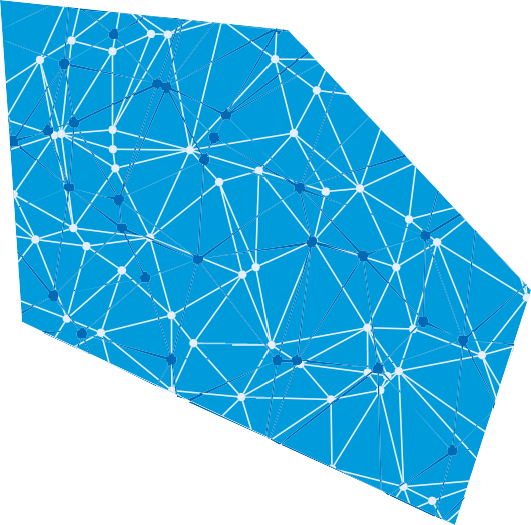
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THE HEALTHY MIND PLATTER

by David Rock Daniel J. Siegel Steven A.Y. Poelmans and Jessica Payne

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**HEALTHY MIND PLATTER**

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The last few decades have witnessed a growing awareness of the importance of nutrition as a basis for health within the general population. In the U.S. and Europe, governments have created nutrition recommendations. Published as charts, such as healthy food pyramids, which indicate that different food groups provide important nutrients, they recommend that citizens follow a “complete” diet that provides all the essentials the body needs. Because the body needs a wide variety of ingredients for optimal health, the basic underlying principles are variation and complementarity. This suggests that always eating the same food, even if it is healthy, does not provide the body with a wide enough variety of ingredients for optimal health.

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THE HEALTHY MIND PLATTER

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Spurred on in 2011 by the U.S. government’s relaunch of the food pyramid as a “healthy eating plate,” the authors Daniel Siegel and David Rock decided to explore a framework for understanding the ideal diet for our brain. We decided to coin this the “Healthy Mind Platter.” We do not refer literally to substances like glucose, which is an essential nutrient for the functioning of the brain, but to a set of everyday activities that, on the whole, optimize “brain health.” Based on our literature review, we hypothesize that there are seven activities that each have different and beneficial effects on the mind that complement each other, providing together a well-balanced “mental diet” for optimal neurocognitive functioning and well- being. We propose that very much as in the case of food, people can do without some of these activities, but this lack of behavior will be associated with suboptimal levels of functioning or ill-health. Further research is needed to determine the exact quantity and quality of each activity that is needed for optimal health, but we propose that each of these activities make a unique and positive contribution to mental productivity and well- being. As such, the objective of the Healthy Mind Platter is *to propose a framework for creating and maintaining mental well-being, summarizing and integrating distinct strands of neuroscience and psychology research, so it can be used to inform communities such as schools, organizations, governments, and communities, as well as families and individuals, about best practices for promoting mental health.*

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**Introduction**

Throughout the world, driven by advances in information technology and automation, our economy is gradually shifting to a knowledge- and service-driven economy, where increasingly the basic production factor of muscle

power is being replaced by brainpower. Although often compared to a muscle, the brain’s anatomy and physiology is fundamentally different from those of muscles. Whereas a combination of exercise, rest, and nutrition can be sufficient to produce physical strength and resilience, these are clearly not sufficient conditions for an alert, creative, and resilient mind. In line with the principles and purpose of positive psychology, we want to move beyond studying and summarizing what is needed to avoid pathology and make clear and useful what is needed to promote health. Though awareness of how an unhealthy diet can result in serious pathologies and epidemics, like obesity, is now being raised, many are hardly aware of the costs of an unhealthy mental diet, like massive losses in productivity, exhaustion, burnout, and stress. Explicating the constituent activities for a healthy mind is therefore timely and important, especially since developed countries are reaching the limits of economic growth. One may daily observe on the news the catastrophic consequences of being deprived of food and basic housing, but society is relatively unaware of what happens when individuals or large communities are deprived of play (think of entire generations of children working under conditions of forced labor), good quality sleep (think of the vast amount of people regularly taking sleep medications), or satisfying time to focus and sustain clear attention without distraction (think of population groups suffering unemployment or underemployment, or the vast number of people who fill their time with junk media).

Most members of the general population know little about how the constant interruptions and distractions caused by communication devices and the bombardment of information and publicity sent out by the media impacts our mental well-being. They have minimal awareness of the negative effects of

5

the sense of isolation and lack of relatedness that can occur in large cities that are built without regard for our need for a sense of community. Finally, what we have to gain as a species from the generalized practice of reflective practices is not readily apparent to the general population unaware of the research pointing to its positive impacts.

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#### With stress, the brain will disconnect more often from the task at hand, and we may find ourselves staring

*at the computer screen, experiencing a momentary state of reverie or trance.*

Consider the current state of how most people manage — cultivate and maintain — their mental well-being. We have all experienced the challenge of maintaining focus over prolonged periods of time and know how it can cause fatigue. We all know that our attention is even more limited if we had little sleep the night before. With stress, the brain will disconnect more often from the task at hand, and we may find ourselves staring at the computer screen, experiencing a momentary state of reverie or trance. As soon as we become aware of our disconnection, we may want to return to the task, but we might feel an urge to stand up, go for a walk, or get a snack. Basically, our brain is demanding a minimum level of physical motion and important nutrients in order to be able to operate well. On our way to the vending machine, we may encounter a colleague, and although we are cognizant of the pile of work waiting for us on our desk, we connect with a bystander to exchange a chat and a joke.

Once again, our brain is automatically driving us to socialize even without our awareness or conscious intention, distracting us and delaying the time before we return to work. Once we are back at our desk, we may be able to focus again, but we seem to lack the necessary creativity to resolve the problem. None of the techniques known to us seem to help in producing a satisfactory

6

solution. Frustrated by this impasse, we may lean back in our chair and suddenly remember the joke made by our colleague half an hour ago.

We internally laugh at the joke and do not realize that thanks to this playful mental intermezzo, our brain is capable of having a sudden insight that will help us to solve the problem. In the case described above, the person is basically stumbling from activity to activity, driven by the needs of the brain, without any level of awareness of why this chain of events is occurring. We may even return back home that night believing we had a productive working day, ignorant of the fact that the reason we are irritable is not because our spouse is being unreasonable but because we are mentally exhausted.

Now consider how different things could be. What would happen if we were to start the day after a good night’s sleep with half an hour of reflective practice, taking advantage of the rested and centered mind to prioritize the activities of the day? We might consciously plan to take a break over lunch, allowing for down time or even a brief nap, and arrange for a tennis game with a friend right after work, thus combining connecting time and physical activity. When we arrive at work, we mindfully schedule the meetings of the day to alternate individual focus time with meetings with colleagues so as to have a day with variation in brain activity. The result might be that when we come back home, we actually have sufficient reserves to connect and play with our children, completing the list of healthy activities for the day before dinnertime. Following a healthy mind diet can provide us with the physical and mental well-being necessary to establish and maintain relationships with family, friends, and colleagues, and efficiently realize the tasks and responsibilities at school, work, and in our communities.

In the next paragraphs we will provide the scientific foundations for the Healthy Mind Platter, synthesizing what we have learned from clinical work, behavioral research, affective and social neuroscience, and psychology. First we will review the neurocognitive benefits of seven key activities: (1) Sleep; (2) Play; (3) Time in (meditation or reflective practice); (4) Downtime; (5) Connect;

(6) Physical; and (7) Focus. We will explicate their relationships with outcome variables like creativity, health, and cognitive performance. Second, we will present the Healthy Mind Platter (HMP) model, representing the complex relationships between the elements of the HMP as antecedents and moderators for the three variables: creativity, (mental) health, and cognitive performance. This approach can serve both as a model with hypotheses for future research and a framework for brain health practice.



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**Figure 1:** Ingredients of the Healthy Mind Platter.

**Seven neurocognitive activities that nurture the mind**

**The Healthy Mind Platter**

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1. ***Sleep — Refreshing mind and body, and consolidating memory***

Sleep is a highly complex and vital process that is essential for the biological balance of the mammalian organism (Benington, 2000), and thought to be critical for homeostatic restoration, thermoregulation, tissue repair, immunity, memory processing, and emotion regulation. Accordingly, sleep deprivation can be more lethal than food deprivation. According to the 2008 Sleep in America poll on *Sleep, Performance, and the Workplace* conducted by the National Sleep Foundation, Americans said that they wake up, on average, around 5:35 a.m. on workdays and around 7:12 a.m. on non-workdays.

Overall, respondents reported an average sleep time of six hours and 40 minutes on workdays, and 44% get less than seven hours of sleep on workdays. About 3 in 10 respondents (29%) reported falling asleep or becoming very sleepy while they were at work in the past month, and just more than 1 in 10 (12%) were late to work in the past month due to sleepiness or a sleep problem. In the U.S., drowsy drivers are responsible for a fifth of all motor vehicle accidents and some 8,000 deaths annually. It is estimated

that 80,000 drivers fall asleep at the wheel every day; 10% of those drivers run off the road, and every two minutes, one of them crashes (Fryer, 2006). A study of work hours, sleep, and depression in 2,643 Japanese citizens who were employed full time showed that participants working more than 10 hours per day, sleeping less than six hours per day, and reporting insufficient sleep were, respectively, 37%, 43%, and 97% more likely to be depressed than those working six to eight hours per day, sleeping six to eight hours per day, and reporting sufficient sleep. The study concluded that depression associated with long work hours is primarily a result of sleep deprivation (Nakata, 2011). These statistics do not take into account the vast opportunity costs that sleep deprivation has on the quality and quantity of performance at work.

Since Aristotle and until the middle of last century, sleep was considered a passive state that simply counteracted sleepiness (Payne, 2011). Now, half a century later, there is a consensus that sleep not only allows for rest and recuperating strength for the next day but also that it is important for cognitive processes such as memory consolidation, semantic integration, learning, and the processing of emotions (Stickgold, 2005; Ibañez, San Martin, Hurtado, & Lopez, 2008; Payne, 2011).

7

Generally a distinction is made between two main types of sleep, rapid eye movement (REM) sleep and non-REM sleep. REM sleep occurs in roughly 90-minute cycles and alternates with four additional stages (stages 1-4, in order of increasing depth) known collectively as non-REM sleep. Slow-wave sleep (SWS) is the deepest of the non-REM phases and is characterized by high- amplitude, low-frequency brain oscillations. REM sleep, on the other hand, is a lighter state of sleep characterized by eye movements, decreased muscle tone (which inhibit the acting out of dreams), and low-amplitude, fast brain oscillations. In fact, REM sleep is a neurophysiological state that is more similar to wakefulness (Hobson & Pace- Schott, 2002) than non-REM states. More than 80% of SWS is concentrated in the first half of the night, whereas the second half of the night contains roughly twice as much REM sleep than the first half.

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**Sleep and the body:**

One proposed theory of sleep, especially slow-wave sleep, involves homeostatic restoration; that is, after a day of “use,” sleep restores chemical and physiological processes that have become depleted during the day. Supporting this idea, the amount and power of slow- wave sleep in the first half of the night is strongly related to the amount of prior sleep and wakefulness, and thereby represents a marker of homeostatic sleep regulation (called “Process S”). The more hours spent awake, the more sleep pressure one accumulates and the more intense and abundant subsequent slow-wave sleep will be. This “slow-wave sleep rebound” may reflect a mandatory period of recovery or restoration for multiple biological systems as they recover from the “wear and tear” of waking activities, which is an idea supported by the surge in growth hormone that parallels slow-wave sleep early in the sleep cycle. Growth hormone is not only critical in early development but also in continued growth and maintenance of bone and tissues throughout life (Payne, 2011).

**Sleep and the mind/brain:**

As important as sleep is for the body, evidence suggests that it may be even more critical for the brain. There is strong evidence that sleep’s role extends beyond the body and includes critical brain functions, such as memory, creative processing, and emotion regulation. Recent studies suggest that sleep is critical for solidifying or “consolidating” memories so that we integrate what we learn into long-term knowledge. Recent studies have shown that during sleep, neuronal populations previously engaged in a learning task are reactivated.

This reactivation during sleep is a key process for stabilizing memory traces (Diekelmann & Born, 2010). Examples include motor-sequence learning (Walker,

8

Brakefield, Morgan, Hobson, & Stickgold, 2002; Cohen, Pascual-Leone, Press, & Robertson, 2005), visual- discrimination learning (Stickgold, James, & Hobson, 2000), perceptual learning of language (Fenn, Nusbaum, & Margoliash, 2003), and declarative memory (Stickgold, 2005). For instance, learning to navigate a maze during the day is associated with activation in the hippocampus, which is a structure that is essential for normal memory function. During subsequent sleep, there is a reactivation or “replay” of this hippocampal activation, as if the brain is reprocessing recently learned information. There is a compelling relationship between the increase in hippocampal activation during sleep and the amount of improvement in the maze task the next day. Moreover, if people dream about the maze task, their performance improves still further. This suggests that the re-expression of hippocampal activation during sleep reflects the offline processing of memory traces, which in turn leads to the strengthening of network connections in the brain, resulting in improved memory performance.

#### As important as sleep is for the body, evidence suggests that it may be even more critical for the brain.

REM sleep, in particular, has been associated with insight and creativity, which is perhaps not surprising given that the most bizarre, fragmented, sometimes emotional, and certainly creative dreams happen during REM sleep. A recent report shows that a nap with REM sleep improves people’s ability to integrate unassociated information for creative problem-solving (Cai et al. 2009). During sleep, our brains integrate information in highly novel ways and make connections that we are simply not capable of seeing during wakefulness (Payne, 2011). In addition, several studies have shown that the suppression of sleep produces deficits in cognitive and emotional processing during wakefulness (Gais & Born, 2004; Durmer & Dinges, 2005; Stickgold & Walker, 2005; Tassi, Bonnefond, Engasser, Hoeft, Eschenlauer, & Muzet, 2006). Even a single night of sleep deprivation can render one more negative and more emotionally unregulated the next day than is experienced with a full night of restorative sleep. Based on this research, the expression “to sleep on it” gains a whole new meaning, and the idea that little

or no mental activity occurs during sleep is unfounded. Instead, sleep is a highly dynamic and active collection of brain states that are critical for physical, cognitive and emotional health.

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But how much sleep should an individual get? It turns out that while the answer is, on average, 8 hours, there is room for individual variation. Sleep need follows a normal distribution or bell curve function, with the bulk of individuals requiring seven to nine hours of sleep. However, some individuals require as little as four or as much as 12. While these people are outside the common range of distribution and very rare, they should not be considered to have a disorder.

Understanding one’s sleep needs and ensuring these are managed properly is central to a healthy body, brain, and mind. What can one do if short on sleep? It turns out even a short nap can help, with studies showing that a day’s worth of sleep need not be acquired in a single nocturnal chunk. Siesta cultures show us that sleep can be divided into a night of five to seven hours and a daytime nap spanning one to two hours. What seems important is that the so-called 90-minute “ultradian cycles” are preserved. Alternatively, however, even very brief naps can help boost cognitive performance and help us feel more alert. In our “sleep-sick” society, napping has become a regular and sometimes necessary part of our daily lives.

Research investigating the benefits associated with napping holds potential for informing workplace practices and individual functioning.

In an informative study, Brooks and Lack (2006) assess the benefits of different lengths of naps (5, 10, 20, and 30 minutes). Interestingly, the 10-minute nap conferred the biggest benefit in alertness and performance both immediately after and up to three hours later. The five- minute nap was not quite enough to confer a significant benefit, while the 20- and 30-minute naps were helpful, but these benefits did not emerge until several hours later, arguably due to the effects of sleep inertia. If one wants the positive effects of a nap right away, a brief nap is most effective. This is because brief naps are more likely to contain light sleep (largely stage 2 NREM sleep) and are short enough to prevent one from delving into slow- wave sleep, which is restorative but difficult from which to awaken. It is also important to recognize that napping can be learned (with enough practice and diligence); this is key because evidence suggests that regular nappers may glean more benefits from napping than those who only nap out of necessity when absolutely exhausted. Clearly, recent research strongly points to the fact that sleep is far more important than is generally recognized, and though people do not get enough of it, there are easy steps to take to start remedying this problem. Adding a

nap to one’s day or an extra 20 minutes to one’s sleep cycle (or both) can yield major benefits to cognition, emotional regulation, and general performance.

1. ***Play — The joy of experimenting with life***

*“Playfulness enhances the capacity to innovate, adapt, and master changing circumstances. It is not just an escape. It can help us integrate and reconcile difficult or contradictory circumstances. And, often, it can show us a way out of our problems.”*

Stuart Brown, National Institute for Play

Play, which may seem like a frivolous, unimportant behavior with no apparent purpose, has earned new respect as biologists, neuroscientists, psychologists, and others see that play is indeed serious business and is perhaps equally important to other basic drives of sleep, rest, and food (Frost, 1998). Neuroscience research reveals that play-joy is a basic emotional system and essential in child development and adult creativity and learning (Panksepp & Biven, 2012). It has been suggested that play is an important behavioral tendency that does not require learning and is an “experience-expectant” process that has adaptive neurodevelopmental effects, which promote later adaptive behaviors and help program higher brain regions involved in emotional behaviors (Gordon, Burke, Akil, Watson, & Panksepp, 2003).

