

VIRTUAL EMBODIMENT
AND PERCEPTION

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PLUS PLUS PLUS

Observer

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How Age Magnifies
Experience

Deconstructing Cross-
Cultural Differences
in Aging

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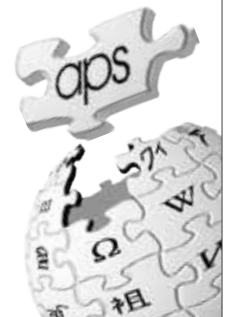
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Forward Into the Past, Part 2

Lisa Feldman Barrett digs deeper into William James's theories on how we think about psychological categories. Counterintuitive hypotheses naturally follow.

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Personality Plus Plus Plus

In his new book and his research, clinical psychologist and Oxford College of Emory University professor **Ken Carter** gets inside the minds of thrill-seekers, daredevils, and adrenaline junkies.

“Human behavior really is the lynchpin here. We are talking about the reactions of the market, about the non-business causes and non-pharmaceutical factors, so we’re talking really about psychological science and human behavior. [People] don’t just take in a whole bunch of facts and then retrieve the facts. They interpret the facts, and this is the foundation of our emotional reactions. Also, any risk is perceived as more dreadful if you can’t control it personally. People need to feel that there are actions they can take. ... They need to feel personally empowered. ”

APS Fellow Dr. **Valerie Reyna** (Cornell University), as part of a Newswise media panel discussing the health and psychological implications of COVID-19, March 12, 2020.

Hear about COVID-19 from more psychological scientists at psychologicalscience.org/news/psychological-science-and-epidemics-voices-of-experts.

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APS Journal Research Related to Epidemics: Publicly Available

To aid in understanding the current pandemic, APS has made published research related to epidemics publicly available through online journal articles.



APS Roundtable: Psychological Science and COVID-19

A virtual roundtable of experts shares their views on the psychological impact of COVID-19. Insights on the pandemic and research-based actions to minimize its impact.



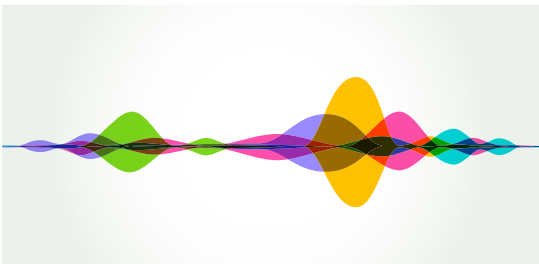
Your Experiences: How Has COVID-19 Affected Your Work?

APS encourages psychological scientists to share how the coronavirus outbreak has affected your work, and the solutions you are tapping to manage the disruption.



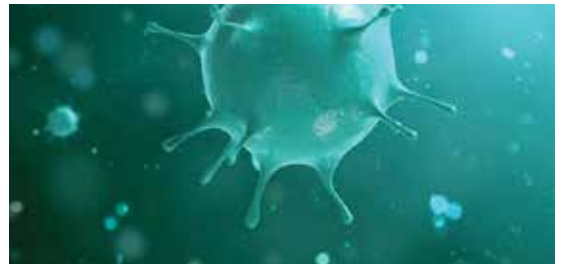
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With COVID-19 disrupting life around the world, funding agencies are issuing policy updates and other guidance related to grants and contracts.



Psychological Science and Epidemics: Voices of Experts

In news stories and opinion pieces, psychological scientists share evidence-based insights on public reactions to epidemics and the viral nature of news.



Epidemics and Public Health Behavior

New Research Topic: The psychology and science behind how individuals and groups respond to epidemics.

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APS Journals: Making your research accessible to the scientific community and beyond.

FORWARD INTO THE PAST, PART 2

By Lisa Feldman Barrett
 APS President

This column was completed before COVID-19 became a pandemic. More on that topic next month.

In last month's *Observer* column, I suggested that a robust and replicable psychological science might be more achievable if we heed some advice from William James. He advised his 19th-century colleagues to think of psychological categories, such as emotion categories, not as "eternal and sacred psychic entities" (James, 1892, p. 374–375)—i.e., not as psychological types—but as populations of situated, variable instances, similar to Darwin's understanding of animal species. In this month's column, let's follow James's line of thinking a little further. It leads to one of the most radical but important ideas in psychological science.

After describing emotion categories as populations of variable instances, James went on to write, "[If] we regard them as products of more general causes (as 'species' are now regarded as products of heredity and variation), the mere distinguishing and cataloguing becomes of subsidiary importance" (James, 1892, p. 375). James was suggesting that emotional events are created by processes that cross-cut traditional categories of western folk psychology, in the same way that animal species are the products of species-general processes. Some ensembles of genes are species-specific, of course, as agents of heredity. But the *processes* that create species cut across

species. So, when it comes to psychological science, we should be focusing on the common processes that, together, create the variable instances of psychological categories. "A science of the relations of mind and brain must show how the elementary ingredients of the former correspond to elementary functions of the latter" (James, 1890/2007, p. 28).

Over the past century, psychological science started with categories of western folk psychology and tried to map them to measurements of the brain. A more robust scientific approach reverses this ordering, however. It begins with research on the structure and function of the brain, and discovers the means by which the brain produces mental events and actions. This approach points directly to hypotheses about domain-general ingredients of the mind. I'll offer a couple of examples, not as definitive claims, but to illustrate the approach.

The first example comes from a family of interrelated research programs referred to as predictive processing. When considered together, these research programs form a coherent, neurobiologically-inspired research framework united by a common core hypothesis: Your experience of the world and the actions you take derive from an active, constructive process driven by past events. Your brain continuously re-implements (i.e., "remembers") trajectories of prior events, and in so doing predicts what's going to happen next; those predictions are confirmed or corrected by incoming sense data from the world (e.g., Clark, 2013; Friston, 2010; Hutchinson & Barrett, 2019) and the body (e.g., Hutchinson & Barrett, 2019; Kleckner et al., 2017). Predictive processing hypotheses reverse the causality found in psychology's traditional scientific approach, in which mental events (e.g., thoughts, feelings) and actions (e.g. behaviors), are reactions to sensory inputs from the world (i.e., stimuli); past experiences, if they are relevant, modulate these stimulus-response links.

Predictive processing is not a new idea—it was anticipated by Helmholtz's idea of unconscious inference and has been proposed numerous



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times in psychological science during the last century (see Box 1, Hutchinson & Barrett, 2019). Nonetheless, this newest generation of predictive processing research does offer something new: the inescapable implication that thoughts, feelings, perceptions, actions, and even hallucinations and delusions are constructed via the same brain-based causes; they are not biological types of psychological phenomena, each implemented in their own specific set of neurons.

A predictive processing approach further suggests that many psychological phenomena with different names... may actually be the domain-general mental ingredients.

We still have much to learn about how a brain implements and corrects its predictive dynamics to control action and create mental events, but in broad terms, predictive processing suggests candidates for James's basic ingredients of the human mind: prediction signals (i.e., "memory") and unexpected sense data from the body and from the world that is encoded to update prediction signals, called prediction error (i.e., "learning"). In this view, "memory" and "learning" are not separate types of mental events, but ongoing processes that are involved, to a greater or lesser extent, in *every* action and mental event. Another ingredient of the mind might be the neural modulation of prediction and prediction error signals (i.e., "executive control"); this ingredient is also thought to be continually present, to some degree, regardless of whether thoughts, feelings, and behavioral responses feel automatic or effortful (e.g., Barrett, Tugade, & Engle, 2004).

And here's another counterintuitive hypothesis: A predictive processing approach further suggests that many psychological phenomena with different names, which we now treat as distinct and separate, may actually be the domain-general mental ingredients. For example, what we refer to as "memory" may be identical to "perceptual inference," "simulation," "ad hoc concept construction," and even "categorization" (e.g., Barrett, 2017). The extravagant assortment of psychological constructs may be ontologically reducible to many fewer mental ingredients.

Analyses of functional magnetic resonance imaging (fMRI) data, particularly during moments when participants are not performing a task (referred to as "resting state" periods), reinforce the hypothesis that "memory," "learning," and "executive control" are possible candidates for James's basic ingredients of the mind. This research has revealed neural "communities," or subnetworks, such as the so-called default mode network, the salience network, and the executive control network that participate in a wide variety of tasks (e.g., Yeo et al., 2015) and dynamic configurations (e.g., Allen et al., 2014). These subnetworks organize along several larger-scale gradients (Margulies et al., 2016; Zhang et al., 2019). One functional gradient describes a spectrum from "re-implementing past experience" (i.e., "memory") at one end to "representing unexpected sense data" (i.e., "learning") at the other. A second gradient runs from representing predictions and prediction errors at one end to modulating those representations (i.e., "executive control") at the other.

Since I'm already way out on a limb here, let's travel a few more inches: your body is also a basic ingredient of your mind. Not in some gauzy metaphorical way, but in a very real, biological way. Neuroscientists have known for some time that a core task of a brain—as a whole system—is to anticipate the body's metabolic needs, attempting to meet those needs before they arise (Sterling & Laughlin, 2015). This process is called allostasis (Sterling, 2012). A brain's estimation of its body's state, in an effort to maintain allostasis, is likely at the core of all mental activity, even in moments that are not bubbling with emotion (Hutchinson & Barrett, 2019; Kleckner et al., 2017).

Many neuroscientists also now agree that sensory systems regulate and are therefore entwined with motor systems, an insight which suggests another mental ingredient: affect. Here's the convoluted logic: If allostasis is a core function of the brain, then so are the sensory consequences of allostasis, called interoception (note that I am not defining interoception as the awareness of sensory signaling from the body, but rather the brain's estimation of the body's metabolic state). Neuroscience research consistently shows that the continuous torrent of interoception is somehow related to a continuous ebb and flow of affective feelings—pleasure and displeasure, comfort and discomfort, arousal and quiescence. The corresponding hypothesis, then, is that affect may be yet another of the mind's ingredients.

Of course, there are many, many challenges to following James's advice. Several have probably already occurred to you, including: Appealing to the basic functions of the brain to discover the basic ingredients of the mind ignores the fact that our notions of how a brain works are inextricably entwined with western concepts of mental life. And the words that name the proposed ingredients of the mind—"memory," "learning," "attention," and "affect"—each refer to a variety of phenomena. For example, "memory" is used to refer to the reimplementation of a past experience (to the act of "remembering"), but also a subjective experience of recollection, familiarity, and nostalgia. The search for James's ingredients of the mind will require that we develop a scientific lingua franca for describing how the brain works separately from what a mind is. We may have to reclaim some words

and scientifically redefine them, and then proceed to use them in a consistent way. Otherwise, we are at risk of unwittingly replacing one set of folk psychology categories with another.

If James is right, and “species” of folk psychology categories are actually variable populations emerging from the continual interaction of domain-general processes, then his vision offers us unprecedented scientific opportunities. First, we have the opportunity to assemble a more cumulative science of the mind. The search for domain-general ingredients treats the boundaries between folk categories of perceptions, cognitions, emotions, and actions as *subjectively experienced* (Barrett, 2009; James, 1890/2007, p. 195). We can extend this insight to question the boundaries between the categories of mental disorder, neurodegenerative disorder, and physical disorder. The search for types, a.k.a., a typological mindset, by contrast, shores up those boundaries. Psychological scientists typically search for domain-specific (i.e., type-specific) processes; for example, each psychological type (such as the category “fear”) is presumed to have a strong correspondence to a specific process (e.g., a fear process) and biological mechanism (i.e., a fear circuit). A domain-general approach questions the presumed parallelism between what a mind is, what a mind does, and how a mind is caused (a.k.a., the computational, algorithmic, and implementational levels of analysis, per the trichotomy of neuroscientist David Marr; Marr, 1982). The result, I expect, will be a major course correction in the scientific questions we ask and how we interpret our research findings.

James’s vision also offers us the opportunity to build a generalizable and ultimately universally applicable psychological science. Ingredients of the mind do more than redescribe the brain’s functions in psychological terms—they offer a path to discover how a single, complex, human brain architecture, in continuous conversation with a human body and the world, produces a *variety* of human minds. The minds in other cultures do not necessarily carve their mental lives into perceptions, thoughts, feelings, and actions (see Danziger, 1997, chapter 1). Human brains are responsive to the contexts that humans find themselves in (and help to shape). We need a psychological science that works to describe and explain the diversity of human minds on this planet. A psychological science which does not assume that the kinds of human minds we now observe have always existed. Or will always continue to exist. ◉

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The APS Board seeks applications for a new executive director to begin in summer or early fall 2020. This search is initiated following the news that current Executive Director Sarah Brookhart is retiring from APS in August after more than 30 years with the organization. Full details will be published on the APS Employment Network (jobs.psychologicalscience.org).



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Dan Ariely, Duke University, NPR, February 17, 2020: Liar, Liar, Liar.

Lisa Feldman Barrett, Northeastern University; **Carlos Crivelli**, De Montfort University, Leicester, UK; **Jessica Tracy**, University of British Columbia, Vancouver, Canada, *Nature*, February 26, 2020: Why Faces Don't Always Tell the Truth About Feelings.

Vanessa Bohns, Cornell University, NPR, February 24, 2020: The Influence You Have: Why We're Blind to Our Power Over Others.

Catherine Caldwell-Harris, Boston University, *The Washington Post*, February 19, 2020: Bilingual People May Make Different Choices Based on the Language They're Thinking in. Here's Why.

David DeSteno, Northeastern University; **Daniel Kahneman**, Princeton University; **Jennifer Lerner**, Harvard University, *The New York Times*, February 11, 2020: How Fear Distorts Our Thinking About the Coronavirus.

Eli Finkel, Northwestern University, *Medium*, February 7, 2020: Is Online Dating Bad for Our Mental Health?

Eli Finkel, Northwestern University, *The Atlantic*, March 2020: The Nuclear Family Was a Mistake.

Alison Gopnik, University of California, Berkeley, *The Wall Street Journal*, February 20, 2020: Detecting Fake News Takes Time.

Jeffrey Glenn, Durham VA Health Care System, WTOP, February 24, 2020: UVa Researchers Find Texts Can Be Early Warning for Suicide Prevention.

Adam Grant, The Wharton School, University of Pennsylvania, *Forbes*, February 26, 2020; 5 Productive Ways to Respond to Rejection.

Jonathan Haidt, New York University, *Wall Street Journal*, February 2, 2020: Why the Democratic Majority Hasn't Emerged.

Elizabeth Linos, University of California, Berkeley; **Eldar Shafir**, Princeton University, NPR, February 4, 2020: The Limits Of Nudging: Why Can't California Get People to Take Free Money?

Tess Neal, Arizona State University; **Dan Simon**, University of Southern California; **Robert MacCoun**, Stanford University, ABC, February 16, 2020: Courtroom Psychology Tests May Be Unreliable, Study Finds.

Grant Packard, York University, Canada, MSN, February 29, 2020: Psychology: Songs With "You" in the Text Apparently Particularly Successful. (See next page.)



TO SURVIVE THE CORONAVIRUS, THE UNITED STATES MUST TIGHTEN UP

While social distancing, hand-washing, and travel bans may help to mitigate the harm of the new coronavirus, "we have yet to address one of our biggest vulnerabilities: America's traditionally loose culture," according to **Michele Gelfand**. "The decentralized, defiant, do-it-your-own-way norms that make us so entrepreneurial and creative also deepen our danger during the coronavirus crisis... By temporarily sacrificing liberty for stricter rules, we'll be able to limit the damage from this disease together."

BOSTON GLOBE | MARCH 12, 2020

Denise Park, University of Texas, Dallas, *Times Colonist*, March 1, 2020: Geoff Johnson: Staying Challenged Is the Best Way to Fight Off the Years.

