoods throughout the COVID-19 pandemic has also carried with it a heavy emotional toll for many people throughout the world. Through a study of 21 countries in The Lancet Psychiatry, Jane Pirkis (University of Melbourne) and colleagues found that, despite increases in depression, anxiety, and other mental health conditions, the number of deaths by suicide remained in line with, or even fell below, pre-pandemic projections during April to July of 2020. This could be due in part to steps many governments took to increase access to mental health services and financial support at the beginning of the pandemic, Pirkis and colleagues wrote. Some individuals might also have benefitted from spending more time at home with loved ones or the sense of social connection derived from the idea that “we’re all in this together.”

It’s important to remain vigilant for the potential long-term effects of COVID-19-related distress on suicide risk, however, which may be more fully felt as governments begin to withdraw pandemic support services, Pirkis and colleagues added.

Given these and other complex and conflicting factors, it can be difficult to know who may be in need of suicide risk intervention.

“Many known suicide risk factors, which have been frequently tested in isolation or within relatively simple
models, fail to predict suicide ideation and suicidal behaviors better than chance,” Brown and colleagues wrote. 

Network analysis could help untangle the web of relationships between these factors, Brown and colleagues continued, allowing researchers and clinicians to better understand the constellation of symptoms and experiences associated with suicide, and therefore to design more effective screening and interventions.

Toward this end, Brown and colleagues analyzed three preexisting data sets from a total of 402 adult psychiatric patients in the United States, where the number of known deaths by suicide was 45,855 in 2020, down slightly from 47,511 in 2019, according to the Centers for Disease Control and Prevention. As part of each study, participants completed both the 15-item Interpersonal Needs Questionnaire (INQ) and the 21-item Beck Scale for Suicide Ideation, developed by APS James McKeen Cattell Fellow Aaron Beck, who died in 2021.

The INQ measures two factors considered central to the interpersonal theory of suicide: thwarted belonging, which includes feelings of isolation from other people, and perceived burdensomeness, which can contribute to the false belief that other people would be better off without the individual in their lives. Suicidal ideation and behavior can occur when these perceptions are paired with a sense of hopelessness about the future, Brown and colleagues explained.

In line with this theory, Brown and colleagues’ item-level analysis found that scores on two INQ items uniquely predicted suicidal ideation and behavior: low scores on “I feel like I belong” and high scores on “I think I am a burden on society.”

This suggests that limiting the number of items used in suicide risk assessments could help improve their reliability while streamlining the clinical process, the researchers wrote. Including items that are not uniquely predictive of suicidal ideation and behavior can dilute results, obscuring individuals’ actual risk for suicide. For example, scores on “I think the people in my life wish they could be rid of me,” were not consistently associated with suicidal ideation or behavior. Keeping such items in an assessment could cause

The Burden of Inflexible Interpretations

Another cognitive bias that may contribute significantly to experiences of suicidal ideation is interpretation inflexibility, wrote Jonas Everaert (Ghent University) and colleagues in a 2021 article in Clinical Psychological Science.

“Beliefs highlighted in prominent theories of suicide might be distorted by biases in information processing, such as the bias against revising interpretations in response to evidence against them,” Everaert and colleagues explained.

According to the interpersonal theory of suicide, suicidal ideation is driven primarily by perceptions of thwarted belongingness and burdensomeness. More often than not, the researchers wrote, these perceptions have been found to be inaccurate.

Everaert’s study of 207 participants suggests that individuals with suicidal ideation can be more susceptible to these misperceptions because of a cognitive bias against updating interpretations of social situations. That bias may lead individuals to resist revising negative self-perceptions, even if contradictory information becomes available.

As part of the study, participants responded to a series of initially ambiguous social scenarios, known as Bias Against Disconfirmatory Evidence tasks, during which they were presented with two increasingly positive additional details and asked to report how their perception of the situation may have changed.

In a birthday scenario, for example, participants were told that they had received just a few Facebook messages wishing them a happy birthday, at which point they were asked to rate the plausibility of several statements: (1) Most of their friends didn’t care that it was their birthday, (2) most of their friends had forgotten it was their birthday, and (3) their friends were planning a surprise birthday message.

Participants then received the additional information that they had one unopened voicemail and, finally, that the voicemail was of all their friends singing happy birthday. At each of these points, participants were asked to reevaluate their perception of the above possibilities.

Individuals who maintained a more negative perception of social scenarios in the face of increasingly positive additional information were more likely to report perceiving themselves as a burden to others, which was in turn related to increased suicidal ideation.

Even when negative perceptions are initially plausible, Everaert and colleagues wrote, interpretation inflexibility may prolong the impact of adverse experiences such as discrimination, financial hardship, and trauma by preventing people from updating their self-perceptions as conditions improve.

Incorporating existing practices for cognitive-bias modification into clinical treatment for suicidal ideation could help address inflexible perceptions, the researchers added.
Measuring the unspoken
Accurately assessing patients’ suicidal thoughts can be challenging given people’s tendency to conceal or deny these feelings, even in clinical settings, wrote Nina Tello (Université de Poitiers) and colleagues in Psychological Science. Fortunately, their research, published in 2020, suggests that the Suicide–Implicit Association Test (S–IAT) can be used to accurately predict patients’ risk of attempting suicide.

In a direct replication of previous research by Matthew K. Nock (Harvard University) and colleagues, which followed 157 patients in the United States, Tello administered the S–IAT to 165 French patients who had been hospitalized for mental health treatment. Similar to the original Implicit Association Test, which was designed to detect social bias, the S–IAT presents participants with a series of simple stimuli in order to determine whether they associate thoughts of themselves with thoughts of death.

This involves using a keyboard to sort terms into a series of categories as quickly as possible—in this case “me,” “not me,” “life,” and “death.” A participant might be asked to sort the term “alive,” for example, into the “me” or “not me” category or to sort “me” into the “lifeless” or “survive” category. An individual who associates terms related to death, as opposed to life, with the self more quickly would receive a higher score, indicating a strong implicit association between themself and death.

Unlike the authors of the original study, Tello and colleagues found that the S–IAT could not distinguish between patients who had just been admitted to the hospital for a suicide attempt versus those who had been admitted for other reasons. When the researchers reached out to participants 6 months later, however, their S–IAT scores were found to predict post-study suicide attempts with 85% accuracy.

“The S–IAT prospectively predicts one of the most important decisions an individual can make, the decision to take one’s life, as attested by official medical records,” Tello and colleagues wrote. “A straightforward implication for suicide prevention is that implicit identification with death or suicide should be assessed early, and patients with an implicit bias toward suicide should be given special attention and care.”

Managing Assessment in Foster Care
Youth in foster care are among the populations most at risk of suicide, said Lily A. Brown (University of Pennsylvania) in an interview with the Observer. Ideally, every child in foster care would be able to receive therapy from a clinician trained in assessing suicide risk, but this isn’t the case in most parts of the United States.

“One thing that we commonly hear from stakeholders is that the system is enormously stressed in terms of the amount of amazing things that foster care organizations are able to accomplish on a limited budget,” Brown said. “We often hear people saying that there are not enough resources to prioritize this; we need to focus on making sure these kids have a safe place to stay tonight and food in their bellies today.”

Training case managers, who oversee children in foster care, to conduct suicide risk assessments could help meet this need in a relatively low-cost manner, Brown suggested in a 2020 Perspectives on Psychological Science article.

Funding is only one part of the equation, however: Even in highly resourced settings, staff may avoid asking about suicide simply because they don’t know how. Preparing case managers to ask these questions, and to know how to respond if a child indicates they are experiencing suicidal thoughts, could be a crucial step in the right direction, Brown said.

Limiting the number of items used in suicide risk assessments could help improve their reliability while streamlining the clinical process.

Computing states of mind
Computational linguistics offers another avenue for analyzing the risk factors that may contribute to suicide attempts, wrote Yaakov Ophir (Technion-Israel Institute of Technology) and colleagues in a 2021 Clinical Psychological Science article.
“To overcome these inherent obstacles in suicide prevention and break through the prediction ceiling in the current state of the literature, more and more scholars are recommending to integrate research methodologies from the field of machine learning,” Ophir and colleagues wrote. More traditional studies restrict researchers to examining just a few predefined variables, the researchers explained. Computational linguistics, on the other hand, allows psychological scientists to identify patterns in large data sets, including text, images, and even emojis. Deep neural networks that specialize in language encoding can also identify relationships between text order and proximity at the level of words, sentences, and paragraphs, providing researchers with a unique window into participants’ state of mind.

A version of these methods has been available since as early as the 1950s, but it’s not until recently that both sufficient computer processing power and large enough data sets have become common enough to apply computational linguistics to a problem as complex as suicide. In the past, Ophir and colleagues noted, written communication was comparatively formal, even in letters between friends, but social media platforms like Facebook and Twitter offer a more casual, if still curated, window into people’s day-to-day lives.

This could allow computational linguistics programs not only to flag discussions explicitly related to suicide, Ophir and colleagues wrote, but to identify language patterns used by at-risk individuals who may not be comfortable discussing their mental health openly, or may even deny experiencing suicidal thoughts when asked.

“Not only can [computational linguistics] tools improve the accuracy of suicide prediction models and increase the accessibility to individuals at risk who lack psychosocial support, but they can also contribute to efforts to monitor the risk in real time,” Ophir and colleagues explained. “Future application of such tools among large populations may therefore expand early suicide-detection efforts in the community, encourage at-risk individuals to seek help, and hopefully contribute to a significant reduction in suicide rates around the world.”

Applying this technology to such a sensitive topic requires researchers to strike the right ethical balance between privacy, autonomy, security, and well-being, Ophir and colleagues acknowledged.

Although social media posts are public, that doesn’t necessarily mean that individuals would consent to having them used in research, or even for platform-wide suicide-risk monitoring, which Facebook began doing several years ago. Additionally, computational linguistics research often requires offline validation, such as medical records, to meaningfully investigate how online content relates to individuals’ experiences of suicidal ideation and behavior.

Instead, the researchers suggested, practitioners in clinical settings could ask patients to share existing diary entries, social media posts, and other personal texts for computational linguistics assessment as part of their treatment, the researchers suggested.

Securing this data for research purposes could require new guidelines around data sharing, such as storing anonymized data in online portals where it can’t be exported, Ophir and colleagues continued. No system is perfect, though, and there is always the risk of information being leaked for nonscientific purposes.

Using computational linguistics programs to monitor suicide risk in more public settings such as social media also raises the question of what to do if a person is identified as being at high risk for suicide. Individuals could be directed to local suicide prevention resources or online intervention platforms, but, in theory, a program could go as far as automatically contacting local social services for a wellness check, a level of surveillance that may make some people uncomfortable, no matter how well intended.

Ophir and colleagues argue that real-world applications of computational linguistics should be subject to the same ethical norms that limit data collection in research settings. This means that programs should be transparent about what information they are collecting, require written consent to begin data collection, and allow individuals to opt out at any time.

“Developers and clinicians should prioritize lifesaving while trying their best to minimize the violation of users’ privacy and/or autonomy,” the researchers wrote. “We have a unique responsibility to convey a message of hope to our patients/research participants, insist that other and better solutions exist to any life crisis, and encourage them to seek further professional help.”

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**References**


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Kim Armstrong is a freelance writer in Boston, Massachusetts.


