



HOW DIVERSITY WORKS



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Being around people who are different from us makes us more creative, more diligent and harder-working

Katherine W. Phillips

THE FIRST THING to acknowledge about diversity is that it can be difficult. In the U.S., where the dialogue of inclusion is relatively advanced, even the mention of the word “diversity” can lead to anxiety and conflict. Supreme Court justices disagree on the virtues of diversity and the means for achieving it. Corporations spend billions of dollars to attract and manage diversity both internally and externally, yet they still face discrimination lawsuits, and the leadership ranks of the business world remain predominantly white and male.

It is reasonable to ask what good diversity does us. Diversity of *expertise* confers benefits that are obvious—you would not think of building a new car without engineers, designers and quality-control experts—but what about social diversity? What good comes from diversity of race, ethnicity, gender and sexual orientation? Research has shown that social diversity in a group can cause discomfort, rougher interactions, a lack of trust, greater perceived interpersonal conflict, lower communication, less cohesion, more concern

IN BRIEF

Decades of research by organizational scientists, psychologists, sociologists, economists and demographers show that socially diverse groups (that is, those with a diversity of race, ethnicity, gender and sexual orientation) are more innovative than homogeneous groups.

It seems obvious that a group of people with diverse individual expertise would be better than a homogeneous group at solving complex, nonroutine problems. It is less obvious that social diversity should work in the same way—yet the science shows that it does.

This is not only because people with different backgrounds bring new information. Simply interacting with individuals who are different forces group members to prepare better, to anticipate alternative viewpoints and to expect that reaching consensus will take effort.

about disrespect, and other problems. So what is the upside?

The fact is that if you want to build teams or organizations capable of innovating, you need diversity. Diversity enhances creativity. It encourages the search for novel information and perspectives, leading to better decision making and problem solving. Diversity can improve the bottom line of companies and lead to unfettered discoveries and breakthrough innovations. Even simply being exposed to diversity can change the way you think. This is not just wishful thinking: it is the conclusion I draw from decades of research from organizational scientists, psychologists, sociologists, economists and demographers.

INFORMATION AND INNOVATION

THE KEY TO UNDERSTANDING the positive influence of diversity is the concept of informational diversity. When people are brought together to solve problems in groups, they bring different information, opinions and perspectives. This makes obvious sense when we talk about diversity of disciplinary backgrounds—think again of the interdisciplinary team building a car. The same logic applies to social diversity. People who are different from one another in race, gender and other dimensions bring unique information and experiences to bear on the task at hand. A male and a female engineer might have perspectives as different from one another as an engineer and a physicist—and that is a good thing.

Research on large, innovative organizations has shown repeatedly that this is the case. For example, business professors Cristian Deszö of the University of Maryland and David Ross of Columbia University studied the effect of gender diversity on

the top firms in Standard & Poor's Composite 1500 list, a group designed to reflect the overall U.S. equity market. First, they examined the size and gender composition of firms' top management teams from 1992 through 2006. Then they looked at the financial performance of the firms. In their words, they found that, on average, "female representation in top management leads to an increase of \$42 million in firm value." They also measured the firms' "innovation intensity" through the ratio of research and development expenses to assets. They found that companies that prioritized innovation saw greater financial gains when women were part of the top leadership ranks.

Racial diversity can deliver the same kinds of benefits. In a study conducted in 2003, Orlando Richard, a professor of management at the University of Texas at Dallas, and his colleagues surveyed executives at 177 national banks in the U.S., then put together a database comparing financial performance, racial diversity and the emphasis the bank presidents put on innovation. For innovation-focused banks, increases in racial diversity were clearly related to enhanced financial performance.

Evidence for the benefits of diversity can be found well beyond the U.S. In August 2012 a team of researchers at the Credit Suisse Research Institute issued a report in which they examined 2,360 companies globally from 2005 to 2011, looking for a relationship between gender diversity on corporate management boards and financial performance. Sure enough, the researchers found that companies with one or more women on the board delivered higher average returns on equity, lower gearing (that is, net debt to equity) and better average growth.