Steven Pinker, Harvard University, *Forbes*, March 2, 2020: Steven Pinker: 'Evolution Has Saddled Our Species With Many Irrational and Destructive Psychological Traits.'

Mark A. Reinecke, Northwestern University & Child Mind Institute, *The Guardian*, January 28, 2020: Reducing Stigma: Could Mental Health Days Help California Students?

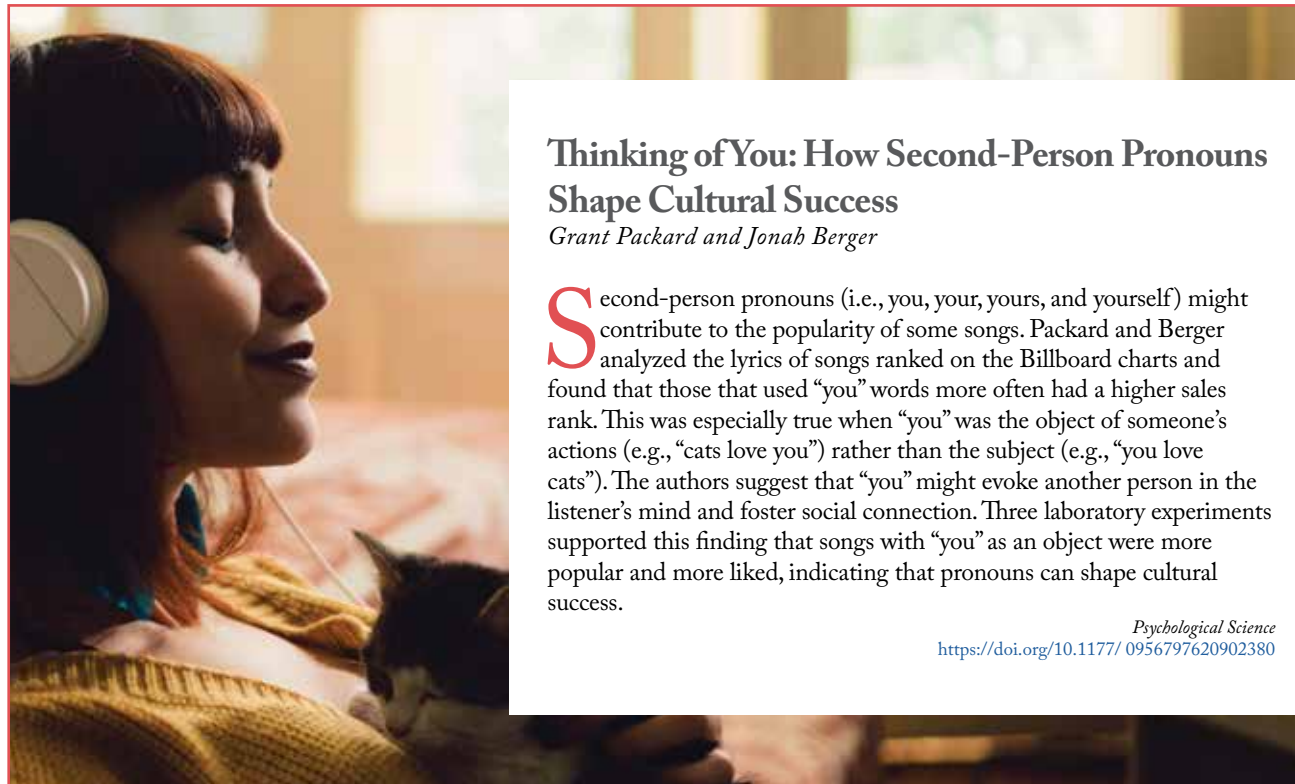
Mark A. Reinecke, Northwestern University & Child Mind Institute, KQED, January 23, 2020: California Considers Permitting Students Excused Mental Health Days.

Clive Wynne, Arizona State University, *The Atlantic*, February 2, 2020: What Do Wolfdogs Want?

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Recent highlights from APS journals



Thinking of You: How Second-Person Pronouns Shape Cultural Success

Grant Packard and Jonah Berger

Second-person pronouns (i.e., you, your, yours, and yourself) might contribute to the popularity of some songs. Packard and Berger analyzed the lyrics of songs ranked on the Billboard charts and found that those that used “you” words more often had a higher sales rank. This was especially true when “you” was the object of someone’s actions (e.g., “cats love you”) rather than the subject (e.g., “you love cats”). The authors suggest that “you” might evoke another person in the listener’s mind and foster social connection. Three laboratory experiments supported this finding that songs with “you” as an object were more popular and more liked, indicating that pronouns can shape cultural success.

Psychological Science
<https://doi.org/10.1177/0956797620902380>

PSYCHOLOGICAL SCIENCE

Turtle, Task Ninja, or Time Waster? Who Cares? Traditional Task-Completion Strategies Are Overrated

Lisa Vangsness and Michael E. Young

Individuals who initiate tasks as soon as possible (precrastinators) as well as those who delay beginning tasks (procrastinators) seem to struggle to finish tasks on time. Vangsness and Young analyzed when and how 8,500 students received credit for research participation. A latent profile analysis, which identified patterns among students’ behaviors, was better than using single behaviors to identify task-completion strategies. Compared with students who adopted a steady work habit, those who precrastinated or procrastinated were less

likely to gain credits through research participation.

<https://doi.org/10.1177/0956797619901267>

Replicating Roaches: A Preregistered Replication of Zajonc, Heingartner, and Herman’s (1969) Social-Facilitation Study

Emma Halfmann, Janne Bredehöft, and Jan Alexander Häusser

In 1969, Zajonc and colleagues showed that cockroaches took longer to complete a complex maze in the presence of other cockroaches than when alone, but they completed a simple runway faster in the presence of other cockroaches. Halfmann and colleagues replicated the original procedure and found that cockroaches took longer to complete both the complex and easy tasks in the presence of

other cockroaches. These findings show the social-inhibition effect but not the social-facilitation effect Zajonc et al. had reported.

<https://doi.org/10.1177/0956797620902101>

Subjective Well-Being Around the World: Trends and Predictors Across the Life Span

Andrew T. Jebb, Mike Morrison, Louis Tay, and Ed Diener

New research conducted in 166 nations indicates that neither life satisfaction nor negative affect changed with age. However, positive affect seemed to decline. Marriage, employment, prosociality, and life meaning were associated with higher well-being (measured by increased positive affect and life satisfaction and decreased negative

affect) over the life span in every world region. Employment and life meaning had large associations with well-being, whereas marriage and prosociality had smaller associations. These findings illustrate how different life priorities, such as marriage or employment, might relate to well-being as we age.

<https://doi.org/10.1177/0956797619898826>

CLINICAL PSYCHOLOGICAL SCIENCE

Depressive Symptoms and Self-Esteem as Moderators of Metaperceptions of Social Rejection Versus Acceptance: A Truth and Bias Analysis

Daniel Moritz and John E. Roberts

Individuals who are more depressed and have lower self-esteem might tend to underestimate how much (a) they are liked by others and (b) others are interested in future contact with them. Nondepressed individuals with higher self-esteem, however, might tend to overestimate others' opinions of them, this research suggests. Moritz and Roberts measured participants' depressive symptoms and self-esteem and their perceptions of being liked and desired for future contact following social interactions with new acquaintances. Their findings highlight the role of depression and self-esteem in social interactions.

<https://doi.org/10.1177/2167702619894906>

PERSPECTIVES ON PSYCHOLOGICAL SCIENCE

Health in the United States: Are Appeals to Choice and Personal Responsibility Making Americans Sick?

Cayce J. Hook and Hazel Rose Markus

Appeals to “choice” and “personal responsibility” that pervade policymaking, advertising, media, and social norms in the United States might contribute to ill health, Hook and Markus propose. These appeals appear to encourage (a) worry and stress over health,

(b) blame and stigmatization of the unhealthy, (c) widened health disparities, and (d) failure to adopt policies that could improve health. Psychologists can help to expand appeals to reflect current science about health's physical, cultural, and social factors, thus promoting the effective communication and implementation of health-supportive policies, the authors offer. (See related article, page 17.)

<https://doi.org/10.1177/1745691619896252>

CURRENT DIRECTIONS IN PSYCHOLOGICAL SCIENCE

Identity Research That Engages Contextual Forces to Reduce Socioeconomic Disparities in Education

Mesmin Destin

Peers, parents, instructors, and institutions can be leveraged in ways that have positive effects on student outcomes, with benefits for science and society, Destin proposes. Several studies show how socioeconomic resources and opportunities shape students' identities, especially how they imagine their lives in the future. These identities, in turn, affect how students perform in school. Connecting identity with academic outcomes is more meaningful when we consider the people and institutions that surround the students—an approach that might help to reduce socioeconomic disparities in education, Destin suggests.

<https://doi.org/10.1177/0963721420901588>

The Sexualization-Objectification Link: Sexualization Affects the Way People See and Feel Toward Others

Philippe Bernard, Carlotta Cogoni, and Andrea Carnaghi

Research has found that sexualized individuals—people whose sexual appearance and physical beauty are emphasized—are more likely to be seen and categorized as objects. They also are perceived as possessing fewer human traits (e.g., fewer intentions or emo-

tions). Bernard and colleagues review findings from electroencephalography and behavioral tasks showing that the brain processes sexualized individuals differently from nonsexualized ones and that sexualized individuals are perceived as possessing less intellect and agency. These findings clarify some mechanisms that might underlie violence, and the acceptance of violence, toward sexualized individuals.

<https://doi.org/10.1177/0963721419898187>

ADVANCES IN METHODS AND PRACTICES IN PSYCHOLOGICAL SCIENCE

Metascience on Peer Review: Testing the Effects of a Study's Originality and Statistical Significance in a Field Experiment

Malte Elson, Markus Huff, and Sonja Utz

How effective is peer review, and how do study originality and statistical significance affect reviewers' evaluations? Elson and colleagues manipulated the originality and statistical significance of the research reported in a fictitious abstract that had ostensibly been submitted to a conference and sent to peer review. They found that there was a small bias in favor of significant results and no aversion to replication studies (i.e., less original studies). This research supports the feasibility and value of conducting metascientific experiments on the peer-review process to develop practical procedures to increase the utility of peer review. ●

<https://doi.org/10.1177/2515245919895419>

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JUST NOT THAT INTO YOU: HOW AND WHY MEN AND WOMEN MISPERCEIVE SEXUAL INTEREST

People tend to project their own level of interest onto prospective partners. This reality, rather than sex-specific evolutionary pressures, might explain why men and women often differently misperceive a partner's sexual interest, suggests a study in *Psychological Science*.

Sex differences in misperceptions of sexual interest have been well documented, but what explains these differences remains unclear, according to Anthony J. Lee (University of Stirling, Scotland) and colleagues. They explain that there are two kinds of accuracy in perceptions of sexual interest: (a) whether and to what extent individuals can distinguish more and less sexually interested potential mates, and (b) whether individuals tend to overestimate or underestimate others' sexual interest, regardless of their ability to distinguish more or less sexually interested potential mates.

The researchers used these measures to examine differences in how well people estimate others' sexual interest. Lee and colleagues tested 1,226 self-reported heterosexual subjects (586 men and 640 women). The individuals participated in a speed-dating task in which they met with several subjects of the opposite sex for 3 minutes and were free to discuss whatever topic they liked. After each interaction, participants rated their own sexual interest as well as the sexual interest they perceived from their partners. Individuals also rated their own facial, bodily, personality, and overall attractiveness, as well as their sociosexual orientation—including their willingness to engage in uncommitted sex in the past, attitudes toward uncommitted sex, and desire for sex.

Individuals were somewhat accurate in identifying the partners who were more and less interested in them, and their own sexual interest did not seem to change how they perceived their partner's interest. However, in accordance with previous research, men tended to be more likely than women to overestimate their partners' levels of sexual interest.

Interestingly, this bias disappeared when researchers accounted for the individuals' sociosexual orientation and self-rated attractiveness. Regardless of sex, participants who were more oriented toward short-term relation-

Factors other than sex itself can explain sex differences in the perceptions of sexual interest.

ships and uncommitted sex, along with those who rated themselves as more attractive, perceived higher levels of sexual interest from their partners, regardless of whether or not these perceptions were valid. These findings are consistent with individuals projecting their own interest onto their partner, Lee and colleagues write.

The results also indicated that men's and women's different perceptions might stem from men being both more oriented toward short-term relationships and more interested in their partners. These findings suggest that individuals can accurately detect cues of sexual interest, even in brief encounters, but partners' actual sexual interest might play a minor role in

these perceptions.

Nevertheless, the findings are contrary to the popular notion that perceptions of sexual interest have evolved differently for men and women because it is advantageous for men to overestimate, and women to underestimate, sexual interest. They seem to indicate that the tendency of individuals to assume that potential partners reciprocate their sexual interest leads to increased mating success, regardless of sex.

"Alternatively, this bias might not reflect a specialized adaptation at all but may instead reflect a broader tendency for individuals to assume that others think like themselves," Lee and colleagues offer.

In summary, the study shows that factors other than sex itself can explain sex differences in the perception of sexual interest. This challenges the notion that misperceptions of sexual interest occur solely because of sex-specific differences in evolutionary selection pressures. •

Reference

Lee, A. J., Sidari, M. J., Murphy, S. C., Sherlock, J. M., & Zietsch, B. P. (2020). Sex differences in misperceptions of sexual interest can be explained by sociosexual orientation and men projecting their own interest onto women. *Psychological Science*, 31, 184–192. <https://doi.org/10.1177/0956797619900315>

In "Observations," the names of APS Fellows and current APS members are denoted by boldface type.

EASIER DONE THAN SAID: LESSONS FROM 6 YEARS OF PREREGISTRATION

More than 6 years after APS began encouraging psychological scientists to preregister their research, the practice continues to earn praise from authors who say it makes them think more carefully about their hypotheses and methods, and, ultimately, makes their work stronger. Many authors remain reluctant to preregister, however, for reasons including lack of familiarity with the process or concern that it could be labor-intensive or inhibitory, even preventing them from doing exploratory research.

For a first-hand look at the process and impact of preregistration, the *Observer* reached out to the authors of several top preregistered studies from APS journals—as determined by number of citations and Altmetric scores. What motivated them to preregister their research? What was their experience in preregistering, in comparison with other research they didn't preregister? And what benefits, if any, did they receive as a result of their decision to preregister?

Cause—and Effect

With preregistration, scientists specify their plans for a study (e.g., hypotheses, number and nature of subjects, procedures, statistical analyses, predictions) and then post those plans online in a locked file that editors, reviewers, and, ultimately, readers can access. Introduced to the APS journals in January 2014, the practice was embedded in several broader changes in APS publication standards and practices “aimed at enhancing the reporting of research findings and methodology,” wrote former *Psychological Science* editor **D. Stephen Lindsay** in an editorial. “The theoretical advantage” of

preregistration, wrote APS Fellow **Eric-Jan Wagenmakers** and Gilles Dutilh later in the *Observer*, “is that it sharpens the distinction between two complementary but separate stages of scientific inquiry: the stage of hypothesis generation (i.e., exploratory research) and the stage of hypothesis testing (i.e., confirmatory research). By respecting this distinction, researchers inoculate themselves against the pervasive effects of hindsight bias and confirmation bias.”

