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When Sparks Fly

When Sparks Fly

Igniting Creativity
in Groups

Dorothy Leonard
Walter Swap

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Creative Abrasion

“Surprise me,” the CEO said to John, who had just assumed the newly created title of Director of Business Development. “You can hire six new people. Get some young blood in here and find us some new products—ones we can bring to market in, say, three or four years. Let’s see what possibilities a creative group of people can identify in eighteen months.” John was thrilled; what an opportunity at age thirty-four! He recruited three of the best financially minded, calculator-wielding MBAs he could find and set them to work sifting through the hundreds of possibilities in the research pipeline. With three job openings left, he pawed through dozens of impressive resumes before selecting three highly qualified young engineers. Eighteen months passed in a whirl of financial and technical analyses. To John’s delight, the group members worked well together and became good friends. However, at the end, John was the one surprised—and out of a job. The group had rejected every idea in the pipeline on the basis of either financial or technical unfeasibility; they had identified not a single new idea worth pursuing. As John moved on to a different company, he was baffled: How could such a smart, well-qualified bunch of people have failed?

John’s bewilderment may be shared by many managers who, presented with an innovation opportunity, hire or select intelligent

people, throw them together—and expect creative miracles. Sometimes miracles do happen, but a randomly identified group of people is not likely to be especially creative. Managers are organizational designers. The composition of a group is as critical in creativity as it is for a choir. Can you imagine trying to sing Handel's *Messiah* with no baritones—or sopranos? Or perhaps worse, forcing half the baritones to try singing soprano? John's mistake was to hire six people whose formal training and personal thinking styles made them essentially a chorus of monotones. If you want creativity, you need intellectual diversity—the kind that leads to creative abrasion. We will talk later about how to manage the chaos that inevitably ensues from such intellectual ferment. First, why is diverse thinking useful? And how can you get that diversity?

Diversity and Creative Abrasion

You want your group to produce creative options. Where to start? Think for a minute about where those creative options are likely to come from. A modern-day Leonardo da Vinci might conceivably have all the different kinds of knowledge and skills needed, and if so, congratulations on landing him on your team. Short of that, you'll need to try something else to produce what scientists have called "requisite variety"—enough different options from which to choose that at least one is likely to be both novel and useful. This means that you must select group members who, in combination, will provide you with the requisite variety. Second, those group members must somehow be induced to *do something* with that variety, including debating—sometimes vigorously—the options. Group members will need to challenge one another and to welcome differences in intellectual background. Through this process, dubbed "creative abrasion" by Jerry Hirshberg,¹ the group can unleash the creative potential that is latent in a collection of unlike-minded individuals. Let's figure out first how to incorporate intellectual diversity into groups so we'll have the requisite variety, and then

CONFLICT AND INNOVATION

Kathleen Eisenhardt and her colleagues have examined the determinants of performance and innovation in technology-based companies. Some companies experienced virtually no conflict. They tended to have little group diversity (e.g., consisting entirely of engineers), created fewer options, and generally suffered in effectiveness (e.g., time to market). Other companies had lots of conflict, but it was frequently *personal* in nature. These companies were also relatively ineffective, because as their interactions (when they occurred) were divisive and angry. A final group of companies was able to minimize interpersonal conflict while effectively managing *substantive* conflict. "Such conflict provides executives with a more inclusive range of information, a deeper understanding of the issues, and a richer set of possible solutions."² As a result, they emerged as the most productive and innovative.³

turn to ways of promoting and managing the resultant creative abrasion.

There are advantages to beginning with a *cognitively* heterogeneous group: people who are capable of providing a set of novel, potentially useful alternatives. If you have heard the phrase, "think outside the box" so often that just reading it makes you queasy, consider this: Each individual has a wealth of idiosyncratic experience and knowledge in his or her box. From that individual box, the worldview is unique; problems and opportunities are seen through a particular lens. Put enough *different* individual lenses together, and you have a kaleidoscope of ideas. The great advantage of a highly diverse group over an individual is that even if individual members are still thinking within the boundaries of their own experience, *collectively* they will have numerous perspectives and those perspectives can combine in wonderfully novel and useful ways.

Each person's preparation for the creative act—what is inside our individual box, if you will—consists of *what we know* (our expertise born of education, job experience, and practice) and *who we are* (our inherent abilities, cultural background, thinking-style preferences). One of the problems in composing a group whose members reflect a variety of perspectives is that none of us has our sources of deep expertise or our problem-solving approaches emblazoned on our foreheads. You can't be certain of what someone truly *knows* from reading a resume any more than you can detect someone's cognitive biases from visual cues. Of course these two sources of intellectual diversity overlap considerably, since our innate abilities and interests (as reinforced or inhibited by our cultures and family background) drive us to select certain educational and career experiences.

What We Know

Think of an expert you know—expert in the Spanish Civil War, in piano playing, in public speaking. How long do you think it took that individual to develop deep knowledge in the topic or activity? Five years? Seven? Research on expertise suggests at least ten. So even if we start young and delve deeply into a variety of subjects, most of us will not be able to claim expertise in more than a few fields. There have been a handful of twentieth-century “Renaissance men” who were remarkably fluent in different intellectual languages (e.g., Buckminster Fuller or Bertrand Russell). But most of us will need to create a diverse-brained group whose members collectively can draw on deep reservoirs of knowledge and create the collision of ideas underlying creative output.

The preparation that makes us into experts in our profession often starts in childhood. Imagine, for a moment, leafing back through the pages of personal history of two individuals. When they were toddlers, the little boy is over by the window, tugging on the long drapes, apparently fascinated by how the sun glints differently as the drapes billow. The girl is sitting on the floor intently lining

up her blocks and building careful structures. When they are teens, she is hunched over a computer late in the night, giggling because she has just rigged her brother's computer to make the sound of a toilet flushing when he boots it—2,000 miles away at college. Our other teen is asleep, having spent the day sketching or experimenting with multilayered photographs, superimposing images on one another. By the time they are adults, their skill bases are totally different. That is, their *preparation* for creative activity is very different. Moreover, their natural interests lead them to seek different training and follow different careers, one in art, the other in computer science.