BEHAVIORAL CHANGE AND SCIENCE COMMUNICATION: SAME PLANET, WORLDS APART

Research credentials won’t resonate with science skeptics. Is it time for psychological science to incorporate tactics from public relations?

By Charles Blue, APS staff writer

When faced with a natural or human-made crisis—climate change, pandemics, and even the eventual comet or asteroid impact—people call upon scientists to reach out to the public with accurate and up-to-date information. After all, a well-informed person is better equipped to rally resources and devise support programs and policies that protect themselves and the rest of society.

“We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology.”
—Carl Sagan
The public can effectively digest and act on complex scientific information—but beliefs and behaviors, particularly those related to group identity, are highly resistant to change merely based on authoritative information.

In the past, effective science communication has indeed inspired the global population to address real and urgent threats. In the mid-1980s, for example, climate researchers discovered an alarming decrease in stratospheric ozone over the Antarctic, a worrying trend that, if left unchecked, would lead to significant health risks for humans and perhaps the entire biosphere. In studying this decrease, scientists eventually discovered that chemicals known as chlorofluorocarbons (CFCs), which were commonly used in hair sprays and refrigeration systems, tended to linger on polar stratospheric clouds, where they ripped apart ozone molecules in the upper atmosphere. This finding was touted as the “smoking gun” of ozone depletion.

In the years that followed, many members of the public changed their behaviors and purchasing habits, and policymakers enacted new regulations aimed at slowing this trend. Perhaps most importantly, there were no appreciable counterarguments by ozone-hole skeptics and deniers, although these individuals certainly existed. The result was that over the past few decades, behavioral change and international accords on CFCs and other ozone-damaging chemicals have helped stop the growth of the ozone hole.

This example suggests that the public can effectively digest and act on complex scientific information. A single case study, however, does not predict responses to similar crises, such as climate change more broadly.

As early as the late 1800s, scientists, including Swedish chemist Svante Arrhenius, identified the role of carbon dioxide in Earth’s greenhouse effect and the potential for human activities, such as burning fossil fuels, to seriously harm the planet. Since that time, the impact of rising levels of atmospheric carbon dioxide has been remarkably well studied, directly observed, and even identified as a grave national security threat that must be addressed quickly.

Yet broad public support to slow climate change akin to that around ozone depletion is harder to rally and sustain. More concerning, political self-identification can accurately predict an individual’s trust in the well-established science related to climate change. Against this background of entrenched and vocal resistance to significant action, calls for better communication about climate change have echoed loudly in academia and in advocacy circles. But is this lack of action and acceptance of science a failure of science communication?

Recent psychological science studies suggest that the answer is no: There are many more factors at play than a dearth of accurate science outreach. Beliefs and behaviors, particularly those related to group identity (as is the case with global warming), are highly resistant to change merely based on authoritative information and public outreach.

This was clearly demonstrated in a recent study in *Psychological Science*, which revealed that explaining the meaning of “scientific consensus” countered false beliefs about the safety of genetically modified foods but was less effective in convincing skeptics that climate change is real and caused by humans. The paper’s lead author, Aart van Stekelenburg, a communication scientist at Radboud University in the Netherlands, believes one possible explanation for this difference is that people, particularly in the United States, have less trust in climate scientists than in biomedical scientists. “It may be that because there is less trust, the emphasis on consensus among climate scientists has also had less influence on the convictions of climate naysayers,” he said in an interview with the *Observer*.

Although the issue of trust is certainly important, other obstacles could also undermine the influence of science communication. In the United States, at least, proponents and opponents of climate-change science tend to be on opposite ends of the political spectrum. This puts the scientific consensus about anthropogenic climate change...
at odds with feelings of identity and group dynamics, making behavioral change much more challenging.

When behavioral change is less susceptible to factual communication, broader public relations tactics may have better luck persuading naysayers. Alas, the scientific community tends to rely on the credentials of its research to carry its message rather than determining what messages resonate, which spokespersons are trusted, and what barriers exist with the community of science skeptics. These are the elements that would form the foundation of a comprehensive public relations campaign.

“The rejection of sound evidence in public health literally costs lives. A disregard for the findings of climate science erodes our capacity to act in a timely fashion. These are but a few critical examples that require different, more engaged approaches to communicating science to address some of the most pressing challenges of the 21st century.” — Laura Lindenfeld, Alan Alda Center for Communicating Science

The power of public relations
If you were to order breakfast in any restaurant in the United States, you

Perspective From Across the Pond: Q&A With Andreas Olsson
COVID-19 is a global pandemic, and misinformation is a global problem. To broaden our perspective, the Observer asked Andreas Olsson, professor of psychology and director of the Karolinska Institute Emotion Lab, for his insights on COVID-19 misinformation in Europe.

Q: In the United States, there are several characteristics that are associated with a person’s support or resistance to vaccination, including political affiliation and susceptibility of conspiratorial thinking. Are there similar predictors in Europe?

Olsson: Because our psychologies are, to a large extent, similar, we should expect many similarities, especially with countries in Western Europe. Yet, I see several interesting differences. In Europe, research shows that you’ll find vaccine hesitancy/denial across the political spectrum—attitudes toward vaccines are not as strongly politicized as they are in the United States. In Europe, it is important to take the East/West and North/South dimensions into account; for example, you have more hesitancy in the East (and to some degree South), which might be linked to distrust in authorities (including scientists). In contrast, trust in health authorities has traditionally been very high in Scandinavia, for example, where vaccines (including for COVID-19) are largely endorsed. Pockets of hesitancy/denial in the West are often linked to suspiciousness toward traditional medicine and big industry/pharma, as well as to regions with a high degree of non-European immigrants.

Q: Do you think those who have so far resisted vaccination will ever change their stance? Is there a message that could help bring about this change?

Olsson: There are many different reasons for why people resist vaccination, and each reason might need a somewhat different approach. Social information is very important. If others in your social network—especially people you trust, identify with, or look up to—get vaccinated (or at least you believe that they are), this increases the chances that you also will. Thus, you should use positive examples and inform people about the high vaccination rates, etc. A related aspect is trust in authorities and scientists (see my reply above).

However, on the individual level, if you decide not to get vaccinated and have yet not contracted the disease, this reinforces your belief you don’t need to (simple learning theory). So, it gets harder to convince that person. Seeing or imagining others suffering from COVID can make you overcome your hesitancy.

Q: What have we—the psychological science community—learned about the power of misinformation in the era of COVID?

Olsson: I think we learned a lot. Although much of the knowledge already established in the field about misinformation and vaccine hesitancy was strengthened and generalized to this new situation, scientists were given an unprecedented opportunity to study these phenomena on a global scale (because the whole planet was hit) and thus to examine how the spread and impact of misinformation was dependent on cultural context. We have also gained important understanding about how misinformation spreads online.
The pandemic has been communicated in impersonal numbers and statistics. Personal stories are more “real” to most of us; many believe numbers to be easily falsifiable.

Behavioral scientist Stuart Vyse published his thoughts on behavior and belief as they relate to ardent “antivaxxers.” His article in *Skeptical Inquirer*, “Why Your Uncle Isn’t Going to Get Vaccinated,” presented four key characteristics of the COVID antivaccine crowd in the United States that, in effect, inoculate them from science communication and public health messages. Unsurprisingly to many, being a supporter of Donald Trump is “one of the strongest predictors of your vaccination status.” That is not to say that Trump himself drove the initial skepticism, but his long contention with public-health experts laid the groundwork for skepticism. Even though the former president eventually tried to urge his followers to get vaccinated—to resounding “boos” from the audience at one event—Vyse believes that it is far too late to pivot on this issue. Vaccine denial is now a defining characteristic of this cohort.

The second characteristic of antivax thinking Vyse highlighted is a desire to avoid cognitive dissonance. Over the past months and years, vaccines and other health measures have become linked to particular group identities. The friends and family with whom we identify are likely to be strongly pro- or antivaccine. Shifting one’s stance may require rejecting the beliefs of one’s group. Changing course midway through the pandemic, even with new surges and greater data on vaccines’ safety and efficacy, would create an unpleasant cognitive dissonance in the minds of antivaxxers. And so long as deniers haven’t gotten seriously ill, they can still believe they’re on the right side of this issue.

The third characteristic Vyse identified is a persistent belief, contrary to all evidence, that COVID-19 isn’t that serious. One important reason for this is the hidden nature of the pandemic. The millions of people who have died from COVID around the world and the many more who have been hospitalized have mostly been shielded from public sight. Unless you’ve worked in a COVID hospital ward or cared for a dying family member, the most visible aspects of the pandemic have been the inconveniences endured by the public. Though this is due, in part, to privacy laws that shield patients from public disclosure, it is clearly a point where scientific communication has failed. The pandemic has been communicated in impersonal numbers and statistics. Personal stories are more “real” to most of us, and

Roadblocks to persuasion

When it comes to swaying public sentiment and shifting behaviors, there is often more to the equation than piling on fact-based information. If the only audience were the science-trusting lay public, using factual data to change behavior would be a perfectly reasonable approach. But when science becomes heavily politicized, the target audience is something else indeed.

Evocative images of children encased in iron lungs put a tragically human face on the polio pandemic. Visceral images like these do more to sway opinion than the charts and figures used to convey the impact of the COVID-19 pandemic. Credit: U.S. Food & Drug Administration
many believe numbers to be easily falsifiable, as shown in challenges to the last U.S. presidential election.

Consider the Sunbury Daily Item, a local newspaper in central Pennsylvania, whose website publishes daily statewide case numbers provided by health officials. This information is accurate, authoritative, and compelling. And yet on a near daily basis, COVID skeptics mock these reports in the comments section.

This is an example of two classic public relations failings. First, it provides information without imagery or a personally relatable context. Second, it is unrelenting to the point of being numbing. The news is the same every day; only the numbers have changed. In the 1950s, heart-wrenching images of children in iron lungs during outbreaks of the far less deadly and less virulent polio virus helped to galvanize support for mass vaccinations. Publishing numbers of new infections is science communications. Publishing images of affected patients is public relations.

Finally, there is the perhaps uniquely American idea that it is better to surrender our lives than to surrender our freedom, however loosely defined. “The theme of liberty and freedom of choice has only strengthened in the current debate over the response to the SARS-CoV-2 pandemic,” noted Vyse in an interview with the Observer. As a measure of hope, however, Vyse did mention that mandates could give cover to those who decide to get the vaccine without triggering cognitive dissonance: They could say that they wanted to avoid the vaccine but were forced to get it for their job.

Outreach campaigns
For a complementary point of view, the Observer asked science-communication expert and political science professor Jon Miller what most concerned him about the current state of science denial. “I think that the American political right has turned into an anti-academic movement that prefers their own ‘alternative facts’ to authoritative sources like scientists,” he said.

He did, however, have a more optimistic observation about the future: “I think that the most promising development is the increasing proportion of our youngest cohorts that are earning baccalaureate and graduate/professional degrees,” said Miller, who is also director of CPS International Center for the Advancement of Scientific Literacy at the University of Michigan. “Many American scientists do not realize that the United States is the only major country that requires all of its baccalaureate graduates to have a year of general education, including a full year of science. In earlier years, many science departments and faculties wrote these courses off as ‘rocks for jocks,’ but there is a strong liberal education movement to make these courses into important learning experiences. I think it is working,” Miller said.