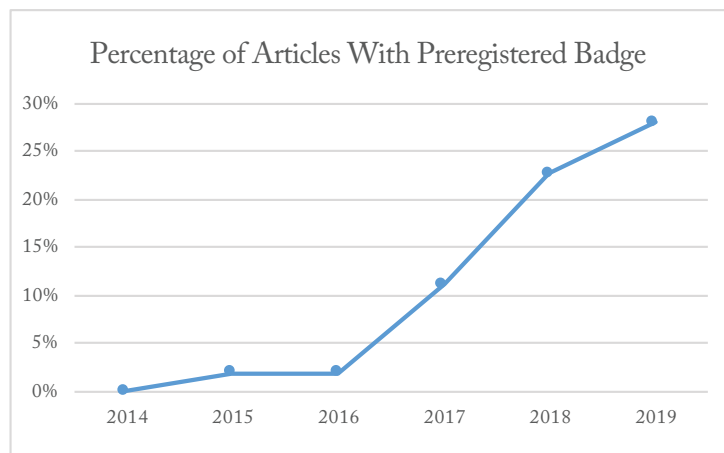
From 2014 through 2019, 43 of 154 eligible articles published in *Psychological Science* earned the preregistered badge “for having a preregistered design and analysis plan for the reported research and reporting results according to that plan.” (APS also awards open science badges for open data and open materials.) Two other APS journals that publish primarily empirical work, *Clinical Psychological Science* and *Advances in Methods and Practices in Psychological Science*, also

encourage preregistration and award badges for it.

“I think preregistration is a really good idea, and more of us should be doing it,” said **Erin Heerey**, principal author of a 2018 *Psychological Science* article, “The Role of Experimenter Belief in Social Priming,” that has 244 citations. “When you think about [your methods] in that level of detail and write them down before you do the work, it helps you catch details that reviewers will ask later and plan for those questions in advance.”

Amy Orben, principal author of the widely cited 2019 *Psychological Science* article “Screens, Teens, and Psychological Well-Being: Evidence From Three Time-Use-Diary Studies” (Altmetric score 1749, 24 citations) also found the experience positive.

“I think preregistration made our study stronger,” Orben said. “We found effects in the opposite direction than we were expecting from the first two data sets we analyzed to ➡



After a slow start, the number of APS journal articles to earn the preregistered badge has risen sharply since 2016. In 2019, 28% of *Psychological Science* articles earned the preregistered badge, and 22% received all three APS Open Science badges.

generate our hypotheses, and this did not cause too many issues in peer review as we had preregistered our study. Furthermore, it allowed us to showcase a distinct hypothesis-generating and hypothesis-testing framework, which I believe in and want to support.”

What prompted the decision to preregister? For Heerey, of Western University in Ontario, “we did it partly out of curiosity about what preregistration entailed, partly because we knew that given how controversial our findings were turning out to be, we needed to document our predictions clearly and publicly in advance, and partly because a reviewer mentioned it as a way of strengthening our work.”

For Orben, of the University of Cambridge, “it felt like the natural step.” She and her colleague had analyzed two preexisting datasets to identify their hypotheses, and they knew the third data set would be released the following month. “It was just enough time to preregister the hypothesis and analysis plan to then have a strong confirmatory test of our formed hypotheses in place.”

Will Skylark, also of the University of Cambridge, believes another benefit of preregistration is that “it requires considerable thought about what one is actually trying to find out,” said the author of the 2017 *Psychological Science* article, “People With Autism Spectrum Conditions Make More Consistent Decisions” (22 citations). “Thinking in detail about the implications of different analysis strategies forces one to be explicit about what, exactly, the hypotheses are that one wishes to test, and how one is testing them.” He cited pragmatic reasons as well. “We thought it best to commit to a single, reasonable plan to avoid a plethora of output and the risk of inflated error rates and unconscious ‘cherry picking’ of results,” he said. Further, he and his coauthors speculated that preregistering “would probably be regarded favorably by our peers.”

As to the perception that preregistration is labor-intensive, “that’s not my experience,” said Heerey. “I think it just shifts the work you do from after you have run the study to before. Basically, it means writing the methods section up front—which means that you pretty much have that section of the paper drafted before you run, which makes the process of writing easier.”

Michael Kardas of the University of Chicago Booth School of Business agrees. His 2018 *Psychological Science* article, “Easier Seen Than Done: Merely Watching Others Perform Can Foster an Illusion of Skill Acquisition,” has 18 citations.

“We preregistered several of our experiments and this wasn’t problematic: It takes a few extra minutes but also prompts you to think more carefully about your hypotheses and your analysis strategy,” Kardas said. “Plus it’s often possible to reuse language from one preregistration when writing up another, so the process tends to be fairly efficient.”

Orben noted that “The Open Science Framework (osf.io), with its many different preregistration templates, makes it relatively easy to preregister and you can even embargo it to keep your registration in the private space until you want to release it.” And while she acknowledged that preregistration is “naturally a process of tying one’s hands, it did not feel particularly inhibiting as I was convinced by the way it will help me test my posed hypotheses.”

Heerey also disagrees with the notion that preregistration can be inhibiting. “You are welcome to explore your data,” she said. “The thing preregistration does prevent is people reporting exploratory findings as if they were main hypotheses. It is often the case that we explore our data (sometimes pilot data that are not preregistered and sometimes

additional findings that we have discovered in a preregistered data set) and then conduct another preregistered study in which we specifically predict and examine those effects. Either way, I think this enhances the quality of the work we are doing in the lab.”

Heerey is such a fan of preregistration that she wishes “more journals would emphasize and encourage to a much greater degree the ability to seek peer review *PRIOR* to data collection. This gives researchers a chance to work collaboratively with reviewers to determine methodology, instead of adversarially”—if, for instance, results don’t match/replicate/confirm previous findings. “I think it would help prevent people from burying nonsignificant results, which can be very easy for reviewers/researchers to explain away or for researchers to simply never write up because they don’t understand why a method that should have generated some finding didn’t do so....”

Not that research practices shouldn’t be nimble for preregistered work. Orben said she did her best “to preregister a detailed analysis plan; however, I found through the peer-review process that the exact analyses could not be adhered to because of the data we acquired. We transparently adapted our analysis strategy, but looking back I wish we would have thought of such contingency planning beforehand.” ♦

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PSYCHOLOGICAL RESEARCH ON THE WORLD STAGE: AAAS NEWS BRIEFINGS FEATURE APS MEMBERS

At the American Association for the Advancement of Science (AAAS) meeting in February, APS members **Tess Neal** (Arizona State University) and **Lisa Feldman Barrett** (Northeastern University) highlighted intriguing findings published recently in *Psychological Science in the Public Interest* (PSPI) during a pair of press briefings.

Neal discussed the dearth of well-established psychological tools in the courtroom and Feldman Barrett explained the limitations of using technology to glean human emotion from facial expressions alone.

Panel 1: Psychology in the Courtroom

The first briefing, “Advancing Justice with Lessons from Psychology,” coincided with the online publication of the *PSPI* report titled “Psychological Assessment in Legal Contexts: Are Courts Keeping ‘Junk Science’ Out of the Courtroom?” The panel discussions began with a summary by Neal of the report’s findings.

“Each year, hundreds of thousands of psychological assessments are used in court to help judges make legal decisions that will affect a person’s life,” Neal told reporters. “We were able to clearly identify only 40% of these tools as having generally favorable scientific properties. This is a problem because bad psychological evidence may contribute to unfair legal processes and unjust verdicts.”

The problem is made worse, she continued, because the courts are not separating the good from the bad. “Even though courts are required to screen out ‘junk science,’ nearly all psychological assessment evidence



Tess Neal, Ira Hyman, and Sarah Brown-Schmidt at the AAAS media panel. Credit: AAAS

is admitted into court without even being screened,” she said. According to the report, legal challenges to the admission of assessment evidence are rare, occurring in only about 5% of the cases reviewed. And only a third of those challenges succeeded.

The report’s findings were also publicized in the APS news release, *The Verdict Is In: Courtrooms Seldom Overrule Bad Science*, which was made available to reporters during the briefing. Two researchers who were not associated with the *PSPI* report, **Ira Hyman** (Western Washington University) and Sarah Brown-Schmidt (Vanderbilt University), also presented during the briefing.

Panel 2: AI’s Shortcomings in Deciphering Emotion

Feldman Barrett kicked off the second briefing, “Emotion Recognition Technology: Present and Future.” She presented findings from a July 2019 *PSPI* report, “Emotional

Expressions Reconsidered: Challenges to Inferring Emotion From Human Facial Movements.” Her panel explored the increasing use of technology to detect emotion by studying people’s facial expressions. Feldman Barrett summarized how the *PSPI* report relates to this potential use of technology.

“The general punch line is, on average, when talking about adults in urban cultures, people scowl when angry about 30% of the time. This is what scientists call low reliability,” said Feldman Barrett. “So 70% of the time, adults do not scowl when they are angry; they do something else with their faces. And people also scowl when they are not angry. They scowl for lots of reasons.”

This means that scowling is not “the” expression of anger, ➡

See more Observations at
psychologicalscience.org/obsonline.



A briefing on "Emotion Recognition Technology: Present and Future" featured findings from this 2019 *Psychological Science in the Public Interest* report. Image © 2019 Anna J. Kutor-Kaden. Used with permission.



Besides presenting research results at the AAAS meeting, APS President Lisa Feldman Barrett presented the 2019 John P. McGovern Award Lecture in the Behavioral Sciences. Credit: AAAS

she explained. It is “an” expression of anger that people will show in certain circumstances but not in others.

“People do not move their faces randomly, but they do move them in highly contextualized ways, so any AI [artificial intelligence] that is claiming to detect anger by looking for scowls has some real problems,” Feldman Barrett concluded.

Two other authors of the study, APS Fellow **Seth Pollak**, (University of Wisconsin-Madison) and Aleix Martinez (The Ohio State University), also served on the panel but discussed other related topics.

Both Neal and Feldman Barrett also presented their results in separate technical sessions.


John P. McGovern Award Lecture in Behavioral Science

During the meeting, Lisa Feldman Barrett also presented the 2019 John P. McGovern Award Lecture in the Behavioral Sciences. She was nominated for this award by APS and was selected by AAAS “for her role as one of the preeminent experts in the study of emotions.” Her talk, titled

“Variation Is the Norm: Darwin’s Population Thinking and the Science of Emotion,” covered the nature of emotion from both psychological and neuroscience perspectives and how it emerged into a new field of inquiry called affective science.

The lecture, first delivered in 1990, honors outstanding behavioral scientists from around the world. The lecture was endowed by the John P. McGovern Foundation to enable scholars to learn and explore the accomplishments and challenges of the behavioral sciences. Dr. McGovern was an internationally recognized physician, scientist, scholar, educator, and humanitarian. ●

The world’s largest general scientific meeting—the American Association for the Advancement of Science (AAAS) annual convention—brings together more than 10,000 researchers from around the world and features over 120 sessions on subjects from every corner of the physical, biological, and social sciences. It also attracts more than 1,000 science journalists, who share the latest findings and results with a broad national and international news audience.



This award lecture can be viewed online. Feldman Barrett also discussed key points of her lecture during an AAAS Expo Stage Debrief video interview, which can be viewed here. psychologicalscience.org/observer/AAAS.

WANT HEALTHIER AMERICANS? SHIFT THE FOCUS FROM "PERSONAL CHOICE"

Popular narratives centering on “free choice” and “personal responsibility” might contribute to high rates of ill health and poor well-being in the United States, suggests a recent article in *Perspectives on Psychological Science*. The authors, Cayce J. Hook and APS Fellow **Hazel Rose Markus** (Stanford University), propose shifting to a narrative emphasizing that: (a) health depends on the individual and the environment, (b) health has impacts beyond the individual, (c) individuals can help cultures to support health, and (d) behavior-change policies can benefit health.

“A culture-wide emphasis on personal choice and personal responsibility is harming Americans’ health and well-being,” write Hook and Markus. Estimates by the Centers for Disease Control and Prevention (CDC) indicate that up to 40% of deaths in the United States caused by chronic “lifestyle” diseases—heart disease, cancer, chronic lower respiratory disease, diabetes, and stroke—could be prevented. Despite constant calls for people to take responsibility for their health, Americans die younger and experience more illnesses and injuries than their counterparts in other high-income countries.

Hook and Markus explain that health might not improve as long as messages such as “our physical and emotional well-being is dependent on measures that only we, ourselves, can affect” and “personal responsibility is the key to good health” (US Department of Health and Human Services, 1991) pervade policymaking, media, and social norms. First, these messages ignore the role of social and environmental factors that are beyond personal control in shaping health. Af-

ter all, a single individual can hardly affect pollution, public safety, inequality, affordability of healthy foods, and quality health care. Second, these messages promote stress and worry over health, can lead to blame and stigmatization of the unhealthy, and hinder the adoption of policies that could make everyone healthier.

Narratives about freedom of choice and fears of government control in health matters are perpetuated throughout a “culture cycle,” the authors propose. According to this model, individuals are simultaneously products and producers of their cultures. In the United States, contemporary approaches to health are shaped by four levels of influence that interact with one another: (a) individuals and their attitudes, (b) interactions with others, (c) institutions (e.g., government, health organizations), and (d) the ideas of freedom of choice, personal responsibility, and individualism.

The emphasis this cycle places on the individual, and the resulting resistance to governmental interference, also overlooks the role of environmental factors in supporting healthy choices.

Everyday environments promote sedentary behaviors and unhealthy food choices. Moreover, “personal choice” has been used to support a health care system that leaves the United States “alone among rich capitalist nations in not guaranteeing basic universal health coverage” and has allowed food, tobacco, and alcohol industry groups to resist regulation that would limit sales, Hook and Markus explain.

Although it is undeniable that health can be influenced by individual

choices, it is fundamental to understand that physical, social, and cultural environments shape these choices too, the researchers continue. Other research indicates that an effective way to improve health in the United States might be to “adopt policies that change everyday environments in ways that make healthy behaviors easy to do,” write Hook and Markus. They call for broader narratives that improve the understanding that healthy choices do not depend solely on the individual and do not exclusively affect the individual. “Individuals’ health choices can have profound effects on their families, friends, and broader communities.”

This broader narrative supports the idea that individuals can be social influencers who can help to change their communities and cultures for the better. It also supports the implementation of policies that make healthy choices more accessible than unhealthy choices. “Psychological science can play a major role in shifting narratives around health that are currently serving as barriers to change,” Hook and Markus believe. “If appeals to choice and personal responsibility are making us sick, one path forward is to work toward creating more supportive environments that afford responsibility and make healthy choices available and easy to choose.”

Reference

Hook, C. J., & Rose Markus, H. R. (2020). Health in the United States: Are appeals to choice and personal responsibility making Americans sick? *Perspectives on Psychological Science*. Advance online publication. <https://doi.org/10.1177/1745691619896252>

SELF-CRITICAL PERFECTIONISM CAN CAUSE STUDENTS TO SPIRAL INTO DEPRESSION

The first year of university can be a difficult time for students—and not just because of the challenges they encounter in the classroom. For more than 44% of freshmen, balancing the academic, professional, and social demands of college life can contribute to symptoms of depression so serious that it can be difficult to function on a day-to-day basis. According to research in *Clinical Psychological Science*, this is especially true of students who tend toward self-critical perfectionism, a thought pattern that can make individuals particularly vulnerable to slipping into a downward spiral of depression.

“The transition to university can be a stressful time for many, and individuals higher in self-critical perfectionism may be more vulnerable to mental-health problems because of an increased sensitivity to stress,” explain researchers Shelby L. Levine (McGill University), Marina Milyavskaya (Carleton University), and David C. Zuroff (McGill University).

Unlike *personal-standards perfectionists*, who strive to achieve to the best of their abilities, self-critical perfectionists often set unrealistic goals and can find their thoughts consumed by self-doubt and fear of judgment, which have been found to contribute to an increase in mental health issues. To further investigate the pathway through which self-critical perfectionism influences mental health, Levine and colleagues surveyed 658 Canadian first-year students at four points in the academic year of 2016–2017.