Any group creating application software will need them both—and need them to feed off each other's different perspectives. The artist becomes a screen designer, talented in expressing his ideas visually, through drawing and use of color. What does a line on the computer screen mean to him? It has depth, width, contour, and perhaps texture—symbols that trigger relationships in the mind of the viewer and guide a computer user by indicating a boundary or a starting point. Our computer scientist is mathematically gifted. To her, a line is an algorithm, an expression of distance between points. Both perspectives are critical to creating the lines on the screen. R. J. Berg, producer at the games company Electronic Arts, in California, says,

The complexity of software development and production today is such that even important individual contributions are not enough for success in the product. People who are wonderfully skilled at engineering or art, music, production itself, need to understand how their contribution intersects with those of the other members on the team. Success in the product absolutely depends on the synthetic ability to see your own expertise for what it is and the contribution it can make in conjunction with everyone else's piece.⁴

How often do we hear our colleagues disparage one another with eloquent waving of the hands: “Oh, he's from marketing,” or “She's

REMOVING BARRIERS TO COLLABORATION

At the Beckman Institutes for Advanced Science and Technology at the University of Illinois, Stanford, and Caltech, disciplinary barriers to collaboration have been effectively removed. Chemists, biologists, behavioral scientists, engineers, and computer scientists work together, united through a common pursuit of "MRTs"—main research themes, such as biological intelligence or human-computer intelligent interaction. Jiri Jonas, the Illinois Institute's director, believes that the focus on MRTs has resulted in a large number of interdisciplinary research proposals. According to one theoretical scientist, "There is an expert in just about any area you need somewhere close at hand and they do collaborate."⁵ William Brinkman, vice president for physical sciences research at Bell Labs, talks about the cross-disciplinary groups that come together because the labs' culture encourages collaboration: "We call it 'spontaneous teaming'—you see an interesting problem that another group is working on and you want to be part of it."⁶

an engineer"—as if such statements equate to: "They're barbarians"? The truth is, barbarians can refresh a different culture. "Hybrid vigor" is important in fields other than horticulture. Interval Research's David Liddle considers the infusion of different disciplinary perspectives into projects as the herbs that spice the dish. "There is no chance of doing good, new work . . . in a sterile environment where there are no herbs allowed."⁷ The intermingling of intellectual bloodlines can reinvigorate routine activities and create a wealth of options not otherwise available for selection. At Fisher-Price, Marilyn Wilson-Hadid (marketing) and Peter Pook (product development), who have teamed up to argue their way to winning concepts, talk about the "magic" that occurs, the "energy that explodes" from their creative abrasion.⁸

Stimulating creative abrasion is difficult and scary because we are far more comfortable being with folks like us. We prefer our barbarians tame—either people from disciplines close enough to the dominant one to fit in comfortably, or ones whose utility is obvious to all. Yet groups noted for creativity expend much energy (and it does take energy) in identifying, recruiting, and hiring real outsiders—or at least getting them to visit for a while. The more radical the combinations of functions, the more likely the creative abrasion we want. Xerox Palo Alto Research Center (PARC) has birthed an enormous number of creative ideas—everything from the graphical interfaces so common on all types of computers today to the mice we use to navigate around the screen. Although Xerox has not profited from every one of the inventions, PARC has always been an exceedingly fertile ground for creativity. It attracts intelligent, creative individuals, of course, but management also deliberately fosters cross-disciplinary encounters. One of the more unusual programs is PARC Artist-in-Residence (PAIR), in which an artist pairs up with a computer scientist. The combination has yielded some unusual multimedia technology that neither could have conceived alone.

Or how about mixing anthropologists in with computer scientists? Introducing social scientists into a laboratory of "hard science" where physics and mathematics have traditionally ruled is not an intuitive way to encourage creativity. However, observations by anthropologists have deeply affected the design of copier machines. The traditional inclination of Xerox engineers was to make the machines "idiot-proof," that is, to try to anticipate everything that could possibly go wrong and design such problems out of the system. The anthropological approach was to observe and deeply understand the interaction of people with the machine, beyond ergonomic factors. The anthropologists filmed a couple of leading computer scientists trying to use a new machine to do their own copying. The footage of some very smart people becoming increasingly frustrated led to an important insight. Some trouble in using the machines was inevitable because of the increasing scope of tasks covered.

The solution was to help users manage troubleshooting through customized instructions in the display panel, linked to particular procedures, and visuals depicting the location of the problem. Clearing paper jams now took 20 seconds, compared to 28 minutes before the redesign.

Okay, so that's in a research setting—and in far-out California to boot. What if you need innovation from a group traditionally focused on rules, standards, and conformance?

At biotech Genzyme Corporation, Russell Herndon set up the corporate group dealing with regulation—a profession not exactly famous for creativity. Regulatory groups (called in some companies the “sales prevention group”) are usually matched in temperament and outlook with the federal bureaucrats with whom they deal. After all, how much creativity do we want in the federal regulations governing drugs? Surprisingly, the answer is quite a bit, if we don't want to shackle biotechnology inventions with rules designed for medical devices. Genzyme products were new to the world, including Washington, D.C.—and for some, there was no extant regulatory path.

The usual job description for a position in regulatory affairs called for a law degree and focused on a very narrow segment of the process—labeling, for example. Herndon wanted his group members to take responsibility for a product from inception through market, and to influence regulation rather than mindlessly submit to government dictates. Although he did hire a couple of unusual lawyers, he also deliberately selected members for his regulatory group from nontraditional backgrounds such as liberal arts (English and History majors), straight biology, and chemical engineering so that they would bring new and diverse perspectives to the regulatory environment. This investment in building a creative group paid off in brainstorming sessions when the purely legal perspective was complemented by both highly scientific and nonscientific approaches.