#### … even very brief naps can help boost cognitive performance and help us feel more alert.

According to a report from the American Academy of Pediatrics (AAP), free and unstructured play is healthy and in fact essential for helping children reach important social, emotional, and cognitive developmental milestones as well as helping them manage stress and become resilient. Forces threatening free play and unscheduled time include changes in family structure, the increasingly competitive college admissions process, and federal education policies that have led to reduced recess and physical education in many schools. Play is not, however, only vital for children; it also appears to generate cognitive benefits for adults.

9

Based on his extensive research of play, Panksepp proposes that the play-joy system is one of the basic emotional systems in human beings similar to rage, fear, expectancy, panic, lust, and the maternal nurturance-acceptance system (Panksepp, 1991; 1992). Research on rough-housing play in mammals, both sapient and otherwise, clearly indicates that the sources of play and laughter in the brain are instinctive and subcortical (Panksepp, 1998). Panksepp’s research revealed that if rats are tickled in a playful way, they readily emit 50-kHz chirps (1998; 2003). Given that these chirps are indicative of positive affect and joy, they are probably comparable to human laughter (Panksepp & Burgdorf, 2003; Panksepp, 2005). Although the human capacity for verbal joking probably requires more refined cortically dependent cognitive skills, language probably “tickles” the ancient play circuits of our minds and causes joy to occur (Panksepp, 2005). The rats that were tickled became socially bonded to the experimenters and were rapidly conditioned to seek tickles. The effect of juvenile isolation on these behaviors appears mainly due to deprivation of play (van den Berg, Van Ree, Spruijt, & Kitchen, 1999a). Therefore, play may serve to prepare for more adaptive social behaviors in adulthood. The early games and frivolity of animals and humans equip them for the skills they will need in later life (Angier, 1992; Brown, 1994).

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Indeed, human play and laughter is fundamentally a social phenomenon. The reason one cannot tickle oneself may be because the underlying neural systems are controlled by social cues and interactions. These are factors that help weave individuals into the social fabric in which they reside, reflecting different levels of position and dominance (Panksepp & Burgdorf, 2003). Following multiple play bouts, juvenile rats develop dominance hierarchies that remain relatively stable over the juvenile period (Meaney & Stuart, 1981; Panksepp, Siviy, & Normansell, 1984). Preventing male rats from playing has lasting consequences on social (Hol, van de Berg, Van Ree, & Spruijt, 1999; van den Berg, Van Ree, Spruijt, & Kitchen, 1999a; van den Berg, Hol, Van Ree, Spruijt, Everts, & Koolhaas, 1999b), aggressive, and sexual behavior (van den Berg, Hol, Van Ree, Spruijt, Everts, & Koolhaas, 1999b). In human children, playing only in isolation has also been associated with social problems (Coplan, Rubin, Fox, Calkins, & Stewart, 1994).

Neuroscientistandplay expert Pankseppsuggests thatone reason for the increasing incidence of attention-deficit hyperactivity disorder (ADHD) may be the diminishing availability of opportunities for preschool children to engage in natural self-generated social play. He suggests that instead of psychostimulants, at-risk children should be stimulated through play in order to facilitate frontal lobe maturation and the healthy development of pro- social minds (2007, see also Panksepp & Biven, 2012).

10

Psychiatrist Stuart Brown, founder of the National Institute for Play, became interested in play when he found that 90% of the 26 murderers he studied had a common history of play deprivation or abnormal play (Brown, 1994; Brown & Vaughan, 2010). This is a sensible conclusion in the light of all the above because play seems to serve an important role in establishing relationships with positive effects. It is a safe way of learning about the “rules of the game” and developing adaptive social behavior. This is of vital importance in children, but is equally important in adults.

#### … human play and laughter is fundamentally a

*social phenomenon.*

An important benefit of play is that it can facilitate learning. Research in rats has shown that play behavior is considered to be rewarding, as the opportunity to play can be used as an incentive for maze learning (Humphreys & Einon, 1981; Normansell & Panksepp, 1990). Just as in rats, the reward circuits in the brain light up during human mirth (Mobbs, Greicius, Abdel-Azim, Menon, & Reiss, 2003). States of engaged attention between infants and their caregivers tend to be associated with play, states of joy, and general experiences of positive affect (Gottman, Katz, & Hooven, 1997). Play-joy stimulates the reward centers in the brain and is associated with the release of dopamine, which facilitates the establishment and consolidation of new neuronal pathways, which in turn is important for creativity (new connections) and memory (lasting connections). A study by Garaigordobil Landazabal (2005) focusing on the impact of play on the intellectual development of school children aged 10–11 years demonstrated a significant effect of play on verbal intelligence, the ability to form concepts or define words, and on the capacity for verbal associative thinking. The intervention program consisted of a weekly 2-hour play session throughout the academic year.

In their review, Spinka, Newberry, and Bekoff (2005) propose that play enables animals to develop flexible emotional responses to unexpected events in which they experience a sudden loss of control. This loss of control has more than a symbolic significance for humans. Indeed, it has been identified as one of the major causes of stress (Karasek & Theorell, 1990; Spector et al., 2002). In the same way that animals play to increase the versatility of movements to recover from sudden shocks such as loss of balance and falling over, young children learn to cope emotionally with unexpected stressful situations by

“training for the unexpected.” Spinka and his colleagues suggest that the playful switching between in-control and out-of-control elements is cognitively demanding and is accompanied with neuroendocrinological responses that produce a complex emotional state known as “having fun.”

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In other words, Mother Nature has provided us with a naturally rewarding activity — play — that allows both animals and humans to experiment with the demands of life itself and practice spontaneous and novel motor and social skills that will prove to be essential for survival in the concrete jungle.

1. ***Downtime—Disconnecting for integration and insight***

When explaining “downtime” in workshops, we found that this is the most counterintuitive component of the Healthy Mind Platter and needs quite a bit of explaining. “Downtime” does not correspond with “leisure time” exactly, which is a much broader term that may refer to hobbies and sports. In the Healthy Mind Platter, hobbies are more likely to come under “focus time” and sports under “physical time.” With downtime, we refer to a very specific type of “activity”: inactivity, or doing absolutely nothing that has a predefined goal. Think of downtime as literally being not goal-focused. Hanging out, being with one’s surroundings, being spontaneous, having no particular goal or focus, as one might do on a lazy Sunday morning with no plans. Downtime is more about “being” in the moment with spontaneous emergence of whatever activity may or may not arise rather than “doing” a pre-planned activity with a goal or preset agenda.

We have many words in our vocabulary that seem to refer to downtime, including idling, hanging around, loafing, lazing, goofing off, and chilling out. These terms suggest that downtime is not very well understood nor highly regarded. In our definition, downtime is actually intentionally having no intention, of consciously engaging in doing nothing specific or “preplanned,” a process of disconnecting from intended directions and surrendering to daydreaming, letting our minds wander off in no particular direction with spontaneity and freedom. Downtime may occur between activities: while waiting for an appointment or an airplane, while listening to music or sifting through a magazine, that is, if we do not really pay sustained, focused attention to what is heard or written. If we consciously choose to spend downtime, we might find a comfortable seat in the comfort of our living room or the shadow of a tree and disconnect from an intentional, linear focus on our environment. During those periods of downtime, we do much more than slumber, rest, and go “offline.” During the “inactive” state of wakeful rest or daydreaming, the default neuronal network (or task-negative network)

activates. This mode has been found to be characterized by activity in the medial temporal lobe (for memory), the medial prefrontal cortex (for theory of mind and sense of self), the posterior cingulate (related to autobiographical reflection), and the lateral parietal cortex (for integration) (Buckner, Andrews-Hanna & Schacter, 2008).

#### … unconscious thought produces better decisions than when people decide immediately using conscious, logical reasoning …

Researchers have shown that insight is preceded and aided by disconnecting from deliberate, goal-directed, conscious thinking. In many ways, downtime permits a sorting through of many disparate elements of our mental lives, permitting a process called integration — the linkage of differentiated parts — to naturally unfold. The research of Dijksterhuis and his colleagues (2004, 2006) found that unconscious thinkers outperform conscious analysts when making complex decisions. A meta-analysis confirmed that across many studies, unconscious thought produces better decisions than when people decide immediately using conscious, logical reasoning (Strick et al., 2010). Unconscious thought leads to clearer, more integrated representations in memory (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006). What has long been dismissed as reverie and distraction now turns out to be a necessary precursor of insight in complex decision-making. Recent research is showing that not just any “distraction” works, though. Maarten Bos and his colleagues (2011) found that “distraction with a goal” produced better results than “mere distraction.” A break in the attentive activity devoted to a problem — also referred to as “incubation” — may eventually facilitate the solution process. Research shows that a break from close, focused, effortful attention improves performance with insight problem-solving, and that its length does not make a difference (Segal, 2004).

In their book *The Break-Out Principle*, Benson and Proctor (2003) explain that the best way to solve thorny issues or complex problems is first to struggle with it, through problem analysis or fact gathering, up to the point where one stops feeling productive and starts

11

feeling anxious and stressed. This is the signal for the second step: “distracting” oneself from the problem. There are many ways of doing this, including visiting a museum, taking a hot shower, or listening to some calming music. According to the authors, the key is “to stop analyzing, surrender control, and completely detach [oneself] from the stress producing thoughts.” This typically leads to what the authors call “the breakout,” a sudden insight or a new perspective that sheds a new light on the problem at hand.

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The very fact that unconscious thought and incubation time is conducive to better decision-making and insight has profound implications for self-leadership. Under pressure of deadlines, quarterly results and shareholders, incubation time is squeezed out of the system, and so is the essential juice of creativity. Caught up in the rat race, laboring under the pressure of demanding objectives, creativity is pushed out of the equation. In this age of the knowledge and service economy, regular breaks on a daily or monthly basis, weekends, or sabbaticals on a long-term basis, and sabbaticals on a long-term basis, should not be viewed as a luxury at all. Such breaks are needed to sort and integrate important elements of our minds and permit creativity to emerge. Organizations need “positive turbulence” to build continuous renewal into their cultures (Gryskiewicz, 1999) and develop supportive cultures that foster creative behaviors in employees (Rao, Wilson, & Watkinson, 2009).

Whereas analytical thinking requires an increase and maintenance of (visual) attention, insight is characterized by less focused, inward-directed, more open forms of attention. We propose that downtime moderates the relationship between previous knowledge/experience and the generation of new insights. Not just any downtime, idle time, or daydream time will do. It is important that our brain disconnects and “unfocuses” from the task at hand and its millions of distractions to connect with something entirely different as a condition to have insights on a whole different level. Insight, contrary to analytic thinking, is fast and manifests as sudden awareness or understanding. Sternberg and Davidson (1995) define insight as a “sudden comprehension that can result in a new interpretation of a situation and that can point to the solution to a problem.” In the light of the previous paragraphs, this “suddenness” is misleading. It is the result of previously collecting the pieces of the puzzle, and time to let them connect in new and perhaps more integrated ways nonconsciously; new assemblies that are outside of awareness.

Psychologists have been studying insight for nearly a century, but more recent advances in neuroscience are demonstrating that insight is the culmination of a series of brain states and processes operating at different time scales (Kounios & Jung-Beeman, 2009).

12

Bowden and Jung-Beeman (2003) propose that semantic activation in both hemispheres cooperatively contributes to problem-solving, but weak solution activation that contributes to the “aha experience” is more likely to occur with neural activations in the right hemisphere than in the left hemisphere. The right anterior cingulate cortex is involved in directing attention to detect weakly activated, nonconscious solutions (Kounias & Jung-Beeman, 2009). Kounias et al. (2006) suggest that the activity observed in ACC prior to insight may reflect increased readiness to monitor for competing responses, and to apply cognitive control mechanisms as needed to (a) suppress extraneous thoughts, (b) initially select prepotent solution spaces or strategies, and, if these prove ineffective, (c) subsequently shift attention to a non-prepotent solution or strategy. Such shifts are characteristic of insight.

#### … people are more likely to solve problems with insight if they are in a positive mood.

Understanding the precursors of insight is important, as it may point at interventional opportunities for the facilitation of insight (Kounios & Jung-Beeman, 2009). For instance, Subramaniam, Kounios, Parrish, Jung-Beeman, and Bowden (2009) found that people are more likely to solve problems with insight if they are in a positive mood. Jill Bolte Taylor’s fascinating tale *My Stroke of Insight* (2009) clearly describes how the right hemisphere is “open-minded and thinks out of the box. It’s not limited by the rules and regulations established by my left mind that created that box” (2009, p. 148). The right brain is present in the moment and integrates and nuances thoughts as the constant chatter of the left brain is silenced. Segal goes one step further, stating that “the default state has a large emphasis on stimulus-independent thought — mind-wandering, chatter that cannot be cut off — and the deviation from that to a place where people aren’t controlled by ongoing internal speech is a place where people are able to find some calm and respite” (2009). Iain McGilchrist (2009) notes that the right hemisphere contributes to a way of being that senses context and the interrelated whole nature of reality whereas the left focuses on text and the individual parts that comprise the world. Downtime may permit integration across the hemispheres and, in particular, enable the less vocal and

assertive right hemisphere’s synthetic processing to be sensed and expressed.

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The relevance for leadership of understanding the antecedents of insight is great as it is a process that from a neurological point of view is extremely cost-effective. It allows connecting very diffuse information in a “moment of genius,” where everything becomes suddenly clear with relatively little effort. Such intuition allows experienced managers to make decisions much more quickly, which in times of constant change, is an enormous advantage. Certain decisions, like buying or selling stock, depend on so many interrelated and complex factors that are in constant flux that using sequential, analytical cognition alone will not suffice. Managers do not always have the opportunity to scrutinize all information, weigh in on all options with conscious deliberation, and think through all solutions. Their “bounded rationality” (Simon, 1991) and limited time forces them to trust their more intuitive, sudden insights. Based on what we are learning from the neurosciences, we need to be more cautious in creating the proper conditions for insight. We can intentionally cultivate a positive atmosphere while encouraging the development of mindfulness to stabilize the mind, quiet the internal chatter, and block out external distractions so that what emerges spontaneously can be seen clearly. With intention, we can invite people to respect nonconscious thought and incubation time and enable genius and “thinking outside the box” to bubble up from the wells of experience and relaxation.

1. ***Time in—Reflection, attunement, mindfulness***

Various studies cited by the National Institute for Occupational Safety and Health in the report *Stress at Work* indicate that between 26% and 40% of all workers today feel stressed or burnt out by work (NIOSH, Publication No. 99–101). Roughly 60% of doctor visits stem from stress-related complaints and illnesses (Kroenke & Mangelsdorff, 1989). Confronted with pressure or stress, the brain strives to reestablish and maintain homeostasis through the coordinated activation and control of neuroendocrine and autonomic stress systems. Stress responses are mediated by largely overlapping circuits in the limbic forebrain — the hypothalamus and the brainstem — so that the respective contributions of the neuroendocrine and autonomic systems are tuned in accordance with stressor modality and intensity (Ulrich-Lai & Herman, 2009). Sabine Sonnentag and her colleagues have extensively studied the dynamic of recovery experiences and distinguish between psychological detachment from work (i.e., not thinking about job-related issues or problems), relaxation (a process characterized by decreased sympathetic activation), and mastery experiences (challenging off-job experiences that provide opportunities for learning and

success) (Sonnentag & Fritz, 2007). Their research showed that low psychological detachment from work during the evening predicted negative activation and fatigue, whereas mastery experiences during the evening predicted positive activation and relaxation predicted serenity. Sleep quality showed positive relations with all affective states. In our Healthy Mind Platter we refer to mastery experiences under “focus time” and to “psychological detachment” under “downtime.” In this section we focus on reflection, relaxation, and mindfulness.

#### We can intentionally cultivate a positive atmosphere while encouraging the development of mindfulness to stabilize the mind …

In his classic work *The Relaxation Response* (1975), Herbert Benson explored the importance and practice of relaxation to a broad business audience. Relaxation is a process characterized by decreased sympathetic activation and becomes evident in a decrease in heart rate and muscle tension (Benson, 1975). There are many relaxation techniques, including progressive muscle relaxation (Jacobson, 1938) and various forms of meditation (Grossman, Niemann, Schmidt, & Walach, 2004). Yet, there are also many “everyday activities” that can result in responses similar to relaxation, such as taking a walk in nature (Hartig, Evans, Jamner, Davis, & Garling, 2003) or listening to music (Pelletier, 2004). There is now a wide body of research showing the beneficial effects of relaxation, such as like the reduction of tension (Van der Klink, Blonk, Schene, & Van Dijk, 2001) and the increase of positive affective states (Stone, Kennedy-Moore, & Neale, 1995; Parkinson & Totterdell, 1999; Fredrickson, 2000).