At each time point—in late August, before the school year began, as well as in October, January, and April—participants completed a series

of questionnaires. These included scales measuring both self-critical and personal-standards perfectionism; participants were asked to rate how strongly they agreed with statements such as “If I fail at work/school, I am a failure as a person” and “I expect the best from myself.” They also reported how often during the previous week that they had experienced symptoms of depression, including reduced appetite and an inability to feel happiness, as well as how stressful or out of control they perceived the previous month of their life to have been.

A certain amount of attrition is to be expected in longitudinal studies, Levine and colleagues note, but while only 358 of the original 658 participants completed all four phases of the study, the researchers did not find a relationship between dropping out of the study and elevated perfection, stress, and depression scores.

Overall, Levine and colleagues found that students with high self-critical perfectionism, compared with those with high personal-standards perfectionism, reported increased depression and stress throughout the school year. In addition, the researchers found that students experienced stress and depression in a “circular and additive manner.” This finding runs counter to the diathesis model of stress, which suggests a one-way link between personality traits such as perfectionism or stress and symptoms of depression.

That is, students who were higher in self-critical perfectionism were found to perceive college as more stressful, which contributed to increased symptoms of depression,

leading a cycle of increased stress and depression throughout the year.

“Stress and mental health do not exist in isolation,” Levine and colleagues write. “Both stress and depressive symptoms contribute to one another, which results in increased experiences of both stress and depressive symptoms over the transition to university for those students higher in self-critical perfectionism.”

Recognizing the bidirectional relationship between stress and depression could help identify intervention options for individuals high in self-critical perfectionism, the researchers note.

“Many students report stressors during the transition and throughout their university experience,” Levine and colleagues write. “However, students higher in self-critical perfectionism may be doing something different that generates even more stress in their lives.”

Research suggests, for example, that self-critical people use more avoidant coping strategies, such as procrastination and denial, and are more likely to ruminate on their past failures. Perfectionism can push students to achieve their best, the researchers grant, but striving to meet those high personal standards may not ultimately be adaptive if an individual’s well-being is contingent on success.

“Focusing on how to improve these cognitive strategies in those who are more self-critical may be the key to improving mental-health outcomes,” Levine and colleagues conclude. ◉

See this article with the complete reference list at psychologicalscience.org.

NSF REPORT: WOMEN, UNDERREPRESENTED MINORITIES GAIN GROUND IN BEHAVIORAL SCIENCE

Slowly but surely, the growing presence of women and underrepresented minorities is altering the makeup of the psychology and social-science workforce, according to the National Science Foundation’s 2020 science-indicators report.

“The State of US Science and Engineering 2020,” published by the NSF’s National Center for Science and Engineering Statistics (NCSES), analyzes a broad range of trends in science and engineering education, workforce, diversity, and public attitudes. Of special interest to psychological scientists are segments that specifically separate out psychology and the social sciences and note the participation of underrepresented groups, including women, underrepresented minorities, and individuals who were born outside of the United States.

According to NCSES, the number of women holding occupations in psychology and the social sciences in the

United States has risen dramatically in recent years. In 2003, more than 250,000 women in psychology and social sciences made up just over 50% of the psychology and social-science workforce. By 2017, that number had grown to almost 400,000 women in psychology and social-science occupations, accounting for about 60% of the workforce. NCSES’s data show that more women hold careers in psychology and social science, proportionally speaking, than in any other science or engineering field.

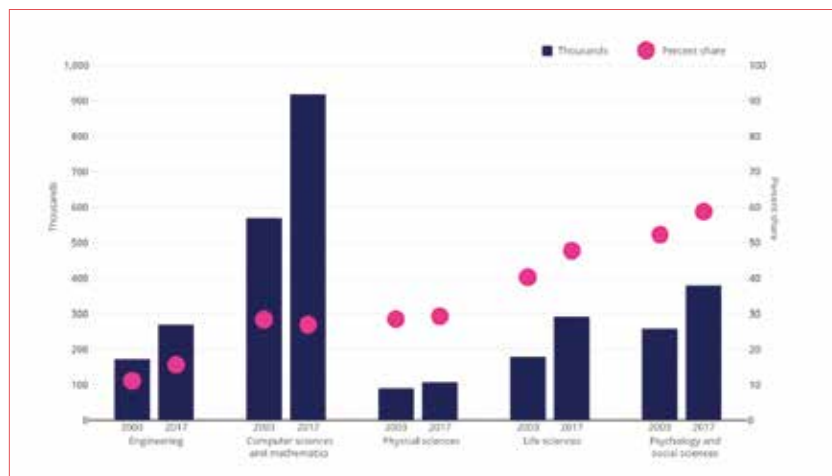
Similar patterns can be found in the participation of underrepresented minorities in psychology and social sciences. According to NCSES, the number of underrepresented minorities in the field rose from roughly 50,000 in 2003 (approximately 11% of the workforce) to almost 150,000 in 2017 (over 22%). This increase in psychology and social sciences exceeded that of any other area of science and engineer-

ing. “The share of Hispanics among psychologists (15%)...is large relative to the Hispanic share of [science and engineering] occupations overall (7%),” according to the report.

A final observation relevant to psychological scientists concerns the percentage share of foreign-born individuals in US science and engineering occupations. In 2017, under 20% of those working in psychology and social science were born outside of the United States, a smaller percentage than in any other science and engineering field.

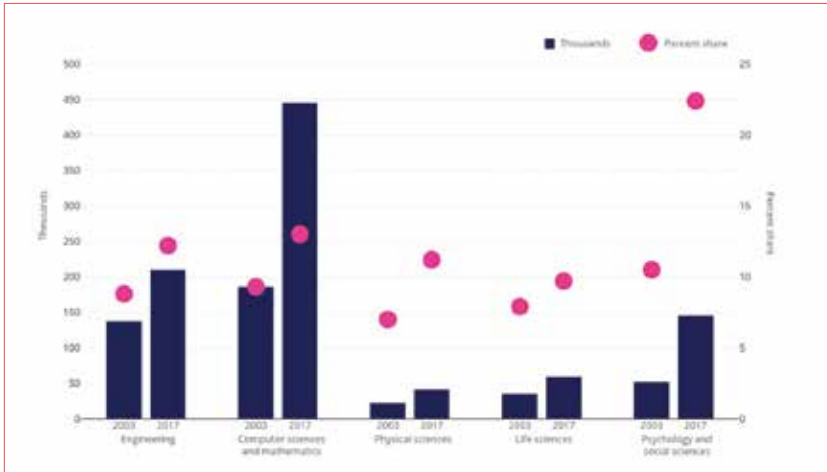
Highlights of other findings from the report:

- US science and engineering is responsible for the largest share of global research and development.
- The United States awards the largest number of science and engineering doctoral degrees.
- East-Southeast and South Asian countries have grown significantly in research and development spending.
- China in particular is an increasingly, heavy contributor to global spending.
- China awarded nearly 1.7 million “first university degrees”—broadly equivalent to a bachelor’s degree in the United States—in science and engineering in 2015, ➔



Women in science and engineering occupations by occupational category, in terms of total number and percent share of the workforce. Image: National Science Foundation

See all government funding opportunities at the Federal Research, Funding, and Policy page on the APS website: psychologicalscience.org/policy.



Underrepresented minorities in science and engineering occupations by occupational category, in terms of total number and percent share of the workforce. Image: National Science Foundation



Percent share of non-US-born individuals in science and engineering occupations by occupational category in 2017. Image: National Science Foundation

more than any other country. The majority of these degrees were in engineering. The United States awarded roughly 750,000 of these degrees, and France, Germany, Italy, Poland, Spain, and the United Kingdom combined offered approximately 720,000.

- France, Germany, Italy, Poland, Spain, and the United Kingdom jointly awarded more than 55,000 doctoral degrees in science and engineering in 2015; the United States awarded about 40,000. The data show that China has seen steep growth in awarding doctoral degrees, with around 34,000 offered in 2015. The report notes that in 2007, China surpassed the United States in awarding the most doctorates in the world in natural science and engineering (excluding social and behavioral sciences).

The NCSES website also includes a variety of other reports tackling topics such as perceptions of and public attitudes toward science; higher education in science and engineering; and invention, knowledge transfer, and innovation. ●

QUOTE OF NOTE

"[W]e found a persistent, severe bias against she pronouns relative to expectations about the election outcome. In the case of the U.S. election, this bias took a particularly clear form. In production, expectations that the next president would be male largely manifested as he pronoun references, whereas expectations that the next president would be female largely manifested as they references, even when the female candidate was expected to win."

—Titus von der Malsburg et al. "Implicit Gender Bias in Linguistic Descriptions for Expected Events: The Cases of the 2016 United States and 2017 United Kingdom Elections." *Psychological Science*, <https://doi.org/10.1177/0956797619890619>

APS FELLOW OSWALD NAMED CHAIR OF NATIONAL ACADEMIES I/O BOARD



Frederick L. Oswald
Rice University

An eminent psychological scientist and APS Fellow now heads up one of the National Academy of Sciences' wings focused on human factors and industrial/organizational psychology.

In January, APS Fellow **Frederick L. Oswald** (Rice University) took on the role of chair of the National Academies' Board on Human-Systems Integration, or BOHSI. Oswald is the Herbert S. Autrey Chair in Social Sciences and professor of psychological sciences at Rice University, where he studies workforce readiness and quantitative methods.

As chair of BOHSI, Oswald oversees the board's mandate to provide new perspectives on theoretical and methodological issues concerning the relationship of individuals and organizations to technology and the environment; identify issues in the design, testing, evaluation, and use of human-centered technology; and advise stakeholders on the research needed to expand the scientific bases for designing technology to support its users' needs.

"BOHSI draws upon a wide range of national and international experts to provide the best scientific evidence on questions about human systems of critical societal importance," said Oswald in an official announcement about the post.

"In what ways will AI technologies and algorithms continue to affect the workforce, human-machine teams, and the nature of work? How can we effectively reduce human errors in space flight, in medical settings, and in nuclear power plants? What human factors and technologies are best combined to improve home health care in the aging US population?...It is now a real privilege to serve as BOHSI chair and forge new paths ahead," he said.

In his work, Oswald coordinates with other members of BOHSI, who

include APS Fellow **Barbara Doshier** (University of California, Irvine) and psychological scientists **Emilie M. Roth** (Roth Cognitive Engineering), Edmond Israelski (AbbVie Inc.), and William J. Strickland (Colonel, US Air Force, Ret.), in addition to experts from medicine, engineering, and other fields. Oswald himself served as a board member for more than 4 years before being named chair.

BOHSI's ongoing and past projects are likely of great interest to psychological scientists. Current projects include investigations of improving Air Force human-capital management, the cybersecurity workforce of the Federal Aviation Administration, and systems approaches to improving patient care by supporting clinician well-being. A full list of BOHSI's many publications and proceedings can be found on the BOHSI website.

BOHSI is one of the boards within the National Academies' Division of Behavioral and Social Sciences and Education, which oversees most of the work at the Academies focused on behavioral science. The board holds open meetings twice a year to discuss scientific issues of interest, meet with federal agency staff who support BOHSI projects, and more. ●

QUOTE OF NOTE

"The effect we observed in our study was similar in magnitude to that reported for melatonin supplements—a commonly used sleep aid. The findings suggest that the scent of our loved ones can affect our health in powerful ways."

—Marlise Hofer, coauthor of a forthcoming Psychological Science article, as cited in "Romance, Scent, and Sleep: The Stuff That Dreams Are Made Of," posted February 13, 2020 on [psychologicalscience.org](https://www.psychologicalscience.org).

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2020 APS MENTOR AWARDS

The APS Mentor Award recognizes the lifetime achievement of psychology researchers and educators who have shaped the future directions of science by fostering the careers of students and colleagues. Four psychological scientists—all APS Fellows—have been selected to receive the award in 2020. Beyond their individual contributions to diverse areas of research, these scholars' dedication to their students and colleagues has fostered a thriving global community of psychological scientists.

Learn more about the APS Mentor Award and past recipients, and nominate a candidate for a future Mentor Award, at psychologicalscience.org/aps-mentor-award.



Toni C. Antonucci is the Elizabeth M. Douvan Collegiate Professor in the Department of Psychology at the University of Michigan.

Toni C. Antonucci University of Michigan

Fostering interests and broadening perspectives. Offering feedback and inspiring growth. Making introductions, facilitating opportunities, guiding grant applications, sharing “incredibly rich” data, and above all creating a sense of family. As a mentor to dozens of current and former graduate students, postdoctoral scholars, and colleagues over the decades, Toni C. Antonucci is “a remarkable role model of leadership and achievement in the field,” said Hannah L. Giasson, a postdoctoral research fellow at Stanford, in a nomination for the award. “I am immensely appreciative of the value for ongoing growth that she imparted in me and continues to inspire through her own achievements.”

Antonucci is a premier scientist working at the nexus of life-span developmental psychology and survey research. She is the Elizabeth M. Douvan Collegiate Professor in the Department of Psychology at the University of Michigan, where she has been since 1979. She serves as senior research professor at the university’s Institute for Social Research and program director for its Life Course Development Program, where she leads large-scale, longitudinal research on how relationships and health change across the life span. To meet the challenges inherent in such complex investigations, her interdisciplinary work has brought together colleagues from psychology, anthropology, neuroscience, medicine, public health, gerontology, sociology, and social work.

A native Brooklynite, Antonucci began studying older people and aging as a graduate student in developmental psychology. She “has been a force behind this historically critical transition of the field,” said Patricia A. Reuter-Lorenz, the Michael I. Posner Collegiate Professor of Psychol- ➔

ogy and Neuroscience at Michigan. “Her seminal work on social networks and aging has been a cornerstone and catalyst of the growth in this area of life-span and aging research.” During Antonucci’s time at Michigan, she has led dozens of research projects involving aging, health, and social relations while contributing generously to leading journals and professional organizations.

In addition to providing others with practical support, Antonucci fosters community among her colleagues. Former mentees remember her lab as a welcoming environment in which scholarly and personal milestones alike were celebrated, and everyone’s contributions were recognized. A strong advocate of diversity and inclusion, she seeks out mentees from many backgrounds. She has fostered relationships with graduate students from around the world, focusing her attention particularly on training opportunities in developing countries.

Former mentees remember Antonucci's lab as a welcoming environment in which scholarly and personal milestones alike were celebrated.



Robert Bjork is distinguished research professor in the Department of Psychology at UCLA. **Elizabeth Bjork** is professor of psychology and senior vice chair of the department.

Elizabeth Ligon Bjork and Robert A. Bjork University of California, Los Angeles

Friday mornings changed forever for UCLA psychology scholars in 1979, when APS James McKeen Cattell Fellows Elizabeth and Robert Bjork established a weekly research meeting that quickly became legendary. “CogFog,” which meets throughout the year, including summers, attracts a mix of faculty, postdocs, and graduate students for a spirited discussion characterized by good-natured debate and rigorous analysis alike—“part warm family gathering over donuts, part academic trial-by-fire (in the friendliest possible way),” said APS Fellow Michael C. Anderson of the University of Cambridge. For this former graduate student and generations of others, CogFog was a formative experience and highlight of every week, and it went on to inspire incarnations at universities around the world. “My own lab is called CogFogEast,” said APS Fellow Janet Metcalfe of Columbia.

Collaborators, comentors, and now corecipients of the APS Mentor Award, the Bjorks are pillars of cognitive research whose work on subjects such as desirable difficulties in learning has left a profound impact on psychological science. Since arriving at UCLA in 1974, they have also codirected a lab for the study of learning and memory. “One of the most extraordinary aspects of being part of their lab is that you weren’t just being mentored by Bob and Elizabeth,” said Veronica Yan of the University of Texas at Austin. Rather, the two “set up a highly stimulating and collaborative environment for all their lab members—the undergraduates, the graduates, the postdocs, and anyone else at UCLA who is interested in memory research.”