PARTICULAR POINTS OF VIEW

By Douglas Medin, Carol D. Lee and Megan Bang

Productivity and equity are probably the most often cited reasons to attend to diversity in science. Gender and culture also affect the science itself, however. They influence what we choose to study, our perspectives when we approach scientific phenomena and our strategies for studying them. When we enter the world of science, we do not shed our cultural practices at the door.

Evolutionary biology is one example. Despite popular images of Jane Goodall observing chimpanzees, almost all early studies of primate behavior were conducted by men. Male primatologists generally adopted Charles Darwin's view of evolutionary biology and focused on competition among males for access to females. In this view, female primates are passive, and either the winning male has access to all the females or females simply choose the most powerful male.

The idea that females may play a more active role and might even have sex with many males did not receive attention until female

biologists began to do field observations. Why did they see what men missed? "When, say, a female lemur or bonobo dominated a male, or a female langur left her group to solicit strange males, a woman fieldworker might be more likely to follow, watch, and wonder than to dismiss such behavior as a fluke," wrote anthropologist Sarah Hrdy. Her interest in maternal reproductive strategies grew from her empathy with her study subjects.

Culture also made a difference in approach. In the 1930s and 1940s U.S. primatologists, adopting the stance of being "minimally intrusive," tended to focus on male dominance and the associated mating access and paid little attention to individuals except to trace dominance hierarchies; rarely were individuals or groups tracked for many years. Japanese researchers, in contrast, gave much more attention to status and social relationships, values that hold a higher relative importance in Japanese society.

This difference in orientation led to striking

differences in insight. Japanese primatologists discovered that male rank was only one factor determining social relationships and group composition. They found that females had a rank order, too, and that the stable core of the group was made up of lineages of related females, not males. The longer-term studies of Japanese researchers also allowed them to notice that maintaining one's rank as the alpha male was not solely dependent on strength.

Diversity has had an effect on studies of education and social science. Lawrence Kohlberg's highly influential work on stages of moral development in children in the early 1970s was later called into question by psychologist Carol Gilligan on the grounds that it ignored the perspective of women, who tended to emphasize the ethic of caring. Nor did Kohlberg's model account for moral principles associated with Eastern religious traditions, in part because his scheme did not include principles of cooperation and nonviolence.

Validity in the sciences involves much more than attending to canons about the need for proper controls, replicability, and the like. It involves choices about what problems and populations to study and what procedures and measures to use. Diverse perspec-

HOW DIVERSITY PROVOKES THOUGHT

Large data-set studies have an obvious limitation: they only show that diversity is correlated with better performance, not that it causes better performance. Research on racial diversity in small groups, however, makes it possible to draw some causal conclusions. Again, the findings are clear: for groups that value innovation and new ideas, diversity helps.

In 2006 Margaret Neale of Stanford University, Gregory Northcraft of the University of Illinois at Urbana-Champaign and I set out to examine the impact of racial diversity on small decision-making groups in an experiment where sharing information was a requirement for success. Our subjects were undergraduate students taking business courses at the University of Illinois. We put together three-person groups—some consisting of all white members, others with two whites and one nonwhite member—and had them perform a murder mystery exercise. We made sure that all group members shared a common set of information, but we also gave each member important clues that only he or she knew. To find out who committed the murder, the group members would have to share all the information they



collectively possessed during discussion. The groups with racial diversity significantly outperformed the groups with no racial diversity. Being with similar others leads us to think we all hold the same information and share the same perspective. This perspective, which stopped the all-white groups from effectively processing the information, is what hinders creativity and innovation.

Other researchers have found similar results. In 2004 Anthony Lising Antonio, a professor at the Stanford Graduate School of Education, collaborated with five colleagues from the University of California, Los Angeles, and other institutions to examine the influence of racial and opinion composition in small group discussions.