The question psychological scientists must answer is, does the current lack of trust in science—as expressed in climate-change denial or antivaccination sentiments—stem from a lack of access to quality science information? Public relations professionals, including this writer, would argue the answer is no. As noted in past Observer columns on communicating science, efforts to debunk myths and misinformation can just as easily reinforce the bunk, and no one has ever had their minds changed by someone getting in their face and calling them an idiot. And yet, as demonstrated on major social media platforms, these two approaches—debunking and name-calling—are the two most common tactics that science skeptics encounter.

To change minds and affect behavior, the broader science community may need to take a page from public relations. We first need to conduct broad public opinion polls, understand the messages and the voices that are trusted by those who do not trust science, and, informed by this research, undertake innovative programs.

Such surveys are expensive and complex. The costs typically exceed research grants and require expertise beyond the scope of Mechanical Turk studies. Public relations campaigns are even more expensive, take longer, and require the combined skills of public relations specialists, marketing professionals, political-science experts, and spokespeople who are both respected by opponents and willing to take some bruises for challenging the antiscience mainstream.

References
The Subversive Nonchalance of Small Changes

Policymakers see promise in “nudges,” norms, habit formation, and other approaches centered around self-determination.

By Christine Browne

In 2008, New York City passed a law requiring chain restaurants and other food service establishments to post calorie information prominently on their menus. People tend to underestimate the calories they consume, especially when eating out; the thinking behind the law was that displaying those calories would help diners make healthier choices. Surveys suggested broad support for the measure (e.g., Bleich & Pollack, 2010), which was soon adopted by other cities and states and, ultimately, written into federal law.

Law professor Cass R. Sunstein and economist Richard H. Thaler hailed the move in 2009 when they revised their 2008 best seller, *Nudge: Improving Decisions About Health, Wealth, and Happiness.* “We prefer mandating information to mandating food ingredients,” the authors noted approvingly. Cass and Sunstein’s original concept of “nudges” had borrowed from findings in behavioral psychology, which showed that rational decision-making is often undermined by contextual factors and heuristics, or mental shortcuts. A nudge is any policy tool that capitalizes on these tendencies to influence behavior by reframing decision contexts—without forbidding or penalizing any options.

Displaying nutritional information alongside diners’ options fit the bill. But how did that policy fare in New
Habit Formation and COVID-19

In the context of the COVID-19 pandemic, behavior-change strategies have come under the spotlight. Health behaviors such as masking, quarantining, and social distancing still feel new to most people. And even relatively commonplace behaviors, such as handwashing or staying home when one feels ill, have become more stringent.

Guidelines on COVID-19 prevention have been widely promoted by governments and health organizations. Unfortunately, knowledge of those guidelines and intentions to follow them won't guarantee people's compliance, warned APS Fellow Allison Harvey and colleagues in a 2021 Current Directions in Psychological Science article. Behaviors are reliable only when they're habitual, the researchers argued; for that reason, public-health efforts against COVID should leverage the science of habit formation.

A behavior becomes a habit once it's consistently triggered by contextual cues, without deliberation or conscious consideration—such as putting on a mask automatically before leaving home. The process of habit formation depends on repetition, which can be motivated by goals, rewards, or other reinforcements.

The researchers proposed a comprehensive strategy for habit formation in the context of COVID-19:

1. Identify and address incorrect beliefs
2. Set goals
3. Devise an action plan
4. Establish contextual cues
5. Engage in repetition
6. Aim for automaticity
7. Acknowledge that change is difficult

Many of these steps can be applied at the individual level. But they can also be promoted by governments, businesses, and other institutions. Moreover, Harvey and colleagues' habit-formation strategy, which builds on decision research in a variety of domains, may be effective for any behavioral change.

Amid the pandemic, policymakers, health professionals, and business leaders have disseminated health guidelines, emphasized risks or prosocial benefits, adapted infrastructure to promote social distancing, implemented cash rewards for vaccination, and instituted fines or barriers to employment or socializing for the unvaccinated. Findings from the broader literature on health-behavior nudges may shed light on what, ultimately, will work—and what won't.

The problem of self-control

Changing behavior isn't like flipping a switch; overhauling old habits demands sustained attention, motivation, and self-control. Unfortunately, according to a 2018 Psychological Science in the Public Interest review by APS Fellow Angela Duckworth and colleagues, people tend to overestimate their powers of self-control—which may explain why purely informational interventions attract so much misplaced enthusiasm.

Interventions that prompt “self-monitoring,” or continued observation and assessment of one’s own behavior, may help overcome this hurdle, Duckworth and colleagues noted. For example, studies have shown that self-monitoring helps alcoholics to drink less and dieters to lose weight. Setting goals—particularly goals that are specific, at least somewhat challenging, and set publicly or made with a group—can also help to channel people's attention and
motivation toward desired behaviors. For people who have less experience with or commitment to a behavior, it may be especially helpful to break big goals into smaller, more easy-to-realize subgoals: Accomplishing each subgoal will feel like a win, resulting in a sense of progress and a rise in the perception of self-efficacy.

Other cognitive strategies that have been shown to boost self-control include pre-planning, such as by forming “implementation intentions” (i.e., linking an anticipated contextual cue with a desired behavior), and “temptation bundling,” or allowing oneself an indulgence only if it’s paired with a good behavior (e.g., watching a guilty-pleasure TV show only while running on the treadmill).

Our desire to achieve self-control, and our optimism about our ability to do so, may make these cognitive strategies appealing. However, the researchers advised, in some cases, people might benefit more from avoiding unhealthy impulses altogether than from learning how to override them.

Relatedly, a broad body of research has shown that people engage in more healthy behaviors when those behaviors are more convenient—for example, hospital visitors’ hand hygiene improves when hand sanitizers are prominently accessible (Birnbach et al., 2012). By the same token, making unhealthy behaviors inconvenient can effectively discourage them.

In 2020, researchers in Thailand tested interventions for reducing fish sauce use—and, in turn, sodium intake—among diners at noodle shops (Kanchanachitra et al., 2020). Normally, noodle shop patrons served themselves fish sauce from large bottles. When fish sauce instead had to be served from a small bowl with a spoon, the sodium in diners’ noodle bowls fell by 124.2 mg; in a more extreme version of the intervention, diners had to use a spoon with a hole in the middle that held less than a teaspoon at a time. In that condition, sodium fell by 276.9 mg. Information on sodium intake was provided in both conditions. But diners who were informed about the health effects of sodium overconsumption and could still use the regular bottles saw nonsignificant effects. In other words, information alone didn’t affect dietary decisions—convenience did.

### Carrots versus sticks
Since 2002, the Japanese government has sought to encourage hepatitis screenings and, in turn, decrease the incidence of liver cancer and other complications—for example, by mandating that workplaces provide screenings for employees age 40 or older. Nevertheless, screening rates in the country have remained low. In one recent study, employers sent a control group typical screening reminders that contained detailed information on the risks of cancer and benefits of screening. Screening rates in this group totaled 21.2%. One treatment group received a similar reminder that was redesigned to be easier to read and more visually attractive; 37.1% of these recipients got screened. Another treatment group was told that their screenings would be provided free of charge. Although the out-of-pocket cost was only 612 yen (less than $5.50), screening rates in this group reached 86.3% (Fukuyoshi et al., 2021). As this experiment showed, eliminating costs—even small ones—can have a big impact on behavior. When feasible, monetary incentives may also have powerful effects.
And they may work for a broad range of health behaviors, including substance-abuse treatment, smoking cessation, weight loss, safe sex, immunization, and HIV screening (Montoy, 2018).

Other research, however, indicates that monetary disincentives may have more impact. Perhaps the strongest evidence comes from anti-smoking efforts. Although counter-advertising, age limits, and bans may all deter smoking, cigarette price hikes and taxes appear to have the strongest, most consistent effects, particularly during youth (Gruber, 2001) and in pregnancy (Ringel & Evans, 2001).

In a 2010 study reported in Psychological Science, APS Fellow Leonard Epstein and colleagues gave parents a strict hypothetical budget for weekly groceries and asked them to complete five mock shopping tasks for their households. In one task, food costs mirrored prices at local grocery stores, where healthy foods cost almost 4 times more per calorie than less healthy foods. In two other tasks, prices for healthy foods decreased by 25% and 12.5%, respectively; in the remaining two tasks, prices for unhealthy foods were raised by the same amounts. The researchers found that shoppers purchased more healthy food when it was cheaper—but they used their savings to purchase more unhealthy food as well. By contrast, when prices for unhealthy food went up, shoppers’ baskets showed corresponding drops in total calories, carbohydrates, and fat.

Other studies, conducted in several countries, have supported that costs can substantially sway people’s consumption of unhealthy foods. For this reason, the World Health Organization has recommended that member states tax unhealthy foods, particularly sugar-sweetened beverages (SSBs), to improve residents’ nutrition. Latin America is at the forefront of such efforts: Several countries in the region, including Chile, the Dominican Republic, Ecuador, and Mexico, have implemented taxes on SSBs, and initial findings have shown subsequent declines in consumption (Pan American Health Organization, 2020).

Unlike nudges, “sin taxes” are coercive—that is, they impose meaningful constraints on people’s behavior—and perhaps for that reason, they are far less popular than other health policies (Le Bodo & De Wals, 2018). Some countries, including South Africa, have rallied public support for such taxes through media campaigns informing constituents about the health effects of targeted products (Murukutla et al., 2020). Other countries and localities have made taxes more palatable by using the revenues to subsidize healthier foods, expand public health programs, or support charities.

Accounting for norms
One of the most important determinants of behavior is norms—ideas about how other people actually act, known as descriptive norms, and how people should act, or injunctive norms. As APS Fellow Deborah Prentice noted in a 2018 SCIENCE OF BEHAVIOR CHANGE: SUBVERSIVE NONCHALANCE OF SMALL CHANGES

Cultural Attitudes and Global Variations
In 2018, Cass R. Sunstein and his colleagues surveyed people in Australia, Brazil, Canada, China, Japan, Russia, South Africa, and South Korea on the acceptability of a variety of nudges—from ads discouraging smoking and overeating to mandated meat-free days at institutional cafeterias.

The researchers had hypothesized that respondents in all the countries would show generally positive attitudes toward nudges. Contrary to their expectations, support was lowest in Japan. For example, nearly two-thirds of Japanese respondents rejected candy-free zones near checkout counters—a policy that found majority support in all the other countries.

Distrust of government might partly explain those results, the authors suggested—except that confidence in government is relatively high in Denmark, where earlier research had revealed relatively anti-nudge attitudes, and corruption scandals had recently tanked government support in pro-nudge South Korea. Alternatively, the authors noted, rejection may simply have signaled lower enthusiasm about the policies’ goals.

Other research supports that idea. A separate survey in South Korea showed lower support for nutritional nudges than has been observed in Europe (Kasdan, 2020). Those findings were explained not by beliefs about government but by perceived risks: Obesity is generally not seen as a pressing health issue in South Korea, and meat is thought to be part of a balanced, healthy diet.

Despite some variation, nudges appear to be broadly appreciated, as long as they align with perceived public health needs. Information-based nudges are the most likely to receive support, particularly in the domain of health behavior. Mandatory calorie posting, for example, won approval from 85% of Sunstein and colleagues’ Japanese respondents—more than any other health nudge.

Social Research article on norms, “Once an intervention is successful in changing the social norm, the ubiquitous human tendency to conform to the norm will move behavior in a socially desirable direction.”