Yet, when we talk about “time in” in the Healthy Mind Platter, we refer to much more than relaxation. Relaxation is actually only one of the aspects or benefits of the broader practice of meditation — a way of training the mind — defined as an intentional self-regulation of attention, in the service of self-inquiry, in the here and now (Masion, Teas, Herbert, Wertheimer, & Kabat-Zinn, 1995). There are many forms of meditation. Descriptions of meditation vary and are often expressed in behavioral terms and include (1) relaxation, (2) concentration, (3) altered state of

13

awareness, (4) suspension of logical thought processes, and (5) maintenance of a self-observing attitude (Perez- de-Albeniz & Holmes, 2000). One particular type of meditation that has been scrutinized by neuroscientists in increasing ways recently is mindfulness meditation. Mindfulness has been described as “paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994). Bishop et al. (2004) propose an operational definition distinguishing two components: (1) self-regulation of attention focused on immediate experience and (2) orientation toward one’s experiences in the present moment, characterized by curiosity, openness, and acceptance. Rather than changing the environment or the appraisal of the situation, mindfulness aims at becoming aware and accepting thoughts, feelings and bodily sensations. According to Creswell, Way, Eisenberger, and Lieberman (2007), part of the positive effect of mindfulness may be due to labeling affect. Mindfulness in trained individuals has been associated with increased engagement of a right lateralized network, comprising the lateral prefrontal cortext (PFC) and viscera-somatic areas such as the insula, secondary somatosensory cortex, and inferior parietal lobule (Farb et al., 2007). According to Chiesa and Serretti (2009a), mindfulness meditation activates the PFC and the anterior cingulate cortex (ACC). Long-term meditation practice is associated with an enhancement of cerebral areas related to attention and emotion regulation (Lazar et al., 2005; Luders, Narr, Thompson, & Toga, 2009). Meta-analytic studies of the impact of mindfulness-based stress reduction seem to suggest that these programs may help a broad range of individuals to cope with their clinical and nonclinical problems, ranging from pain, cancer, heart disease, depression, anxiety, and stress (Grossman, Niemann, Schmidt, & Walach, 2004; Chiesa & Serretti, 2009a; 2009b). A meta-analysis of the effect of mindfulness-based therapy (MBT) on anxiety and depression concluded that MBT improves symptoms of anxiety and depression across a relatively wide range of severity and even when these symptoms are associated with other disorders, such as medical problems (Chiesa & Serretti, 2009b; Hoffman, Sawyer, Witt, & Oh, 2010).

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To conclude, “time in” is characterized by a very particular type of conscious, focused attention on the inner life of the self in the here and now. Time in focuses attention on one’s intentions and highlights awareness of itself — the two fundamental elements of being mindful (Siegel, 2007). Time in develops the capacity to be present with experience. Presence, in turn, has been found to be associated with improvements in a number of processes, including the levels of the enzyme telomerase, which maintains the telomere caps at the ends of chromosomes within the nucleus of our cells (see Parker, Nelson, Epel, & Siegel, in press). Time in focuses on acceptance of

14

process rather than content (Perez-de-Albeniz & Holmes, 2000) and can be generally seen to be related to a range of benefits if practiced on a regular basis. In addition to being a wakeful hypometabolic physiological state, it has physiological (e.g., balance of parasympathetic and sympathetic function, health), cognitive (e.g., attention, flexible perspective), emotional (e.g., self-control, stress management), and social (e.g., compassion, empathy) benefits. Regular time in can therefore be counted among the seven vital activities on the Mental Health Platter.

#### … social support is reliably related to beneficial effects on aspects of the cardiovascular, endocrine, and immune systems …

1. ***Connecting time—The healing power of relationships***

*“Pleasant words are a honeycomb, sweet to the soul and healing to the bones”;*

Solomon, 1000 B.C., Proverbs 16:24

According to Matthew Lieberman, one of the founders of social cognitive neuroscience, our “evolutionary wiring predisposes us to be social,” actually causing a sense of physical pain if we are socially rejected (Eisenberger, Lieberman, & Williams, 2003; Eisenberger & Lieberman, 2004). As such one could argue that social connection is a basic human need, very much like water, food, and shelter. Social support is a well-documented antecedent of well- being. A landmark study of Berkman and Syme (1979) found that the status and extent of social relationships predicts mortality over a nine-year follow-up after controlling for sociodemographic, physical health, and health behavior variables. Based on these epidemiological findings, researchers have proposed specific relationships between interpersonal functioning, biological processes, and disease (Pettit, Grover, & Lewinsohn, 2007).

Cohen, Gottlieb and Underwood (2000) propose two processes through which social relationships affect health. Oneprocessinvolvestheprovisionorexchangeofemotional, informational, or instrumental resources in response to the perceptions that others are in need of aid. The other process focuses on the health benefits that accrue

from participation in one or more distinct social groups. Others can influence cognitions, emotions, behaviors, and biological responses in manners beneficial to health and well-being through interactions that are not explicitly intended to exchange help or support, for example, to increased self-esteem, personal control, and conformity to behavioral norms that have implications for our health (Cohen, Gottlieb, & Underwood, 2000).

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A review of 81 studies revealed that social support is reliably related to beneficial effects on aspects of the cardiovascular, endocrine, and immune systems (Uchino, Holt-Lunstad, Uno, Betancourt, & Garvey, 1999). Social support has been associated with positive effects on various diseases, such as cardiovascular reactivity and blood pressure (Spitzer, Llabre, Ironson, Gellman, & Schneiderman, 1992; Uchino, Holt-Lunstad, Uno, Betancourt, & Garvey, 1999; Gallo, Smith, & Kircher, 2000; Steptoe, 2000; Evans and Steptoe, 2001; Uno, Uchino, & Smith, 2002) and depression (Hays, Steffens, Flint, Bosworth, & George, 2001; Sayal et al., 2002). Reviews of the social support literature (e.g., Berkman, 1984; Cohen & Wills, 1985; House, Landis, & Umberson, 1988) conclude that social integration and perceived emotional support are directly and positively related to physical and mental health, including lower mortality (Thoits, 1995). The most powerful measure of social support is whether a person has an intimate, confiding relationship or not, typically with a spouse or a lover; friends or relatives function similarly but less powerfully (Cohen & Wills, 1985).

Given that stress is an important cause of sleep problems and cognitive impairment, the buffering effect of social support on stress is pertinent to our discussion of the Healthy Mind Platter. Impaired social functioning may represent a form of stress (Cohen, 2004) that affects physical health indirectly via emotional experiences (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002) and directly through physiological pathways. Social support is one of the pillars of the job-demand-contol-support model developed by Karasek and Theorell (1990) and adopted by the World Health Organization for predicting stress, cardiovascular disease, and productivity. According to a meta-analytic review, social support has a threefold effect on work stressor–strain relations (Viswesvaran, Sanchez, & Fisher, 1999): Social support reduces the strains experienced, mitigates perceived stressors, and moderates the stressor–strain relationship.

Cacioppo et al. (2000) found that satisfying social relationships are associated with more positive outlooks on life, more secure attachments and interactions with others, more flexible autonomic activation when confronting acute psychological challenges, and more efficient restorative behaviors. Individuals who

were chronically lonely had elevated mean salivary cortisol levels across the course of a day, suggesting more discharges of corticotropin-releasing hormone and elevated activation of the hypothalamic-pituitary- adrenocortical axis. Lonely individuals may experience higher levels of perceived stress, react more negatively to stress, and benefit less from social interactions (Cacioppo et al., 2002; Hawkley, Burleson, Berntson, & Cacioppo, 2003). Lonely individuals experience less efficient and less effective sleep that may interfere with the restorative processes of sleep (Cacioppo et al., 2002), another crucial element of the Healthy Mind Platter. In contrast to impaired social functioning, the perception that others are available to provide assistance and emotional support buffers the negative effects of stress on health.

#### Lonely individuals may experience higher levels of perceived stress, react more negatively to stress, and benefit less from social interactions …

The presence of positive social support reduces the likelihood of negative health outcomes in the wake of stressful events (Rosengren, Orth-Gomer, Wedel, and Wilhelmsen, 1993). In addition, the extent to which individuals actively participate in social activities and hold social roles prospectively predicts health outcomes (Cohen, Doyle, Skoner, Rabin, and Gwaltney, 1997).

Another interesting strand of research studying the interplay between stress, health, and social support looks at the effect of neuropeptides like oxytocin. Oxytocin is an evolutionarily highly preserved nonapeptide released from the paraventricular nucleus of the hypothalamus through the posterior pituitary (Buijs, De Vries, Van Leeuwen, & Swaab, 1983). In nonhuman mammals, oxytocin is a key mediator of complex emotional and social behaviors, including attachment, social recognition, and aggression. Oxytocin reduces anxiety and impacts on fear conditioning and extinction (Kirsch et al. 2005). Heinrichs, Baumgartner, Kirschbaun, and

15

Ehlert (2003) designed a placebo-controlled, double- blind study, in which 37 men were exposed to the Trier Social Stress Test and were randomly assigned to receive intranasal oxytocin or a placebo, as well as social support from their best friend during the preparation period or no such presence of a friend for support. They found that salivary free cortisol levels remained low with social support in response to stress. The combination of oxytocin and social support exhibited the lowest cortisol concentrations as well as increased calmness and decreased anxiety during stress (Heinrich et al., 2003).

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#### … from our earliest days of life, our connections to others provide a source of feeling seen, safe, and secure …

Oxytocin administration in humans was shown to increase trust, suggesting involvement of the amygdala, a central component of the neuro-circuitry of fear and social cognition that has been linked to trust (Winston, Strange, O’Doherty, & Dolan, 2002; Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005). In their study, Kirsch et al. (2005) show that human amygdala function is strongly modulated by oxytocin. They used fMRI to image amygdala activation by fear-inducing visual stimuli after the intranasal application of a placebo or oxytocin. Compared with a placebo, oxytocin potently reduced activation of the amygdala and reduced coupling of the amygdala to brain-stem regions involved in autonomic and behavioral manifestations of reactive fear (Kirsch et al. 2005). Further, from our earliest days of life, our connections to others provide a source of feeling seen, safe, and secure (Siegel, 2012). Our profoundly social brains may require ongoing connections with close and reliable others in order to maintain the physiologic and emotional balance that such relationships establish from the beginning of life.

To conclude, the link between social support and health is well documented, but the exact neural mechanisms of social cognition in the human brain and the beneficial effects of social supports are complex and need further research drawing from a wide range of disciplines like social cognitive neuroscience, neuro-immuno-endocrinology and occupational health psychology.

16

1. ***Physical time—Improving the brain’s plasticity through exercise***

In an article in the New York Times, Sandra Aamodt, editor- in-chief of Nature Neuroscience, and Sam Wang, associate professor of molecular biology and neuroscience at Princeton, take a critical look at computer programs to improve brain performance. The digital brain health and fitness software market is a booming business. According to the 2010 industry report called “Transforming Brain Health with Digital Tools to Assess, Enhance and Treat Cognition across the Lifespan: The State of the Brain Fitness Market 2010,” the size of the worldwide market in 2009 was $295 million dollars, a 35% growth since 2008, and representing an annualized growth rate of 31% since 2005. According to Aamodt and Wang (2007):

*“[a]dvertising for these products often emphasizes the claim that they are designed by scientists or based on scientific research. To be charitable, we might call them inspired by science — not to be confused with actually proven by science. One form of training, however, has been shown to maintain and improve brain health — physical exercise.”*

Exercise can help to achieve and maintain brain health and plasticity throughout life (Cotman & Berchtold, 2002). The clinical literature has recognized for years that exercise affects overall health and brain function, especially in later life (Berkman et al., 1993; Blomquist & Danner, 1987; Rogers, Meyer, & Mortel, 1990; Hill, Storandt, & Malley, 1993; Laurin et al., 2001). Exercise is associated with enhanced metabolism of energy throughout the body (Gomez-Pinilla, 2007).

Studies in humans have demonstrated the beneficial effects of exercise on cognitive function (Suominen-Troyer, Davis, Ismail, & Salvendy, 1986; Kramer et al., 1999). Exercise has the capacity to enhance learning and memory (Suominen- Troyer et al., 1986; Rogers, Meyer, & Mortel, 1990; van Praag, 1999b) under a variety of conditions, ranging from counteracting the mental decline associated with aging (Kramer et al., 1999) to aiding recovery in patients suffering from brain injury or disease (Bohannon, 1993; Lindvall, Kokaia, Bengzon, Elmer, & Kokaia, 1994; Grealy, Johnson, & Rushton, 1999). Cardiovascular fitness training improves overall cognitive function regardless of task type (Colcombe, 2004). Exercise improves “executive functions,” the set of abilities (like response speed and working memory) that allows us to select appropriate behavior, inhibit inappropriate behavior, and focus despite distractions (Aamodt & Wang, 2007; Davis, Tomporowski, Boyle, Waller, Miller, Naglieri, & Gregoski, 2007). Moderate aerobic-type exercise also reduces stress, decreases anxiety, and alleviates depression (Salmon, 2001). Overall, physical activity has a significant positive and global effect on mental functioning.

Studies by neuroscientists are strengthening the premise that exercise can benefit brain function and are encouraging additional clinical studies in this area (Cotman & Berchtold, 2002). Research reporting human brain activity during exercise is sparse but consolidates the data in the animal literature, showing that the simple act of moving activates a large percentage of the brain involving sensory/perceptual processes, autonomic regulation, and motor output (Dietrich, 2006). A PET study found that increased brain activation was recorded in the “primary sensory cortex, primary motor cortex, supplementary motor cortex as well as the anterior part of the cerebellum” in response to cycling (Christensen, Johannsen, Sinkjaer, Petersen, Pyndt, & Nielsen, 2000). Another study using single photon emission computed tomography found increases in regional CBF (cerebral blood flow) in the supplementary motor area, medial primary sensorimotor area, striatum, visual cortex, and cerebellar vermis during walking (Fukuyama et al., 1997).

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Exercise is an activity that, if practiced on a regular basis, activates molecular and cellular cascades that support and maintain brain plasticity. It induces the expression of genes associated with plasticity and promotes brain vascularization, neurogenesis, functional changes in neuronal structure, and neuronal resistance to injury (Cotman & Berchtold, 2002). Exercise activates mechanisms that protect the brain from damage. Studies in animals show that physical activity, in the form of voluntary wheel running, can increase levels of brain-derived neurotrophic factor (BDNF), a molecule that enhances synaptic growth, increases neuronal survival, promotes learning, and protects against cognitive decline. It also increases other growth factors, stimulates neurogenesis, increases resistance to brain insult, improves learning and mental performance, and induces gene expression changes in the brain (Cotman & Engesser-Cesar, 2002; Cotman & Berchtold, 2002). The finding that exercise increases BDNF levels in the hippocampus — an area vital for memory formation and learning — has provided insight about the possible molecular mechanisms responsible for the positive effects of exercise on cognition (Neeper, Gomez-Pinilla, Choi, & Cotman, 1995; Gomez-Pinilla, Ying, Roy, Molteni, & Edgerton, 2002; Vaynman, Ying, & Gomez-Pinilla, 2004). By inducing BDNF and other molecules, exercise strengthens neuronal growth and interconnected synaptic linkages among neurons and facilitates synaptic transmission, thus priming activated cells for encoding into long-term storage (Cotman & Berchtold, 2002).

1. ***Focus time—Attention management for performance***

Today’s business context is characterized by a number of tendencies that combined have radically increased the

fragmentation of time. Developments in communication and information technology have multiplied and made more immediate and intricate the nature of our connectivity. Globalization has intensified competition, and with it, customers increasingly expect 24/7 access, just-in-time deliveries, and minimum waiting times. In turn, firms expect their managers to be flexible, mobile, and available to meet customer expectations. With a steady increase of women in the labor force, dual-earner families have become the norm, and juggling work and family responsibilities are now a concern for both men and women. In this context, time is being fragmented and focus scattered. There is less time available for more tasks and responsibilities. Since time is a scarce resource, those skilled in (re-)focusing quickly and staying focused within fragments of time will thrive and be more successful. This requires the capacity to manage one’s attention: to focus entirely on the person or task at hand while also exerting self-control to block out interferences.

#### … physical activity has a significant positive and global effect on mental functioning.

The central component of the Healthy Mind Platter for those concerned not just with brain health but also performance is undoubtedly focus time: the time we are able to focus, stay focused, and refocus efficiently and effectively. Focusing attention involves several functions, including alerting, orienting, and executive control (Tang & Posner, 2009). The executive capacity to focus is dependent on a well-developed prefrontal cortex (PFC), also referred to as the executive part of the brain, responsible for most of the higher cognitive functions organizing actions, both physical and mental. The PFC’s functions are wide and varied; they include capacities such as (1) working memory, involved in organizing and structuring information, remembering self, and creating images of the possible future for consequence evaluation and long-term planning; and (2) processes for monitoring behavior and inhibiting prepotent responses, including emotion regulation and self-observation (Siegel, 2010). Our executive functions allow us to reconsider the environment moment to moment and make choices that may be different to our automatic responses.

17

When we focus, we activate working memory long enough to allow other recombinant processes to happen within this “chalkboard of the mind.” This consists of encoding the information through the activity of the hippocampus and parts of the cortex to create linkages among aspects of experience that encode both context and the explicit elements of factual and autobiographical memory. Ultimately, these forms of explicit memory can be flexibly retrieved, enabling us to have a context for the present, an understanding of the past, and to more effectively plan for the future as we harness the power of the prefrontal cortex.