More than 350 students from three universities participated in the study. Group members were asked to discuss a prevailing social issue (either child labor practices or the death penalty) for 15 minutes. The researchers wrote dissenting opinions and had both black and white members deliver them to their groups. When a black person presented a dissenting perspective to a group of whites, the perspective was perceived as more novel and led to broader thinking and consideration of alternatives than when a white person introduced *that same dissenting perspective*. The lesson: when we hear dissent from someone who is different from us, it provokes more thought than when it comes from someone who looks like us.

tives and values are important in these choices. For instance, predominantly white, middle-class social scientists focus their research programs primarily on white, middle-class populations, which may lead to conclusions that are not generalizable.

If participation in cultural practices is central to our development as humans, then these practices will influence *how* we learn and practice science. In psychology, scholars who have intentionally focused on cultural orientations have expanded previously accepted conceptions of identity development, motivation and resilience. Research on the effect of teaching children to appreciate their racial heritage has pushed boundaries of accepted conceptions of identity development. Minority scholars have pointed out that studies tend to focus on the effects of diversity rather than the effects of homogeneity and other gaps in scientific practices.

A diversity of scientists is important for reducing bias and

for providing different ways of looking at the world. Two of us (Bang and Medin) and our colleagues have documented consistent cultural influences on the perceived relationship between humans and nature: rural European-Americans tend to see themselves as apart from nature,

whereas Native Americans see themselves as a part of nature (although it is more complicated than we have space to explain). This may influence how we think about environmental issues. It may also be why the mainstream view excludes urban settings as part of any ecosystem and sees ideal ecosystems as free of human influence, and so on.

It is commonly said that scientists should have a professional distance from what they study. But the metaphor of distance is misleading. Science, like a painting, necessarily has a perspective. To the extent that we can remove our biases and learn from multiple perspectives, we will understand our world better.



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This effect is not limited to race. For example, last year professors of management Denise Lewin Loyd of the University of Illinois, Cynthia Wang of Oklahoma State University, Robert B. Lount, Jr., of Ohio State University and I asked 186 people whether they identified as a Democrat or a Republican, then had them read a murder mystery and decide who they thought committed the crime. Next, we asked the subjects to prepare for a meeting with another group member by writing an essay communicating their perspective. More important, in all cases, we told the participants that their partner disagreed with their opinion but that they would need to come to an agreement with the other person. Everyone was told to prepare to convince their meeting partner to come around to their side; half of the subjects, however, were told to prepare to make their case

to a member of the opposing political party, and half were told to make their case to a member of their own party.

The result: Democrats who were told that a fellow Democrat disagreed with them prepared less well for the discussion than Democrats who were told that a Republican disagreed with them. Republicans showed the same pattern. When disagreement comes from a socially different person, we are prompted to work harder. Diversity jolts us into cognitive action in ways that homogeneity simply does not.

For this reason, diversity appears to lead to higher-quality scientific research. This year Richard Freeman, an economics professor at Harvard University and director of the Science and Engineering Workforce Project at the National Bureau of Economic Research, along with Wei Huang, a Harvard economics Ph.D. candidate, examined the ethnic identity of the authors of 1.5 million scientific papers written between 1985 and 2008 using Thomson Reuters's Web of Science, a comprehensive database of published research. They found that papers written by diverse groups receive more citations and have higher impact factors than papers written by people from the same ethnic group. Moreover, they found that stronger papers were associated with a greater number of author addresses; geographical diversity, and a larger number of references, is a reflection of more intellectual diversity.

SCIENCE EXPOSED

By Steven Bishop

Opening science to public participation, the "citizen science" mode of research, has stimulated a diversity of projects that have led to real innovation and changes in behavior. It has done more than simply enhance existing research. It has also engaged a range of viewpoints that otherwise would have remained below the radar, allowing new people to provide new ideas to solve new problems.