In addition to their research contributions, the Bjorks as mentors have inspired the values, practices, skills, and personal traits in their mentees that encourage a lifelong love of science and a global community of colleagues. Despite being accomplished scientists and leaders in their field, they exude a

disarming warmth and openness, their students say. Former mentees describe them as “bottomless pits of knowledge,” “inseparable in their contributions to their students’ development,” Minnesota nice.”

Their egalitarianism and respect also enable mentees to comfortably share ideas. “Whereas in some institutions, faculty guard their students’ time and may limit their interaction with other laboratories, the Bjorks do the opposite: They believe that collaboration brings more skill, wisdom, and ideas to the student and allows them to blossom,” noted Anderson.

The impact that Elizabeth and Robert Bjork have had on psychology cannot be overstated. Of the more than 80—and growing—honors, graduate, and postdoctoral students and scholars the two have comentored at UCLA, a staggering 57 (70%) have gone on to careers in academia related to learning and memory. Their unique partnership and approach provide an atmosphere of support in which scientific achievement thrives.

A former graduate student describes “CogFog,” a weekly research meeting that the Bjorks instituted in 1979, as “part warm family gathering over donuts, part academic trial-by-fire (in the friendliest possible way).”



E. Tory Higgins is the Stanley Schachter Professor of Psychology and professor of business in the Department of Psychology at Columbia. Photo by Bruce Gilbert

E. Tory Higgins Columbia University

Testament to the positive influence of APS William James Fellow E. Tory Higgins as a mentor runs wide and deep. He is “passionate about science and getting to the truth,” “a fun and constant source of inspiration,” “one of a kind—always searching for a better idea, always pushing his theories to the limit,” according to various former students in nominating letters. Contagiously enthusiastic and able to spot breakthrough potential in even “failed” studies, he became known “as a kind of ‘foster father’ for wayward graduate students” who went on to thrive after being brought into his lab, said James Cornwell of the US Military Academy at West Point. “To a person, his students feel supported, lifted up, encouraged, energized, and stimulated,” said Abigail A. Scholer of the University of Waterloo and APS Fellow Daniel C. Molden of Northwestern University. “He treats his students as equal partners in an intellectual pursuit.”

A professor of psychology and business and director of the Motivation Science Center at Columbia, Higgins has won many of the highest awards in psychological science for his work on knowledge activation and self-regulation. Besides being one of the most highly cited social psychologists in the field (more than 76,000 citations, according to Google Scholar), he has fostered countless students’ research and scholarship even in areas outside of social psychology. “For many graduate advisors, the task is to get the student to a PhD. For Tory, the task was always to get the student a job,” said one former graduate student. More than 35 of Higgins’s former students are affiliated with academic institutions around the world, but “Tory has always supported his students in following the career trajectories that made the most sense for them, even if that wasn’t academia,” said a current graduate student. “He respects our individual



talents and interests, he never stops encouraging us, and all the while he exemplifies what social psychology (and behavioral science writ large) can be," said APS Fellow Timothy J. Strauman of Duke University.

Perhaps the primary reflection of the deep impact Higgins has on his students is the regular "Labfest" conference that brings together current and former students from both academic and nonacademic sectors, fostering further opportunities for collaboration and enrichment. Having joined the Higgins Lab, many former students never want to leave. Thanks to his ongoing dedication to them and the field, they never have to. ●

Former mentees say Higgins is "a fun and constant source of inspiration" and a tireless booster of his students' work. "He treats his students as equal partners in an intellectual pursuit."

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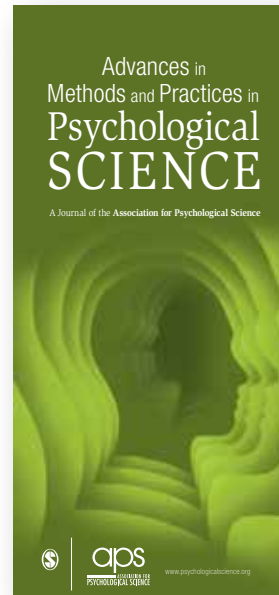
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How Age Magnifies Experience



Deconstructing
Cross-Cultural
Differences
in Aging

By Kim Armstrong, APS Staff Writer

No matter where you are in the world, it's more likely than not that you live in an aging society. As average life expectancy increases and fertility rates continue to drop, people age 65 and older are representing a larger and larger proportion of the population everywhere from Lebanon to Germany to China.

One of the most drastic of these shifts is occurring in Japan, a “super-aging” society where, according to the United Nations’ 2019 World Population Prospects report, 28% of individuals currently qualify as senior citizens, and one in three are projected to be over age 65 by the year 2030.

In 1987, Hiroko Akiyama, an emeritus professor at the University of Tokyo’s Institute of Gerontology, launched the National Survey of the Japanese Elderly—a 30-year longitudinal study of nearly 6,000 Japanese residents over 60—to track changes in the physical and mental health, economic status, and social relationships of this growing population. Since then, she has worked with the city of Kashiwa, Japan to redesign the city to meet the needs of a super-aging society. They developed workplaces for residents’ “second life” as senior citizens, community dining services, a civic participation program for frailty prevention, and a home-based health and long-term-care system, which may allow individuals to maintain greater independence and quality of life by “aging in place” in their communities.

But while these solutions might be a good fit for Japan, research suggests that the needs of aging societies may differ significantly between cultures—at least in part because of differences in older adults’ social relationships and what they expect to get out of them.

Sizing Seniors’ Social Networks

In 2017, Akiyama collaborated with Kristine J. Ajrouch, a professor of sociology at Eastern Michigan University; Heather R. Fuller, a

professor of human development and family science at North Dakota State University; and APS Fellow Toni C. Antonucci, a professor of psychology at the University of Michigan and recipient of the 2020 APS Mentor Award, to examine these differences in a study of 1,980 adults over 50 in metropolitan areas of Japan, Lebanon, Mexico, and the United States. Each of these countries is undergoing significant generational shifts in fertility, the researchers noted; on the high end, Mexico has dropped from an average of 6.8 children per family in 1960 to 2.2 children in 2014, and, on the low end, Japan has dropped from 2 to 1.4 children in that same time span.

Participants in Ajrouch and colleagues’ study mapped their relationships with up to 20 of the closest people in their lives. In line with the *convoy model of social relationships*, which envisions individuals as moving through life surrounded by supportive others, relationships could fall into one of three categories on the circular map: the inner circle (people who feel so close that it is hard to imagine life without them); the middle circle (not quite as close, but still important); and the outer circle (otherwise important, but less close individuals). Participants also provided additional information on the top 10 people in their networks, including demographics, geographic proximity, and how frequently they had contact.

This data revealed several universal findings, including how children are close and frequent sources of support in old age. In the context of drastically declining fertility, this means it will become increasingly difficult for children to meet the needs of aging parents without outside support such as in-home health aides and long-term care facilities, Ajrouch and colleagues noted.


A number of findings unique to these countries were uncovered as well. For example, although Americans reported having the largest social networks, with an average of 11.3 close relationships, their social networks became smaller and more geographically disparate with age. This was not the case for Japanese and Mexican participants, however. Moreover, the social networks of Lebanese participants, who had the smallest, most local social networks (an average 5.8 important relationships), expanded with age.

In a related study of 1,331 individuals between 70 and 90 years old in France, Germany, Japan, and the United States, Antonucci, Akiyama, and APS Fellows Jennifer E. Lansford, a professor of public policy at Duke University, and Jacqui Smith, a professor of psychology at the University of Michigan, found smaller social networks among widowed or ill older adults in Germany and France than among those in Japan or the United States.

Together, these findings suggest that not all social networks shrink inevitably with age as a result of members dying and not being replaced; in fact, this effect may occur differentially within cultures. These findings may also reflect differences in countries’ size and socioeconomics: Americans, for example, often move across the country for career opportunities or retirement, while people in Lebanon are more likely to remain with the same people in one community for their entire lives, though young adults are leaving the country at a higher rate in pursuit of economic opportunity.

“These findings signify a need for flexibility with respect to how policy is developed and implemented given the unique situational contexts of nations,” Ajrouch and colleagues concluded.

Social Expectations Shape Well-being

The effects of these various social network structures may vary on the basis of the social expectations of cultures as well. In a 2008 study, Katherine L. Fiori, a professor of psychology at Adelphi University, along with Antonucci and Akiyama, compared the social network maps and self-reported 

mental/physical health outcomes of 491 Japanese and 514 American adults over age 60.

This analysis revealed four common network types, which the researchers referred to as *diverse*, *friend-focused*, *family-focused*, and *restricted*. In Japan, the most common network type, reported by 29% of participants, was a family-focused close network in which married and widowed individuals alike reported frequent contact with supportive family members. In the United States, on the other hand, 32% of participants reported living in a diverse, extensive social network, in which primarily married individuals interact with a large number of supportive family members and friends.

There were also several network types unique to each culture. Some Japanese participants reported a unique married and distal, or isolated, network type, with few emotionally or geographically close relationships outside of their marriage. In the United States, these unique social-network types included unmarried individuals in emotionally supportive (and unsupportive) friend-focused networks, as well as family-focused networks in which interactions were perceived as mostly negative.

In addition, American participants in family-focused negative networks, as well as those in functionally restricted networks—in which they reported low emotional support and highly negative relationships—reported significantly higher levels of depressive symptoms and physical health problems than those in other network types. Even when Japanese participants reported

low levels of support, Fiori and colleagues found that social-network type was not associated with their self-reported physical or mental health.

There are a range of potential explanations for the differences between US and Japanese participants. It is possible, the researchers wrote, that Japanese participants were less willing to admit they were unhappy with their social networks. It may also be that people from different cultures assign different meanings to their social networks and therefore respond to the same kinds of social networks differently.

“In Western societies, like the US, the key to relational well-being may be the creation of intimate connections with large numbers of people as a safeguard against the experience of loneliness,” Fiori and colleagues proposed. “Because in Japan relationships may be viewed as predetermined or obligatory, rather than constructed or voluntary, the Japanese may ‘learn’ to be happy with whatever network they have.”

In fact, these differing expectations permeate our social experiences, causing individuals from different cultural backgrounds to respond differently to social support on a physiological level, according to APS William James Fellow Shelley E. Taylor, a professor emeritus of health psychology at the University of California, Los Angeles, and colleagues in *Psychological Science*.

In a 2007 study of 81 undergraduate students, half of whom were Asian or Asian American and half European American, Taylor and colleagues collected a set of three saliva samples from participants before, during, and after they completed a series of challenging mental-arithmetic tasks and presented a short speech to the researcher in the room with them. Just before giving their speech, however, participants were assigned one of three writing tasks: an implicit-support task, in which they wrote about a group of people who were important to them; an explicit-support task, in which they wrote to a person important to them for advice about the speech; and a no-support task, in which they wrote about campus landmarks.

After completing these tasks, European-American participants in the explicit-support condition reported being less stressed and produced less cortisol (a stress hormone) in their saliva compared with the Asian and Asian American participants in the same condition. The Asian participants, on the other hand, reported being less stressed and produced less of the hormone when they reflected on important relationships without specifically referencing their own troubles.

"How people gain the psychological and biological benefits of social support in a given cultural context may depend on the cultural emphasis on relationship goals," Taylor and colleagues wrote. "Culturally inappropriate forms of social support... may actually have exacerbated stress."

“How people gain the psychological and biological benefits of social support in a given cultural context may depend on the cultural emphasis on relationship goals,” Taylor and colleagues wrote. “Culturally inappropriate forms of social support... may actually have exacerbated stress.”

In line with this and other research, there is no one-size-fits-all approach to addressing the long-term care needs of older adults, Fiori and colleagues wrote.

See article on page 23 to learn more about how 2020 APS Mentor Award recipient Toni C. Antonucci has fostered community among students and colleagues studying aging and development across the lifespan.

“Back-to-the-family” policies that tout the benefits of multigenerational households may seem appealing on the surface, for example, but that doesn’t mean they’re appropriate for all settings or social-network types.

“Those developing social policy must balance an understanding of cultural values with the varying needs of different groups of elders,” Fiori and colleagues concluded.

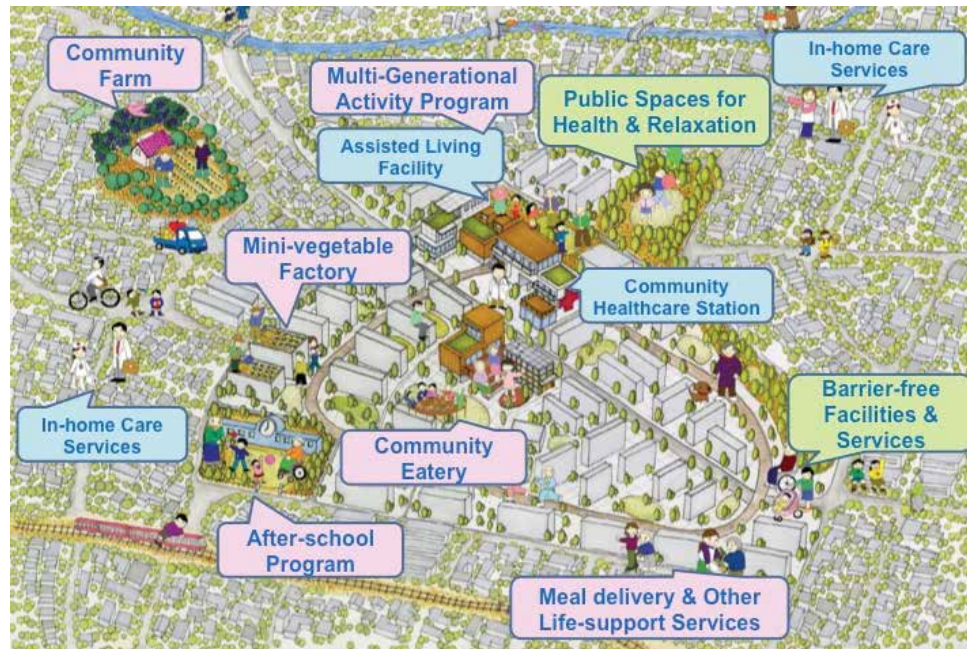
Sowing New Stereotypes

Research by APS Fellow Becca Levy, professor of epidemiology and psychology at the Yale School of Public Health, pioneered the perspective that aging is not just a physiological phenomenon—it’s socially constructed, and internalizing negative beliefs about aging can make the decline associated with age more severe. These stereotypes are built up over the life course, Levy wrote in *Current Directions in Psychological Science* (2009). Her research group has found that age stereotypes can influence everything from memory to balance and willingness to pursue a healthy lifestyle or follow through on a course of medication.

In one study, Levy and colleagues found that individuals with more positive perceptions of aging lived an average of 7.6 years longer than those who took a negative view, even after adjusting for baseline differences in health.

“The adverse effects of negative age stereotypes point to the need to develop interventions that will maximize the influence of older individuals’ positive age stereotypes in their everyday life,” Levy wrote.

Fortunately, this does appear to be possible. In a 2014 *Psychological Science* study of 100 older US adults between 61 and 99 years old, Levy found that 4 weeks of an implicit stereotype intervention significantly improved participants’ self-perceptions—and boosted their physical functioning more than a 6-month exercise intervention.



Akiyama's research suggests that community programs such as those outlined above could help make Japanese cities more aging friendly. Photo credit: The Toyoshikidai Gerontology Research Group (May 2018), Kashiwa-Toyoshikidai Projects for Enabling Age-friendly Communities: Achievements and Future Challenges."