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#### A lack of stimulation (boredom) and overstimulation (stress) leads to impairment of executive functions, distraction, and lack of focus.

To focus is to pay close attention. Attention is a complex process involving multiple parts of the brain related to perception, arousal, emotion, and memory. The attention process, akin to putting “a spotlight” on something, consists of three stages which involve different parts of the brain and different systems (norepinephrine and dopamine) (Carter, 1998, p. 305): (1) alerting (Reticular Activating System, brainstem, thalamus), activated by fear or novelty; (2) orienting (thalamus, superior colliculus, parietal cortex), to orient or direct the focus of processing on input from the sensory organs or internally generated neural activity from the cortex; and (3) executive functions (PFC, ACC, striatum) that can hold information in mind and make choices about processes as they occur.

These highercognitive functions mediatedby the PFC have been found to require adequate levels of catecholamines, which in turn are altered by levels of arousal or stress. A lack of stimulation (boredom) and overstimulation (stress) leads to impairment of executive functions, distraction, and lack of focus. In these conditions, the brain can be altered to enter a state of hypo- or hypervigilance that can impair performance. Attention can therefore be considered to be dependent on a state of optimal arousal that activates our body and

18

mind to process the incoming information and respond adequately. In order for a person to function at optimal levels of arousal, predictability and a sense of control are necessary. Deep breathing, mindfulness (openness and acceptance to what arises in the field of attention), and framing the stressor as controllable or transient can also help to maintain or bring a person back to optimal levels of arousal and attentional focus. In short, there is a direct relationship between stress, focus, and health. One could even propose that the capacity to focus attention is an ongoing indicator of mental fitness. Many mental difficulties such as attention-deficit hyperactivity disorder (ADHD), schizophrenia, and Alzheimer’s disease are characterized by attention problems.

Another aspect of focus time is sustaining attention, or staying focused, which is a function of self-control. This important function of motoric, cognitive, and emotional control is mediated by activity in the (ventrolateral) prefrontal cortex (areas 44, 45, and 47). Lesions or dysfunction in this area are associated with obsessive- compulsive behavior and addictions. The exertion of self-control appears to depend on a limited resource. Just as a muscle gets tired from exertion, acts of self- control cause short-term impairments (mental depletion) in subsequent self-control, even on unrelated tasks. Research has supported this strength framework for understanding the possible challenges in the domains of eating, drinking, spending, sexuality, intelligent thought, making choices and interpersonal behavior (Baumeister, Vohs & Tice, 2007). These authors note that motivational or framing factors can temporarily block the deleterious effects of being in a state of mental depletion, and that blood glucose is a component of the energy required for effective executive control.

Last but not least, there is the capacity to refocus following distraction or during multitasking. Given the limited capacity of our working memory, rather than processing multiple sources of information simultaneously, we continuously switch our spotlight of attention back and forth between different stimuli. As a consequence, we divide attention and allocate less time to each task, or distribute a given focus in divided ways over a longer time span. The logical consequence is that multitasking impairs performance, also referred to as “dual-task interference.” According to Meyer et al., multitasking requires multiple cognitive micro-processes (1998), involving multiple regions of the brain (1997), including the dorsolateral PFC for goal-shifting and refocusing attention, the posterior parietal lobe for activating the task’s procedural rules, the ACG for error monitoring, and the premotor cortex for anticipatory movement preparation. The time required for executing all these micro-processes depends on a series of criteria, but in general, increases

with the number of interruptions, switching from one task to the other (Rubinstein, Evans, & Meyer, 1994).

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In the Healthy Mind Platter, focus time involves the application of a singular attentional focus on a task that permits a sense of mastery and completion. Focus time enables an individual to avoid the sense of being overwhelmed and incomplete that so often accompanies multitasking. Focus time is both a cognitive process necessary for effective performance and an intentional effort that requires self-control, both of which require energy and the management of stress. This has important implications for self-management — keeping down the “switching-time costs” of multitasking, which diminishes cognitive performance. In these ways, focus time is helpful for the process of a sense of efficacy in the outcome of efforts and the effective sense of contributing to work output.

**Discussion and Conclusion**

In this article, we introduced the Healthy Mind Platter, a framework for managing our lives and promoting mental, relational, and brain health. This approach may be useful in informing schools, organizations, governments, and communities about the necessary “mental nutrients” that entail the daily mental activities that promote well-being. The ingredients of the Healthy Mind Platter are sleep, play, time in, downtime, connect, physical, and focus. The Healthy Mind Platter can be used as a simple visual framework to promote and increase the awareness of mental health in our daily lives. Following a healthy mind “diet” can provide us with the physical and mental well-being necessary to establish and maintain relationships with family, friends and colleagues and efficiently realize the tasks and responsibilities at school, work, and in our communities. The mind can be seen to emerge from both body and relationships, and so the Healthy Mind Platter focuses on our bodies, our social connections and how we focus our minds themselves (See Siegel, 2012a and 2012b).

Although we have introduced the different factors constituting the Healthy Mind Platter individually, there are many direct and indirect, and sometimes complex, interrelations between them. All ingredients have clear and well-documented relationships with one or several of the outcome variables: creativity, mental health and cognitive performance. Downtime, play, connecting time, time in and focus time are associated with creativity. All factors are related with mental health.

Focus time has complex relationships with many other variables. First, focus time is a logical antecedent of cognitive performance. Focusing involves a coordinated constellation of cognitive processes necessary for

thinking or acting consciously and intelligently in general. If focus time is characterized by “flow” or engagement; according to positive psychologists like Seligman (2011) and Csikszentmihalyi (1990), it has many beneficial effects for health. For instance, active leisure time is an example of focus time which allows us to completely distract ourselves from work and reconnect with a refreshed mind. The relationship between focus time and cognitive performance is moderated by sleep time, down time, and time in. Without sufficient rest and breaks, people may be quite challenged to maintain focus. Without alternating focus time with instances of reflection within time in, for example, attention fades and the level of processing may be restricted to only surface considerations.

#### Moments before an insight, we unfocus visually and mentally to enable an idea

*to bubble to the surface.*

The relationship between focus time and creativity is a complex one. As mentioned in the section on downtime, insight often does not occur without previous processes of analysis (focus time) and incubation (downtime, sleep time, time in), for the pieces to come together in a creative “aha” way, or within a complex decision- making process. Moments before an insight, we unfocus visually and mentally to enable an idea to bubble to the surface. Interestingly, EEG assessments of gamma waves suggest this cognitive event resembles moments of deep meditation. In other words, in some cases, different ingredients in the Healthy Mind Platter (e.g., focus time, downtime, time in) alternate with each other instantaneously to produce yet another phenomenon (e.g., a transient state of insight or creativity).

A second complex relationship is between physical time and cognitive performance, which we discussed in the section on physical time. According to the transient hypofrontality hypothesis, during exercise and exertion of effort, cognitive performance decreases because blood is disproportionally concentrated in the muscles. Following exercise and long afterwards, however, physical activity practice should increase cognitive performance thanks to improved blood distribution to the brain and due to enhanced neuroplasticity following exercise. In addition, downtime and sleep time moderate

19

the relationships between physical time and mental health. Both incessant physical activity without rest and a general lack of exercise can endanger mental health. While we have not listed amounts of time or ratios of proportions of time to be spent in engaging in these activities, each individual and each program harnessing the Healthy Mind Platter can apply reflective reasoning to include each of these activities on a daily basis within a range of time allotted for each that may depend on the day and on the individual. Sleep time, for example, may vary depending on age, but for the average adult, seven to eight hours is the typical amount often needed. For children and adolescents, this time is often greater

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— though modern life makes teenagers challenged to achieve the eight to nine hours of sleep that may be needed for optimal functioning and well-being, ideally such important healthy priorities should be achieved if possible.

Further research is needed to understand which combinations are needed — and in what order, proportion and relationship — to produce optimal levels of creativity, health, andperformance. Wecanconclude fromourreview that as we are writing, neuroscientists, psychologists, molecular biologists, and many other researchers around the world are independently investigating the physical and mental substrates underlying the relationships between the elements of the Healthy Mind Platter and a variety of health outcomes. A range of disciplines may contribute meaningfully to research that will be required to study which different constellations among these elements represent the best recipes for public health and individual and organizational performance. As for the field of neuroleadership, the Healthy Mind Platter offers a theoretical model to study and optimize the mental well-being, brain health, creativity, and performance of leaders. For families, schools, and our wider society, the Healthy Mind Platter offers a framework to open the conversation and facilitate the work of public health policy makers, health practitioners, educators, coaches, organizational consultants, and many other professionals to develop and evaluate interventions. As the brain takes more of a central stage in health management, science, and society at large, we need to integrate insights generated in laboratories around the globe to confront one of the biggest scientific, public health, and economic challenges of the 21st century: improving brain health and plasticity to deal with the increasing complexity and uncertainty unfolding around us.

20

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23

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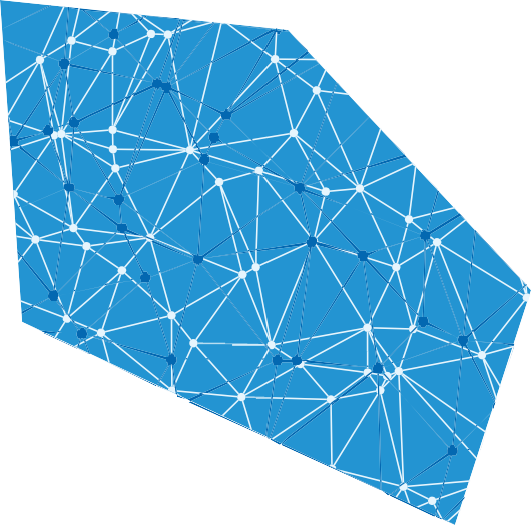
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THE SCARF® MODEL:

##### Updating the social neuroscience of collaborating with others

by David Rock and Christine Cox

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The SCARF® Model stands for status, certainty, autonomy, relatedness, and fairness. SCARF® defines the five domains of experience that activate strong threats and rewards in the brain, thus influencing a wide range of human behaviors. In the five years since its introduction in 2008, SCARF® has become a widely discussed model in management circles, including being highlighted as one of the “Best Ideas of 15 Years” by *Strategy+Business* magazine.

THE SCARF® MODEL:

###### Updating the social neuroscience of collaborating with others

**by David Rock and Christine Cox**

Students in the NeuroLeadership Institute’s post- graduate and master’s program are conducting a wide range of research studies based on SCARF® concepts, and hundreds of thousands of people have learned about the model through blogs, videos, and training programs. Since first being published, social neuroscience research has contributed to a more in-depth understanding of the domains of SCARF®, providing support for the model and motivating further exploration of each domain.

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In this article, we begin by proposing a conceptual model for how SCARF® enables people to exhibit more adaptive behaviors based on how mental experiences occur over time. We then update the research supporting The SCARF® Model that has been conducted in the five years since it was published, starting with the importance of social processing in the brain, and then highlighting recent social neuroscience findings relevant to each of the SCARF® domains. Finally, we explore interactions between the domains and issues such as individual variation and SCARF®, the ideas of the multiplying and offsetting effects, as well as SCARF® and leadership, culture, engagement,and reward.

A conceptual model for the way SCARF® can improve thinking and performance in individuals and teams

The SCARF® Model improves people’s capacity to understand and ultimately modify their own and other people’s behavior in social situations, to thus be

4

more adaptive. The model is especially relevant for organizational leaders and managers, organizational learning and development professionals, facilitators, trainers, coaches, consultants, and teachers, as well as social workers, community aid workers, or anyone looking to influence others.

We collectively call these types of people “change agents.” SCARF® is also helpful for understanding and improving the quality of everyday interactions with colleagues, friends, or family.

How does SCARF® help? The SCARF® Model enables people to be more adaptive by providing a clear, easy-to-remember language. Having this language improves our ability to label or reappraise our emotions, which helps to regulate social threats and rewards (Ochsner, 2008). Social threats, in particular, such as a fear of looking bad in front of your peers, can inhibit high-quality perception, cognition, critical thinking, creativity, and collaboration. Having a memorable language for social threats and rewards allows us to notice these experiences at several points that we may not otherwise: before, during, or after an emotion-producing event.

Before: Prediction

The language of SCARF® can help us predict whether a threat is going to happen and modify our activities or choices accordingly. In James Gross’ model of how emotions unfold, this is called “situation modification” (Butler et al., 2003). This is being introduced in this paper as the PRE model by David Rock.

Before an emotional event occurs, SCARF® enables people to predict ahead of time the impact that an action may have on others. For example, before announcing the reorganization of a team, a manager might recognize that the team could sense this as a status threat. He could offset this threat by increasing people’s sense of certainty about the situation by providing more information and increasing their sense of autonomy by providing some choice in how the process occurs. Before a SCARF® threat kicks in, knowing SCARF® enables us to mitigate or take away the threats that an interaction might bring about.

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#### The language of SCARF® can help us notice a threat occurring while it is happening in

*real time and look to regulate our emotions.*

During: Regulation

The language of SCARF® can help us notice a threat occurring while it is happening in real time and look to regulate our emotions. Many studies show that labeling or reappraising emotions can help reduce the emotion and increase executive functions (Lieberman, 2009).

During an arousal-producing event, SCARF® provides people with an easy-to-recall framework to label and reappraise their response. Regulating emotions during the event is not easy, as strong emotions reduce the capacity for self-regulation (Ochsner, 2008). With an easy-to-recall framework like SCARF®, people are able to identify the cause of a threat response better through labeling. They can also then change their response to an event through reappraising, which is easier to do after labeling has allowed them to reduce the overall threat response. Reappraisal can also occur by changing your opinion of other people’s reactions to events. For example, in the situation where someone felt

5

their work was attacked by others during a meeting, knowing SCARF® could help an individual identify (label) their response as a status threat, and then look to see which threats others might be feeling that could be driving their reactions (for example uncertainty). In this way, SCARF® can help with the two main planks of self-regulation, both labeling, and reappraisal. Doing this in the heat of the moment, where possible, can help people make better choices and reduce social conflict.

After: Explanatory

After an emotional event, such as a team meeting that went wrong because a comment generated a sense of unfairness, SCARF® can also help people explain and therefore understand a situation. This does not necessarily increase adaptive responses in the moment, but it can reduce uncertainty and ongoing conflict over time. With this knowledge, people may choose different strategies in the future for interacting with others. Using SCARF® to explain a situation after the event may be the easiest and most likely use of SCARF®. However, with sufficient awareness, people may be able to move from using SCARF® after to during and then before an event, from explanatory to regulatory to predictive, as the distinctions become more easily accessed from moment to moment. More research would be useful on this issue.

In summary, understanding SCARF® can impact people in these ways:

**Before an event: Prediction**

SCARF® can provide an increased ability to minimize negative and maximize positive emotions ahead of time in oneself and others, thereby mitigating distracting threats and increasing overall motivation.

**During an event: Regulatory**

SCARF® can increase the ability to regulate one’s own and others’ emotions in the moment, thereby increasing perception, cognition, creativity, and collaboration.

**After: Explanatory**

SCARF® can increase one’s ability to understand strong emotions after the fact, thereby decreasing uncertainty and enabling different choices in the future.

In short, SCARF® is a cognitive tool, a heuristic,

The SCARF® Model

**AWAY** THREAT

Threat Is Stronger

STATUS CERTAINTY AUTONOMY RELATEDNESS FAIRNESS

**TOWARD** REWARD

Reward Is Better



**Status**

Is about relative importance to others

**Certainty** Concerns about ability to predict the future

**Autonomy** Provides a sense of control over events

**Relatedness** Is a sense of safety with others: friend, not foe

**Fairness**

Is a perception of fair exchange between people

for quickly and easily recalling the potential impact of your actions on others (and others’ actions on you), thus enabling the possibility of different choices. The fact that it is simple to recall makes it especially useful, as it can be easily accessed when cognitive resources are low.

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The five domains of SCARF®

We begin with a brief review of the five domains of The SCARF® Model (Rock, 2008). Status refers to one’s sense of importance relative to others (e.g., peers, co-workers, friends, supervisors). Certainty refers to one’s need for clarity and the ability to make accurate predictions about the future. Autonomy is tied to a sense of control over the events in one’s life and the perception that one’s behavior has an effect on the outcome of a situation (e.g., getting a promotion, finding a partner). Relatedness concerns one’s sense of connection to and security with another person (e.g., whether someone is perceived as similar or dissimilar to oneself, a friend or a foe). Finally, fairness refers to just and non-biased exchange between people (e.g., praise for or acknowledgment of one’s efforts, equivalent pay for equivalent work, sharing a candy bar with everyone, etc).

6

All five of these domains can have an impact on a person’s perception of a social situation, be it threatening or rewarding. For example, uncertainty about the way one’s boss is evaluating one’s performance can be threatening in the same way as uncertainty about whether the dark, elongated shape in one’s peripheral field of view is a snake or not. Conversely, being acknowledged for one’s hard work and effort by a supervisor can be rewarding in the same way as finding money on the street is rewarding.

The importance of social processing in the brain

Since 2008, advances in social neuroscience research have supported the basic tenets of The SCARF® Model: the view that social concerns are a primary motivator for human behavior and that the human brain is primed to attend to and process social information in a privileged manner.