One of the group's early innovation opportunities was the commercialization of Carticel, a process by which cartilage cells taken

DIVERSITY OF PROFESSIONAL BACKGROUND AND CREATIVITY

Laboratory research has consistently demonstrated that groups that are heterogeneous with respect to abilities, skills, and knowledge perform more creatively than homogeneous groups.⁹ To verify this finding in work settings, Susan Jackson contacted the CEOs of 199 banks and asked them to assess the level of innovation in their organizations and to identify up to eight people who were key players in their top management teams. Jackson found a significant relationship between the extent of innovation (in products, programs, and services) and the degree of heterogeneity in “functional background” in the top management teams. That is, teams made up of people with different professional backgrounds and experiences were more creative than those made up largely of, say, marketing people.¹⁰ In general, the empirical research has found that “when working on complex, non-routine problems—a situation that presumably requires some degree of creativity—groups are more effective when composed of individuals with diverse types of skills, knowledge, abilities, and perspectives.”¹¹

from a patient are cultured, grown, and reimplanted in the knee. Since Carticel did not fit neatly into any of the regulated categories, no clear guidance existed on how to govern its application. Under the threat of having the process regulated as a standard biologic, which would have required ceasing production while the company ran prospective clinical studies, the Genzyme regulatory group came up with an innovative proposal that allowed Carticel to stay on the market in response to strong patient demand. As there were no immunological concerns and the tissue came from the same person receiving it back, Genzyme argued the procedure should be viewed more as a practice of medicine. However, the group suggested that the Food and Drug Administration (FDA) license the facility in

which the cells were grown, and use historical data and surrogate markers (indicators of health benefits) to justify their approval. This novel proposal accomplished two major objectives at once: it protected Carticel from inappropriate regulation and erected a barrier to competitors.¹² It's unlikely that a traditional regulatory group would have been so creative.

Who We Are

We partially define ourselves by what we see in the mirror. Our mirror reports on our gender, our ethnicity, our age. Unfortunately, visible cues of difference among group members (gender, race, age) frequently merely add abrasion without creativity. So much depends on how differences are handled—and what differences we are talking about. But who we are is more than what people see when they first glance at us across a conference table. The kind of culture and family in which we have been raised, the ways our genes have predisposed us to think, and our distinctive personalities all shape the lens through which we see the world.

Cultural Diversity When we think of cultural differences, we are mostly aware of the dangers—violating local taboos can lose you anything from a business deal to a piece of your anatomy. If you are in Thailand, don't point the sole of your foot at peoples' heads. If you are in a fundamentalist Muslim country, don't touch the opposite sex—even on the hand. And you have probably heard of some egregious, if humorous, stories about miscommunication. How about the baby food company that pictured a smiling tot on their label? In some developing nations, the company discovered, only pictures of *contents* were traditionally portrayed on food jars. Consumers in those countries were understandably reluctant to buy jars that appeared to advertise cannibalism. An Asian company wanting to introduce a locally popular fermented cow's milk drink into the U.S. market started off on the wrong hoof when they named the drink "Calpis." (Think about it.) And for a car selling into a Spanish-

"DEMOGRAPHIC" DIVERSITY AND CREATIVITY

The experimental evidence strongly suggests that people prefer to associate, interact, and work with those who are similar to them. The "similarity-attraction" effect has been demonstrated in literally hundreds of studies.¹³ People seem remarkably willing to seize upon virtually any basis for similarity, including age, gender, or race. How does this play out in terms of group process and creativity? *Age diversity* leads to low levels of group cohesiveness or integration, which in turn lead to high turnover. *Mixed-sex groups* have been found to be somewhat (although not statistically significantly) more creative than single-sex groups,¹⁴ although, again, turnover tends to be high. Results for *mixed-race groups* do not form a coherent pattern. However, a recent study found that within an organization widely viewed as supporting diversity, creativity in mixed-race groups was high, particularly for mixed white-Asian groups. The results were attributed to a strong identification with the group task, which prevented the formation of same-race cliques.¹⁵

speaking culture, the name "Nova" ("No Go") is literally a non-starter. Panasonic committed an infamous gaffe in its 1996 worldwide ad campaign for its Japanese Web Browser, which featured Woody Woodpecker. The accompanying slogan was "Touch Woody—The Internet Pecker."

Cross-cultural misunderstandings go beyond communication; decisions in different cultures may rest on completely different assumptions. Western architects working in Asia, where different rules of design apply, soon discover that one does not place a stairway to the upstairs directly opposite the front door because this configuration invites Bad Luck to rush right into the family quarters.

Despite the possibility of cross-cultural misunderstandings, the mingling of cultural differences can also aid creativity. Commenting

CULTURAL FACTORS IN INNOVATION

In his study of innovation during and immediately after World War II, J. F. O. McAllister contrasted British and Nazi science efforts. "German war science was hierarchical and compartmentalised, discouraging free-wheeling interchange between scientists and soldiers. Hence while German radar was beautifully engineered, achieving signal stability 'that was better than that of the best instruments that [Britain] had available,' the German method of displaying aircraft position was awkward for air defence controllers to use."¹⁶

Geert Hofstede's classic study of IBM employees in forty countries illustrates the importance of culture on work-related values and attitudes. Child rearing and other socialization practices create a "collective mental programming" that sets us apart from our counterparts in other countries. Hofstede considers four primary dimensions along which cultures differentiate us: (1) power distance (how much people accept as natural and permanent the unequal distribution of power and influence); (2) individualism–collectivism (people viewing their selves and immediate families as sources of loyalty, as opposed to thinking in terms of larger work and societal units); (3) uncertainty avoidance (how much

on the innovation that flourished in fifth-century B.C. Greece, fifteenth-century Florence and eighteenth-century Paris, Csikszentmihalyi has noted, "centers of creativity tend to be at the intersection of different cultures, where beliefs, lifestyles and knowledge mingle and allow individuals to see new combinations of ideas with greater ease."¹⁹ Nissan Design International (NDI) designers from California presenting their Japanese counterparts with the design for the Infiniti J-30 found that they had omitted a very important consideration—what the "face" of the car, viewed from the front, looked like. A downturned grill ("frowning mouth" as the Japanese characterized

people desire the reduction of ambiguity); and (4) masculinity–femininity (strength of traditional gender roles). Hofstede's analysis clusters the forty countries in terms of how similar they are to one another along these dimensions. Knowing, for example, that your team members are from Denmark, the United Kingdom, Belgium, and France, suggests that the former two might welcome ambiguity, while the latter two would likely wish to avoid uncertainty. This, in turn, might imply that your Danish and British colleagues would be more interested in open-ended strategic problems, while the Belgian and French members would be more comfortable with operational problems.