Participants, who were interviewed in their homes seven times over 8 weeks, were split into one of four conditions:

- Individuals in the implicit-intervention group, who were tasked with indicating whether a flash appeared above or below a point on screen, were subliminally exposed to positive stereotypes about aging during four sessions. During these sessions, positive age-stereotype words such as “spry” were flashed on screen at a speed that allowed them to perceive the words without becoming consciously aware of them. They also wrote a series of unrelated essays. The participants in this group also took part in a neutral-explicit condition.
- Participants in the explicit-intervention group wrote a series of short essays about mentally and physically healthy senior citizens and completed the flash-indication task with neutral implicit stimuli.
- Participants in the combined implicit and explicit groups completed both tasks about positive age stereotypes. Finally, those in the control group completed both tasks about unrelated topics, such as clothing.
- Participants in all groups also completed an “image of aging” scale that asked them to rate how closely positive terms such as “capable” and negative terms such as “helpless” matched their image of older people in general and of themselves specifically as older people. Finally, they completed a short test of physical functioning that measured their ability to rise from a chair, walking speed, and their ability to balance in various positions.

The implicit-stereotype intervention was found to serve as an “implicit fitness center,” Levy and colleagues wrote, reducing participants’ negative associations with aging 30% more effectively than the explicit intervention, ➔

which was in turn found to improve physical functioning.

“The explicit approach may be thwarted by cognitive strategies that preserve existing beliefs,” Levy and colleagues suggested. “The implicit approach may be able to circumvent the internalized negative age stereotypes that tend to predominate over the positive ones.”

The cultural variability in older adults’ health further demonstrates that aging does not have to be accompanied by an inevitable decline in physical and psychological well-being, Levy noted in *Current Directions*.

The cross-cultural relevance of these findings is notable, Levy says. Her findings on the impact of beliefs about aging on older adults’ health have been replicated by psychological scientists on five continents and supported by four meta-analyses.

Aging societies are already taking on the challenge of redefining this stage of life. Officials in Japan, for example, have called for the country to take steps toward becoming an “age-free” society where, instead of being expected to retire at a particular age, people are encouraged to remain active and working for as long as they are willing and able.

“The remaining challenge is to achieve the activation of positive age stereotypes on a sustained basis,” Levy concluded. ●

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See this article with the complete reference list at psychologicalscience.org.

CULTURE SHAPES HOW AND WHAT WE REMEMBER

The interplay of culture and neurobiology sculpt the brain over the course of a lifetime, according to APS Fellows Denise Park, a professor of behavioral and brain sciences at the University of Texas at Dallas, and Angela Gutches, a professor of neuroscience and psychology at Brandeis University, in *Current Directions in Psychological Science* (2006).

“Cross-cultural investigation of aging provides a window into the stability of changes with age due to neurobiology, as well as into the flexibility of aging due to life experiences that impact cognition,” the researchers explained.

Park’s research suggests that while age may degrade our “cognitive hardware”—reducing processing speed, as well as working and long-term memory—it generally leaves our acquired knowledge, the brain’s “software,” intact. Over time, these experience-based differences continue to magnify, wrote Park and Gutches, contributing to cross-cultural differences in the aging process even as our brains undergo similar physiological changes.

When young Americans and Singaporeans were examined under fMRI, for example, the researchers found that they exhibited similar activity in the visual cortex when scanning images for repeated objects. But while older Singaporeans and Americans demonstrated similar activity in areas associated with processing images’ background features, elderly Singaporeans had significantly less activity in their object-processing areas.

These findings align with previous research suggesting that individuals from more interdependent cultures attend more to their environment—or, in this case, the background of an image—than do those from more individualistic societies, who attend more to focal objects. These differences are often more evident in older adults because they’ve spent a lifetime immersed in a given culture, Park and Gutches wrote. Whether these differences qualify as a “deficit” is also culturally dependent.

For example, episodic memory for personal experiences, or autobiographical memory, supports our sense

of self, enabling us to recall specific past experiences that make up our personal history. Research has previously linked more detailed autobiographical memory with increased creative thinking, more active coping skills, and greater overall psychological well-being. But while this appears to be true in Western, educated, industrialized, rich, democratic (WEIRD) cultural contexts that emphasize creating a unique, independent personal identity, these benefits may not generalize globally.

In fact, having detailed memories of one's own experiences may work against the cultural expectation for fitting into an East-Asian context, reducing well-being. In *Clinical Psychological Science* (2018), APS Fellow Qi Wang, a professor of human development at Cornell University, and colleagues reported a set of four studies comparing European-American and Chinese or Chinese-American children and young adults.

In the first of these studies, 99 European-American students from Cornell University and 110 Chinese students from Peking University in China completed a measure of avoidant coping and a memory task that required them to recall three personal events that took place in the last week, the last year, and the past 10 to 15 years. Participants had 3 minutes to describe each of the events in writing, providing as much detail as possible in their native languages. The researchers then coded these descriptions on the basis of whether each detail was specific to that event (e.g., "I went to the science museum with my family") or general in nature (e.g., "The science museum is very small").

As suggested in previous work, European-American students who recalled more specific details across all three time periods also reported using fewer avoidant coping mechanisms, such as making up excuses to get out of social events, compared with peers with hazier memories. The researchers found no relationship, however, between memory specificity and use of avoidant-coping mechanisms among Chinese students. Instead, in subsequent studies, Wang and colleagues found that Chinese-American children with more detailed autobiographical

memories reported more symptoms of depression. In addition, their parents rated them as having fewer adaptive skills, such as leadership and active coping.

"Cultural contexts...give rise to the purpose of remembering and thus shape the way the past is remembered in service of the present and the future," Wang and colleagues conclude. "Detailed remembering of one's personal past is not necessarily the norm, nor is it always beneficial for psychological well-being."

Similarly, Park and Gutches's research suggests that the quality of our memories changes over time both as a function of age—which can contribute to a reduction in source memory, free recall, and other mechanical skills—and of culture—which may help preserve certain types of memory relative to others. ●

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MIND OVER BODY

Can virtual embodiment lead to positive changes in our perception—and even our cognition?

By Alexandra Michel

“We categorize as we do because we have the brains and bodies we have and because we interact in the world as we do,” wrote cognitive linguist George Lakoff in his 1999 book, *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*. Lakoff is renowned as a leading voice in the field of embodied cognition, an interdisciplinary area of cognitive science that is often called “radical” for pushing the boundaries of our understanding of the relationship between our minds and bodies.

Integrating methods from neuroscience, psychology, and computer science, embodied-cognition researchers are delving into groundbreaking new technologies such as virtual reality to observe how modifying our bodies can also lead to profound changes in our sense of self, identity, and cognitive processes.

Invasion of the Body

Swappers

You won’t find mannequins with head-mounted video cameras or kitchen knives in the labs of most cognitive neuroscientists, but Henrik Ehrsson and his lab rely on these unusual props to study fundamental questions about how our minds construct a sense of ownership over our bodies.

For decades, researchers have relied on optical illusions to gain insights into the ways that the eyes, mind, and brain work together to create our experience of the world. But Ehrsson, a professor of neuroscience at the Karolinska Institutet in Sweden, has pioneered



In one experiment by Ehrsson and Petkova, participants wore head-mounted display goggles while facing a mannequin wearing a pair of eye-level video cameras. When participants looked down at their own bodies, what they actually saw, via the video from the goggles, was the mannequin’s body.

the use of mind-bending illusions using the body itself to study the perception of body ownership.

Although we might take it for granted that we perceive our bodies as our own, Ehrsson’s bodily illusions have shown that this perception is actually the product of a multisensory orchestra playing in sync.

“If these signals are congruent, if they happen at the same time and same place, the signals are integrated, infused into a coherent representation of your own body,” Ehrsson explained at the 2019 Integrative Science Symposium at the International Convention of Psychological Science (ICPS). “If the signals don’t match, if they are out of sync or different in places, the signals are not integrated.”

Even minor tweaks to our position in space, visual perspective, and tactile sensations can dramatically skew our sense of ownership over our bodies.

In a 2008 study published in *PLOS ONE*, Ehrsson and Valeria Petkova, at the time a colleague at the Karolinska Institutet, found that with a mannequin and a few other props, they could create a vivid illusion of swapping bodies. In one experiment, participants wore head-mounted display goggles while facing

a mannequin wearing a pair of eye-level video cameras. When participants looked down at their own bodies, what they actually saw, via the video from the goggles, was the mannequin's body.

This bodily illusion was so vivid that “threatening” the mannequin's body with a kitchen knife caused a spike in evoked skin-conductance response, which was used as an objective measure of anxiety.

“We think this is a multi-sensory perception phenomenon,” Ehrsson said at ICPS. “We think it happens because the brain continues to integrate what you see and what you feel. That elicits a very vivid illusion that the mannequin's body is your own body—it's a perceptual illusion.”

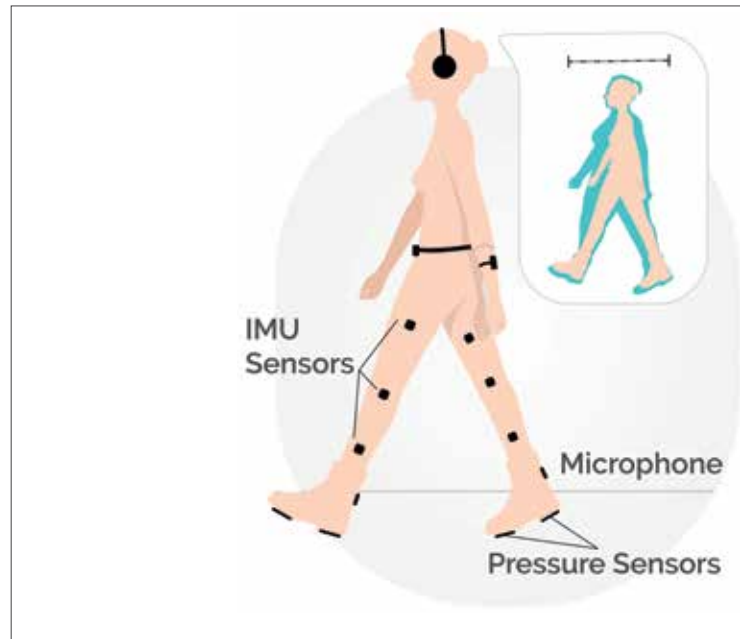
Not all participants experienced these body-ownership illusions; neuro-imaging studies have found that people who experience full-body ownership illusions demonstrate activity in brain areas that integrate multisensory and visual information in the frontal and parietal cortex.

Ehrsson is currently pursuing a new line of research on how body perception itself can influence various high-level cognitive functions, such as gender identity. His lab's new research suggests that experiencing the illusion of having an opposite-sex body, even for a brief amount of time, can shift participants' self-assessment to being less stereotypically gendered.

“Another way of thinking about this is self-coherence, that the mind and the brain are trying to keep these different self-representations somewhat coherent; and, if there are inconsistencies, there will be adjustment,” Ehrsson explained. “So, if you change the bodily self, that could then lead to changes in self-concept.”

Virtual Skin

In the classic novel *To Kill a Mockingbird*, Atticus Finch advises his daughter that truly understanding other people requires taking on their experience of the world: “You never really understand a person until you consider things from



To study how our bodies use and interpret sensory inputs to form self-perceptions, a team led by Ana Tajadura-Jiménez (next page) created a pair of “magic shoes” wired with microphones and inertial measurement unit (IMU) motion sensors to track the wearer's movement and gait. The sounds picked up from the microphones can be modified to emphasize different frequencies before hitting the wearer's ears through a pair of headphones.

his point of view, until you climb inside of his skin and walk around in it.”

Atticus Finch may have been speaking metaphorically, but Domna Banakou, a postdoc at the University of Barcelona, is using virtual reality as a new tool to show that inhabiting another person's skin really can lead to positive changes in our perceptions of others.

Through virtual reality, Banakou has measured how people's beliefs, attitudes, and abilities change after they experience the illusion of inhabiting a body that is dramatically different from their own—swapping race, age, sex, and gender.

To experience this body swapping technology, participants wear a virtual-reality headset and motion sensors that match their body's movements to those of their virtual body. Mirrors are often included within the virtual environment, further enhancing the sensation that the virtual body is actually their own.

In a 2016 study published in *Frontiers in Human Neuroscience*, Banakou and coauthors Parasuram Hanumanthu and Mel Slater found that experiencing virtual embodiment has the potential to reduce racial bias. In the study, White participants completed an Implicit Association Test on racial bias a week before their virtual-reality sessions, in which they took a Tai Chi lesson while inhabiting either a Black or White virtual body. A week later, participants retook the Implicit Association Test. Those who had experienced a Black virtual body had reduced racial bias scores compared with those who had experienced White virtual bodies.

In addition to influencing bias, there is also evidence that the illusion of ownership over a different body can lead to changes in cognition.

In a 2018 study published in *Frontiers in Psychology*, Banakou was interested in the flexibility of the relationship between embodiment and the brain: If we gave someone a recognizable virtual body that represents intelligence, would they perform better on a cognitive task than people in a normal body?

To explore that question, participants were virtually embodied as the iconic physicist Albert Einstein. First, participants completed an IQ test, ➡

an Implicit Association Test on age bias, and the Tower of London test of executive functioning. A week later they returned to the lab, where they completed a series of embodiment exercises in virtual reality using either Einstein's body or a normal adult body. Afterward, participants again completed the Tower of London task and the Implicit Association Test.

Those who had been embodied as Einstein showed decreased bias toward the elderly as well as more improvement on the cognitive task compared with the control group. However, participants who reported low self-esteem showed the biggest improvement in cognitive skills.

"There could therefore be the possibility that embodying the Einstein body led low self-esteem participants to increase their self-confidence—thus decreasing any experienced task-related stress—which in turn led to better performance," Banakou and colleagues wrote.

New Sensation

Our mental representations of our own bodies are not fixed—they are continuously being attended and updated. And, as psychoacoustics researcher Ana Tajadura-Jiménez's team at Universidad Carlos III de Madrid and University College London has shown, the sensory cues we rely on to build our sense of self can include things as mundane as the sound of our own footsteps.

Tjadadura-Jiménez has shown how modifying these self-generated sounds can lead to surprisingly wide-ranging shifts in perceptions, attitudes towards the self, and emotion.

With every movement, we interact

See also "Psychological Science Meets Sensory Technology" in the December 2019 *Observer*, about Roberta L. Klatzky's James McKeen Cattell Fellow Award Address.

with the environment and generate sounds with our bodies, Tajadura-Jiménez explained at ICPS. These sounds, which we often fail to even notice, provide us with a lot of feedback information about our bodies and our environment. Our bodies are constantly using sounds generated by the body and the environment to build our shifting sense of self; every time our feet touch the ground our bodies are processing a wealth of information.

Tjadadura-Jiménez noted the experience of hearing someone walking behind you. From the sound of their footsteps, you can surmise a lot of information—something about their size, their posture, their pace, the type of surface they're walking on. This is because, in general, heavy-hitting objects produce sounds with lower frequencies compared with lighter-hitting objects.

"Even if we are not aware of this relationship with sound frequencies, people are actually quite good at detecting it, when they are asked to make judgments about the body of a walker just on the basis of their footstep sounds," she said.

To study how our bodies use and interpret sensory inputs to form self-perceptions, Tajadura-Jiménez's team created a pair of "magic shoes." The shoes are wired up with microphones and motion sensors to track the wearer's movement and gait. The sounds picked up from the microphones can be modified to emphasize different frequencies before hitting participants' ears through a pair of headphones.