Specifically, research has shown that humans have a fundamental need to belong, are incredibly sensitive to their social context, and are strongly motivated to remain in good standing with their social group and avoid social exclusion (Heatherton, 2011). There is compelling evidence that the experiences

people perceive as both the best and the worst in their lives are not individual achievements, such as winning awards, but social experiences, such as beginning and ending close relationships (Jaremka, Gabriel & Carvallo, 2011). Understanding of others’ minds and emotions is central to the way our brains process information.

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#### ... research has shown that humans are incredibly sensitive to their social context ...

Social pain is processed in the brain in much the same way as physical pain. Being excluded from a game or looking at a picture of someone who broke up with you “hurts” and also engages very similar brain regions as when you are physically hurt (i.e., when something hot touches your arm) (Eisenberger, 2012). Similarly, social rejection or ostracism can lead to increased inflammation in the body (Slavich, Way, Eisenberger, & Taylor, 2010) and negative mental health consequences, such as depression (Williams & Nida, 2011). Recent evidence has taken this even further, showing that people who took acetaminophen, a physical pain reliever, for three weeks reported reduced levels of social pain and showed reduced neural responses in the brain regions involved in the pain associated with social rejection compared with those who took a placebo (DeWall et al., 2010). Just as the direct experience of social rejection activates pain circuits in the brain, so too does watching someone else being socially rejected (Masten, Eisenberger, Pfeifer & Dapretto, 2010).

The processing of threat and reward in the brain is also affected by social context. Bault, Joffily, Rustichini, and Coricelli (2011) showed that beating a peer in a lottery is more rewarding than winning alone, that this is associated with greater activity in the brain regions that process reward and social information, and that social winning increases the likelihood that people will take more risks and be more competitive.

7

These and other social neuroscience findings, further detailed in this article, make a strong argument that the consideration of the social and emotional responses and needs of others play a role in helping people successfully collaborate and understand one another. This is especially relevant for individuals in leadership roles, since fostering and supporting rewarding experiences, such as a sense of connectedness among employees, is crucial for well-being and job satisfaction. In fact, recent research cites co-worker incivility not only as a cause of increased distress and problems in the workplace but also as leading to a carryover effect in which stress from work is transferred to the home, negatively impacting personal relationships by, for example, reducing marital satisfaction (Ferguson, 2012).

The social abilities of team members are of the utmost importance in enhancing performance. “Collective intelligence,” or how well a group of people performs across a wide range of tasks, does not depend on having one or many smart people in the group, but instead is directly related to factors such as the social sensitivity of the group members and how much time is spent giving everyone in the group equal time to talk (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010).

The wide reach and influence of SCARF® has motivated an exploration of the most recent social neuroscience research, and how findings from the last five years can update and provide a more in- depth understanding of the SCARF® domains and their influence on human social behavior. The following sections highlight results from recent studies relevant to each of the five SCARF® domains.

The latest social neuroscience of SCARF®

Status

People are acutely sensitive to their social status, that is, their importance relative to others, and tend to be accurate judges of where they fall on the social ladder (Srivastava & Anderson, 2011). Even though people have a good sense of their own social status, comparing oneself to another person with higher status can elicit a threat response. Stronger envy when comparing oneself with someone of higher social status is associated with activation in the dorsal anterior cingulate cortex, a region of the

brain implicated in processing pain (Takahashi et al., 2009). Conversely, stronger Schadenfreude, or pleasure derived from another person’s misfortune, is associated with activation in the striatum, which is involved in processing reward (Takahashi et al., 2009).

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Sensitivity to one’s own social status can also be seen in small-group settings, where a perception of lower status in the group is associated with reduced cognitive capacity (lower IQ), increased responses in the amygdala, and decreased responses in the prefrontal cortex relative to perceived higher group status (Kishida, Yang, Quartz, Quartz, & Montague, 2012). Making social status salient can also influence large-scale brain activity. Priming high social power (think of a situation in which you had power over someone) versus low social power (think of a situation in which someone had power over you) was associated with increased left frontal brain activity, previously shown to be related to a tendency to an approach-related orientation and seeking of reward (Boksem, Smolders, & De Cremer, 2012).

Status-confirming information can elicit activation in reward neural circuitry. Izuma, Saito, and Sadato (2008) showed common activity in the striatum when a person received a monetary reward and when he or she acquired a social reward, namely, when perceiving that he or she was acquiring a good reputation with others. Izuma (2012) further argued that reputation-based decision-making drives many aspects of human social behavior and engages not only the striatum but also the medial prefrontal cortex, temporal parietal junction, and amygdala, further highlighting the importance of status in threat, reward, and social processing.

Actively and consciously considering status-related information, such as when we compare ourselves to someone more affluent or with a more prestigious job, affects both our behavior and threat/reward neural activation. However, one’s predisposition toward valuing status-related information operates on a more nonconscious level as well. Terburg, Hooiveld, Aarts, Kenemans, and Van Honk (2011) showed that people who tend to be more dominant took longer to avert their eyes from a subconsciously presented angry face. In the same study, people who were less dominant and more sensitive to reward took longer to look away from happy faces, also presented without conscious awareness. These findings support the idea that the importance of status for

8

an individual may be a basic personality trait and can influence social interactions even if he or she is not aware of it. Someone who highly values status may be more likely to react to status-threatening situations in an aggressive and confrontational manner.

#### Status-confirming information can elicit activation

*in reward neural circuitry.*

The tendency to perceive changes in social status as threatening also appears to be related to a person’s baseline level of testosterone. After losing a competitive task, both men and women with higher levels of testosterone exhibited increases in cortisol, a stress hormone released during a threat response, compared with low-testosterone losers (Mehta, Jones, & Josephs, 2008). More recent work highlights the critical interplay between hormones and stress in dominance and social status. People who are high in testosterone but low in cortisol (low stress) seek to gain more social dominance, whereas high testosterone paired with high cortisol (high stress) is actually associated with seeking lower status (Mehta & Josephs, 2010).

Together, these studies support and extend prior work, showing that threats to or confirmation of status influence the way in which people perceive others and interact in social settings.

Certainty

Imagine how you would feel if your flight had been delayed and you were sitting in the plane on the runway. Would you feel less anxious and annoyed if the pilot gave you constant updates, or would you be just as happy if you did not have any of that information? People differ in their need for certainty and their ability to tolerate uncertain or ambiguous situations. Specifically, intolerance of ambiguity is the tendency for one to perceive ambiguous or uncertain situations as sources of threat.

In general, increasing certainty is perceived as

rewarding and increases activation in reward neural circuitry (e.g., ventral striatum). Although previous research has shown that unexpected rewards increase activation in reward-related brain regions more than expected rewards, just receiving information about an upcoming reward also activates these reward regions. Dopamine neurons in monkeys have been shown to fire during the expectation of a reward, but also in the expectation of information about that reward (Bromberg-Martin & Hikosaka, 2009). Conversely, increased ambiguity or uncertainty decreases activation in reward circuits and increases activation in threat neural circuitry (e.g, the amygdala).

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#### People differ in their need for certainty and their ability to tolerate uncertain or ambiguous situations.

Individual differences in various personality traits can also affect the way that people process and respond to uncertain or ambiguous situations. Ambiguous social situations can cause a large amount of stress, especially if someone is worried about being negatively evaluated, and this anxiety and stress is amplified by low self-esteem. People with low self-esteem who experience ambiguous social rejection engage in more negative self- appraisal and self-blame; they also show greater cortisol reactivity than people with high self-esteem (Ford & Collins, 2010).

These studies highlight the rewarding nature of certainty and the threatening nature of uncertainty and ambiguity. An individual’s ability to tolerate ambiguity has profound implications for whether or not uncertain social situations, such as the restructuring of a company or having to work with a new team of people, will be met with manageable or overwhelming levels of anxiety and stress.

9

Autonomy

The perception of having autonomy, that is, of having control over the things that happen in one’s life, has long been known to increase well-being and cognitive functioning and to improve health. Across the globe, psychological prosperity (such as a sense of autonomy), as opposed to economic prosperity, better predicts feelings of well-being (Diener, Ng, Harter, & Arora, 2010).

People have a fundamental need for personal control. In a recent study by Leotti and Delgado (2011), people reported that they liked a cue that signaled being able to make a choice in the future more than a cue that predicted no choice. In the same study, anticipation of making a choice increased activity in the reward regions, specifically the ventral striatum, supporting the idea that a sense of autonomy is inherently rewarding.

Autonomy can be closely linked to the concept of agency, which is typically defined in neuroscience research as behavior that is self-generated (i.e., oneself moving a joystick vs. another person moving a joystick). Thus, the focus of much of this research is on who initiates a behavior and not why a person does so. However, Lee and Reeve (2012) were interested in the latter question, which is pertinent to a discussion of the social neuroscience of autonomy: What are the neural correlates of being motivated to do something because you are intrinsically motivated and choose to do it (autonomy) compared with being motivated by extrinsic factors such as incentives? Intrinsically, as opposed to extrinsically, motivated behaviors activated the anterior insula, which is implicated in integrating information about internal bodily states and emotional evaluations. This insula activation was found to be highly correlated with the level of perceived autonomy and satisfaction thatpeoplereportedexperiencing intheir lives. Extrinsic motivations, such as performance- based monetary incentives, have actually been shown to reduce intrinsic motivation to perform a task, a phenomenon termed the “undermining effect,” which is associated with reduced activation in the striatum and prefrontal cortex (Murayama, Matsumoto, Izuma, & Matsumato, 2010).

Inesi, Botti, Dubois, Rucker, and Galinsky (2011) showed that when people lack a sense of power (i.e., control over what other people do), they seek

out a sense of choice (i.e., control over their own outcomes), and vice versa. People can be content with only a sense of power, only a sense of control, or both, but having neither power nor control leads to dissatisfaction.

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#### People have a fundamental need for personal control.

These findings have specific implications for the workplace; leaders should be able to increase the satisfaction of individuals with a relatively powerless or low-level job by giving them a greater perception of choice, thereby increasing autonomy. In fact, Wood and De Menezes (2011) showed that this was the case; employees with a greater sense of autonomy reported greater job satisfaction and reduced anxiety. Social neuroscience research highlights the cognitive and neural mechanisms underlying this phenomenon — since the perception of autonomy is processed in the brain as a reward, and that fostering intrinsic motivation is also rewarding, implementing leadership practices that increase autonomy and intrinsic motivation in employees will increase productivity and promote collaboration.

Relatedness

The degree to which people feel a sense of connectedness and similarity to those around them is directly related to whether or not people feel they areengaging insafeorthreateningsocial interactions. The phenomena known as “in-group preference” and “out-group bias” refer to the consistent finding that people feel greater trust and empathy toward people who are similar to themselves and are part of their same social circles and greater distrust and reduced empathy toward those who are perceived as dissimilar and members of other social groups.

People even process information about in-group members and out-group members in different parts of the brain (Mitchell, 2009; Jenkins, Macrae, & Mitchell, 2008). In-group preference and out- group bias are not only human phenomena but are observed in monkeys as well (Mahajan et al., 2011).

10

It appears that the definition of in-group and out- group members is not limited to racial, ethnic, or political distinctions, but that arbitrarily assigning people to different teams can have the same effects of increasing liking for members of one’s own team and decreasing liking for members of the other team, which is reflected in brain activity (Van Bavel, Packer, & Cunningham, 2008). Mitigating in-group bias and out-group prejudice is an important consideration when facilitating collaboration among individuals who may perceive outside individuals as a threat (e.g., an independent consultant, a new team of co- workers, etc.) Walton, Cohen, Cwir, and Spencer (2012) showed that providing minimal social links to another person or group increases motivation and performance. Equally important is the fact that increasing intergroup contact can reduce the prejudice observed toward out-group members (Dhont, Roets, & Van Hiel, 2011). If two groups or teams of people need to work together, fostering more social contact between groups is one way to increase relatedness and decrease a sense of threat.

Oxytocin, a neuropeptide involved in social cognition and behavior in mammals, is involved in increasing relatedness. It has been shown to reduce social stress, reduce amygdala activation, improve the processing of social and emotional information, and increase attachment and empathy toward others (Meyer-Lindenberg, Domes, Kirsch, & Heinrichs, 2011). New research, however, has questioned this “love drug” role of oxytocin; instead, it may play a more general role by increasing all approach- related social behavior (e.g., positive as well as negative emotions such as anger and jealousy) and reducing social withdrawal (Kemp & Guastella, 2011). Interestingly, oxytocin not only promotes in-group trust and cooperation, but it also increases aggression toward out-groups (De Dreu et al., 2010).

Several research studies have shown that the size of one’s social network is related to the structure and function of the brain. `In monkeys, living in larger social groups is associated with increased gray matter volume and increased functional coupling between brain regions important for processing social information (i.e., temporal and prefrontal cortices) (Sallet et al., 2011). Pertinent to the ever- increasing prominence of social media and the debate about its effects on social relationships and relatedness, Kanai, Bahrami, Roylance, and Rees

(2012) showed that the more friends people have on Facebook, the greater the size of their amygdala and temporal cortex. Tamir and Mitchell (2012) recently reported that people are highly motivated to share information about themselves and that self-disclosure is related to increased activation in reward regions of the brain. It is interesting to speculate whether this motivation for self-disclosure is an underlying factor in the popularity of social networking sites such as Facebook and whether greater self-disclosure is related to larger social networks and an increased perception of social support.

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#### Relatedness isn’t just about feeling good … having stronger social relationships increases your chance of

*living longer.*

Relatedness isn’t just about feeling good. New studies show that having stronger social relationships increases your chance of living longer. A meta- analysis across 148 studies concluded that people with stronger social relationships have a 50% increased likelihood of survival than those with weaker social relationships (Holt-Lunstad, Smith, & Layton, 2010). Similarly, people who feel they have high levels of social support at work are at a reduced risk of mortality (Shirom, Toker, Alkaly, Jacobson, & Balicer, 2011)

Fairness

The perception of the fairness of any situation is not based on “cold,” rational thought processes, but instead, emotions are integral to judging fairness, and those judgments emerge over time through social experiences with others (Barsky, Kaplan, & Beal, 2011).

Unfair offers in neuroeconomic games, in which one person has to divide money between himself

11

and another player and does so in an unequal manner (e.g., $9/$1), elicit strong negative emotional reactions and increase anterior insula activation (Rilling & Sanfey, 2011). Recent research has also shown that the amygdala is activated during the rejection of these unfair offers (Gospic et al., 2011). Even when fair and unfair offers are made equally valuable (i.e., equating their monetary value), people are happier to receive fair offers than unfair ones, and receiving fair compared to unfair offers activates reward regions in the brain (Tabibnia, Satpute, & Lieberman, 2008).

Not only receiving but also making fair offers activates reward — and theory of mind-related brain regions (Weiland, Hewig, Hecht, Mussel, & Miltner, 2012). Tricomi, Rangel, Camerer, and O’Doherty (2010) reported that people who gave more money to others than to themselves, i.e., acted pro-socially and reduced inequality, showed increased activity in the ventral striatum and ventromedial prefrontal cortex, reward-sensitive brain regions. The authors claim that this is evidence for inequality-averse social preferences in the brain.

Results from a meta-analysis showed that perceptions of unfairness in the workplace can negatively affect employees’ physical and mental health (Robbins, Ford, & Tetrick, 2012). Accordingly, increasing the perception of fairness and reducing unfairness will promote satisfaction and well-being, especially in social situations in which sensitivity to interpersonal equality and inequality is heightened.

Interactions between SCARF® domains

Although much can be said about each SCARF® domain on its own, recent social neuroscience research points to several ways in which these domains relate to one another. Two of the most prominent are the connections between status and relatedness and between certainty and relatedness.

Status and relatedness

Social status can influence the way we relate to, behave toward, and interact with others. Lount and Pettit (2012) showed that people with high status were more trusting of others than are people with lower status, and this is due to the fact that high- status individuals believe that others have positive (benevolent) intentions toward them. One’s own social status can influence activity in reward-related brain regions when processing information about

the social status of others. People with lower social ranking (i.e., lower socioeconomic status) showed increased activation of the ventral striatum when answering questions about a low-status individual, and people with higher social ranking showed increased activation in the same brain region when answering questions about a high-status individual (Ly, Haynes, Barter, Weinberger, & Zink, 2011). In a highly publicized paper, Piff, Stancato, Cote, Mendoza-Denton, and Keltner (2012) showed that upper-class (high social status) individuals are more likely to act unethically than lower-class individuals. These behaviors included cutting people off while driving, cheating, stealing office supplies, taking candy that was intended for children, and viewing greed more positively. Further research suggests that higher social class people are worse than lower social class people at reading others’ emotions, that is, they are lower in empathy (Kraus, Horberg, Goetz, & Keltner, 2011).

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Individuals who experience high levels of anxiety in social situations (social anxiety disorder) perceive themselves as having low social rank but also having low perceived closeness with others, including peers, friends, and romantic partners (Weisman, Aderka, Marom, Hermesh, & Gilboa-Schechtman, 2011). Difficulties relating to others are associated with perceptions of reduced social status.