While that process sounds simple, norms are anything but. According to Prentice, when we decide how to act, we don’t simply rely on a repertoire of norms; we construct a
SCIENCE OF BEHAVIOR CHANGE: SUBVERSIVE NONCHALANCE OF SMALL CHANGES

norm that applies in the current context: Even a college student who strongly associates parties with heavy drinking might hesitate to crack open a beer if no other partygoers have done so.

Given these insights, one way to influence behavior might be to harness people’s preexisting norms. A study in China (Ong et al., 2020) showed that gay men who reported greater tolerance for risk also engaged in more risky sexual behavior, including sex without condoms. Interestingly, despite their benefits, health screenings may be subjectively perceived as risky, because they raise the possibility of negative results. When asked if they wanted to enter a lottery in which they could win money only if they tested negative for syphilis for 3 months, these risk-loving men were the most willing to participate. In brilliant fashion, this intervention capitalized on the men’s preexisting risk preferences.

Many health interventions seek to change behavior by shifting norms. But because norms are vulnerable to contextual cues, Prentice cautioned, it’s easy for these shifts to revert.

To design effective interventions for behavior change, said Prentice, researchers and policymakers need to consider what mechanisms might underlie relevant changes in norms: What are the inputs to norm construction in this situation? (Are people responding to convenience? Costs? Social approval? Anticipated pleasure?) Do people have accurate conceptions of other people’s behavior? (Are they justifying an unhealthy behavior because they think it’s more common than it really is?) Are current norms inhibiting more beneficial behaviors? (Do guidelines or standards demotivate low performers? Are some unhealthy behaviors highly visible, whereas healthier behaviors are harder to observe?) Will changing norms require people to learn new behaviors?

Christine Browne is a freelance writer in Carrboro, North Carolina.

References


CONGRATULATIONS TO THE RECIPIENTS OF THE

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UP-AND-COMING VOICES: THE SCIENCE OF BEHAVIOR CHANGE

As part of the 2021 APS Virtual Convention, researchers had the opportunity to connect with colleagues and present their work to the broader scientific community in the form of 15-minute Flash Talks. In this collection, we highlight talks by students and early-career researchers related to behavioral change. View the videos online at psychologicalscience.org/behavior-change-talks.

Evaluation of an Intervention Based on Training Sessions to Increase the Use of Control Charts in Hospitals
Laura Kudrna (University of Birmingham)

What did the research reveal that you didn't already know about the use of control charts in hospitals?
In health care, control charts illustrate variations in processes that could ultimately affect patient outcomes. Examples of topics on control charts include monthly changes in patient waiting times to see a specialist and staff compliance with diagnostic regulations. Control charts display data in a way that allows the reader to distinguish noise from the signal in the data; that is, to spot patterns that may warrant further investigation.

Despite their appeal, many hospitals in England do not appear to use control charts to guide decision-making. They seldomly appear in publicly available documents called “board papers” that hospital board members discuss during meetings. Training sessions to improve uptake were established as part of an initiative called Making Data Count (#PlotTheDots). Our research aimed to discover if the training was effective by comparing hospitals that received the training with similar hospitals that did not.

Training alone usually does not create behavior change. However, hospitals taking part in the training subsequently used more control charts in their papers than untrained hospitals. Interestingly, staff in training hospitals who did not change control chart usage very much still said the training was worthwhile—underscoring the importance of using observational outcomes to reduce phenomena like social desirability bias.

How might your findings improve this use and potentially enhance hospital outcomes?
Other research shows that providing control charts to hospitals reduces adverse patient outcomes. Our study suggests that a more scalable approach encouraging hospitals to make their own control charts can improve their uptake. It may be beneficial to roll out the training more widely and assess why it was effective, such as the potential role of the implementation climate.
Trust and Trust Funds: People Have Less Faith in Those With Higher Socioeconomic Status

Holly Engstrom, Kristin Laurin, Toni M. Schmader (The University of British Columbia)

What did the research reveal that you didn't already know about our likelihood to trust others, particularly when stereotypes involving economic status are involved?

We found that our participants trusted people with lower socioeconomic status (SES)—that is, people with lower incomes, less education, and less prestigious jobs—more than people with higher SES. This was especially surprising because our studies involved trusting someone else with money. You might think that people would assume that someone who is in a bad economic situation might be more tempted to steal money and therefore be wary of trusting them, but we found that this is not the case. Instead, people stereotype lower-SES folks as moral, honest, good people, whereas they suspect that higher-SES folks might be immoral, greedy, and selfish, and that stereotype seems to explain why people place more trust in those with lower SES.

How might your findings improve our understanding of these issues?

These findings suggest that in general, when deciding to trust others, people place less weight on whether the other person's situation might tempt them to act immorally and more weight on whether the other person seems moral. But there is still a lot of research to do to understand these issues. For example, the balance of these two considerations may shift in different situations. If you are trusting someone with a lot of money, you might pay more attention to their economic situation if that could tempt them to betray you and steal the money. The nature of these considerations might also shift in different situations. If you are trusting someone to babysit your child, you would probably want someone who is both moral and competent. People typically stereotype lower-SES people as more moral but less competent than higher-SES people, so it is not clear how SES would influence trust in a situation that involves both morality and competence. Overall, though, our findings suggest that people with bigger trust funds can expect to get less trust from others.

The Role of Frontal Polar Cortex in Patch Selection

Chun-Kit Law (The Hong Kong Polytechnic University), Nils Kolling (University of Oxford), Chetwyn C. H. Chan (The Education University of Hong Kong), Bolton K. H. Chau (The Hong Kong Polytechnic University)

What did the research reveal that you didn't already know about the role of the frontal polar cortex in selections between patches?

In our daily lives, important decisions often pertain to selection between complex patches—options that determine the items we will encounter in the future (e.g., a fresh graduate selects an industry that determines their likely job opportunities). To scrutinize the neural mechanisms underlying patch selection, we combined behavioral testing, computational models, and brain imaging. Our results revealed that the frontopolar cortex (FPC) subserved the encoding and comparison of values of the patches. Crucially, we systematically compared the multivariate signals of the FPC and of a series of deep learning models. This revealed that FPC was involved in multiple parallel processes to extract and integrate the multiplex features embedded in the patches to guide decisions. FPC was also capable of flexibly selecting relevant patch features in response to the external contexts. Our results are in line with the implicated roles of FPC in related processes such as abstract reasoning and information integration. Furthermore, our novel approach of inspection of FPC activity with deep learning models provides more in-depth understanding of the multiple, parallel neurocomputations during patch selection.
How might your findings improve our understanding of these issues?
Economists have long believed that choice preference can be quantified as utility such that people can make any kind of decisions—even comparing apples and oranges. Over three decades, neuroscientists have put forth the neural common-currency hypothesis as the biological basis of utility. Such a proposition is supported by the observation that the ventromedial prefrontal cortex (vmPFC) encodes the utility of a wide variety of items (e.g., money, food, and trinkets). However, our findings refute the neural common currency hypothesis by showing the dissociable roles of the vmPFC and FPC—the vmPFC only encoded the utility of items, but the FPC encoded the utility of patches. This double dissociation between FPC and vmPFC sheds light on the functional specialization of prefrontal subregions to meet the specific demands of choices—the FPC involved in specific decisions that involve complex information in nature.

Intention in Action: Towards an Agent-Centered Perspective on Cheating and Rule-Breaking
Roland Pfister (University of Wuerzburg)

What did the research reveal that you didn’t already know about compliance with rules?
Our research highlights the intriguing possibility that the human cognitive system is geared toward rule following by its very design. That is, we are consistently biased toward compliance with rules even in situations in which rule breakers do not have to fear sanctions, negative social evaluations, or other negative consequences. It goes without saying that the latter influences likely play an important role in many everyday decisions—but our tendency to abide by the rules runs deeper than this.

The proposed bias toward rule compliance, ironically, becomes evident when taking a close look at the behavior of rule breakers. Even when violating a rule eventually, these agents show subtle signs of conflict between rule following and rule breaking that we have captured in behavioral measures and electrophysiological recordings alike. Such conflict even occurs when there are no sanctions for rule-violation behavior whatsoever, and this even holds true for people who are prone to breaking rules, such as convicted criminals or children and adolescents with conduct disorder.

These findings add novel evidence in support of the idea that the human brain has considerable difficulty overcoming anything it has previously accepted as correct—it is impossible to unlearn on the fly what we have once accepted as fact. This mirrors recent findings on lying and dishonesty, which come with a similar tug-of-war between truthful responding and its dishonest counterpart.

What we do not know yet is whether there are relevant cultural differences in how rules are represented and put into action, and whether different types of rules (say: prescriptions as compared to prohibitions) are picked up and retrieved with similar ease. But we now know how and where to look for such differences.

How might your findings improve our understanding of cognition and behavior surrounding rules?
If we want to foster rule compliance, we are well advised to focus on how to communicate a rule as clearly and efficiently as possible. This alone might have a similarly strong—or even stronger!—impact on compliance as compared to a focus on sanctions and punishments for rule breaking.

When evaluating cognition and behavior surrounding rules, we further have to distinguish between the black-and-white nature of whether or not a person follows a rule as compared to potential signs of conflict that point toward the retrieval of rule-based action tendencies even in case of rule violations. In many cases, the eventual outcome will be of main interest in applied settings, but zooming in on how an action comes about offers unique cues for understanding what actually happens in the mind of a rule breaker.

Another intriguing question is whether we should always be interested in promoting rule following. The answer to this is: No, we shouldn’t! Indeed, positive and desirable behaviors such as creativity or moral courage, by definition, are violations of current rules or norms. Highlighting the cognitive challenges inherent in breaking rules may help us appreciate these behaviors even more and might lead to the discovery of elegant means to support creative problem-solving in the future.
Computational Mechanisms for the Effect of Acetaminophen on Risky Decision-Making

Xiaoyu Zeng, Zizhou Li, Yina Ma (Beijing Normal University)

What did the research reveal that you didn’t already know about acetaminophen and behavior?
One of the most novel parts of this research was that we simultaneously applied two complementary computational models—one for value computation and one for evidence accumulation—to investigate how acetaminophen affects the underlying computational processes of risky decision-making. This advantage helps to reveal two interesting findings. First, we found that individuals given acetaminophen (vs. matching placebo) showed a lower decision threshold (less conservative) during the risk evidence accumulation process. Second, we found gender differences in the effects of acetaminophen on other computational processes. Acetaminophen increased females’ risky choices by reducing the valuation of losses, increasing the efficiency of processing risk information, and shifting the a priori starting point toward risky options. However, the opposite pattern of acetaminophen was observed in males, making them more averse to risk and loss and less inclined to make risky choices.

How might your findings improve our understanding of (and potential interventions for) how this common drug can impact risky decision-making?
First, our study contributes to providing a computational account of the gender-independent effect of acetaminophen on risky decision-making: Acetaminophen drives less cautious and more decisive decisions (lower decision threshold) and results in faster response time. Second, our study also contributes to highlighting the role of gender when investigating the effects of acetaminophen on risky decision-making. It has been long recognized that there are gender differences in the usage of painkillers in survey studies as well as in the mechanism of acetaminophen in clinical studies. However, previous acetaminophen studies in the psychological domain tended to ignore the potential gender difference. Our study well captured the gender difference of the acetaminophen effects by using two complementary computational models. Our findings suggest that acetaminophen could affect several distinct but complementary processes during risky decision-making (i.e., the valuation of losses, the efficiency of processing risk information, and a priori starting points) and that acetaminophen’s effects on these computations were opposite for males and females. These findings would otherwise be unidentifiable, as these computations cannot be measured using conventional approaches.