Of course, as Hofstede takes pains to point out, it would be a mistake to rely on group averages to characterize individuals, but group trends can be useful in gaining insight into how different people select and deal with problems.¹⁷ While asserting the importance of cultural differences, Fons Trompenaars and Charles Hampden-Turner issue a similar warning against stereotyping. They see cultural differences as overlapping bell curves, in which each culture has the full range of behaviors, but the *most predictable* behavior will be different for the two.¹⁸

it) and narrow rectangular headlights ("squinty eyes" according to the Japanese) gave the car an unhappy, even rude appearance! The U.S.–based designers were less sensitive to this perspective because they tended to follow their cultural predilection for viewing the car from the side more than from the front. By slightly cheering up the face of their car, the NDI designers felt they moved the design to a higher level of cultural intelligence.²⁰ We also have the Japanese to thank for a design adjustment to the toilet seats in the next Boeing airplane. Sensitive to embarrassing others, the Japanese suggested that hydraulics could eliminate the harsh sound of the seat slapping

down, an unnecessarily public communication of personal activities to people awaiting their turn outside the toilet.

Guido Arnout, CEO of CoWare, a company with corporate headquarters in Santa Clara, California and R&D in Belgium, is keenly aware of the need for cultural sensitivity. "By creating cultural diversity, you open employees' scope, make them sensitive to the fact that the world is *one* world. It is natural in the U.S. to think of the Far East as connected to U.S. markets and products—not so natural in Europe, where people tend to feel connected only to those countries on their borders (if at all). You can't grow a world-class company by staying in one ethnic culture."²¹

How did Tommy Hilfiger—a forty-five-year-old white man from Connecticut, designing prep-school clothes—become the designer of choice for urban black America? A writer in search of the answer came up with several hypotheses, including endorsement by Grand Puba, a hip-hop artist. The writer also had lunch with one of Hilfiger's designers, who was

a twenty-six-year-old named Ulrich (Ubi) Simpson, who has a Puerto Rican mother and a Dutch-Venezuelan father, plays lacrosse, snowboards, surfs the long board, goes to hip-hop concerts, listens to Jungle, Edith Piaf, opera, rap, and Metallica and has working with him on his design team a twenty-seven-year-old black guy from Montclair [New Jersey] with dreadlocks, a twenty-two-year-old South Asian guy from Fiji, and a twenty-one-year-old white graffiti artist from Queens [New York]. That's when it occurred to me that maybe the reason Tommy Hilfiger can make white culture cool to black culture is that he has people working for him who are cool in both cultures simultaneously.²²

As these examples illustrate, our cultures imprint preferences and perspectives. Show a cross-cultural group of consumers different design concepts, and it is likely that the Japanese will talk first about shape in describing objects, and only later about color, whereas

Europeans will do the reverse—or at least that was the experience of one group of consultants. To draw from a very different field, a medical professional remarked that the U.S. approach to inconvenient ailments was "just cut it out." (He noted the high number of cesarean sections and gallbladder operations.) The European approach he characterized as more systemic and conservative, and the Asian as including mind and body interactions more. A combination of the best from all three cultures, he believed, would result in the best possible treatment. Are these stereotypes? Yes—and subject to the usual dangers. Clearly not every U.S. doctor is a knife-wielding cowboy, and many are very sensitive to the effects of the mind, if not necessarily believers in the importance of *ch'i*, or spirit, in healing. The point is that the clash of cultures can be creative.

Think about the last time you were at a company meeting, a convention, or a social gathering with different cultures represented in the room. Did you view that time as an opportunity to explore, to identify some new perspectives, to learn? Or did you avoid talking about mutual problems for fear of controversy? (Or because it is hard work to speak slowly and really listen to someone with a pronounced accent?) Toy maker Fisher-Price has recently started a "Fisher-Price College in Reverse." After spending a couple of days in the traditional explanations of corporate history, identity, and culture to new hires (the usual "college" format), the "instructors" turn the tables on their "students" and ask to be taught about what the toy business is like in the countries outside the United States. What do East Aurora, New York employees learn from such sessions with their new European and Asian colleagues? Such things as that Japanese consumers want every toy to have an educational component, from baby rattles to pirate ships. Exchanges with their Milan, Italy contract design house have stimulated important product innovations for Fisher-Price. The Italian designers are less experienced in designing for the preschool market, while the U.S. designers are less exposed to European trends. The Europeans altered a toy western frontier fort they were building when the U.S. designers suggested a small but money-saving change. One of the actions a tot could

instigate was rolling barrels out of the fort on a chute. The European zigzag path for the barrel was sophisticated and fun to watch, but expensive and relatively slow for children of this age. American counterparts suggested replacing the zigzag path with a straight chute that would give the young child immediate satisfaction—and would save three dollars on production. The Europeans, in turn, suggested a significant addition to a line of toys for infants when they emphasized the popularity of velour and striking colors over pastel-colored corduroy and gingham-covered playthings.²³

So diversity based on culture *may* engender useful disagreement and alternative perspectives. However, individuals from a particular subset of society, be that based on gender, race, or nationality, may not represent the stereotype of that group. This cuts both ways: people who appear very different can be intellectual twins. We have a photograph of a heavily bearded, turbaned Sikh from India standing beside a woman from Minnesota—laughing together about the fact that their scores on a diagnostic instrument measuring intellectual preferences were identical. Moreover, people who look alike can have very different skills and approaches to problem solving. So adding an Asian American female or an African American gay man to your group may add diversity—but not *necessarily* the type we are talking about. (Of course, there can be other important reasons for “balancing” the group’s membership.) The major point is that you can’t judge the intellectual diversity of your group by *looking* at the members.

Yet the human tendency seems to be to aggregate upward to the highest level of abstraction—or the most visible difference. Personality differences we may attribute to culture or nationality. When an individual displays some behavior that is distinctive enough to attract our conscious attention, we may think, “That’s because he’s French,” even if the real reason that his behavior is “different” is that he is more of an extrovert. We see gender when we might more reasonably notice profession. “Isn’t that typical of a woman” may more accurately describe the fact that she’s an artist, and a male artist would likely behave the same. The more sophisticated we are about all the

different possible sources of abrasion, the more we can address them appropriately and include—or exclude—them in our groups. Judgments about intellectual diversity can be made only by a careful assessment of peoples’ background, experience, and, as explored in the next section, their thinking styles.