In a conference paper, Tajadura-Jiménez and colleagues (2015) reported that changes to the sound of footsteps could lead to a cascade of other perceptual and affective effects. For example, when the sounds generated while walking in the magic shoes were altered to boost high frequencies, participants began to perceive their bodies differently: They changed their gait to correspond to the mechanics of feeling lighter—their feet had less contact with the floor. Manipulating walking sounds to emphasize lower frequencies appears to have the opposite effect; participants start moving as though their feet and legs were heavier than they were before.

When asked how they felt, participants in the high-frequency condition report feeling faster, more positive, and happier.

Tjadadura-Jiménez is now investigating whether these findings could have applications to support well-being or therapy by enhancing individuals' perceptions of their own bodies.

This could involve finding a tool to encourage people to be more physically active and exercise more, but it could also have clinical implications in settings where participants experience dysphoric or negative body perceptions. They have conducted proof-of-concept pilot studies with populations with chronic pain and stroke and are currently extending these findings to other populations.

Ghosts in the Machine

Andrea Serino, a professor in the department of clinical neurosciences at the University Hospital of Lausanne (École Polytechnique Fédérale de Lausanne, or EPFL) in Switzerland, runs a lab that investigates how our brains represent our bodies in space to create our experience of self. Serino is also the head of the MySpace Lab in Lausanne, where his research focus is "really about finding the neural basis of peripersonal space," he said at ICPS.

Understanding how our bodies interpret "peripersonal" space, the space immediately surrounding our bodies, helps inform how many of these embodiment illusions work.

Body illusions rely on physical proximity and the mechanisms of peripersonal space, Serino said. Neurons that respond to touch on a part of the body—tactile neurons—can also respond to visual or auditory stimuli that occur in close proximity to that body part. Whether these tactile neurons respond to stimuli

depends on whether it occurs within our “personal bubble” of peripersonal space.

Normally, our senses operate in synchrony and are linked to our movement—we move our hands, we see an object near our hands, and at the same time we feel the tactile sensation. However, as Ehrsson’s research with mannequins demonstrates, when we experience sensorimotor conflicts, our brains may perceive an internal sensation as coming from outside of our bodies, leading to body illusions or even, in some cases, perceptions of a foreign presence like a spirit or a ghost.

These body illusions may help scientists understand the causes of some of the symptoms of conditions like schizophrenia and epilepsy. Patients with schizophrenia may experience hallucinations or delusions of alien voices or presences. These hallucinations may be caused when the brain misattributes sounds and movements generated by the body as being generated by an external agent.

In a 2014 study published in *Current Biology*, Serino and colleagues, in the lab of Olaf Blanke at the EPFL, used a robotic device synchronized to touch participants’ backs as they moved their hands in front of their bodies. When the device’s movements matched participants in real time, they perceived the touch sensation as their own. However, introducing a time delay of just a few milliseconds produced enough sensory asynchrony to induce the sensation that participants were being touched by an invisible presence behind them.

A few participants found the illusion of a foreign presence to be so vivid and disturbing that they asked whether there was really someone close to them.

“Whenever we complete a movement with our bodies, our brains generate a prediction of what’s going on in terms of sensory consequences,” Serino said. “If our prediction corresponds to the sensory feedback that we get, there is no problem—I know that it’s me and my body. But if my brain generates a

As Ehrsson's research with mannequins demonstrates, when we experience sensorimotor conflicts, our brains may perceive an internal sensation as coming from outside of our bodies, leading to body illusions or even, in some cases, perceptions of a foreign presence like a spirit or a ghost.

prediction and then the sensory feedback contradicts these predictions, then my brain decides that this must not be me.” Currently this research is evolving to study how these sensory-motor conflicts, and the associated changes in experience, affect high-order cognitive processes, such as self-monitoring and thought insertion.

Studies like his elegantly demonstrate how even very simple manipulations of congruency between sensory and motor inputs can have profound effects on our cognition and sense of self. ●

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WHEN PSYCHOLOGISTS SHOULD INTERVENE AND WHEN THEY SHOULDN'T

By C. Nathan DeWall

Walton, G. M., & Yeager, D. S. (2020). Seed and soil: Psychological affordances in contexts help to explain where wise interventions succeed or fail. *Current Directions in Psychological Science*. <https://doi.org/10.1177/0963721420904453>

Most students study psychology because they want to improve their lives, their relationships, or their community. They can learn how to live a meaningful life, why a romantic partner's criticism echoes louder than praise, and how to motivate companies to do well while also doing good. But students may not recognize psychology's limitations: Psychology's interventions do not succeed for all people, in all places, or at all times. To do the greatest good, according to Greg Walton and David Yeager (2020), psychologists need to recognize when they should intervene and when they should not.

Walton and Yeager use an agricultural metaphor to make their point: For humans to flourish, they need a high-quality seed and nurturing soil. The seed refers to an adaptive belief system, such as the belief that intelligence can grow with hard work or that all people deserve the right to feel socially accepted (Walton & Wilson, 2018). Certain soils (situations) enable adaptive belief systems to blossom, whereas others do not (Gibson, 1977).

Seeds and soils vary. When students are encouraged to believe that intelligence can grow through hard work, their academic performance improves if their school's norms afford behaviors in line with that belief (e.g., seeking out academic challenges to grow one's intelligence; Yeager et al., 2019). In the absence of such fertile soil, adopting a growth mindset offers few academic dividends. Rather than a failure to replicate, such findings identify a successful theoretical expansion. They illustrate the power of the situation in tipping the scales for or against the impact of adaptive belief systems on behavior (Noah, Schul, & Mayo, 2018).

To bring this cutting-edge research into the classroom, have students complete the following activity.

Class Activity

Ask students to imagine that their college or university received a charitable gift to be used to improve academic performance. Students learn that their institution will use psychological science to design an effective intervention. Which **one** of the following four options should their institution select?

- **Option A:** Teach all students and faculty to adopt a growth mindset of intelligence: "Intelligence can grow with hard work and effective strategies; this remedies the thought 'I'm dumb' in response to academic setbacks" (Walton & Yeager, 2020, p. 23). Use this new mentality to attempt to improve **all** students' academic performance.
- **Option B:** Teach all students and faculty to adopt a fixed mindset of intelligence: Intelligence does not change with experience; when you experience an academic setback, it is a statement of your innate intelligence. Use this mentality to attempt to improve the academic performance **only** of students who were initially struggling academically (i.e., the bottom half of performance).
- **Option C:** Teach all students and faculty to adopt a fixed mindset of intelligence: Intelligence does not change with experience; when you experience an academic setback, it is a statement of your innate intelligence. Use this new mentality to attempt to improve **all** students' academic performance.
- **Option D:** Teach all students and faculty to adopt a growth mindset of intelligence: "Intelligence can grow with hard work and effective strategies;

this remedies the thought ‘I’m dumb’ in response to academic setbacks” (Walton & Yeager, 2020, p. 23). Use this mentality to attempt to improve the academic performance **only** of students who were initially struggling academically (i.e., the bottom half of performance).

Have students share with a partner which option they would choose and why. After a few minutes of discussion, instructors can share with students how Walton and Yeager would recommend starting with option D because it offers an adaptive belief system (growth mindset of intelligence) to address a psychological vulnerability (students that struggle academically who may doubt their ability to succeed in school). Instructors can then lead discussions about why someone might

question implementing option D. Should there be a similar intervention that targets high-achieving students? How are the benefits of boosting struggling students outweighed by not intervening to help flourishing students?

Psychological scientists have much to offer the world. We can teach people how to improve their well-being, their relationships, and their role as global citizens. But psychological scientists do the most good when they recognize the limitations of psychological interventions. We should not expect interventions to work for all people, at all places, and at all times. Rather, we should harness the most powerful and practical aspect of psychological science—our ability to theorize—to help solve the riddle of when psychologists should intervene. ●

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Change requires good seeds and fertile soil.

| | Some contexts do not afford a more adaptive perspective (poor soil) | Some contexts afford but do not yet give people an adaptive perspective (fertile soil) |
|---|--|---|
| Examples | <ul style="list-style-type: none"> • Dining hall with bad tasting healthy dishes • A peer school environment in which academic challenge-seeking is uncool • A college environment with limited opportunities for people like you to belong | <ul style="list-style-type: none"> • Dining hall with tasty healthy dishes • A peer school environment in which students seek out academic challenges • A college environment with opportunities for people like you to belong |
| Is a change in the context (soil) needed? What kind? | <p style="text-align: center;">Yes</p> <ul style="list-style-type: none"> • Tastier healthy dishes • Peer norms for challenge seeking • Greater opportunities for belonging for one’s group | Not necessarily |
| Is a change in individuals’ psychology needed (a good seed)? What kind? | <p style="text-align: center;">Yes</p> <ul style="list-style-type: none"> • Indulgent labels on healthy foods • Growth mindset intervention • Social-belonging intervention | |

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 classroom activities and demonstrations:

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SEX OBJECTS ARE PROCESSED LIKE... OBJECTS

By Beth Morling

Bernard, P., Cogoni, C., & Carnaghi, A. (2020). The sexualization-objectification link: Sexualization affects the way people see and feel toward others. *Current Directions in Psychological Science*. Advance online publication. <https://doi.org/10.1177/0963721419898187>

The March 2020 cover of *Rolling Stone* magazine depicted three female artists—SZA, Megan Thee Stallion, and Normani. The article on “women shaping the future” claimed to emphasize their artistic, cultural, and political accomplishments. Yet the women on the cover pose suggestively in lace bras and leather bustiers.

Sexualized images like these may encourage us to see women as objects that can be used, owned, or silenced, instead of human beings with autonomy, identity, and agency (Fredrickson & Roberts, 1997; Hatton & Trautner, 2011). The notion that people are sometimes objectified (i.e., reduced to their body and body parts) can be traced to philosopher Immanuel Kant. But only recently have researchers documented the cognitive and neuroscientific mechanisms of this process.

In their *Current Directions* article, researchers Philippe Bernard, Carlotta Cogoni, and Andrea Carnaghi (2020) summarize research showing that when people view images of sexualized humans, their cognitive processes resemble object processing more than the processing of (nonsexualized) humans.

Psychologists already know that people view nonsexualized human faces

and bodies as wholes rather than separate parts. In contrast, objects such as shoes, houses, or cars are processed analytically—as a set of features. One way to test for holistic processing is to turn photos upside down (e.g., Reed et al., 2006). When we have to recognize whether two pictures of the same human are the same or different, we make more errors and react more slowly when the photo is upside down compared to upright. In contrast, when we do the same task with a shoe, it’s not as difficult because even when it’s upside down, we process the features in a piecemeal way (laces, sole, shape) not as a whole. In sum, when people are slower or less accurate at identifying an inverted image of a human body, there’s evidence they are processing that image holistically. Electroencephalography (EEG) studies also indicate that our brains work harder to process inverted faces and bodies (compared with upright ones), suggesting holistic processing. In contrast, the EEG signatures for inverted and upright objects look similar, suggesting piecemeal processing.

Bernard and his team have presented participants with both sexualized and nonsexualized people in both upright and inverted orientations. As expected, they observed the holistic processing signature for the nonsexualized images of people. But the EEG signatures for sexualized images resembled the processing of objects. In this work, researchers have manipulated sexualization either by presenting models dressed in skin-baring lingerie, posing in a sexualized posture, or both. Both posture and nudity are often used for women on *Rolling Stone* covers (Hatton & Trautner, 2011). But in this research, the EEG signatures (N170s) suggest that sexualized posture, rather than partial nudity, activates object processing and does so for both men and women (Bernard et al., 2019).

Teaching About Objectification

You can introduce students to this topic by showing half of them an image of a sexualized woman and the other half an image of a nonsexualized woman. Then all students should rate their target on her competence, warmth, and morality. As you analyze the results, explain how most research has found that sexualized women are rated lower on humanness-related traits compared with nonsexualized women. Students can discuss the real-world consequences of such dehumanized perceptions. One example concerns people’s evaluation of victims of sexual violence. When attorneys ask juries to consider the clothing a victim was wearing (Safronova, 2018), they can induce less sympathy for the victim.

Next you can walk students through several demonstrations of how Bernard and colleagues have used cognitive neuroscience methods to study the objectifying effects of sexualization. (This online resource provides stimuli for all activities: <https://tinyurl.com/wnoznv>.)

For example, students can consider a functional MRI (fMRI) study on the

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effect of sexualization on empathy (Cogoni et al., 2018). While being scanned, participants watched a woman being excluded from a ball-tossing game (Cyberball). Sometimes the woman was dressed in a sexy black dress and other times dressed in jeans and a t-shirt. When the woman was sexualized (in the black dress), the study detected lower activation in areas of the brain associated with (a) the emotional aspect of pain and (b) the network people use to mentalize about others. This activation pattern suggests that people experienced less empathy for the sexualized target.

Next, introduce students to the inverted-image paradigm that Bernard and colleagues have used to test the objectification process. The Thatcher illusion, included in many textbooks, introduces the phenomenon of holistic processing. Then students can participate in a recognition task that illustrates holistic versus object processing. For each trial, present an image, followed by the original image and a distractor and have students indicate whether the image they saw illustrates holistic or object processing. The demonstration proceeds in three stages: first with shoes, then nonsexual-

ized bodies, and finally sexualized bodies. Your students may notice that the task was easier for shoes and sexualized bodies—the “objects”—and more difficult for nonsexualized bodies. Such a pattern matches that found in Bernard and colleagues’ studies.

This fascinating line of work suggests that if *Rolling Stone* wants to celebrate the achievements of female artists, it should start photographing them in ways that signal their humanity, not in ways that promote their objectification. ●

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COMMUNICATING PSYCHOLOGICAL SCIENCE—WHY IT MATTERS AND HOW TO GET STARTED

By Zoe Bridges-Curry



Zoe Bridges-Curry
University of Louisville

As psychology students, research is the cornerstone of our training and our long-term career goals. For many of us, our work is motivated by a belief that psychological science has a key role to play in addressing some of the most urgent problems of our time, from the climate crisis and widening partisan divides to implicit bias and the rise of fake news. Our undergraduate and graduate training emphasizes the importance of communicating our work to fellow psychologists, whether through the peer-review process or presentations at conferences. However, we learn much less about sharing our research with the public—and that has to change.

Why Communication Matters

Many of us know the frustration of

seeing our area of interest misrepresented in the news or misunderstood in our communities. Representations of psychology in policy conversations, on social media, and in the news are often inaccurate, sometimes with dangerous consequences. Within the realm of clinical psychology, we are still grappling with the gap between research and real-world practice. Decades of research have demonstrated that some treatments are more effective than others, but widespread dissemination and implementation of evidence-based practice remains one of the most intractable challenges facing the field (Baker, McFall, & Shoham, 2008).

When we fail to communicate our work to a broader audience, we miss out on opportunities to amplify its impact. On a personal level, individuals and families lose access to the insights and interventions that could improve their lives and reduce suffering. Organizations and systems function less efficiently. And at the policy level, psychological science risks being overlooked in decisions about health care, education, and funding. With science under attack and so much at stake, it is more important than ever that psychological scientists enlist their skills to communicate strategically and persuasively to the public.

How to Communicate Science to the Media

Before I started graduate school, my work focused on helping advocacy and research organizations elevate their work to the national stage. Here's what I learned about how to generate and maintain media interest in a topic, respond to current events, and communicate effectively to a lay audience.

General Best Practices

Regardless of the topic or venue, it is crucial to consider the audience. What is their familiarity with the topic? Why should they care about what you have to say? How does your work connect to what people are already talking about? For any public-facing materials, keep your language concise, clear, and free of academic jargon and acronyms. Use hyperlinks instead of citations and a reference list. Consider writing at an 8th-grade reading level to make sure that your ideas are accessible to as many readers as possible.