Together, these findings reveal the computational mechanisms underlying the gender-independent as well as the gender-dependent effect of acetaminophen on risky decision-making.
DIVERSITY, DISTINCTION
MARK 2022 APS LIFETIME
ACHIEVEMENT AWARDS

Longtime champions of social justice Patricia Gurin and James Jones receive inaugural award honoring research that advances understanding of diversity, equity, and inclusion.

Fourteen scientists renowned internationally for their research, on subjects ranging from the effects of alcohol on self-regulation to the use of technology to enhance brain science, have been selected as recipients of the 2022 APS Lifetime Achievement Awards, which since 1992 have recognized distinguished psychological scientists for their contributions to psychological research. The association’s highest honors, the Lifetime Achievement Awards will be presented at the 2022 APS Annual Convention in Chicago in May.

Patricia Gurin (University of Michigan) is noted for her exceptional work in domains including women’s studies, social identity, intergroup relations, motivation and cognition, and diversity. A lifelong champion of social justice and an exemplar of strategic thinking and initiative, she actively promoted a culture of diversity, inclusion, and equity as chair of the University of Michigan’s psychology department, Kitayama said, and played a central role in the university’s legal defense of its admission policies addressing diversity and equity issues.

APS Fellow James Jones (University of Delaware) has produced groundbreaking work in prejudice, racism, and diversity. “His 1972 classic study on racism set the research agenda on the science of race and diversity for the decades to follow,” said Kitayama. “His theoretical insight into the systemic nature of racism predated the current debate by many years.” One of Jones’s most noted theories is the TRIOS (time, rhythm, improvisation, orality, and spirituality) model of the psychology of African American culture, which illuminates the experiences and resilience of African Americans and highlights the positivity of humanity.

Inaugural: APS James S. Jackson Lifetime Achievement Award for Transformative Scholarship

Honors APS members for a lifetime of outstanding psychological research that advances understanding of historically disadvantaged racial and ethnic groups and/or the psychological and societal benefits of racial/ethnic diversity, equity, and inclusion

New in 2022, this award pays tribute to James S. Jackson, a pioneering social psychologist known for his research on race and ethnicity, racism, and health and aging among Black Americans. Jackson died on September 1, 2020, following a nearly 50-year career at the University of Michigan.

“The field of psychological science neglected diversity, equity, and inclusion for so long,” said Shinobu Kitayama, the Robert B. Zajonc Collegiate Professor of Psychology at the University of Michigan and the 2020–2021 APS president. “APS has a strong commitment to redress this neglect, following in the footsteps of the late James S. Jackson, who not only pioneered scientific research on Black Americans [but also] mentored and nurtured new generations of Black researchers and teachers in psychological science.”

Two social psychologists were selected for the inaugural award.
APS Fellow **Dedre Gentner** (Northwestern University) has produced an ongoing body of influential research into the power of analogy and metaphors in reasoning, learning, and discovery. Her work on the relation of language to thought continues as she addresses questions regarding how particular languages and cultures may lend themselves to possible relations in semantics.

APS Fellow **Trevor Robbins** (University of Cambridge) conducts biology-inspired, theory-driven empirical research that delves into experimental and neuro psychological science as well as psychopharmacology. His contributions have provided a basis for the emerging field of computational psychiatry and the study of mental disorders by applying computational modeling of cognition and behavior, neuroscience, statistical modeling, and machine learning.

APS James McKeen Fellow and President-Elect **Alison Gopnik** (University of California, Berkeley) is known internationally for her research on the learning and exploratory behavior of children. Her high-profile appearances in the media and public, including a TED Talk with millions of views and six award-winning books, have furthered understanding of developmental psychology among laypersons and scientific researchers alike.

Posthumous: APS Fellow **James H. (Jim) Sidanius** (Harvard University) initiated research on individual differences in political attitudes, a concept that later expanded into his work on social dominance, along with prejudice, stereotyping, discrimination, and social dilemmas. Perhaps his best-known work is in social dominance orientation, which showcases a person’s dispositional tendency to accept, and even prefer, circumstances that perpetuate and sustain social inequalities. Sidanius died June 29, 2021.

APS William James Fellow Award

*Honors APS members for a lifetime of significant intellectual contributions to the basic science of psychology*

APS James McKeen Cattell Fellow Award

*Recognizes APS members for a lifetime of outstanding contributions to applied psychological research*

APS William James Fellows **Mahzarin R. Banaji** (Harvard University; APS president 2010–2011) and **Anthony G. Greenwald** (University of Washington) are collaborators in theories that have revolutionized social and cognitive psychological science. Among other accomplishments, together they expanded on the idea of implicit social cognition and the concept that attitudes, self-esteem, and stereotypes can reflect unconscious processes linked to memory/social cognition rather than always reflecting explicit cognition.
APS SPOTLIGHT: 2022 APS LIFETIME ACHIEVEMENT AWARDS

APS William James Fellow Claude Steele (Stanford University) has made insightful contributions to the fields of clinical psychology, addiction, and social cognition in areas including stereotype threat and through groundbreaking ideas for examining cognitive processes, motivation, engagement, and physiological responses in intergroup settings.

APS Fellow Laurence Steinberg (Temple University) is honored for pushing her students to engage deeply with theory and research, to appreciate the broader connections between their own work and the general nature of psychological science, to value the strength of argument, and to question the assumptions of others.

APS William James Fellow Susan E. Carey (Harvard University) is honored for pushing her students to engage deeply with theory and research, to appreciate the broader connections between their own work and the general nature of psychological science, to value the strength of argument, and to question the assumptions of others.

APS Fellow Serena Chen (University of California, Berkeley) is honored for mentorship through her remarkable work in several domains as well as her collaborations with her students and colleagues, including junior faculty members.

APS Fellow Kazuo Mori (Matsumoto University) is honored for mentorship that has led to fruitful international collaborations that have helped students publish collaborative work and secure funding for equipment and travel to conferences.

APS Fellow Anna C. (Kia) Nobre (University of Oxford) is honored for prioritizing her mentees in their discussions about career development, projects, and ideas—all while demonstrating impeccable attention to detail, kindness, and humility.

APS Fellow Harry Wellman (University of Michigan) is honored for encouraging students to think outside the box, ponder broad scientific questions, and identify research questions that are fundamental to them.

UPDATE ON TRANSPARENCY AND OPEN SCIENCE IN APS JOURNALS

Since its founding, APS has been committed to strengthening scientific rigor and reliability. In 2011, APS made open science an explicit organizational priority, convening discussions with top researchers and organizations about mechanisms for increasing the credibility of published results. Eric Eich, then editor in chief of *Psychological Science*, proposed the idea of Open Practices badges, and in 2014, the journal began awarding them to recognize authors who made available their data (Open Data badge), materials (Open Materials badge), and preregistered study designs and analysis plans (Preregistered badge).

In the 8 years since the badges were introduced in the journal, author sharing has steadily increased in all three domains: The percentage of articles earning an Open Data badge and Open Materials badge increased 61% and 42%, respectively, and although no articles earned a Preregistered badge in 2014, more than 4 in 10 received one in 2021. In 2014, 20% of articles earned at least one Open Practices badge; in 2021, 83% did.

The Open Practices badges were adopted by *Clinical Psychological Science* in 2016, and *Advances in Methods and Practices in Psychological Science* has been awarding the badges since its inception in 2017. Thus, all APS titles that publish primarily empirical work currently award these badges to recognize and further incentivize open science practices.

APS is also an original contributor to and signatory of the Transparency and Openness Promotion (TOP) Guidelines, which were created in 2015 to provide journals and organizations with a concrete and actionable strategy for improving research and publishing practices. The TOP Guidelines comprise eight modular standards, each with three levels of increasing stringency: disclosure, requirement, and verification. *Psychological Science* adopted the guidelines at Level I, at which authors are asked to disclose information regarding their transparency practices (e.g., whether or not they have made their data available to readers).

The badges program and encouragement of sharing practices with TOP Level I criteria have resulted in widespread adoption of these practices among authors. In the interest of making these practices more standardized, the APS Open and Transparent Practices Committee (OTPC) recommended in 2021 that APS empirical titles adopt TOP Level II criteria, which would require certain open practices, such as sharing preregistration details with reviewers, allowing exemptions only for legal or ethical reasons.

*Psychological Science* Editor in Chief Patricia Bauer worked with the OTPC on a plan for 2022 in which the journal will adopt TOP Level II criteria on five of the eight TOP domains. The journal will continue to encourage (but not require) the sharing of data, analysis/code, and materials and collect information on reasons for not sharing these research components, with the aim of developing a more robust list of valid exemptions before the journal eventually adopts requirements for sharing. Bauer laid out the details and rationale for these changes in her February 2022 editorial, “Psychological Science Stepping Up a Level.”

*Clinical Psychological Science* Editor in Chief Jennifer Tackett is working with the OTPC to implement similar changes at that journal in the coming months, at which point all three empirical APS titles will have adopted most or all of the TOP Level II criteria for submissions.

APS journals have always been on the cutting edge of research findings and methodological breakthroughs. With these changes, they will continue to lead the field in the area of open scholarship as well.

— Amy Drew

APS Director of Publications
From major TV networks and syndicated talk shows to regional newspapers and podcasts, including APS’s own Under the Cortex, the media often need credible subject matter experts who can provide context, help personalize complex findings, and offer contrary viewpoints on controversial issues.

When there is breaking news, however, few journalists have time to hunt for qualified scientists who are willing and able to respond on often remarkably short deadlines.

In such circumstances, the news media will often reach out to people and organizations who have worked with them before or have a reputation for responding quickly. Major universities and federal agencies, which employ multiple public information officers, are particularly helpful in this regard and are able, often in a matter of minutes, to provide either written answers to questions or the personal cell phone number of a scientist who can discuss their own related research.

This arrangement has pluses and minuses.

On the plus side, trusted and experienced subject matter experts add important commentary on breaking news and often give pithy soundbites that can effectively punctuate the central issues being covered.

On the minus side, equally qualified experts may be overlooked in favor of those who are more effectively promoted (or self-promoted) to the media.

The potential disconnect and a path forward

Earlier in my career as a public information officer in a research facility, I was occasionally admonished for seemingly relying on a select few scientists to respond to media inquiries. This was a fair criticism considering the breadth of knowledge in the organization and the importance of having a diversity of opinions and perspectives to share with the international news media.

The reality of the situation was a bit more nuanced, however. Given the demands on their time and their research priorities, only a few scientists pro-actively offered to help with media inquiries. Additionally, some researchers simply preferred not to talk with the media. Their reasons varied, but the two most common I encountered were a lack of training—and therefore understanding—and a prior miscommunication or unsatisfactory encounter with the media. The latter was often an extension of the former.

One of the most effective ways to address these problems is comprehensive media training for scientists. Traditionally, media training covers the important elements of message development and reviews both the benefits and pitfalls of talking to the media. It should also explain how the news-gathering process operates, from story pitching and expert selection to fact-checking and headline writing. Scientists who receive media training give universities and scientific societies a broader pool of interested and informed researchers to choose from when responding to media inquiries. These researchers, in turn, gain better inroads with the media and an opportunity to establish lasting connections with journalists.