Thinking-Style Preferences Ever wondered why an intelligent, well-meaning, and respected colleague annoys you almost any time that you work with him or her? Maybe you think this individual is always too deep into the details to understand the big picture—all trees and no forest. Or perhaps the opposite is true: he seems to be flying over a problem at 30,000 feet and ignoring critical data, perhaps labeling decisions as “strategic” because—from your point of view—he doesn’t have the detailed information to back up the decision. And surely you have been in meetings where some of the participants sit on the edges of their chairs, pressuring for closure, with frequent glances at the clock and pointed comments about schedule, whereas others are clamoring for more information before a decision can be made—or, even more extreme, asking to revisit a decision made yesterday. These two groups of people can drive each other crazy! A prolific source of creative abrasion is the natural differences that occur among people in their preferred ways of thinking—problem solving, information processing, selection, and evaluation of data.

Take a moment to do a simple physical exercise. Cross your arms across your chest, in your normal posture—one arm over the other. (Even if you are on a plane, your companions won’t think you odd!) After you have them solidly crossed, now cross them the other way, so that the arm that was underneath is now on top. How does that feel? Awkward? Did you have to stop and think about how to do it? Here is another exercise. (You will learn more if you actually do these rather than just read about them—come on, take a risk.) Take out a pen or pencil and write your first name down. Okay? Now, put the pen in your other hand and do it again. (If you are in public, you probably won’t do this because it embarrasses

you.) How did that feel? Worse than awkward, right? Maybe you had to move your whole arm to write. Your signature is probably two to four times bigger than usual! Why does this feel so much worse than just crossing your arms the opposite way from usual? What people usually say is: "It was much harder—this takes skill." "The signature looks stupid." "Takes me back to age eight." Writing with your nondominant hand is difficult because you have a natural preference for the other hand, reinforced by years of practice and experience. Perhaps most critically, your ego is involved in the production of your signature—you feel silly that the output is so visibly inferior.

Just as you have strong and weak preferences for body movements, you also have inborn *thinking-style preferences*, as "hard-wired" as left- or right-handedness, reinforced by years of practice in your chosen profession and the way you interact with others in your private life. Some of these preferences are very strong and unlikely to be altered by circumstances. Others are relatively weak—even weaker than your arm-crossing preference. In choosing between two aspects of thinking styles we can be mentally ambidextrous (i.e., relatively indifferent between the two), but for other aspects, a switch is as difficult as trying to write with our nondominant hand. Since most of us don't spend much time or effort in analyzing why we approach problems the way we do or, for that matter, why others do so differently, we cannot identify our thinking preferences without systematic examination. However, there are dozens of diagnostics that can help people understand their own preferences. The most widely used such diagnostic is the Myers-Briggs Type Indicator, but there are many others.²⁴

In the early-twentieth century, psychologist Carl Jung discovered that people had preferences in three aspects of their thinking styles: Sensing versus Intuition, Thinking versus Feeling, and Extroversion versus Introversion. Later researchers added a fourth discriminator: Judging versus Perceiving. The diagnostics based on Jung's work allow us systematically to reenact with pencil and paper our daily, often unconscious behavioral choices, and our responses to questions

reveal patterns that identify our strong and weak preferences. If you are asked to fill out such a diagnostic—relax. It reveals no deep, dark secrets about your personality. But it can be quite useful, for example, in helping you recognize when you need to seek complementary preferences from partners and fellow team members, or in order to balance your own biases and strengths, or to design more cognitive variability into your groups.

Think back to the situation described at the beginning of this chapter. John limited himself by hiring people who all approached problems from similar perspectives. Although three were from financial backgrounds and three were engineers, all six preferred essentially "left-brained" tools and approaches. They all wanted lots of data, relied on solid analysis as a basis of reasoning, sought a definitive decision, and were temperamentally unwilling to revisit each other's decisions. Their analysis paralysis was predictable, given that no one in the group was inclined to seek out relatively imprecise but novel product concepts or talk to people outside their usual customer base.

The activities of our brains aren't really neatly divided between left and right cortexes, as once was thought. Nature is far more sophisticated—complex and messier. However, the left-brain, right-brain distinction is useful metaphorically because it helps us understand the complementary nature of thinking styles. The left-brained approach tends toward the highly detailed, analytical, and logical, whereas the right-brained tends toward more intuitive, emotion- and values-based reasoning. Any group of individuals focused on creativity and innovation rather than routines and efficiency profits from a mixture of thinking styles. When Jerry Hirshberg first set up the Nissan Design International studios in San Diego, he challenged himself to design the organization for creativity. He resisted the temptation to select and retain only people in his own image—highly intuitive, big-picture, visually oriented right-brained individuals. Instead, he also deliberately hired a few left-brained individuals who sought structure and always questioned "why" before proceeding. Initially, however, these individuals annoyed him; they seemed to

be “anticreative” and threatened by novelty. However, he soon came to realize that he was wrong in that assessment: “They simply come to the table with a different set of preparations and expectations.”²⁵ He needed such individuals to complement his own inclination to leap first and ask why and how later. In thinking-style diagnostics, Hirshberg found that he was “somebody who is likely to leap off a cliff with a joyous intuition and halfway down, scream up to the rest of the group, ‘Hey, let’s build a parachute—*now!*’ And thank God, the [left-brained] people were there. I might have told them beforehand that I was having this impulse, and I thought we were going to jump off a cliff tomorrow morning about seven. If I did that, they would say ‘thank you, Jerry,’ and they would go home that night and think about it and come in with some ideas about how to make it work.”²⁶

What Hirshberg discovered was the opposite of John’s experience—whereas John needed a few right-brainers to help him put aside the analysis for the moment in favor of unfettered exploration, Hirshberg needed a few left-brainers to help him consider the implementation of his bright ideas before he committed to them. Hirshberg came to think of this as *creative abrasion*—and to encourage it. Under his leadership, Nissan Design International hired designers in complementary *pairs*—as unlike as possible “so we keep from becoming a harmonious choir, all singing the same tune.” So, for example, they hired a “breathhtakingly pure artist who is passionate about colors” the same year that they hired a “Bauhaus, Teutonic, rational, clear-headed” designer with “a function-form orientation,” who is “passionate about clarity and logic.”²⁷ Such a managerial practice not only invited disparity but also virtually guaranteed that there would be conflict. This intellectual conflict Hirshberg willingly tolerated, believing that if the energy thus generated were channeled correctly into creativity instead of into anger, it would be a power plant of innovation.²⁸