If you are speaking with the media or to a public audience, prepare talking points in advance to distill the most important takeaways. These topline messages should make clear connections between your work and the issues that are most likely to resonate with your audience (e.g., a major breaking news story or ongoing debate). When in doubt, return to these key points. If there are certain questions or controversies that come up frequently in your area of interest—or that you can anticipate being a concern for a lay audience—consider preparing



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Psychological scientists are well-positioned to shape crucial conversations and policy decisions about the most pressing issues of our time, but our voices are often absent.

and practicing answers to these questions in advance.

As graduate students, our words reflect on our mentors and academic communities more broadly. Consider university policy and check in with your advisors before communicating with the media.

Proactively Communicating Your Work

Op-eds. One great way to bring attention to your research is by submitting an op-ed to a local or



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national paper or to an online outlet such as HuffPost or Medium. If you have a specific outlet in mind, check its website for detailed guidelines and submission information. Op-eds should be between 500 and 800 words and often start with a ‘hook’ that ties the piece to current events or an upcoming holiday (e.g., Veterans Day, a bill being debated in Congress). If you are submitting to a local paper, demonstrate how your topic affects that community specifically. Keep paragraphs short and conclude with a call to action so that readers have a clear sense of what to do with the information you have provided. To increase the chances of your op-ed getting placed, it can be helpful to call or email the op-ed or editorial page editor in advance to gauge their interest. If your first-choice media outlet declines, you can always submit the piece to another newspaper or online outlet.

Building relationships with reporters. If you have noticed a reporter who writes on a topic related to your area of research, you can reach out by email or phone to make them aware of your research and start to build a relationship. If there is significant overlap, they may want to schedule an in-person meeting to hear more about your work and determine how you might be a resource in their reporting.

Reacting to Relevant Current Events

Letters to the editor. Letters to the editor are shorter than op-eds (150–200 words) and are usually written in response to something the newspaper recently reported on. For example, if I read an article in my local paper about family separation at the border, I might write a letter to the editor to provide information about the detrimental consequences of early traumatic experiences.

Handling media requests. Reporters are always looking for sources to provide expert commentary and answer questions about the topics they are covering. If a reporter calls you, you do not have to answer their questions immediately. You can ask to schedule the interview for a later time or ask to respond to their questions in writing. You can also ask for more information about the types of questions they have. Consider your level of competency—it is absolutely OK to refer reporters to someone with more expertise. If you do not want to be quoted but want to offer general information, you can offer to speak to the reporter “on background.” However, there is a *never* a guarantee that you will not be quoted directly (i.e., “on the record”). A reporter at a prominent newspaper once printed an e-mail exchange with me verbatim.

When the news gets it wrong. You may want to set up a Google news alert to keep track of media coverage of your topic. If you stumble across reporting that is inaccurate or unhelpful, you can call or e-mail the reporter who wrote the story to provide feedback. When you see your area of interest being misrepresented (or represented well) in popular media, it can be a great opportunity to educate a broader audience—whether by reaching out to a reporter covering entertainment, penning an op-ed, or weighing in on social media.

Psychological scientists are well-positioned to shape crucial conversations and policy decisions about the most pressing issues of our time, but our voices are often absent. If we want our research to make an impact beyond the lab, learning to communicate our work to the media and the public is more important than ever. ●

References

Baker, T. B., McFall, R. M., & Shoham, V. (2008). Current status and future prospects of clinical psychology: Toward a scientifically principled approach to mental and behavioral health care. *Psychological Science in the Public Interest*, 9(2), 67–103. <https://doi.org/10.1111/j.1539-6053.2009.01036.x>



1 Funding & Recognition

Student Grant Competition
Student Research Award
RISE Research Award

2 Build Your CV

Become a Reviewer
Serve on the APS Student Caucus Executive Board
Write for the Student Notebook
Represent APS on Your Campus

3 Connect & Keep Current

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ILLINOIS

Indiana University

Bloomington, IN

Assistant/Associate Clinical Professor

The Indiana University Department of Psychological and Brain Sciences invites applications from candidates who are deeply committed to innovative clinical psychological training within an evidence-based, translational, and interdisciplinary model of doctoral training. We are seeking an individual with training and clinical experience in evidence-based intervention techniques and a commitment to intervention development, implementation, and outcome assessment. A strong interest in translational research and practice with a focus on moving interventions from the lab/clinic to the community is desirable. Primary responsibilities will include: (1) supervision of predoctoral psychology students in clinical practicum training; (2) coordination with, and oversight of, external practicum sites; (3) teaching clinical courses in the department; (4) assisting with administrative and accreditation activities in the clinical science doctoral program.

Qualifications include a Ph.D. in Clinical Psychology from a PCSAS and/or APA accredited program; licensure in the State of Indiana (eligible), training and clinical experience in evidence based services; clinical supervisory experience; interest in university level teaching; and commitment to pedagogical advancement. This will be a full time non-tenure track, faculty appointment beginning August 2020. Rank and salary commensurate with experience.

The Clinical Science Program at Indiana University is nationally recognized for an emphasis on translational research on mechanisms and intervention. Clinical and research training is highly integrative, often involving approaches from medicine, cognitive science, neuroscience, behavioral genetics, informatics, social and developmental psychology. The Department of Psychological and Brain Sciences' in-house training clinic serves adult, family, and child populations and is integrated with active programs of research. Faculty overseeing its operation are supported by administrative staff. The University is located in Bloomington, Indiana, a university town which offers an exceptional cultural, educational and recreational environment.

Interested candidates should submit a letter of application, CV, teaching, and diversity and inclusion statements, and letters of recommendation as described at: indiana.peopleadmin.com/postings/8766. Review of all applications will begin on March 31, 2020 and will continue until the position is filled. Questions regarding the position or application process can be directed to: Cheryl Crees, Assistant to the Chair, ATTN: Clinical Professor Search, Department of Psychological and Brain Sciences, 1101 E. 10th Street, Bloomington, IN 47405-7007 or chcrees@indiana.edu.

The College of Arts and Sciences is committed to building and supporting a diverse, inclusive, and equitable community of students and scholars.

Indiana University is an equal employment and affirmative action employer and a provider of ADA services. All qualified applicants will receive consideration for employment without regard to age, ethnicity, color, race, religion, sex, sexual orientation, gender identity or expression, genetic information, marital status, national origin, disability status or protected veteran status.

ANNOUNCEMENTS

Send items to apsoobserver@psychologicalscience.org

GRANTS

NIH Encourages Studying the Social Contagion of Substance Abuse

The National Institute on Drug Abuse (NIDA) invites grant applications proposing to study the social contagion of behavior and substance abuse. Proposed research should apply social network theory—the study of how people, organizations, and groups interact in a network. Applications are open through January 8, 2023.

Social contagion, defined by NIH, is the “spread of affect or behavior from person to person and among larger groups.” NIDA recognizes “social network theory can also be applied to chronic behavioral conditions, including substance use disorders, as social factors and their interactions with age and sex are important determinants of substance use.”

Models that examine how substance abuse and peer use/misuse develops in peer groups should make use of big data sets and data science to form computational models required for social network analysis.

Learn more about NIDA's Notice of Special Interest: Modeling Social Contagion of Substance Use Epidemics (NOT-DA-20-009) at grants.nih.gov/grants/guide/notice-files/NOT-DA-20-009.html

NSF Funding to Support Transition From New Research Discoveries to Innovation

The National Science Foundation (NSF) offers researchers the opportunity to transition their research from discoveries to the marketplace through the Partnerships for Innovation Program (PFI). The program has five goals:

- Identifying research with the potential for commercialization
- Supporting proof-of-concept work,
- Promoting sustainable partnerships between academia and the private sector
- Developing multi-disciplinary innovation ecosystems
- Providing professional development, mentoring, and advice in entrepreneurship

The solicitation supports efforts on two different tracks. The Technology Translation track provides the opportunity to turn NSF-funded research into technological innovations with promising social impact. The Research Partnerships track has similar goals but supports larger, complex, multifaceted technology development projects that require the involvement of more than one researcher or institution. This track requires the creation of a partnership between academic researchers and a third-party organization (e.g. industry, a federal laboratory, a public or nonprofit technology organization).

Deadlines: January 13, 2021

Learn more about the PFI program at bit.ly/3ac7JDw.

MEETINGS

All meetings are subject to change and/or cancellation due to the COVID-19 pandemic. Please check the appropriate websites for the latest information.

32nd APS Annual Convention

Cancelled

For details and updates, visit psychologicalscience.org/covid-19.

4th International Convention of Psychological Science

March 25–27, 2021

Brussels, Belgium

ICPS2021.org

2020 Cognitive Aging Conference

April 16–19, 2020

Atlanta, Georgia

cac.gatech.edu

Consortium of European Research on Emotion (CERE) 2020

June 5–6, 2020

Granada, Spain

cere-emotionconferences.org

International Society for the Study of Behavioural Development 2020 Conference

June 21–25, 2020

Island of Rhodes, Greece

issbd2020.org

AAAS Forum on Science & Technology Policy

May 7–8, 2020

Washington, DC

aaas.org/page/forum-science-technology-policy

NIH Matilda White Riley Behavioral and Social Sciences Honors

June 8, 2020

Bethesda, MD

obssr.od.nih.gov/event/nih-matilda-white-riley-behavioral-and-social-sciences-honors/

Biennial International Seminar on the Teaching of Psychological Science

July 13–17, 2020

Paris, France

nitop.org/BISTOPS.org

Behavior, Energy, and Climate Change 2020 Conference

December 6–9, 2020

Washington, DC

becconference.org

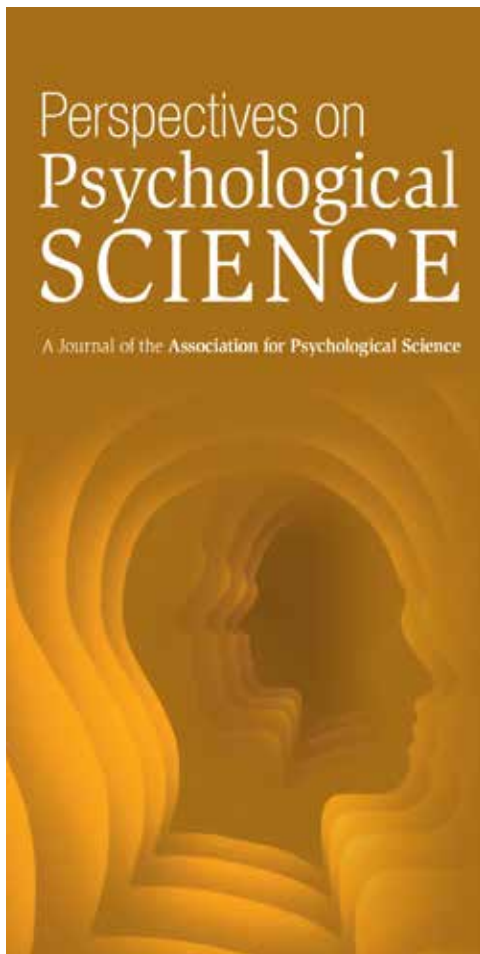
Perspectives Special Issue: Call for Papers

Microaggressions: State of the Science and New Directions

Guest Editor: Dr. Monnica Williams, University of Ottawa

Advisory Editor: Dr. Laura A. King, University of Missouri, Columbia

Deadline for Letter of Intent Submissions: April 30, 2020



Although microaggressions often appear harmless, they are considered a form of everyday discrimination. Microaggressions and everyday discrimination have been linked to numerous mental health problems, as well as physical health problems and poor quality of life. However, many people are completely unaware of the presence of microaggressions occurring all around them or that they may even commit themselves. Psychology as a discipline can benefit from a better understanding of microaggressions to improve research, training, and clinical practice. Although the harms of microaggressions are well-documented, there are still many unanswered questions and areas in need of new research. This special issue is intended to advance the scientific dialogue surrounding this important topic.

This issue will accept the following types of articles:

- Theoretical articles
- Integrative reviews
- Program overviews
- Meta-analyses
- Commentaries
- Book reviews

Articles should advance psychological science in important ways that are relevant to a wide range of readers. All articles should be original works, well-written, accessible to psychologists across subdisciplines, and scientifically rigorous. This issue is open to submissions from all areas of psychology, as well as from related behavioral sciences and education. Prior to manuscript submission, a Letter of Intent should be submitted to the guest editor via the online submission portal.

Learn more: www.psychologicalscience.org/microaggro-call



Ken Carter
Oxford College of Emory University

What led to your scientific interest in high sensation-seeking personalities?

While working on a book about people I call “chaos junkies,” I became fascinated with Marvin Zuckerman’s research into the sensation-seeking personality trait. I abandoned my original plan and began a translational piece about this fascinating personality trait that I think is even more prevalent in society today.

Why do you think this trait has become more prevalent?

We’ve always had high sensation-seeking people, and I think we’re seeing them more because of social media—where they’re learning new things, getting reinforced for doing them, and sometimes even making a living. I just noticed that the Summer 2020 Olympics is adding a few new sports, and three of them high sensation-seeking sports: sport climbing, surfing, and skateboarding.

In your earlier work at the CDC, you focused on smoking as a risk marker for suicidal behaviors in adolescence. How did that inform the research you’re doing now?

I’ve always had an interest in looking at the whole person, at behaviors as

PERSONALITY PLUS PLUS PLUS

In his new book, *Buzz!*, clinical psychologist and Oxford College of Emory University professor **Ken Carter** gets inside the minds of thrill-seekers, daredevils, and adrenaline junkies.

indicators of who someone is as a person. The idea behind some of my research at CDC was to encourage primary care physicians to ask younger smokers about other kinds of risky behaviors they engaged in. It’s the same sort of thing with high sensation-seeking behaviors. Whether rock climbing or eating unusual foods, these are not just something a person does, it’s part of who they are as an individual.

What characteristics determine whether an individual will develop into a thrill-seeker?

Zuckerman created something known as the sensation-seeking scale, which goes from zero to 40 (I’m an eight, which is fairly low!). Some estimates say that about 58% of this characteristic tends to be genetic. For instance, high sensation-seekers don’t necessarily experience chaos and stress the same way as most of us. In chaotic experiences, they don’t release as much cortisol, and they don’t even perceive those chaotic experiences as being that stressful. If they’re in their cars darting in and out of traffic, their bodies don’t necessarily produce as much cortisol, but they might be producing higher levels of dopamine (a neurotransmitter associated with pleasure).

By comparison, someone like me would produce a lot of cortisol but not necessarily much dopamine. I’m not feel-

ing great in those stressful situations. It’s easier for me to get overwhelmed.

Can we learn to control these characteristics—can we turn them up or turn them down to our advantage?

Somewhat. Habituation can always kick in. If I ride a roller coaster 50 times, I’m going to be less scared the 50th time. But I’m not going to experience the same kind of safe thrill as a high sensation-seeker might. On the other hand, someone like me has certain advantages that some high sensation-seekers don’t. I have low levels of boredom susceptibility; I don’t get bored that often, and that may be my superpower.

What kinds of superpowers do thrill-seekers have?

Number one is the ability to be calm and focused in the midst of chaotic experiences. Imagine if you’re a pilot landing a plane in an emergency situation, or an emergency room physician or nurse, or a first responder in a chaotic situation. Not producing much cortisol helps you stay calm and focused so your training can kick in.

We need high sensation-seekers in our society, but we also need people like me—low sensation-seekers who can prevent chaotic things from happening in the first place. ●



Read a longer version of this interview at psychologicalscience.org/observer/carter.

Back Page showcases particularly interesting work by a wide variety of psychological scientists. Know of a good candidate for a future profile? Contact the *Observer* at apsobserver@psychologicalscience.org.

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**Due to the COVID-19 pandemic,
APS 2020 has been cancelled.**



For more information, please visit
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