We have discussed how perceptions of high status and greater relatedness are rewarding. Recent work takes this one step further and purports that a particular kind of status — sociometric status, that is, respect and admiration from peers — is much more predictive of a person’s well-being than socioeconomic status (Anderson, Kraus, Galinsky, & Keltner, 2012). This highlights the integral relationship between status and relatedness; increased social status that grows from better relatedness to others appears to be more rewarding than economic status.

We suspect that economic status can at times reduce relatedness (think of wealthy people in homes with big walls, cut off from people), whereas sociometric status involves being in a community of others.

Certainty and relatedness

Relating to and understanding others usually involves some degree of uncertainty or ambiguity

12

because we have to guess or deduce what other people are thinking or feeling. Activity in the medial prefrontal cortex is sensitive to the amount of ambiguity involved when making decisions about what a person thinks or feels, reflecting greater computational demands in the part of the brain implicated in simulating different possible scenarios (Jenkins & Mitchell, 2010).

#### Even when fair and unfair offers are made equally valuable … people are happier to receive fair offers than unfair ones …

In addition, personality characteristics such as a need for cognitive closure (i.e., a high need for certainty and to avoid ambiguity) are related to prejudice. People who have very low tolerance for ambiguity exhibit higher levels of race- and gender-based prejudice (Roets & Van Hiel, 2011). Promisingly, however, increasing contact between in-groups and out-groups is effective in reducing prejudice, especially in people who have a high need for cognitive closure. Uncertainty can undermine relatedness (increase prejudice), but increasing one type of relatedness (intergroup contact) can mitigate the threat caused by uncertainty and reduce its negative impact on relatedness (reduce prejudice).

Individual variation and SCARF®

The SCARF® Model provides an intuitive and easily remembered framework for conceptualizing the main factors that influence the way people perceive and respond to social situations. The five factors of the model — status, certainty, autonomy, relatedness, and fairness — all affect the extent to which a person feels threatened or rewarded in social settings and, therefore, the extent to which a person is able to collaborate effectively with others. Going beyond these general descriptions, the SCARF® framework has also been used to characterize individuals in

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Status** | **Certainty** | **Autonomy** | **Relatedness** | **Fairness** |
| **Total (out of 6,239)** | 791 (12%) | 2,898 (46%) | 190 (3%) | 1,684 (27%) | 766 (12%) |
| **Gender: M Gender: F** | 313 (40%)  478 (60%) | 1,077 (37%)  1,821 (63%) | 77 (41%)  113 (59%) | 671 (40%)  1,013 (60%) | 325 (42%)  441 (58%) |
| **Age (under 18)** | 67 (8%) | 188 (6%) | 24 (13%) | 175 (10%) | 120 (16%) |
| **Age (18–25)** | 47 (6%) | 168 (6%) | 8 (4%) | 124 (7%) | 63 (8%) |
| **Age (26–35)** | 244 (31%) | 601 (21%) | 48 (25%) | 395 (23%) | 216 (28%) |
| **Age (36–45)** | 234 (30%) | 842 (29%) | 47 (25%) | 448 (27%) | 180 (23%) |
| **Age (46–55)** | 146 (18%) | 766 (26%) | 44 (23%) | 390 (24%) | 135 (18%) |
| **Age (56–65)** | 47 (6%) | 305 (11%) | 17 (9%) | 136 (8%) | 47 (6%) |
| **Age (over 65)** | 6 (1%) | 28 (1%) | 2 (1%) | 16 (1%) | 5 (1%) |
| **Top Industry** | Banking/Finance 80 (10%) | HR 326 (11%) | HR 28 (15%) | Education 198 (12%) | Education 104 (14%) |
| **2nd Industry** | HR 80 (10%) | Education 291 (10%) | Accounting, Education, Engineering 17 (9%) | HR 176 (10%) | HR 66 (9%) |

Table 1. Findings from a study of the most common SCARF® profiles, alongside demographic variables of gender, age, and industry. The most prevalent overall was Certainty (46%), followed by Relatedness (27%). The study was conducted by the NeuroLeadership Group, n=6239.

terms of their sensitivity to each of the five domains, effectively creating custom SCARF® profiles. This individual differences approach highlights the ways in which people with different SCARF® styles require different approaches when managing or collaborating with others. For example, a person who is highly anxious in uncertain situations will likely need more clarity and concrete detail than a person who is more tolerant of uncertainty.

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In informal studies within SCARF® workshop settings run by the NeuroLeadership Group (a consulting firm that draws on the NeuroLeadership Institute’s work), people appear to have widely different orders in which the domains of SCARF® are important to them. For example, an individual may feel most passionately about fairness and least passionately about status, with the other domains spread in between. This individual variation is likely to be influenced by the environment at the time and perhaps change over one’s lifetime; however, it also appears to be relatively static. An individual who valued fairness can usually track back through their life history and see how this domain informed their life and career choices over time. This is an area for substantial future research,

with individual variation studied over time in relation

13

to different career paths and in connection with genetic variability.

In contrast to data from informal studies are findings from a large-scale research study conducted by the NeuroLeadership Group in which SCARF® profiles from over 6,300 individuals were collected. Table 1 summarizes these findings, highlighting the most prevalent profile types and demographic variables associated with each. What is striking here is that 46% of responders indicated that the most important domain was certainty, followed by relatedness, which 27% of responders rated as the most important domain.

Understanding individual variation can have many benefits. Identifying an individual’s SCARF® profile can help tailor both engagement as well as reward programs to each person by focusing on their key drivers rather than all domains at once. This kind of assessment can be helpful because of our tendency to think that others perceive the world as we do, a bias called the “false consensus effect” (Ross, Greene & House, 1977; Krueger & Clement, 1994). Without some kind of awareness of other people’s motivators, managers and peers will tend to try to motivate in the way they themselves would be motivated.

SCARF® and culture

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While there appears to be some individual variation in SCARF® profiles, there is likely to also be a cultural influence in terms of ethnic culture, as well as the culture of someone’s organization or community.

Studies from cultural neuroscience, summarized by Rockstuhl, Hong, Ng, Ang, and Chiu (2010), suggest that there is a genetic basis to a number of our tendencies that tie closely to SCARF®. For example there is a gene that alters the uptake of oxytocin in the brain, which makes some cultures feel social rejection and social support more acutely. This genetic variation may be behind variations in collectivism versus individualism, pushing some cultures to value relatedness and fairness more and others to value autonomy and status. Further research should be done on whether cultures have any consistent tendencies in terms of the SCARF® framework itself, something that could help with intercultural understanding and communication.

#### Without awareness of other people’s motivators, managers and peers will tend to try to motivate

*in the way they themselves would be motivated.*

Organizations are likely to have their own SCARF® profile. An organization such as a start-up technology company, which values creativity and innovation, and requires an overall approach state, is likely to focus on issues such as autonomy, relatedness, and fairness and try to reduce the status gap between people. However, the downside is that with so much autonomy and relatedness, certainty can suffer by having so much individual choice in how things are done and so many people involved in decision-making.

14

An organization that needs people to follow preexisting systems may focus on using created status differentials to motivate others, as well as on the need for certainty with an emphasis on rigor and controls. An example of this might be a government office, where people may have high certainty but low autonomy. More research needs to be done on organizational SCARF® profiles, the relevance of these, and how they can be altered over time.

SCARF® and workplace engagement

The paper entitled “Neuroscience of Engagement” (Rock & Tang, 2009) outlined how the SCARF® domains are likely to be the underpinning drivers of workplace engagement. In this paper, the authors showed how several of the more popular engagement assessments were measuring various domains of SCARF®; however, with an uneven weighting and without all domains being measured. We propose that a more accurate measurement of engagement will be assessments that test evenly across all domains of SCARF®. More research is needed in this area.

In noting that the SCARF® domains drive threat and reward, it is useful to note that the reward or threat response can be either an expectation of or an actual positive increase in a domain. That is because expectations of rewards (or threats) are as strong as or stronger than actual rewards (Rock, 2009).

Rock and Dixon propose that people experience the strongest sense of engagement when they have rewards occurring in multiple domains, termed the “multiplier effect” (Rock, Dixon, & Ochsner, 2010). For example, someone who is given a promotion may be rewarded by a greater sense of control over their work, an increased sense of status, and a perception of fairness if they worked hard to get the promotion. A feeling of making progress on a task, which was shown in a 2010 study (Amabile & Kramer, 2010) to be the most engaging experience at work, is likely to increase one’s sense of status, certainty, and autonomy all at once, another example of the multiplier effect.

The opposite is likely to be true as well: Someone will be highly disengaged via the multiplier effect if their sense of uncertainty goes up as a result of a change in their team, over which they have less control than they expected, and it is seen as unfair.

Minimizing disengagement is perhaps the first rule of thumb, as threat responses tend to be the most intense experiences. This best happens ahead of time through better planning of organizational initiatives to minimize SCARF® threats and by offsetting threats that may be necessary.

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#### ... people experience the strongest sense of engagement when they have rewards occurring in multiple domains ...

SCARF® and change

The SCARF® Model partly explains why change can be so hard and points to ways of making change easier. Unless carefully managed, an organizational change is likely to affect all five domains of SCARF® for a wide range of people. Managing a change carefully would involve using the offsetting effect (Rock, Dixon, & Ochsner, 2010) to create a perception of increases in the domains where increases are easiest to execute. For example, a team that is reorganizing functions could offset SCARF® threats by involving people in some aspect of choice about the process, which would increase a sense of autonomy. Also, information could be provided about the wider context so that people sense increases in certainty.

SCARF® and leadership

There are many links between SCARF® and leadership. In this brief summary, we have explored a few of the links between SCARF® and individual variation, culture, engagement, and change. Another issue involves self-management as a leader, or how a leader manages his or her own behavior.

The relationship between people and their boss is a troubled one on average. One study showed that people trust a stranger in the street more

15

than their boss (Segalla, 2009). This challenge may be explained by SCARF® and the multiplier effect. Having a boss creates a status threat through being the lower-status person. A boss tends to create uncertainty by not setting clear expectations and by continuously seeking improvements, which are seen as changes and, therefore, uncertain. A boss has the control and the final say, reducing one’s autonomy. Bosses tend to keep themselves separate, putting themselves in a different group, in this case, the out-group, resulting in a threat to relatedness. Finally, a boss is likely to be seen as unfair simply because they appear to be paid more money than their team while not doing the direct work. With all five domains under threat, there may be minimal sharing of information, reduced accurate perception of the other’s thoughts and intentions, and reduced creativity.

The threat that leaders inherently create needs to be offset for successful collaboration. Successful leaders do this by increasing relatedness, which can come from identifying and focusing on shared goals, and also by being authentic and open so that people share positive human experiences (George, 2003). Alternatively, a leader may increase a sense of certainty through extensive sharing of information, or being sure to be clear about where people have authority and, thus, autonomy. Leadership may easily devolve into threat-producing experiences; however, with attention, leaders can learn to offset these threats and develop a relationship with their teams built on moderate rather than high stress.

Conclusions

Economic theory that purports that individuals are purely rational decision-makers is clearly false; people are also significantly driven by social information and social motivations, in the form of both threats and rewards. Leaders who acknowledge this and take advantage of being able to reduce threat and foster reward in each of the SCARF® domains are going to be much more successful than those who expect people to suppress their emotions and social needs. Suppression is, after all, a strategy that tends to make emotions worse and further reduce cognitive functioning (Ochsner, 2008).

Leaders are under social magnification; everyone is watching them, looking for meaning, and even

taking on their emotions nonconsciously. All social interactions for a leader are meaningful and must be done with care. This is why it is so important to take advantage of psychology and social neuroscience research and to be aware of implicit or unconscious influences on behavior, especially social signals and biases. Understanding and internalizing The SCARF® Model can help leaders become more socially sensitive and socially adaptive, helping them to use social rewards and threats in more deliberate, useful ways that are in line with an organization’s objectives. Christine Williams, a leadership development practitioner at NASA, once said, “We can predict what will happen to a tiny spacecraft in 10 years and a million miles away, but we can’t seem to predict what will happen at a meeting tomorrow.” SCARF® may be only one small step in the journey toward understanding social interactions, but it appears to be a step in the right direction.

16

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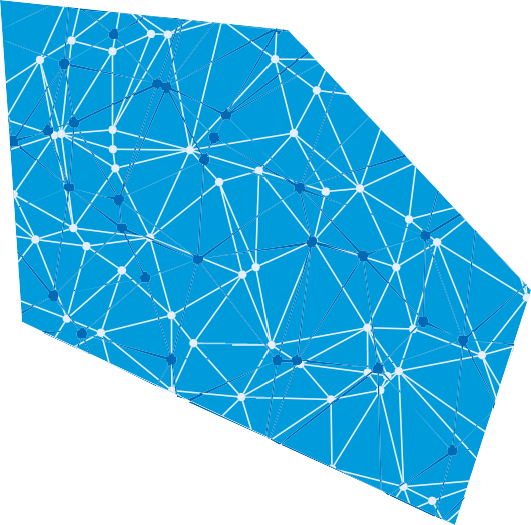
19

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THE EUREKA SCALE:

##### From “Oh” to “Uh-huh” to “Aha!”

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Consistent innovation is a gold standard for bringing organizations to the forefront of competition (Lee & Yu, 2019). One of the scientifically proven methods for increasing innovation is to foster environments for insight, which can boost motivation, enable better recall, and improve performance (Davis et al., 2015; Jung-Beeman et al., 2008). Recent research has revealed different features of the “aha” phenomenology that can be measured and placed onto separate scales and is beginning to provide a more nuanced view of the (often variable) insight experience (Danek et al., 2014a; Webb et al., 2016). Here, we unpack our Eureka Scale, first presented by the NeuroLeadership Institute in 2015. This scale pulls together various measures of insight into one memorable, usable framework for measuring the intensity of insight in real time or after the fact. This is the first framework that can be used to measure and improve the intensity of insight across all contexts, whether in written, audio, video, or experiential content. It is useful for improving the impact of all kinds of change initiatives, including one-to-one coaching or group teachings, training of all types, advertising and marketing campaigns, communications programs, strategy development, or anywhere you are trying to share or develop an understanding of an issue. We first solidify the scientific underpinnings of insight and how they relate to the outcome variables that define its scalable nature and then directly apply the scale as a tool for measuring and improving the impact of many kinds of interventions within organizations.

**Key takeaways:**

1. In the current environment, organizations that can demonstrate agility and adapt more quickly may have the competitive edge they need.
2. Achieving these benchmarks requires the ability to learn and relearn, at scale and speed.
3. The heart of client-facing interactions is being able to successfully challenge points of view and create value in the work together, building lasting relationships.
4. Insight generation is the key to all three of these issues and more. Here, we show the science underlying how the benefits of insights scale with their intensity on the Eureka Scale.

4

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The Measurable Scientific Underpinnings of an Insight

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Insights are often described by individuals both in and out of the laboratory as a sudden feeling of awareness, a “knowing” of a solution that comes along with an array of positive emotions (Salvi, 2021). Supporting this notion are results using techniques such as electroencephalography (EEG) or functional magnetic resonance imaging (fMRI) that reveal underlying predictable neural signatures of what happens when someone experiences insight (Bowden & Jung-Beeman, 2003a; for an extensive and thorough review, see: Sprugnoli et al., 2017). Prior to insight, a brief increase in the alpha frequency EEG waveform over the right parietal-occipital area is thought to dampen new sensory input, which then switches to a burst within the gamma frequency band over the right temporal area at the moment of insight and is associated with the formation of new synaptic connections (Bowden & Jung-Beeman, 2003b; Jung-Beeman et al., 2004).

Specific areas involved in preparing for insight and integrating distant information are the anterior cingulate cortex and the superior temporal gyrus (Salvi, 2021; Jung-Beeman et al., 2004). Deeper dopaminergic, hippocampal, and amygdala regions, as well as the prefrontal cortex (PFC), all support the feelings of reward and learning that occur when insight happens (Subramaniam et al., 2009; Zhou et al., 2013; Kizilirmak et al., 2016; Santarnecchi et al., 2019; Csorba et al., 2021). Finally, engagement of an area involved in receiving our interoceptive feelings (or feelings from inside our body), the dorsal anterior insula, has even been implicated in the experience of clarity, enlightenment, and certainty (Bartolomei et al., 2019). Below, we expand on this foundational work by exploring the rich cognitive and neurophysiological evidence for a Eureka Scale, a product of the combined impact of five behavioral factors.

5

Strengths of emotion released

Number of aftershocks

Number of implications

Strength of Insight

Ability to recall later

Motivation to act

Figure 1: Variables that contribute to the strength of insight.