Citizen science is driven mainly by the Internet, cloud computing, smartphones and social media, which enable thousands of scientists—or nonqualified individuals who are often globally dispersed—to participate in the gathering of information and knowledge on a range of scales: Galaxy Zoo (galaxyzoo.org) classifies galaxies, Qcumber (q-cumber.org) allows international users to upload sites of environmental hazards, Project FeederWatch (feederwatch.org) counts birds in North America, and the California Roadkill Observation System (wildlifecrossing.net/California) reports animals killed by vehicles. These programs enable data sampling on a scale finer than could be achieved by any other means.

Ubiquitous mobile devices means that

projects need not be restricted to the affluent, literate and educated public. In his work with the ethnic Baka groups in Cameroon, Jerome Lewis of University College London uses simple images to document valuable trees. Methods of citizen science are being opened up to projects in social science to study discrimination and human-rights abuses and to support local peoples in better representing themselves to outsiders.

Besides data gathering, many citizen science projects change our perceptions. The Annual Audubon Christmas Bird Count (birds.audubon.org/christmas-bird-count) gives information about population trends. It engages with society and in doing so provides education that can help lead to cultural change. The project was started to replace the tradition of shooting birds on Christmas day.

Ideas can also be readily scaled up. A project started in a classroom can soon become a global initiative. Projects such as Leafsnap (leafsnap.com), which identifies plants, feed information back to individuals, who become part of a two-way process. This collective knowledge may spark other ideas, leading to new ways of doing science, as seen, for instance, in solutions to the protein-folding puzzles put forward by the Foldit project (fold.it/portal). Platforms such as Zooniverse

THE POWER OF ANTICIPATION

DIVERSITY IS NOT ONLY about bringing different perspectives to the table. Simply adding social diversity to a group makes people *believe* that differences of perspective might exist among them and that belief makes people change their behavior.

Members of a homogeneous group rest somewhat assured that they will agree with one another; that they will understand one another's perspectives and beliefs; that they will be able to easily come to a consensus. But when members of a group notice that they are socially different from one another, they change their expectations. They anticipate differences of opinion and perspective. They assume they will need to work harder to come to a consensus. This logic helps to explain both the upside and the downside of social diversity: people work harder in diverse environments both cognitively and socially. They might not like it, but the hard work can lead to better outcomes.

In a 2006 study of jury decision making, social psychologist Samuel Sommers of Tufts University found that racially diverse groups exchanged a wider range of information during deliberation about a sexual assault case than all-white groups did. In collaboration with judges and jury administrators in a Michigan courtroom, Sommers conducted mock jury trials with a group of real selected jurors. Although the participants knew

(zooniverse.org) give millions of people access to all manner of collaborations. At CERN near Geneva and other large-scale scientific projects, people with a range of skills have come together to work toward specified goals; through citizen science, this idea can be broadened, be it by classifying newly discovered galaxies or identifying plants. This adds a novel dimension to citizen science, letting the crowd propose new solutions to unsolved problems.

In Iceland, after the 2008 financial crash, city councilors had hard choices to make about how to spend their limited budgets. Better Reykjavik was set up to enable citizens to debate innovative ideas to improve their communities. They crowdsourced potential projects, prioritized them and decided what budgets to allocate. Such successes have opened our eyes to new ways of funding science, such as the Experiment crowdfunding platform (experiment.com). How long will it be before such approaches become de rigeur in scientific funding?



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When coupled with big data, citizen science projects will expand yet further. Open platforms will give individuals access to data, models and analyses, so they can pose their own questions and find solutions. This will change the way we teach science in schools and perform research.

TAKING IT PERSONALLY

By D. N. Lee

Creating safer communities. Ensuring access to clean water. Tackling such problems requires science. Yet for much of its history, science has been shaped by European values. White European and American men have largely controlled who asks the questions, how they are studied and what is significant. Many important discoveries and innovations have been made, but many questions have been overlooked or unacknowledged because the experiences of investigators were limited.

Pursuing personally relevant research broadens science and makes it more meaningful for us all. Robin Nelson, an assistant professor of anthropology at Skidmore College, acknowledges that opinions on research design in biological anthropology are shifting because more people recognize the role of personal experience in shaping science. She recalls the moment in her work on caretaking strategies in Caribbean families when she decided to heed advice from her female subjects and expand a study to include male family members who also contribute to familial well-being.