APS members have a great deal to offer media outlets and individual journalists and reporters. Our members’ expertise is particularly in demand for stories that address the behavioral aspects of the COVID-19 pandemic and political, racial, and cultural conflicts that impact individuals and governments. However, reporters’ routine requests for experts often have inconveniently short deadlines, as little as a day or two—or, sometimes, merely a few hours.

The missing piece is a robust cohort of member volunteers who are willing to speak on behalf of APS and respond quickly to media requests. This is where you can step up and support our efforts and enhance the quality of scientific information in news stories.

If you are interested in serving as a media liaison for APS, I strongly encourage you to complete the form at psychologicalscience.org/media-liaison. We will be in touch to share details on how you can help, let you know what to expect, and schedule media training if needed.
GEORGIA

GEORGIA STATE UNIVERSITY

GEORGIA STATE UNIVERSITY (www.gsu.edu) invites applications for one anticipated tenure-track (rank of Assistant) faculty position to contribute to its funded Center: Research on the Challenges of Acquiring Language and Literacy (RCALL). This anticipated position is part of a major initiative to enhance existing strengths in language and literacy at Georgia State and continues our successful hiring in this area. The focus of RCALL is research with children and adults, with or without disabilities, who face challenges in acquiring language and literacy. In this university-funded Center, more than 40 faculty members from 8 departments in the Colleges of Arts & Sciences and Education & Human Development come together to engage in interdisciplinary research. The Center’s faculty has a broad range of external funding support including from the Institute of Education Sciences, the National Institutes of Health, and the National Science Foundation.

We encourage applicants whose program of research addresses basic or applied, conceptual or methodological issues concerning challenges in the acquisition of language and literacy with a particular interest in intervention research. Applicants must have a Ph.D. degree in special education, psychology, educational psychology, communication sciences and disorders or related areas. The appointment is open to all programs within the Center. The successful applicant will be the individual who is prepared to take advantage of the interdisciplinary collaborative research opportunities available, has a strong record of programmatic research, can obtain external grant support, and has a commitment to, and experience in, the instruction of undergraduate and graduate students. We are particularly interested in applicants whose research complements other faculty within this Center. (www.researchlanglit.gsu.edu).

Inquiries may be made to Co-Directors, Dr. Rose A. Sevcik (rsevcik@gsu.edu) or Dr. Daphne Greenberg (dgreenberg@gsu.edu). Submit curriculum vitae, a brief statement of professional goals and research interests, evidence related to teaching interests and effectiveness, and the names and three letters of reference electronically to Keneé Stephens at kstephens@gsu.edu, with the subject line “Language & Literacy Faculty Search”. The review of applications will begin on October 15, 2021 and continue until the position is filled contingent on available funding.

MARYLAND

UNIVERSITY OF MARYLAND

The University of Maryland, College Park (UMD), the flagship public, land-grant University of the State of Maryland, seeks a highly respected scholar and educator to serve as Dean of the College of Education (COE). UMD is home to a highly distinguished faculty in its 12 colleges and schools and serves more than 30,000 undergraduate and 10,000 graduate students. The COE serves as a center for cutting-edge research in multiple areas of education across the university as well as a focal point for capacity building throughout the
EMPLOYMENT NETWORK

State of Maryland and its communities. The new Dean will join a top-ranked faculty and college and a new and very supportive senior leadership team at the University level with a vision for enhanced real-world impact and inclusive academic excellence. The Dean will have the exceptional opportunity to leverage a strong foundation and reputation in the College of Education to shape the changing landscape of 21st-century education both in the classroom and beyond.

Reporting to the Senior Vice President and Provost, the Dean will lead the College’s over 250 faculty and staff members in enhancing its shared identity and developing a visionary strategy to realize the next stage of the College’s development. The College provides a broad and robust set of offerings to diverse students across three departments. The Dean will champion the COE across the campus as well as externally, engaging stakeholders in the UMD community, throughout surrounding counties, the state, and Washington, D.C., as well as nationally and globally. They will convey the range of offerings of the College and its immense potential to be a major source of research and scholarship to guide policy and practice in a time of rapid change in education. As the chief academic and administrative officer of the College, the Dean is responsible for the educational experiences of the approximately 600 undergraduate and 760 graduate students and will oversee many highly ranked programs, including the number one ranked Counseling and Personnel Services program in the nation. The Dean is expected to advance diversity, equity, and inclusive excellence within the College community and in the field of education, broadly defined. The Dean is also responsible for continuing to enhance and cultivate impactful research activities across the College, advancing academic excellence and eminence. The College has a $32.5 million operating budget and research expenditures of approximately $16.7 million annually.

The University of Maryland has retained Isaacson, Miller, a national executive search firm, to assist with this important recruitment. Review of candidates will begin immediately and continue until an appointment is made. All inquiries, nominations, and applications should be directed electronically and in confidence to:

Gale Merseth, Partner
Elizabeth Dorr, Managing Associate
Isaacson, Miller
www.imsearch.com/search-detail/S8-272
Intensive longitudinal designs allow researchers to characterize changes to complex psychological processes within individuals or groups, along with the causes and consequences of such changes. This type of research involves frequent and repeated measurements of individuals, sometimes in the course of their everyday lives, outside of lab environments, using smartphones and other mobile devices.

Using those repeated measurements, researchers can gain insight into the dynamic psychological processes within individuals, as well as individual differences in the dynamics of these processes. These differences have, for instance, been linked to individual differences in health and well-being. As an example, in a 2010 *Psychological Science* article, Peter Kuppens and colleagues used intensive longitudinal designs to show that emotional inertia—the degree to which an individual’s emotional states are resistant to change—can be linked to low self-esteem and depression.

### The importance of an adequate sample size

However, because intensive longitudinal designs use frequent repeated measures, they require adequate sample-size planning that the usual power calculations employed in other designs may not achieve. An adequate number of participants enables researchers to control the accuracy and power of statistical testing and modeling, contributing to the replicability of empirical findings (e.g., Szucs & Ioannidis, 2017).

### Power and Sample Size

Statistical power is the probability of correctly rejecting a null hypothesis when the alternative hypothesis is true in the population under study (Cohen, 1988). Thus, the power to detect an effect depends on (a) the size of the effect on the population, (b) the predetermined Type I error rate (i.e., the significance level), and (c) the standard error of the statistical test used.

Power is higher if the effect in the population is larger, the significance level is larger, and the standard error of the statistical test is smaller. Because standard error is related to sample size (larger sample sizes lead to smaller standard errors), power analysis can inform adequate sample sizes. Be sure you select a sample size large enough to detect an effect with a given size in the population. Studies with high power can improve reproducibility of research findings.

“Although power analyses are often used to inform sample-size planning in general (Cohen, 1988), they are not yet well established in IL [intensive longitudinal] research,” write Ginette Lafit, Janne K. Adolf, Egon Dejonckheere, Inez Myin-Germeys, Wolfgang Viechtbauer (Maastricht University), and Eva Ceulemans (all at Katholieke Universiteit Leuven) in a 2021 article in *Advances in Methods and Practices in Psychological Science*.

In their article, Lafit and colleagues provide a tutorial showing how to perform simulation-based power analyses and select the appropriate number of participants for models widely used in intensive longitudinal research. They also provide the R code for a Shiny application—an interactive web app built straight from R. The code is available via a Git repository hosted on GitHub at github.com/ginettelafit/PowerAnalysisIL and via OSF at osf.io/vguey.

### What makes power analyses in intensive longitudinal designs complex?

Lafit and colleagues (2021) explain why performing power analyses for intensive longitudinal designs and selecting an adequate sample size can be challenging, given the intricacy of data obtained with these designs and the potential complexity of the applied statistical models. The reasons include:

- Intensive longitudinal data have a multilevel structure, in that repeated observations are nested within individuals.
- Observations are closer in time in intensive longitudinal research than in traditional longitudinal designs (i.e., measures usually take place several times per day).
The statistical models used (usually multilevel regression models) have to distinguish interindividual differences from intraindividual changes.

The statistical models should take temporal dependencies into account to control for them or to quantify and model them, which requires researchers to include either serially correlated errors or the lagged outcome variable as a predictor in the multilevel models.

According to Lafit and colleagues (2021), the main problem researchers might encounter when trying to calculate power (and sample size needed) for intensive longitudinal designs is that the tools available for calculating power in multilevel models do not account for temporal dependencies. The user-friendly application they developed allows researchers to properly account for such temporal dependencies. In their tutorial, they explain how to deploy the app in models that are widely used to study individual differences in intensive longitudinal studies.

Using a Shiny app to perform power analysis
If you are interested in using the power-analysis tool developed by Lafit and colleagues (2021) to calculate the recommended number of participants in intensive longitudinal designs, you can download the app and run it locally on your computer in R or RStudio. On the opening page of the app, select the population model of interest, set the parameter values, and run your power analysis.

“Because many studies use the same sampling protocol (i.e., a fixed number of at least approximately equidistant observations) within individuals, we assume that this protocol is fixed and focus on the number of participants,” Lafit and colleagues (2021) note. In their article, they provide step-by-step instructions and illustrations of computations for different types of models that explicitly account for the temporal dependencies in data by assuming serially correlated errors or including autoregressive effects. These models include:

- models estimating differences between two groups of individuals in the mean of the outcome variable,
- models assessing the effect of a continuous Level 1 predictor on the outcome of interest,
- models assessing the effect of a continuous Level 2 predictor on the outcome of interest,
- models investigating differences between two groups of individuals regarding the association between a Level 1 predictor and the outcome of interest,
- models that account for cross-level interaction between a continuous Level 2 predictor and a continuous Level 1 predictor, and
- multilevel autoregressive models that capture the amount of temporal dependence in the outcome.

References


Explore more tutorials and other articles about methodology and practices in psychological science in the APS open-access journal *Advances in Methods and Practices in Psychological Science*. Visit psychologicalscience.org/publications/ampps.
WHEN DOES SOCIAL NETWORKING UPLIFT—AND DISPIRIT—US?

By David G. Myers


With people spending hours daily on social media, it’s no surprise other activities are being displaced: face-to-face conversations, reading, sleeping, and working (Kemp, 2020; Livingston, 2019; Twenge, 2019). Time spent networking can be time spent not-working.

More troublingly, as smartphone use quadrupled between 2010 and 2019, anxiety, depression, and self-harm dramatically increased among teen girls (Duffy et al., 2019; SAMHSA, 2019)—a reality reportedly well known to Facebook and Instagram (Haidt, 2021; Wells et al., 2021). Was this simultaneous rise in online networking and emotional struggles a mere coincidence?

In quest of an answer, Jonathan Haidt and Jean Twenge (2022) accumulate the available evidence from:

- **Correlational studies** that explore associations between social media use and teen mental health. They report a small correlation between social media screen time and mental disorder risk, linking heavy—but not light—use to harm.

- **Longitudinal studies** that ask whether extended social media use at Time 1 predicts worse mental health at Time 2. In 10 of 17 studies, the answer is yes.

- **Experiments** that ask whether volunteers randomly assigned to a reduced “social media diet” become less lonely or depressed, compared with other volunteers. Generally, yes, but with mixed results.