The Scientific Evidence for the Eureka Scale: The Variable Strength of Insights

A eureka moment can be described as a result of the combined impact of five variables (Figure 1): the emotions felt, motivational drive, number of aftershocks (post-insight reflections, described as spontaneous feelings of amazement that can prime future problem-solving and improve performance and engagement) (Shen et al., 2018; Kraus & Holtgraves, 2018), ability to recall the moment, and number of implications that result. It is important to note that the sum of these variables comprise what neuroscientists argue as the affective human experience. The terms “affective” and “affect” refer to emotions or feelings, and often in relation to behavioral drive or outcomes. The dominant theory suggests that “affect” is not only composed of the hedonic dimension (i.e., pleasant or unpleasant) but also the internal physiological underpinnings such as valence (i.e., positive or negative) and arousal (i.e., level of intensity). They underlie the motivational drive and other behavioral expressions that may enable aftershocks, implications, and memory formation (Barrett et al., 1999, 2007). In fact, this further validates our exploration of insight through the lens of each variable, as they are each individually critical to the experience as a whole. How an individual reports an insight may vary, and some 20% of the population may not even be able to recognize the experience (Ovington, 2018), yet those who do, reveal phenomena that are both multidimensional and quantifiable, validating the use of a scale to quantify a subjectively qualitative experience. As each of the five variables intensifies, so does the overall eureka experience (Danek & Wiley,

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1  No  insight | 2  Weak  insight | 3  Moderate  insight | 4  Strong  insight | 5  Intense  insight |
| What we say out loud | “I sense something in the background.” | “What was that idea again?” | “That’s an interesting idea.” | “That’s an important idea.” | “This changes everything!” |
| What our brains “say out loud” | * *No felt emotions* * *No ability to recall* * *No change in motivation* * *No implications* * *No aftershocks* | * *Weak emotions* * *Weak recall* * *Low motivation* * *Unclear implications* * *Low aftershocks* | * *Positive emotions* * *Short-term recall* * *Can be motivating* * *Some implications* * *Few aftershocks* | * *Good emotions* * *Long-term recall* * *Highly motivating* * *More implications* * *Many aftershocks* | * *Greatest emotions* * *Lifelong recall* * *Most motivating* * *Highest number of implications* * *Most aftershocks* |

Figure 2. NLI’s Eureka Scale. This represents how we experience insights and the underlying measurable neural underpinnings.

2017), leading us to apply insights as they vary in strength — via the Eureka Scale (Figure 2), a concept well supported by rich neurocognitive research and expanded on below (Subramaniam et al., 2009; Bowden & Jung-Beeman, 2003a; Salvi et al., 2016; Smith & Kounios, 1996). This tool can be used to increase metacognition, or an intentional reflection of one’s own thought or learning processes, and facilitate heightened awareness of the experience of insight by having individuals rate on a five-point Likert scale (1 = weak to 5 = strong) the strength of insight and how much the insight motivates them to act. The Eureka Scale is similar to the five-point scale used in research demonstrating the relationship between the reported strength of insight and differential neural patterns (Tik et al., 2018). In fact, neural signatures of insight scale in magnitude, along with the experience, and explicitly support the five variables lending to its intensity (Salvi et al., 2020; Jung-Beeman et al., 2004; Rothmaler et al., 2016; Sprugnoli et al., 2017). Below we examine each variable separately as it relates to the neural and cognitive underpinnings and how they contribute to the scalable nature of insight.

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***Emotional***

Central to insight is the emotional experience, and this correlates with measurable activity in emotional processing brain regions, which is also highly variable. To begin, the affective or emotional

6

experience may include a dramatic increase in warmth or, in this case, certainty in regards to the solution (Metcalf, 1986), along with a rich emotional description (Laukkonen & Tangen, 2018). Thus, in addition to general mood increases with insight, an emotional experience often includes varying levels of suddenness (or a dramatic awareness of the solution), surprise, certainty, and relief. In fact, the ability to recall and solve problems gets better as feelings of happiness, surprise, and suddenness grow (Subramaniam et al., 2008; Danek et al., 2014b; Danek & Wiley, 2017; Stuyck et al., 2021). Notably, the highest levels of confidence are reported for problems solved via insight compared to analytical methods (85% vs. 63%), which was also linked to an increased likelihood of correctness (Danek et al., 2014a; Salvi et al., 2016; Webb et al., 2016).

Published insight scales suggest that the “radicality” of the emotional experience correlates with ratings of its intensity (Jarman, 2014) and are strongly supported by underlying physiological mechanisms (Bowden & Jung-Beeman, 2003b), such as those revealed through EEG metrics. For example, gamma waveforms covary in magnitude with levels of reported emotional “suddenness” (Sandkühler & Bhattacharya, 2008). In addition, a separate gamma burst detected over the orbitofrontal cortex, an area associated with pleasurable emotions, varies in

strength with each insight (Oh et al., 2020). Finally, fMRI analysis reveals an increase in activity within the anterior cingulate cortex that matches reported positive mood changes and solutions via insight (Subramaniam et al., 2008).

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Thus, stronger insights lead to a more positive emotional experience (Ludmer et al., 2011; Danek et al., 2014b; Danek & Wiley, 2017; Laukkonen & Tangen, 2018). In the realm of application and cognitive performance, emotional strength is crucial for determining whether information will be integrated into memory (Davachi et al., 2010; Davis et al., 2015). For example, when participants report solving problems via insight, the level of activity in brain regions that underlie our emotional experience, such as the amygdala, correlates with the amount of recall a week after the initial learning. Here, greater amygdala activity is related to greater long-term recall (Ludmer et al., 2011). What this means for organizations is that enabling space for insights will create an emotionally rewarding work environment that will enable individuals to generate better memories and maintain higher executive and cognitive control (Rock & Cox, 2012), ultimately leading to enhanced performance.

***Motivation***

Higher insights are also associated with a boost of motivational drive. These studies reveal greater neural activity in reward and pleasure centers as a function of eureka intensity. Thus, fMRI techniques have revealed that as insight strength increases, neural activity increases as well in reward brain regions, such as the ventral tegmental area and the nucleus accumbens, and there is a scalable increase in dopaminergic release, all of which drive motivation and its behavioral outcomes (Oh et al., 2020; Sandkühler & Bhattacharya, 2008; Tik et al., 2017). Finally, synchronized activity at the moment of insight occurs within areas of the PFC that encode and value the reward (Csorba et al., 2021), likely stemming from dopaminergic input of the deeper reward-based regions.

What this means for employees is that solving problems via insight may allow individuals to benefit from the motivational boost obtained from the receipt of intrinsic rewards, often stronger than rewards from other sources, such as bonuses. In fact, these types of rewards can be most effective

7

and are linked to increased curiosity, exploration, learning, and creativity (Eccles & Wigfield, 2002).

***Recall***

Referred to as the “insight memory advantage,” solving problems via insight leads to better recall, likely due to a combination of the above variables of positive emotions and greater motivation (Wills et al., 2000; Danek et al., 2013; Danek & Wiley, 2020; Duon et al., 2020). Mechanistically, this is dependent on the hippocampus, and as insight strength grows, so does hippocampal activity, which directly supports memory formation (Davachi et al., 2010; Tik et al., 2017). In fact, the strongest and most generalizable memory formation stems from experiences that are both positive emotionally, as well as those that trigger intrinsic motivation. Thus, as insight strength increases, so does the memory of the insight and the environment in which it occurred (Van de Cruys et al., 2021). So, when employees experience stronger, highly meaningful insights, this will pave the way to more innovative ideas and lead to increased competitiveness of the organization.

***Aftershocks***

After the initial experience of insight, many individuals experience aftershocks, which are affective, post-insight reflections described as spontaneous feelings of amazement that can prime future problem-solving and improve performance and engagement (Shen et al., 2018; Kraus & Holtgraves, 2018). Physiological support of experiencing aftershocks is reflected in the measured change in pupil dilation prior to insight, which is directly tied to the release of norepinephrine (NE) from the brainstem. Research has revealed that NE is often released in bursts, differing in amount and presumably the proportion of which can map to different levels of insight. Moreover, NE release has been shown to be predictive of realization and continued cognitive arousal (Salvi et al., 2020; Sara & Bouret, 2012; Lindström & Gulz, 2008).

In fact, the existence of post-insight aftershocks is how creative advertising works to trigger follow- up engagement in regards to items (Shen et al., 2021). For example, the award-winning, successful campaign for “#LikeAGirl” by feminine products maker Always has forever changed the impact this phrase has on action, from one of devaluing girls

to one that encourages girls to grow and challenge themselves. Using this example, organizations that create space for more insight-induced aftershock experiences can expect increased and continuous employee excitement, interest, and engagement.

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***Implications***

Finally, the physical restructuring of neural networks leads to a multitude of impactful implications for organizations, as individuals are more likely to generalize this learning and apply it to other scenarios, which will trigger behavioral action. Coined the “eureka effect,” this may enable individuals to solve tougher problems after having an insight by boosting behavioral flexibility without any additional experience (Ahissar & Hochstein, 2004; Vaidya et al., 2021). Thus, if employers create space for insights (Jung-Beeman et al., 2008), this may be the starting point for innovative ideas and solutions, thinking outside the box, and benefitting from experimentation in a variety of scenarios. The scientific underpinnings of this may lie again in the release of NE, which can occur in bursts and to different levels impacting cognitive arousal (Salvi et al., 2020; Sara & Bouret, 2012; Lindström & Gulz, 2008). Important here, is that it has also been shown to mediate cognitive flexibility in problem-solving, a characteristic critical for creativity, innovation, and adaptive behavior (Sara, 2009).

The Eureka Scale can be a thoughtful and intentional tool for developing people, as this is one of the best ways to drive performance, learning, and behavior change. It can also help develop and assess the success of organizational change initiatives. In a great example of its usage, after the rollout of a learning experience with a client looking to improve the quality of its conversations, more than 300 individuals were surveyed by NLI on their experienced insight strength, motivation to act, and the frequency that learned behaviors were acted on. More than 80% of participants reported level 4 or 5 insights, and two-thirds of them changed their behavior at least one to three times per week. Thus, integrating new initiatives that involve self-generated insights can drive motivation and lead to measurable action in organizations. On the individual level, in a process we call the “Dance of Insight” (Rock, 2009), methods for fostering more insights begin with the act of establishing or asking “permission” of others.

8

This opens a cognitive “floor” for their own thinking and gives them autonomy over how and where a conversation will progress. Asking for permission can often be accomplished best at the beginning of a conversation, when an individual can ask a co-worker or employee whether they are open to discussing a new goal, way of thinking about a problem, or a deeper view of a topic. The process continues by providing “placement” for others, enabling all individuals to be informed equally about the conversation. For example, placement can encourage thinking around the focus, intention, and overall objective of the problem or conversation. And finally, “clarification” of the conversation is a final piece of this process, which works by summarizing critical points. This is not the same as paraphrasing but is a way to confirm understanding in fewer, but different, words. This is a critical step that enables others to feel heard and understood. For example, these questions may involve what the other is trying to say, what they are not saying, and the emotional context of what the person is saying. In all, the “Dance of Insight” is a powerful way to help generate insights in others.

The results are clear: Stronger insights engage motivation-, memory-, and connection-forming pathways to the highest levels, leading to the greatest performance benefits. So how do the individual variables of great insights benefit organizations?

The Value of the Eureka Scale, in Practice

The Eureka Scale has broad applications for measuring and improving the impact of many kinds of interventions within organizational life. In addition, it can be used to measure and improve a wide range of activities, from government interventions to the creation of books, movies, documentaries, to the way we teach K-12 education and beyond. We will focus here on organizational implications, in three broad categories.

1. ***Communication and change strategies of all types***

The purpose of change and communication strategies in organizations is to share ideas and move people to take action. As the research suggests, the stronger the insight people have, the more likely they will take a desired action. Using the Eureka Scale, practitioners can develop communication

strategies and test them against the strength of insight, and then tweak and improve, using hard data for greater objectivity. For example, if launching a communications campaign to announce a change to how performance management will be delivered, a company could test several different approaches to messaging with small groups and ask them for the strength of insights when they happened and why. Using this knowledge can significantly improve the way we develop communications around any kind of change or how we launch a new product or strategy.

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1. ***Coaching, learning, and leadership initiatives***

Like with general communication strategies, the purpose of coaching, learning, and leadership initiatives is to get people to take action, in addition to helping them grow and learn. This means people need to have new ideas but also the motivation to try new things. Given that the strength of insight correlates to the level of motivation people feel, measuring insight is like getting a direct line into the efficacy of an intervention. This can be done in real time or after any kind of intervention. It can help practitioners understand the key moments in an intervention, to make sure they are given quality attention, and perhaps remove content that hinders the strength of insight. The Eureka Scale can also be used to compare different approaches and interventions to see what works most effectively. For example, when looking to scale a leadership development experience, you might compare the strength of insight people have in a half-day classroom experience versus three one- hour online sessions, exploring both the intensity and the number of insights participants have during the event as well as in the month following.

1. ***Innovation strategies***

Innovation and creativity are critical for organizational success. At the heart of creativity is the frequency and intensity of the insight moment, and organizations invest huge resources, both financial and human, into strategies designed to help employees be more creative. Yet until now, there has been no framework that can be used to measure, tweak, and improve these strategies, individually or across different approaches. This includes how we design leadership retreats and off-sites, which are intended in part to find breakthrough ideas. This is also relevant to the way offices are physically laid out. The Eureka Scale could be used to determine if people have more

9

insights if they have quiet spaces to work or if they are all together in larger rooms and can interact more freely. Additionally, organizations could track the quality and quantity of insights across different types of working styles, comparing full time in the office, people working full time at home, or a mix of the two, to identify the best approach for creativity overall.

Consider the enormous costs and work involved in gathering top leadership teams every year. While part of the benefit of this experience is to build social capital and share knowledge, a key goal of this kind of event is to find new ideas and increase leaders’ levels of motivation — two concepts that directly tie to the strength of insight. Here, different design approaches can be assessed through gathering Eureka Scale data across a leadership retreat and comparing this with previous years to identify the kinds of designs that increase insight. For example, are there more insights if a group stays together and shares their learning or if the group is broken into subgroups? Are insights stronger in groups of two, four, six, or eight leaders working together? What time of the day do people have the most insights? This kind of data can be extremely helpful for maximizing what is generally very expensive time spent together.

In summary, across communication strategies, learning interventions, and innovation initiatives, the Eureka Scale provides a consistent and somewhat objective framework for understanding the key messaging, moments, content, or activities that move people to action. Using this framework can help organizations be significantly more data-driven around their people strategies, whether this involves crafting a company-wide email, designing a learning experience, or deciding how much to let employees work from home.

Conclusion

Above, we described our Eureka Scale as it fits within current research and how it supports individual and organizational performance (Davis et al., 2015; Jung-Beeman et al., 2008). Stronger insights will not only boost intrinsic motivational circuitry but also promote better memory formation and solution awareness, all while supporting innovative problem- solving and idea generation. Better understanding of the scale, its components, and implications will spur more actionable applications and inform better decision-making toward viable, measurable solutions (Laukkonen et al., 2020). We often say that organizations should design for insight. What we now know is that the science tells us it’s even more impactful to design for the highest insight possible.

10

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11

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12

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Glossary

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**Research-based techniques used to detect insight**

**Electroencephalography (EEG):** This superficial measure of the brain’s electrical activity is obtained by applying a set of surface electrodes to the scalp that will record cortical brain electrical potentials. This type of neural recording is analyzed by separating the waveforms via frequency. Commonly encountered frequency bands are: delta (<4 Hz), theta (4-7 Hz), alpha (8-12 Hz), beta (13-30 Hz), and gamma (>32Hz). Each of these has been associated with distinct physiological mechanisms. For purposes of eureka moments: The alpha frequency band is associated with restful activity or inhibitory control, as in to gate incoming visual stimuli; and the gamma frequency band has been associated with short-term memory and neural network formation that happens as a function of new synaptic connections.

**Functional magnetic resonance imaging (fMRI):** This type of imaging uses a powerful magnet to manipulate and measure the oxygenated blood flow throughout the brain. The idea is that the brain areas most active at any time will receive more of the oxygenated blood and areas less active receive less. So this technique results in an image of relative blood flow indicating areas more or less active during an activity or in response to a stimulus.

One benefit of fMRI is that it can access deeper brain regions, and from multiple angles, so it can essentially examine the whole brain in relation to the environmental context.

**Brain regions that underlie the eureka experience:**

As they relate to the functions associated with

the eureka experience. Keep in mind, there is a large amount of overlap between each and

their co-functionality.

**Amygdala:** This small, almond-shaped region underlies the processes related to our emotional experience such as cognitive, reward, and learning. As emotional experiences can be both positive or negative in their valence, the amygdala is attentive to both. Its engagement helps us to learn about, form memories of, and develop behavioral actions in response to these emotional experiences, especially those related to insight.

**Anterior cingulate cortex:** This is a hub for a number of integrative functions, specifically in regards to the emotional experience after conflict. One major theory suggests its involvement in

13

detecting and processing inconsistencies of new stimuli. This can lead to insight as it triggers an attentional shift toward the inconsistencies, and this may lead to insight-based solutions. Additionally, the processing of the emotional experience that occurs alongside an insight moment is thought to be due to activity in this area. Notably, this area is also associated with processing of pain and is discussed in other publications.

**Brainstem releasing norepinephrine (NE):** As the brainstem is the most evolutionarily conserved brain area, as a whole, it primarily supports the basic, unconscious functions that keep us alive and responsive to the environment. One nucleus here, the locus coeruleus (LC), is the main source of NE for the brain. NE is critical for modulating our state of arousal and attention toward novel things in our environment. It is also involved in the sympathetic arm of our autonomic nervous system, triggering our fight-or-flight response. As such, it directly controls our pupillary diameter, and this observable response occurs at the moment of insight, making it an ideal external indicator.