People who see the world differently, require different kinds of information, and have different levels of tolerance for ambiguity do annoy each other. The artist who has spent a lifetime thinking

visually processes information differently from the accountant who has immersed herself in data. And recall that these choices of profession were likely based on a very early preference for certain kinds of problem solving. When you see the conflict of different preferences, you may think that there is an unavoidable “personality clash.” Sure, such clashes do occur—and they may be based on antagonisms having little or nothing to do with thinking styles (e.g., two big egos). But identifying those clashes that *do* originate in different thinking-style preferences can transform conflict into opportunity for creative interaction. We should be no more irritated by someone who asks for more data when we have been sketching out the big picture, or someone who insists on suggesting far-out scenarios when we are intent on the details at hand, than we are by an accidental elbow jostling at a dinner party because we are right-handed and seated next to a left-handed guest. The reasons the physical jostling is less offensive than the mental are likely twofold: we know the guest next to us cannot help his preference any more than we can. Moreover, there is no ego involvement in which hand holds the fork! It therefore helps to understand that thinking-style preferences are similarly natural and not deliberate.

It helps even more if we can regard the resulting abrasion as an opportunity for a better solution than would have evolved from a comfortable process of compatible styles. When Fisher-Price moved to a cross-functional team structure, a thinking-styles preference diagnostic was part of the training. Director of Marketing Lisa Mancuso found understanding others’ preferences enlightening. “One man on the team had been driving me nuts,” she said. “He wanted to give me every little detail about why a schedule had slipped or what was going on in the factory—and all I wanted was the bottom line. [After taking the diagnostic] it turned out that he had thought me really rude because I wasn’t interested in all the details, and just wanted him to get to the point. It really helped us communicate to understand that we just approached things differently.”²⁹

Recognizing thinking-style preferences also allows complementary staffing. Paul Horn, senior vice president and director of IBM

CREATIVITY AS A BALANCING ACT

Psychologist Robert Sternberg considers creativity a balance among three types of intelligence: creative, analytical, and practical. *Creative intelligence* is the ability to generate new and unusual ideas. *Analytical intelligence* is the ability to analyze those ideas and make decisions based on that analysis. *Practical intelligence* is the ability to see the connections between the ideas and real-life situations. It is certainly possible—but unusual—that one person might excel in two or even all three types of intelligence. More typically, a “creative” person would shine in only one. So a group composed exclusively of “creative” types would likely excel in coming up with lots of ideas but be hopeless in separating the good ideas from the worthless or in seeing practical implications of their creativity. And a group that also has members capable of elaborating novel ideas and others who can explore their applications will be more than a collection of creative individuals—it will be a creative group.³⁰

Research, advises: “Pair your visionaries with implementers. The obvious fact here is that an idea won’t succeed unless it is implemented. By pairing implementers with visionaries from the outset of the process, you reap two rewards: first, you get an end product, and second, implementers learn the craft of vision and visionaries learn the craft of implementing, which makes your team more valuable. Both skills need to be recognized, cultivated, and rewarded.”³¹ Carol Snyder, director of product design at Fisher-Price, makes a similar observation.

“If I could compose a creative group from scratch,” she says, “I would want three different kinds of people: ones that are really, really good at providing the seed of an idea, but get totally bored beyond the seed; some who love to

LOCATING CREATIVE ABRASION

At what level of the organization should creative abrasion be fostered? The easy answer is “everywhere.” But this ignores the nature of the creativity process, in which divergence and convergence may depend on different abilities. Some managers, or groups of managers, may excel in their positions not because they are highly creative but because they are excellent promoters of creativity in those who report to them. Creative abrasion is more essential in fostering divergence, while the smooth interpersonal relations that characterize a homogeneous group facilitate convergence. In a study of forty-seven firms across eleven manufacturing industries, Sylvia Flatt found that *homogeneity* in length of service in the top management team (the CEO and direct reports) combined with *heterogeneity* in the vice presidential and senior management team led to highest creativity (number of patents awarded annually). The latter team was the source of new ideas and creative alternatives (divergence), and the CEO’s team chose wisely among those (convergence).³²

take the seed and build on it, once the idea is out there—massage it, make it into something; and finally, the ones who are really good at getting the idea through the system. That takes as much creative thinking as coming up with the idea in the first place.³³

Designing Creative Abrasion into Your Group

There are many ways to introduce divergent thinking into your group, ranging from virtually cost-less to highly expensive, and there are degrees of creative abrasion, from mild to Tabasco-hot. The objective is to increase the level of stimulation and variety, to multiply

the number of newcomer “dumb” questions that can stump your smartest people—and lead to innovative thinking. But let us not equate creative abrasion with simple conflict. The idea is not, of course, just to irritate group members. Personal conflict or basic incompatibilities over interpersonal styles can poison a group. Rather, you want to design appropriate cultural, disciplinary and thinking style diversity into groups, and then manage effectively the resulting abrasion for creativity.

Hire People Who Are “Not Like Us”

Look around you. How did recent hires hit the organizational radar screen? Did they submit resumes to a human resources department that is skilled at selecting people who “fit”? Top schools? Best experience base? Or perhaps they were identified by friends or relatives in the organization. Whatever your hiring practice, you are unlikely to interview, much less hire, someone who is very different in educational or cultural background unless you make a concerted effort to do so. The body politic rejects foreign transplants. If your hiring goes through the usual channels, your future workers will inevitably be cast in the image of those who have made your organization successful in the past.³⁴ And “different” people, whose abrasion could generate creative light, will head elsewhere. The hotshot computer programmer heads for Microsoft. A whiz at Finance? Destination: Wall Street.

So what, you say? Well, as long as you expect the world to stay pretty much the same, no problem. However, suppose you suspect environmental changes may build superhighways over your prior roads to success. Maybe the Internet will outdate your distribution system. Perhaps an aging population means taking aim at a different audience. Possibly the fact that consumers are increasingly sophisticated about “spin” changes your communication strategy. If you believe that some radical change is inevitable, you want to inject into the organization people whose preparation for creative activity (i.e., their deep knowledge bases) differs from the usual. If you wish

to attract a top-notch recruit from an educational background not usually associated with your company, you will have to work at it.