In their review of social networking and well-being, Philippe Verduyn, Nino Gugushvili, and Ethan Kross (2022) offer a more nuanced view. They make a distinction between active social networking—interacting with others—and passive networking—merely reading or watching content posted by others. Initial studies suggested that active social networking is beneficial, whereas passive networking diminishes well-being (Verduyn et al., 2017).

Instructors might ask students to ponder why (in their experience or that of their friends) active networking tends to lift spirits if passive networking depresses them.

Possible answers: Active engagement not only connects people but is often informative and supportive, with more “likes” and encouraging words. Passive engagement entails more social comparison: With others mostly presenting themselves having fun, looking great, and doing well, one’s own social life may seem impoverished. Small wonder that most people today perceive that others’ social lives are more active than their own (Deri et al., 2017).

Verduyn and colleagues stress, however, that there’s more to the story than active = good and passive = bad. A teen may be depressed by an active engagement with cyberbullies, and a grandparent may find joy in passively viewing photos of their grandchildren. As these examples indicate, the active/passive distinction alone is too coarse.

So, another question for students: What sorts of active networking might be beneficial? What factors might influence whether active social networking uplifts or dispirits us?

Can your students anticipate the researchers’ evidence-based answers? First, regarding active engagement with social media:

1. Is one’s engagement reciprocated? Posting something that elicits no response does not lift one’s spirits. Reciprocal self-disclosure and support become more likely when communications are targeted, such as comments to small groups or direct messages.

2. Does one’s engagement enhance social communion? Is it warm and agreeable (as most networking comments are), or cold and quarrelsome?
Second, regarding passive engagement:

1. Are others’ posts relevant to one’s self-esteem? Teens may respond with a twinge of envy to posts that display others’ good looks. A graduate student may respond similarly when a fellow student announces a publication—but not when that peer posts about winning a swimming race.

2. Are others sharing their successes or failures? People disproportionately share news of their accomplishments—which may lead passive networkers to feel deflated by the social comparison. But sometimes friends share their disappointments, which may trigger a mix of empathy for them and reassurance about one’s own greater success.

Finally, the researchers note, individuals differ in their social-comparison focus. People who care a great deal about their standing relative to others, and about others’ opinions, tend to be more emotionally responsive to social networking.

Many students will be socially attuned to their friends. Thus they might be advised to manage their social networking time, to monitor their feelings, to hide irritating friends, to practice restraint in their own posts, and—when focusing on important offline matters or face-to-face relationships—to disable alerts.

References


STUDENT ACTIVITY:

MOOD TRACKING

For one week, have students track their social media use (both iPhones and Android phones provide social media use data in their settings apps) and rate their daily mood before bed each night without disclosing their social media use. The next week, have them commit to some degree of social media reduction, such as one hour less per day, and again track their mood. Finally, have students bring their data to class and discuss their findings. (For other discussion possibilities, see the article text.)

Edited by C. Nathan DeWall

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

By Michael Scullin and Cindi May


If you want to make memories stick, you’d best practice retrieving those memories (Brown et al., 2014). That is why you should repeat people’s names soon after meeting them, however awkward it may feel!

Paradoxically, psychological scientists have also shown that retrieving a memory can cause forgetting, or temporary inaccessibility, of related memories (Anderson et al., 1994). Imagine that you’ve been introduced to a couple of teachers, Nathan and Dave, at a party. You repeated Nathan’s name, but not Dave’s, shortly afterward. As you are leaving the party, you enter an elevator with both of them and can easily recall Nathan’s name. Retrieval practice made it stick! Unfortunately, even though Dave’s face is familiar, you are at a loss for his name. It strikes you as odd that you have a harder time recalling his name than the names of two journalists you also just met, whose names you never practiced retrieving. This retrieval-induced forgetting pattern would not surprise scientists who have found recall of face–name–profession associations to be susceptible to such effects (Ferreira et al., 2014). Too bad for Dave.

M. Teresa Bajo, Carlos J. Gómez-Ariza, and Alejandra Marful (2021) argue that retrieval-induced forgetting is explained by inhibitory control mechanisms. The general idea is that our knowledge is vast and interconnected, and we need some control over which memories come to mind at any given moment. When you retrieve specific information (TEACHER–Na___?), the relevant information becomes highly accessible (Nathan), in part because you reduce the accessibility of similar but irrelevant information (Dave). This allows your cognitive system to operate efficiently by maintaining focus on the most pertinent information. Yet it also has consequences: Inhibiting memories when they are not immediately needed makes them more difficult to access shortly thereafter.

Inhibitory mechanisms act quickly and often without intentional initiation, but they still require attentional control. In a series of studies, Bajo and colleagues found that adding cognitive load, such as with a divided-attention manipulation, eliminates the retrieval-induced forgetting effect (e.g., Román et al., 2009), possibly by reducing the resources available to implement inhibitory control. Furthermore, applying transcranial direct current stimulation to reduce activity in the right lateral prefrontal cortex—a region involved in attentional control—eliminates inhibition effects (Valle et al., 2020).

Broaden students’ appreciation of inhibitory control by covering the concept of task independence. Put simply, retrieval-induced forgetting is not just about

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Michael Scullin is an associate professor of psychology and neuroscience at Baylor University. His research aims to translate psychological science into real-world benefits. He is an APS Rising Star and a National Science Foundation CAREER award recipient. Scullin can be contacted at michael_scullin@baylor.edu.
Our knowledge is vast and interconnected, and we need some control over which memories come to mind at any given moment.

recalling category–exemplar pairs like FRUIT–banana. Such effects apply to creativity, decision making, and language—all abilities that integrate with memory functioning. Guide students in identifying the competitor item and retrieval-induced forgetting phenomenon in the following examples.

• When generating creative solutions to a problem, people are less likely to arrive at the correct answer if they dismissed that answer earlier in the process (Gómez-Arizá et al., 2017).

• When job candidates have both neutral and positive traits, evaluators who recall their neutral traits will be less likely to select them later (because recalling the neutral traits decreases the positive traits’ accessibility; Iglesias-Parro & Gómez-Arizá, 2006).

• When students are immersed in a study-abroad experience, they have greater difficulty accessing words from their native language than they would in their home country, learning the second language in a classroom (because immersion in a second language has an inhibitory effect on one’s native language; Linck et al., 2009).

We know you want this information to stick, so go ahead and practice retrieval. But it might be wise to practice retrieving all of the information covered on retrieval-induced forgetting. Otherwise, in light of the principles discussed here, your well-intentioned retrieval practice might have the unintended consequence of causing forgetting of the unpracticed content! ●

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ANGELO BRANDELLI COSTA ON PREJUDICE, SEXUALITY, AND THE HEALTH OF THE LGBTQ+ POPULATION

Angelo Brandelli Costa

Spotlight

Current role: Associate professor of social psychology in the Graduate Program in Psychology, the Graduate Program in Social Sciences, and the Graduate Program in Medicine and Health Sciences at the Pontifical Catholic University of Rio Grande do Sul, 2016–present


Terminal degree: PhD in psychology, Universidade Federal do Rio Grande do Sul, 2015

Recognized as an APS Rising Star in 2017

Angelo Brandelli Costa is an associate professor of social psychology at the Graduate Program in Psychology, the Graduate Program in Social Sciences, and the Graduate Program in Medicine and Health Sciences at the Pontifical Catholic University of Rio Grande do Sul. His research in social and health psychology has an emphasis on prejudice, sexuality, gender, HIV/AIDS, and the health of the LGBTQ+ population.

Sparking his interest

My choice to work on prejudice toward LGBTQ+ people was a mixture of the need that presented itself in Brazil at the time, the influence of my mentors, and my intention to provide a technical answer to the barriers I was facing as a gay psychologist in training.

When I was an undergraduate psychology student, LGBTQ+ themes were treated in the curriculum in an exotic, pathologizing way. I vividly remember an episode in which a professor told me that research on these topics should take place within the scope of individual psychotherapy and not at the university.

By the time I graduated, these topics were starting to gain traction in Brazil with the Supreme Court’s approval of same-sex marriage and the implementation of related public policies. Professor Henrique Nardi, from the Federal University of Rio Grande do Sul Social Psychology Graduate Program, invited me to collaborate...
When I was an undergraduate psychology student, LGBTQ+ themes were treated in the curriculum in an exotic, pathologizing way. I vividly remember an episode in which a professor told me that research on these topics should take place within the scope of individual psychotherapy and not at the university. With him I evaluate prejudice against sexual and gender diversity in secondary school contexts. Until then, social psychology work in Brazil dealt with LGBTQ+ themes mostly within gender studies and within a critical psychology framework.

At that time, I was more interested in bringing to Brazil the traditional psychological study of attitudes that had been underway in the United States since the 1970s. This approach was a novelty. Later, I emphasized the impact of prejudice on its victims based on my professional experience outside academia, working on social movements and public policies and under the mentorship of professor Silvia Koller.

Getting started
Before my first job as a professor, I worked as a consultant on projects related to HIV/AIDS and LGBTQ+ issues at the United Nations. This focus has been a constant in my career, even when I did a split-PhD program at City University of New York Hunter College while working at the United Nations Development Programme (UNDP) headquarters in New York City. I still work as a consultant to the Joint United Nations Programme on HIV/AIDS (UNAIDS), coordinating the scientific branch of the People Living With HIV Stigma Index in Brazil, which is a national community-based survey of the impact of HIV-related stigma on HIV-positive people. I try to bridge the worlds of academia and public stigma, seeking to implement evidence-based policies, for example, and basing my research on the needs of the communities I have worked with.

Moving up
Unlike in the Global North, it is quite common in Brazil for professors to work in universities that are their alma mater. Right after I finished my PhD and did my training at the Federal University of Rio Grande do Sul, I worked there for a brief period as a substitute professor of the history of psychology.

Luckily, there was an open position for a professor in social psychology at the Pontifical Catholic University of Rio Grande do Sul. Although I was a young researcher, I was hired in a tenure-track position. I had the opportunity to create my research group—Prejudice, Vulnerability and Psychosocial Processes—and great freedom to set up my line of work in the field of social psychology. I was also lucky to have a large group of very talented students working with me right from the start.

By 2017, when I received the APS Rising Star award, I was finishing research on healthcare needs and barriers to accessing healthcare among LGBTQ+ populations. This concerned both transgender people’s needs for gender affirmation procedures and HIV care, for example. Although intricately linked to medicine and public health, our idea has always been to use psychological models to bridge public health and psychology. We use the minority stress model, which is based on the idea that discrimination can cause people to anticipate future prejudice and avoid services as a result.

Advancing understanding and acceptance
My research has positively influenced health policies related to the LGBTQ+ population in Brazil. For example, as a consultant for UNESCO (the United Nations Educational, Scientific and Cultural Organization), I created and was the first coordinator of a health policy for the LGBTQ+ population in my state. In this policy, we implemented an evidence-based massive online course to train and reduce prejudice among healthcare personnel. The course’s effectiveness has been documented, and we are now adapting it for educators.

My group is now expanding our investigations of mental health and general health among LGBTQ+ populations. For example, several manuscripts in development explore discrimination in gynecological care, social identity, intersectionality, and minority stress among women who have sex with women.

In addition, we have projects on LGBTQ+ youth, especially trans and gender-diverse youth, and how they are impacted by gender affirmation practices. This work embraces the interface between social and developmental psychology.

I was also part of a recent World Health Organization working group that assessed the new ICD-11 (International Classification of Diseases, 11th edition) diagnostic criteria for gender incongruence in Brazil. We are making a significant effort to provide empirical support for depathologization and stigma reduction among trans and gender-diverse people.