“To fully comprehend female caregiving dynamics, I had to understand how these women construct their universe,” Nelson says. “They live in a patriarchal social system. That meant interviewing male family members such as brothers and fathers, too.” She discovered that female caretaking strategies were often, in part, a response to financial and emotional provisions of male family members.



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When individuals from underrepresented groups become scientists, they often come with a mission. Carl Hart, an associate professor of psychology and psychiatry at Columbia University, grew up in inner-city Miami during the 1980s war on drugs. After witnessing friends and neighbors suffer from drug-related crime and a short stint selling and trying drugs, he remapped his trajectory. He graduated from college and went on to study physiological effects of drugs on the human brain because he wanted to understand how drugs affected people. “You just have these different perspectives that are not from our typical pool of scientists, and so you look at problems differently,” he told the Huffington Post in 2013. “You are certainly more courageous in some areas because you see the impact on people you care about.”

Margaret Hiza Redsteer, a research scientist at the U.S. Geological Survey, studies climate change impacts on the Navajo Nation's land and water. While raising her family on the reservation, she grew frustrated about water supplies that were intermittent and sometimes contaminated. When she began her college studies at 28, she was interested in geology and hydrology because she wanted to better understand the relations among the land, how it was used and the water her community needed. “One of the most important things I learned over the course of my education is that who you are helps define how you look at the world and

how you approach a problem,” says her profile for the Society for Advancement of Hispanics/Chicanos and Native Americans in Science. “Using traditional Native American knowledge is not just important from a scientific point of view but also from a cultural point of view.... We need people who approach problems from this perspective in the sciences so that we can learn—and hopefully teach others—how to be better stewards of the land.”

Ecologists have recently begun to pay attention to urban environmental issues. But these issues were not new to people of color and those living in low-income communities, who saw through the lens of environmental justice. As a native Chicagoan, Kellen A. Marshall-Gillespie, a doctoral student in urban ecology at the University of Illinois at Chicago, noticed how pollution from cars and businesses affected the respiratory health of her neighbors. She hypothesized that these pollutants would negatively affect the growth and physiological development of plants, including vegetables in nearby gardens. “Environmental inequities and racism [have] tremendous implications for the sustainability of natural systems and ecosystem services,” she wrote for the Ecological Society of America. “I felt a deep charge to connect the social benefits of studying ecosystem services, [environmental justice], and segregation.”

When science is inclusive, everyone wins. Long underserved communities are finally heard, and scientists who listen are rewarded with fresh insights.

the mock jury was a court-sponsored experiment, they did not know that the true purpose of the research was to study the impact of racial diversity on jury decision making.

Sommers composed the six-person juries with either all white jurors or four white and two black jurors. As you might expect, the diverse juries were better at considering case facts, made fewer errors recalling relevant information and displayed a greater openness to discussing the role of race in the case. These improvements did not necessarily happen because the black jurors brought new information to the group—they happened because white jurors changed their behavior in the presence of the black jurors. In the presence of diversity, they were more diligent and open-minded.

GROUP EXERCISE

CONSIDER THE FOLLOWING SCENARIO: You are writing up a section of a paper for presentation at an upcoming conference. You are

anticipating some disagreement and potential difficulty communicating because your collaborator is American and you are Chinese. Because of one social distinction, you may focus on other differences between yourself and that person, such as her or his culture, upbringing and experiences—differences that you would not expect from another Chinese collaborator. How do you prepare for the meeting? In all likelihood, you will work harder on explaining your rationale and anticipating alternatives than you would have otherwise.

This is how diversity works: by promoting hard work and creativity; by encouraging the consideration of alternatives even before any interpersonal interaction takes place. The pain associated with diversity can be thought of as the pain of exercise. You have to push yourself to grow your muscles. The pain, as the old saw goes, produces the gain. In just the same way, we need diversity—in teams, organizations and society as a whole—if we are to change, grow and innovate. ■