Unless you are in the military, you probably do not have an *official* “dress code,” but employees in your organization are accustomed to certain personal profiles and manners of speech and dress. (Ever think of wearing a brightly colored floral sports shirt to an important business meeting? See what we mean?) People who look different or act differently make us uncomfortable. The usual hiring channels screen out people whose cultural backgrounds differ. Picture this: a woman with a tongue stud and with hair striped with various shades of red applies for a position as accountant at your organization. Will she get hired? Probably not, but she was at *Wired*, the ultramodern journal that follows the Internet world. Unusual haircuts and pierced body parts are also the uniform at many entertainment-related companies where a man sporting a conservative suit and close-cropped hair would be the eccentric.

Hiring people who are very different from the norm does not guarantee creative output—especially people who just *look* different. As we said earlier, you can’t always judge the book from the cover, the corporation from the Web page. To the relief of most of us, our appearances are not an infallible guide. However, hiring *everyone* with the same background and preparation bounds the employee pool in predictable ways—and therefore limits the types of creative abrasion likely to occur.

But wait, you say. What about the highly successful, even creative companies that select employees precisely because they *are* alike? Federal Express looks for “risk taking and courage of conviction.” Disney wants people with an “up personality.”³⁵ What Southwest Airlines seeks “first and foremost, is a sense of humor,” according to CEO Herb Kelleher. “Then we are looking for people who have to excel to satisfy themselves and who work well in a collegial environment. . . . We hire attitudes.”³⁶ Two points: First, these companies are looking for common personality factors that may be found in a wide variety of *intellectually diverse* people. Optimism (being “up”), for instance, isn’t limited to detail-oriented people or

big-picture folks, to accountants or to artists. Second, as we will discuss in Chapters 4 and 6 in some detail, homogeneity in the sense of sharing the organization's vision, goals, and values can aid creativity.

Invite Alien Visits and Perspectives

Perhaps, you say, after the "downsizing, right-sizing" era, you aren't hiring—period. That doesn't let you off the hook for inviting stimulation into the group. Even if you can't hire someone, you can bring people in on a temporary basis. Professors and employees from other companies take sabbaticals. Students and others are often willing to serve as paid or unpaid interns. Local colleges may have field-based studies or co-op programs through which students can work for a time in your organization and hold a useful mirror up to your operations for reflection. Fisher-Price finds room for ten or more "co-op" design-school students every year. Notes Senior Vice President Kevin Curran, "Not only are they a big help to designers and bring a fresh perspective, but we get to look them over as prospective hires."³⁷ At Integrated Systems Design Center (ISDC) in San Diego, cofounder Marco Thompson has taken the concept of internships a step further. "Each one teach one" is one of seven principles in the corporate "mantra." At any given time, ISDC has ten to fifteen interns among its 120 employees. Originally conceived to ensure that the company had a stream of well-trained engineers available for hiring, the internship program has become a profit center, as the students have proven so productive that their time can be billed to clients. The program succeeds because successful mentoring is an important element in employee performance reviews. Engineers and project managers are judged by how well their interns do. "No one can become a manager at any level in this company," says Thompson "unless you have proved yourself as a mentor."³⁸ ISDC also imports another kind of "alien": the customer's own engineers, who work on product development teams. For example, when ISDC was designing a set-top box for Mitsubishi, six of the twenty-person team were from Japan.

Consultants are another, if more expensive, option. The point is to introduce alien perspectives—people who will challenge the group by asking "dumb" questions and making ingenuous observations. A newly appointed director to the board of a company providing chickens to supermarkets asked a naive question: "What is fresh?" that provoked an industry review of the common practice of labeling frozen chickens "fresh."

And at many companies, returning "alumni" can bring with them the perspectives they learned from working at other organizations. American Management Systems keeps in touch with employees who have left because often the best return to the fold. At Gensler, the international architectural design and planning firm, a number of designers have a boomerang hanging on their wall. CEO Arthur Gensler values the fact that creative designers sometimes want to leave the firm to try their luck elsewhere. But they are always welcome to return, and the gift of a boomerang symbolizes their homecoming. The return rate of 12 percent is one of the highest in the field.³⁹

The Manager and Creative Abrasion

If you have designed your group or organization with some of the suggestions above in mind, you have diversity. Plenty of it. And probably abrasion too. Now, let us consider the implications of creative abrasion for your personal management style.

Know Thyself

The starting point for all management is understanding yourself, and managing creativity is no exception. Your thinking style affects your ability to lead your group in creativity as surely as your vision affects your ability to walk. As the section above on thinking-style preferences indicates, each of us is hard-wired and highly proficient in some modes of thinking and relatively uncomfortable with others. Yet, if we are to spark innovation, we need the intellectual disagreement that raises options. If you are an enthusiastic, spontaneous,

shoot-from-the-hip person, you *need* a cautious, detail-oriented person to ask the “how” questions—even if you choose to move ahead without answering them all. If you love protocol and the proven solution, you *need* that reckless think-from-the-gut individual who will push you to consider options that have never been tried before—even if you decide that none of them is feasible. So you need to know what your own biases are. Because so many of our biases are unconscious, the exercise of systematically exploring our preferences, using some reliable diagnostic such as the Myers-Briggs Type Indicator mentioned above, helps us understand how we make decisions. John (in our opening anecdote) loved working with highly analytical thinkers. “Right-brainers” gave him mental hives. Naturally (but unconsciously) he created a cozy, homogeneous, intelligent—but for his purposes, ineffective—group. Had he understood his own biases, he might have brought in some aliens, suffered the discomfort, and had better results.

Protect the Aliens

Suppose you have identified and recruited a useful “alien” who can challenge the group’s prevailing world view. Any alien has to live with rules, reward systems, and most important, social norms that evolved to support *us*—that may be totally inappropriate for the alien. So your job does not end with hiring. If your new hire begins to feel as isolated and far from home as E.T., he or she is likely to “phone home” and leave unless you provide good reasons to stay. We humans are social animals, and we do not like being ostracized. The wise manager takes a number of measures to retain the alien perspective.