We are starting, in partnership with UNAIDS and various community organizations, the second wave of the People Living With HIV Stigma Index Brazil.

Another focus concerns political psychology. With the expansion of authoritarian discourses and practices in Brazil, several students came to me to start a line of work in this field. We are adapting classic measures of right-wing authoritarianism and social dominance orientation, among others, and studying the phenomenon of authoritarianism and the (lack of) political participation in the context of prejudice and sexual and gender diversity.
By invitation of a group from the computer science program, I am now contributing to projects that assess patterns from personality and social psychology models and in video sequences of crowds and crowd simulations. For the next step in this novel line of work, we are including gender diversity discrimination.

Motivating early-career scientists
I have a large group of master’s and doctoral students, as well as postdoctoral and scientific initiation candidates, which in Brazil is a modality where undergraduate students actively work in research groups. They come mostly from the social sciences, psychology, and medicine programs that I teach. This interdisciplinary climate is important to advancing the kind of work we are doing. I also like to create an open working climate, leaving students free to take part in large projects that are underway or to start new lines of work that will add to what the group is already developing. Something like this happened recently when, based on student demand, we incorporated models from our political psychology work into our work on prejudice.

I like my students to subvert what I’m researching. Our roles as mentors should be to support demands for novelty, pointing to a future generation that surpasses in every way what we are developing now.

When we are in training, we are expected to stick to our mentors’ theories, scientific problems, and best ways of researching. My advice is a little different from that. I think it is fundamental to try to respond to the concrete demands of the communities around us and of which we are a part. This provides an endless source of ideas on what to do and how to positively influence societal development.

I strongly believe that psychological science, even at its most basic, should be a way to operationalize and answer these demands.

Always something new
I like the sense of newness in my work. We are always meeting new students who propose new questions. In teaching, the fact that we constantly revisit what we believe gives me great enthusiasm. We are never stagnant in academia.

Being able to work with nongovernmental organizations, the United Nations, health services, and other stakeholders also energizes me. The relationship between academia, society, and implementation encourages me to keep going. Building these bridges and putting actions in motion based on what psychological science can offer gets me out of bed every day.

What is the biggest challenge you have encountered in your career so far?
We face the dismantling of science and education policy in Brazil by the current federal administration. This means a lack of funding in science and higher education.

More than that, there is a climate of devaluation of teaching and research that contaminates the entire academy as well as future students. Bright professors are leaving the country, and there is a noticeable decrease in the number of students seeking scientific careers, which is a disaster for a country that still has a dearth of people with advanced scientific training and where science still can and must answer many social problems.

What are your plans for the future?
I recently returned from serving as a visiting professor at Sapienza University in Rome. This time in Italy supported my interest in expanding my internationalization not only in research but also in teaching and science communication. Relatedly, I am completing a book about the history of research on prejudice, to be titled The Reason of Prejudice.

We recently created, together with colleagues from Chile, Uruguay, Peru, and other Latin American countries, a network of researchers on topics of applied psychology and the LGBTQ+ population. I am also finishing my involvement as a young leader at the APA Global Learning Leadership Institute and Global Psychology Alliance. This experience has been particularly important in my pursuit of internationalization.

Angelo Brandelli Costa: “I like my students to subvert what I’m researching. Our roles as mentors should be to support demands for novelty, pointing to a future generation that surpasses in every way what we are developing now.”
THE PERKS OF STUDYING A NEW TOPIC—AND HOW SEXUAL BOREDOM TURNED INTO A GOOD THRILL

By Leonor de Oliveira

Let me start off with a confession: I’m easily bored. I reckon this does not make me any more special than your average millennial who, like me, is overstimulated and exhausted from endless browsing for the past 10 years. I can even be more revealing: I’m easily bored in bed. Again, this doesn’t make me unique. Problems with sexual desire are among the most common (Kleinplatz, 2018). This is especially true for women: Some prevalence studies indicate that approximately 50% to 70% of women experience low sexual desire (West et al., 2008; Worsley et al., 2017). These rates drop if you assess levels of sexual distress and control for menopausal status, but they’re still high. Too high. They make me feel uncomfortable, and suspicious: Should we be talking about “low” desire when numbers hint this might be the standard?

In 2017, I was working in crisis intervention, finishing my training as a sexual therapist, and had to present my final work to become a sexual therapist in the Portuguese Society for Clinical Sexology. I was shattered from the emotional work I was doing and did not feel I had the energy (or time) to run a series of ideas by a supervisor. I decided to do something on my own that would potentially benefit my personal life as a serial monogamist—conduct a review of literature on sexual boredom. I thought I was going to find tons of papers on the topic, considering the prevalence of issues involving sexual desire in clinical settings. It seemed obvious, after all: Women were not dysfunctional, they were just bored, and I could not be the only person thinking so. Well, it appeared that I was. I found exactly three papers specifically targeting sexual boredom. I found a few more papers by stretching my search and using all sorts of word combinations, but the truth was evident: A review of literature was not going to solve my personal problem. Fortunately, it did allow me to get my certification in sexual therapy.

My dissertation ended up being more about boredom than about sexual boredom, but it laid the foundation for a tentative model of sexual boredom. In hindsight, this tentative model was quite naive. However, it caught the attention of Joana Carvalho, who became my supervisor and whose interest changed my life course and likely my career. It’s interesting how genuine interest and encouragement make a difference. I remember her simply saying “I think this construct has great potential and is yet to be studied.” A few months later, she told me the University of Porto was going to open a doctoral program in human sexuality, where she believed I would fit in. She feared I wouldn’t be interested (I had well-paid contract as a clinical psychologist, a rarity in the Portuguese scenario), but I was. I applied, got in, and got a scholarship, too.

One of the challenges of studying a subject ignored by other researchers is that you must put in extra work in explaining why your topic matters and how studying it can be relevant for the field. To me, the importance of sexual boredom resides in its potential contribution to understanding sexual desire.
In that sense, it’s the El Dorado of sex research; many of my colleagues have also tried to figure out why desire wanes and how to handle it. Conventional treatment approaches have generally not proved effective (Leiblum, 2010). Despite the ubiquity of modern attempts to increase desire (Charest & Kleinplatz, 2018), there is no “pink” Viagra (Tiefer, 2004). It’s difficult to have a cure when there may not be a disease.

But although the topic of sexual boredom has flown under the radar of sex researchers, renowned clinicians including Esther Perel, David Schnarch, and Barry McCarthy have all touched the subject in various ways. Why haven’t scientists done the same? I used to think this could reflect an apparent overlap in issues with sexual desire and sexual satisfaction, and hence not be worth studying. I now feel it’s something else. Sexual boredom is almost too intuitive. To me it was obvious back in 2017 and it’s obvious today: Many people with low desire don’t have sexual dysfunction, they only have a boring sex life. The question we should be asking is, why? Is sex uninteresting? Are they bored with life or their relationships? Is society demanding too much from them? Are they just easily bored? Our studies hint that all these factors might play a role, but we are missing pathways (de Oliveira, Carvalho, & Nobre, 2021; de Oliveira, Rosa, et al., 2021). That is, we still don’t know what leads to what, or when.

Doing research that is personally driven is highly motivating. However, wanting to solve our own issues also carries powerful biases. I often see what I want to see, but I realize that’s partly because there are no perfect strategies to overcome my preconceptions, so I doubt myself constantly. Fortunately, instead of being shredded by anxiety, I was able to befriend it. I now welcome doubt, surrounding myself with senior and junior researchers whose criticism I invite. I also need encouragement, of course; if my supervisors did not promote my autonomy and share my enthusiasm, I wouldn’t be able to explore new territory, let alone ensure that other researchers will want to pay attention.

I understand I might be overly optimistic about the potential of sexual boredom to explain long-lasting and distressful problems with sexual desire. Perhaps my passion makes me naive and creates a risk that others won’t feel as fervent as I do. Maybe sexual boredom will carry on unnoticed. One benefit of boredom is that it seems to have the capacity to promote personal growth (Elpidorou, 2018) by signaling that change is needed (Danckert et al., 2018). My research zeal comes from my own susceptibility to boredom: Like most boredom-prone people, I’m always up for a thrill—in this case, of taking on the risks of pursuing a new research topic.

References
Tiefer, L. (2004). The pink Viagra story: We have the drug, but what’s the disease? In Sex is not a natural act, and other essays (2nd ed.). Westview Press.

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THE DEVASTATING TOLL OF DIET CULTURE

Cheri Levinson is an associate professor in the Department of Psychological and Brain Sciences and the director of the Eating Anxiety Treatment Laboratory (louisvilleeatlab.com) at the University of Louisville.

What sparked your interest in eating disorders?
Growing up in Louisville, Kentucky, I had several friends who had eating disorders and nowhere in the state to go for treatment. As an undergraduate, I joined a clinical psychology research lab that did research on personality factors underlying eating disorders. In my PhD program I worked in an anxiety disorder lab, and what fully cemented my interest was doing a practicum my third year at an eating disorder facility, where I made two observations. First, a bunch of women, just around my age, were in this facility for months at times not able to live their lives because of eating disorders. Second, every single patient had extremely high anxiety in addition to their eating disorder. This made me want to figure out why and how to help with that anxiety.

You’ve referred to eating disorders as a silent epidemic. What makes this so?
Eating disorders are extremely prevalent: 28.8 million Americans will have an eating disorder in their lifetime, and their cost to society in one year alone is $64.7 billion. Someone dies from an eating disorder every 52 minutes. Unfortunately, these rates are growing quickly, and younger and younger kids are developing eating disorders. For example, in Kentucky, we have shown that around 50% of children 10 to 12 years old report being on a weight-loss diet, which is the strongest risk factor for development of an eating disorder (and obesity). Despite these staggeringly troubling statistics, eating disorder research and treatment is underfunded; most clinicians and medical professionals have no training in eating disorders, nor do they assess for eating disorders; and most cases go undetected, with help-seeking usually occurring at least 10 years after onset.

Is the epidemic worsening?
Definitely. Diet culture (i.e., society’s emphasis on losing weight and thinness as good, and on using weight loss or other fad diets to reach those goals) plays a huge role in eating disorders and is certainly leading to more and younger eating disorders. I often compare diet culture to smoking. Sixty years ago, smoking was the norm, and our society did not realize how harmful it was or that it was killing millions of people. It took a huge awakening in society to change public perception and thus reduce health consequences and deaths from smoking. The same is true for diet culture. It is harming as many people as smoking, but harmful beliefs about thinness and wellness are still deeply embedded in our society.

What factors might affect likelihood of developing a disorder?
Eating disorders are a caused by a mixture of genetic, psychological, and societal factors, just like any psychiatric illness. If you have a genetic predisposition to develop an eating disorder and you begin to restrict your food intake for any reason, you’re likely to trigger the eating disorder. Think of genetics as the programming and restriction as the trigger. Of course, lots of other factors come into play, too, things like trauma, anxiety, social support, etcetera. Eating disorders are very complex.

What treatments could actually end eating disorders?
We have been working on developing a personalized data-based treatment. Every individual with an eating disorder has very different symptom presentations, and we can use data to capture that and personalize a more targeted treatment. Our next steps are to test personalized treatment for eating disorders versus our current gold-standard treatment, and we are starting a new National Institute of Mental Health-funded trial in the new year.

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