No Alien Should Have to Stand Alone If you are going to bring a data-driven individual into a big-picture group, or an artist in with engineers, or a hip youngster in with middle-aged traditionalists, try to bring in more than one frame-breaker—more than one very different person, even if the second or third individual differs along

THE IMPORTANCE OF ALLIES

In his classic study of conformity, Solomon Asch brought college students into a laboratory ostensibly for a study of “the visual perception of lines.” A standard line was shown, along with three comparison lines, one of which was the same length as the standard; the other two were obviously different. Unknown to the naive subject, the six other students were experimental confederates who had earlier been instructed to respond incorrectly on certain trials. The subject would face a situation in which his eyes told him one thing, but the weight of six other judgments told him something entirely different. On these critical trials, most subjects went along with the erroneous judgment of their peers at least some of the time. However, when *one* of the confederates gave the objectively correct answer, while all of the others gave the incorrect answer, conformity was reduced nearly to zero. Just having that one ally was of crucial importance in resisting pressures to conform.⁴⁰

alternative characteristics from the first. Aliens need some critical mass before they are effective.

Why the Alien Is There The alien’s utility may be obvious to you and totally obscure to the other members of the group. A couple of psychologists invited to join a computer science group made the best of it by calling themselves “the psychos,” emphasizing both their differences and reminding the group of why they were there—using humor to make both points. You may also need to prepare the aliens, inoculating them against the discouragement of initial rejection. The group may be pretty hostile—or may merely ignore them.

Make Sure the Alien Succeeds You were probably with us until that last point. Make sure the alien succeeds, you ask? How and why

HELPING ALIENS SUCCEED BY PREPARING THEM FOR REJECTION

During the Vietnam War, many men newly inducted into a combat unit were treated with hostility and derision by the veterans.

The recruit felt stupid and inadequate, and psychiatric casualties among the new men were common. The psychiatrists named the effect the "FNG syndrome" (for the veterans' "fucking new guy" epithet). Rather than trying to treat these men after the fact, they intervened preemptively, preparing the new men for the hostility by helping them anticipate the reaction as being directed against the "FNG" rather than against them personally.

"They don't hate you, they hate the FNG."⁴¹

should I do that? Ultimately, of course, it is up to the alien to succeed. However, it is important to ensure some small demonstrations of usefulness early in this individual's experience with your group. For example, some prominent male university professors in a university decided to launch a new executive education program in engineering management. They asked a younger female colleague whose background was in the social sciences to direct it. They had a number of reasons for wanting this alien in their midst—not the least of which was that they believed the program would be more innovative if they could include her different perspective. However, she was understandably concerned about the potential for failure. "Don't worry," they said. "We will make sure this succeeds." They carried through on their promise by personally recruiting excellent participants for the first run-through and agreeing to teach in it themselves so that the program would benefit from their prominence and reputation. They reviewed the curriculum to make sure that it would satisfy the engineering requirements, and encouraged the inclusion of social science materials about which their colleague was an expert. Once the program was successfully launched, they did not have

to expend more energy helping the alien; she was integrated and productive.

The Limits of Heterogeneity

Imagine a group in which everyone is so different that they literally have no common language for communication. Members can be so grounded in their disciplines, cultures, or thinking styles that they refuse to listen to anyone else. As a result, creative abrasion is never ignited, and instead the group resorts to time-saving techniques such as voting and splitting the difference.

Managers of creative groups interviewed emphasized the need to select group members who are willing to "blur the boundaries," that is, those who are not territorial about their specialized knowledge and are not afraid to venture onto the intellectual turf of others. In fact, members of creative teams often emphasized that it was difficult to assign authorship for innovative ideas because everyone trampled down disciplinary boundaries in their eagerness to contribute. And more than one manager removed a team member who would not, or could not, leave his intellectual island for the good of the group. Therefore, just throwing different kinds of people together and expecting wonderful, creative results is unlikely. To manage a diverse group effectively requires some special skills that we will discuss in subsequent chapters.

To return to John...

To his relief, John did not have much difficulty finding another job. Since his whole group had been dissolved, managers in other companies interpreted his departure as part of downsizing. His former title as Manager of Business Development landed him a similar position in a new company. He recognized that at least part of his problem at his old job was that group members used very similar approaches to scrutinize ideas and all the same sources to identify potential product concepts. Determined not to make the same mistake, he added to his fledgling

group of eight engineers at the new company, five people with very different backgrounds—two industrial designers, a market researcher, an industry expert, and an anthropologist who had worked on a number of highly successful consumer product lines. While all of them had some experience in new product development, they had all worked on different aspects. He knew a couple of them were going to annoy him personally because they were big-picture, idea people who were unlikely to present ideas as thoroughly backed with data as he would want. In fact, they sounded downright “touchy-feely.” But he had worked with a very homogeneous, personally comfortable group before and look where it had gotten him! Better to have a group that would challenge him and each other. One thing he was sure of—the group meetings were going to be lively.

Key Points

- * Creative groups need people who bring different, useful perspectives to the creative task. Selecting people with different *deep knowledge* as well as different *culture* and *thinking styles* provides intellectual diversity.
- * Group diversity and the creative abrasion that results are most important when divergent thinking is needed.
- * Selecting diverse group members is not the only way to promote creative abrasion. Visits to “aliens” and bringing in aliens with different perspectives are also crucial.
- * Managing creative groups is particularly challenging because we want the benefits of *creative abrasion*—the clash of ideas—while avoiding *interpersonal abrasion*—the clash of people.
- * Creative abrasion is most likely to flourish when managers understand their own thinking styles and ensure that aliens are protected and succeed.
- * Creative groups select experts who can “blur the boundaries” of their disciplines.

Generating Creative Options

“I don’t need to tell you how important this distance learning contract is,” said Hazel as she opened the meeting. “If we get to design the ad campaign, we’ll have a whole new line of business. That’s why I’ve put our very best people on this team—including Fred from Sales and Tom—even though he’s moved to our financial services account. I know some of you were a bit surprised at my bringing them in, but we needed a variety of backgrounds and knowledge to be creative. I was really pleased with yesterday’s brainstorming session—we came up with a lot of cool ideas. Given our schedule and resource constraints, I’ve gone ahead and selected one to work on. The parody of university professors concept was funny—but I don’t think we know enough about university teaching to pull it off. And I liked the notion of outreach to kids in developing nations, but we could offend some people with that one. So I suggest we go with the puppy training idea. If your dog can be trained to sit up and beg through the Internet, then for sure your kids can be taught calculus the same way. People like animals in ads; it won’t offend anyone; we can make it funny and it’s a low budget approach. I’ve divided you up into three subgroups; each group needs to get going on slogans, storyboards, budgets. We’ll get together next Friday to see what you’ve come up with and select the best treatment. Any questions? No? Okay, let’s move.