**Dorsal anterior insula:** This somewhat hidden cortical structure has been associated with several functions, including sensory and emotional processing. Specifically, it allows us to process a range of internal sensory information, from external to internal bodily sensations. Its involvement in

our emotional experience stems from the impact of internal body sensations on our subjective experience of emotion. For instance, a wide range of emotional experiences, from disgust to pleasure, activate the insula.

**Hippocampus:** This deeper brain region plays a critical role in learning and memory. It is especially important for memories of events and spatial relationships (like remembering where you parked your car). It is also critical for filtering important information into long-term memory, which is determined in a large part by the emotional

and rewarding nature of the experience. Thus, emotional and rewarding events, such as those that happen with higher levels of insight, are more likely consolidated into long-term memory.

**Nucleus accumbens (NAcc):** This area is involved in motivation, reward, and feelings of pleasure and is part of the reward-based mesocorticolimbic pathway. As it is also associated with the limbic system, it helps to mediate our emotional response, which is why activity here is linked to pleasure and motivation. It primarily uses the neurochemical dopamine to communicate with the prefrontal cortex, amygdala, and hippocampal regions.

**Orbitofrontal cortex:** This ventrally located frontal lobe structure plays a role in the conscious experience of pleasure and reward and is involved in reward-based and decision-making behavior. In

relation to eureka moments, it becomes engaged in response to the emotional experience of insight and will impact the decisions that follow the insight and the formation of the memory related to the event.

**Prefrontal cortex (PFC):** This large brain region, which takes up about 30% of our cortical space, is involved in many of our higher level cognitive functions. While still in the early stages of understanding, it is generally thought of as our executive control driver. Specifically, it is critical for attentional modulation, working memory, and complex decision-making. As it relates to the

moment of insight, its involvement seems to relate to the attentional focus toward the resulting solution and the learning that follows.

**Right parietal-occipital area:** This combination of cortical regions is highly involved in sensory and motor processing. Specifically, the occipital lobe underlies visual perception and processing. So when thinking about its involvement in solving problems via insight, the type of EEG signal recorded over

this region indicates that the sensory input to the occipital region is being gated or suppressed. This can help to enable insight since it dampens new incoming, and possibly distracting, signals to allow for the current problem to be solved via insight.

**Right temporal area:** The temporal lobe is one of the major cortical regions of the brain. As a lobe, it has a number of functions associated with it,

including sensory, language, memory, and emotion. Important here is its role in the formation of memory and emotional processing. Based on the type of EEG signal recorded here, specifically a burst of the gamma frequency band, which is associated with the formation of new neural connections, it suggests that its involvement is centered on the network formation at the moment of insight.

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**Superior temporal gyrus:** This brain area has been associated with the integration of distantly related information when working to understand novel ideas or problems. Its engagement during an insight moment could be to combine this distant and quieter activity. It should be noted that this area is also highly linked to language perception.

**Ventral tegmental area (VTA):** This region is involved in generating feelings of reward and motivation and will impact learned reward-directed and motivational behavior. It is part of a larger reward-based mesocorticolimbic circuit. Most of the cells release dopamine and these are largely projected to areas like the prefrontal cortex so

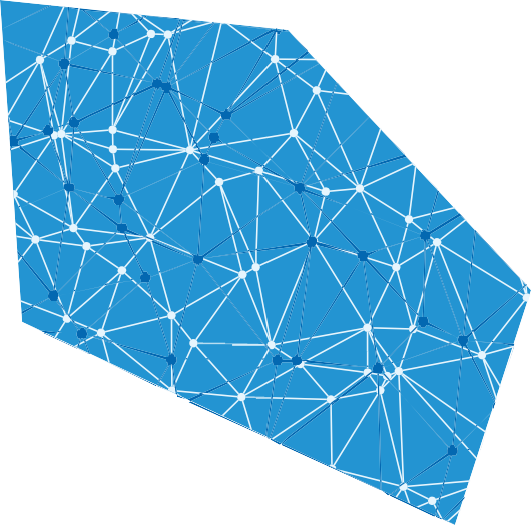
that the reward can impact executive control and ultimately decision-making behavior.

14



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GETTING TO A CULTURE OF FEEDBACK:

##### A science-based strategy to improve performance at scale

By Camille Z. Inge Christine B. Chesebrough Tessa V. West

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Frequent quality feedback is necessary for employees to remain agile and engaged. But despite best intentions, there is a substantial gap between how much feedback people need and how much they actually receive. Based on what happens in the brain when feedback works, we believe this gap persists because of an underlying assumption in the traditional approach: that we need to focus on giving more feedback. That is, while organizations have been trying to close the gap by getting managers to *give* more feedback, we may more effectively close the gap by encouraging employees to *ask* for more feedback. Giving and receiving unsolicited feedback is an inherently threatening experience due to the high sensitivity of the social brain. Threat makes it difficult for the receiver to efficiently process feedback and for the giver to share quality feedback. Further, threat makes both parties less likely to willingly engage in the behavior, lowering the quantity of feedback shared. Whereas a focus on giving feedback may continue to face these challenges, a focus on asking for feedback offers cognitive benefits that are more likely to lead to higher quality and quantity feedback.

This paper details what the science says about why people should shift from giving to asking, how to ask for feedback, and how to give feedback once you’ve been asked. By encouraging everyone to ask for feedback, rather than encouraging them to give it, organizations should be better equipped to create a culture of feedback.

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GETTING TO A CULTURE OF FEEDBACK:

###### A science-based strategy to improve performance at scale

**By Camille Z. Inge Christine B. Chesebrough Tessa V. West**

**David Rock**

No system, whether made of cells, silicon, or people, can improve without receiving feedback. An organization’s success in a changing environment depends upon its ability to propel frequent, quality feedback throughout its human network. The traditional focus on giving more feedback to employees appears too slow and ineffective an approach for the current rate of change that organizations must navigate. Organizations know they need to increase the quantity of feedback that is exchanged across the board. This paper explores how we might get there.

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The quality of feedback shared throughout an organization is one of the most powerful indicators of its ability to grow employees’ talent (Kegan & Lahey, 2016). The single most important predictor of success as a leader at Google, for example, is the ability to be a good coach (Google, 2011)—an ability that implies the sharing of high-quality feedback. Although organizations on average spend more than $1,250 per employee on learning initiatives each year (ATD, 2016), feedback, as a free and renewable learning resource, is arguably the tool with the highest return on investment.

In theory, the most valuable way managers can help employees learn and improve is to provide feedback

4

on their performance. But in practice, person-to- person feedback often fails to achieve its potential. Despite awareness and good intentions, there is a substantial gap between how much feedback people need and how much they actually receive. Feedback conversations generally are both too infrequent and too ineffective to reliably improve performance at scale. First, most employees do not receive enough feedback—87% of employees report that they want to be developed in their job, but only a third of employees report that they receive the feedback they need in order to engage and improve (Globoforce, 2011; Gallup, 2016). And second, when feedback *is* given, studies show that it is often not useful—traditional approaches to giving feedback are more likely to have null or even negative effects on the receiver’s performance than they are to improve it (Kluger & DeNisi, 1996).

It is well-known that feedback has a troubled history—that it is hard to get right, and that it has real consequences for performance and retention when it goes wrong. After dissatisfaction with salaries, a lack of opportunity for growth or enhancement is the top driver of workplace stress (APA, 2017). Further, employees who do not receive the feedback they need to feel valued were twice as likely to say they would quit in the next year (Gallup, 2016).

***A thought experiment.*** The discrepancy between how much feedback we need and how much we actually receive may be quite high. Consider the threshold of tasks we perform at work that we could improve upon by getting quality feedback from other people. For instance, feedback may not necessarily be meaningful after chatting with a colleague, but perhaps after leading an internal meeting and probably after presenting to a client. Now consider with what frequency we engage in a task important enough where we could really benefit from feedback. Whatever that frequency is—say it is around five times a week, roughly once a day—compare that to how many times we actually receive quality feedback on those tasks. Although exact numbers may be hard to know, an estimate for many people could be as low as five times a quarter, roughly just once every couple of weeks. With about fifty weeks a year, that would mean that the discrepancy in the amount of useful feedback we receive is over tenfold.¹

Box 1. How big is the gap?

But leaders have not given up on feedback; they recognize that it has the potential to be quite powerful. This is why there are hundreds of articles on how to get better at giving feedback, decades of training programs, and dozens of feedback models in current use. So why then, with all of these attempts to fix the problem over so many years, has so little changed?

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What we did

The NeuroLeadership Institute took on a yearlong research project to find out where best to direct our attention to make feedback more reliably successful. In order to ensure that we landed on the right problem to solve, we reverse-engineered the research. That is, we began not by asking, “Why does feedback fail?” but rather by asking, *“What happens in the brain when feedback works?”*

We first defined quality feedback as socially- exchanged information that leads to positive behavior change. We began our research by reviewing the relevant social neuroscience and psychology literature, as well as directly interviewing the scientists themselves. We compared findings across relevant subtopics of behavior change, including learning, motivation, decision-making, social cognition, personality, and creativity.

1 If a company has a thousand employees, that is the difference between 20,000 (5 x 4 quarters x 1,000 employees) meaningful pieces of feedback a year and over 250,000 (5 x 50 weeks x 1,000 employees) a year.

5

Our synthesis pointed to a sequence of cognitive processes that occur in quality feedback. By identifying what these required processes are, we were able to align on what we think are the central obstacles to creating a culture of feedback.

What we found

Working backward, in order for feedback to result in positive behavior change, the individual has to commit to a plan to improve. But crucially, before that can happen, they must understand that there is a discrepancy between where they are now and where they need to be.

**Resolve cognitive dissonance**

Before an individual can improve their behavior, they must accept that they need to. Behavior change requires recognizing that one’s current behavior is in conflict with a desired behavior, and knowing what to do to improve. Experiencing this kind of contrast can create cognitive dissonance (Festinger, 1962). This is the state of holding two conflicting beliefs or behaviors, such as believing oneself to be healthy while maintaining a habit of smoking. Since dissonance is experienced as discomfort, the brain is motivated to resolve it (Elliot & Devine, 1994). In this example, our brains can resolve the dissonance between “I’m healthy” and “I smoke” by using one of three strategies: either by justifying the behavior (e.g., “I don’t smoke that much”), by changing the belief (e.g., “I’m not healthy”), or by changing the

**Performance**

(physical and mental)

**Optimal arousal,**

**optimal performance**

Low engagement

Anxious

Inactive

***stress***

***zone***

Panic, anger or violence

High

Medium

Low

Low

(underload)

Medium

**Arousal level**

High

(overload)

Figure 1. The relationship between performance and arousal, known as the inverted U of optimal arousal. Figure adapted from Yerkes & Dodson (1908).

behavior (e.g., quitting smoking).

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When feedback works, the receiver is motivated to resolve cognitive dissonance not through excuses, but through a plan to change their behavior.

Working backward once more, we identified that in order to resolve cognitive dissonance productively, we must create the optimal psychological conditions for processing information about the self.

**Maintain optimal arousal**

An open cognitive state occurs when an individual’s attention is engaged, but before the point at which they are overwhelmed or anxious. This is known as the optimal level of arousal (Yerkes & Dodson, 1908; Arent & Landers, 2003). If arousal is too low, the individual remains disinterested; the brain doesn’t consider the information to be important enough to devote its attention to. But if arousal is too high, the individual becomes debilitated; the brain shifts its attention from the information to the emotion, thus impairing performance. That is, optimal performance requires moderate arousal— neither too low, nor too high. This relationship can be visualized in the form of an inverted U (see Figure 1).

When feedback works, both the giver and the receiver are in a state of moderate arousal. At this level, both parties are engaged enough to process information effectively and communicate in a clear and honest fashion.

6

However, feedback conversations often contain self-challenging information, or information that conflicts with one’s idealized sense of self. Processing self-challenging feedback, and changing one’s behavior as a result, requires adequate working memory resources in order to be successful. Working memory resources are available when the individual is in an open psychological state.

Receiving or anticipating giving self-challenging feedback can trigger a biological threat response, which is experienced as an overwhelming state of arousal (Muscatell et al., 2015). This is a closed psychological state. The threat response decreases working memory capacity (Schmader & Johns, 2003), which translates to not being able to attend to the information being told to us, nor to accurately encode it into memory and recall it later. When an employee receives feedback that they process as threatening to their sense of self, of how they are perceived by others, or to their job, their working memory resources are automatically redirected toward emotion and self-defense, rather than logic and self-examination. So, if the suggestion to change is perceived as a threat, it is more likely for that individual to become overly aroused and resolve dissonance by defending their behavior or ignoring the conflicting information.

Based on this understanding of human nature, it is clear that unless the threat response is mitigated, people will continue to stumble through feedback conversations, or avoid them altogether.

Accordingly, efforts to increase the quantity of feedback without first addressing the *quality of the experience* of feedback will be unsuccessful.

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The question, then, is this: How can feedback be provided in a manner that achieves a manageable threat response?

The current feedback approach

To find out, we explored relevant industry data, as well as our own performance management field research. We homed in to examine feedback models currently used in performance management practices and coaching programs through the lens of what happens in the brain when feedback works. The goal was to see what these approaches have in common, and what may be missing.

***Sample of popular feedback models. Extended list in Appendix.***

* Sandwich Model *(compliment, criticism, compliment)*
* Stop, Start, Continue
* SBI *(situation, behavior, impact)*
* STAR/AR *(situation, task, action, reaction/ alternative action, reaction)*
* AID *(action, impact, do)*

Each of these feedback models improves various aspects of feedback interactions. The Sandwich Model attempts to mitigate threat by making the interaction more pleasant. Stop, Start, Continue understands that giving positive reinforcement is a powerful behavioral tool. SBI, STAR/AR, and AID encourage people to give behavioral feedback in context, which helps distinguish between behavior and personality.

These models vary in their prescriptions, but they all take the same approach: They are tools for the feedback giver.

But because the brain is designed to protect itself, any approach that solves for giving more feedback is unlikely to be successful, because it amplifies the aspect of the interaction that is most psychologically unproductive.

We propose that the solution to the discomfort of feedback, and therefore an acceleration of feedback at scale, may be a reversal of the central assumption that feedback conversations should be driven by the

7

person giving the feedback. Rather than focusing on encouraging managers to *give* more feedback, we propose that it is far more effective to focus on encouraging employees to *ask* for more feedback.

The solution may seem simple, but research indicates that the directionality of the conversation has a profound impact on the way the brain processes and embeds the information therein. There is compelling data to support the hypothesis that when organizations switch from solving for giving feedback to asking for feedback, there should be an increase in both the quality and quantity of the those conversations.

*... unless the threat response is mitigated, people will continue*

*to stumble through feedback conversations,*

*or avoid them altogether.*

The problem with giving feedback

To contextualize our proposed approach to closing the feedback gap, it is helpful to bring to life what typically happens when the opportunity for giving feedback arises.

**Meet Josh.** Joshhas worked diligently andconfidently in sales for most of his career and has been eyeing an internal opening for VP of the region. In order to gain more experience and visibility, he’s begun to give more in-person presentations to prestigious clients.

Josh is determined to look good, so he’s spent the past few days preparing data and talking points for today’s pitch. His colleague, Sam, is an experienced presenter herself, and accompanies him to take notes.

Overall the presentation seems to go well; Josh communicates all of his planned material, and the client says she appreciates them coming in. But in

the cab ride home, a feeling of doubt lingers with Josh, and he quietly replays a few fumbles in his mind. From Sam’s perspective, there were clear instances where Josh could have made a bigger impact and highlighted their firm’s value.

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**Scenario 1: Sam doesn’t give Josh feedback.** Feeling slightly defeated, Josh decides to let it go and respond to emails on his phone. Sam spends most of the ride in a back-and-forth: Should she offer Josh feedback on his presentation? If so, how can she make sure it’s not awkward? What if he takes it the wrong way and she damages the relationship? She can’t find a natural opening to say something, and she can tell Josh is already upset. Sam ultimately determines that giving feedback is not worth it. So, she decides to just make him feel better: “Hey, nice work back there.”

**Scenario 2: Sam gives Josh feedback.** After some internal deliberation, Sam decides it would be helpful for Josh if she shared her point of view:

“I think you presented well. But did you notice the client seemed a little disengaged at times?”

“Yeah,” Josh reluctantly responds, “It wasn’t my best. I haven’t done many presentations like this. Plus, that lady looks like she’s rarely engaged with anything.”

“I think it was all those data points,” Sam offers. “The client really could’ve gotten a lot more value if you spent time asking her questions.”

“Yeah maybe, but I had to cover what’s in the slide deck, and at that point, there was no time left.”

Josh is visibly eager to end the conversation, so Sam decides not to push any further. Neither Josh nor Sam feel great about their interaction, and part ways when they get back to their office.

In these scenarios, both Josh and Sam instinctively recognized that there were opportunities for improvement. However, since the onus was on Sam to offer feedback, the interaction was less likely to succeed from the start.

**. . . . .**

Research in social neuroscience has shown that the brain processes social pain with the same circuitry as it processes physical pain (Eisenberger & Lieberman, 2004). This neural circuitry is so well- tuned to figuring out how others view us, that our

8

perceived social standing is highly correlated with our overall well-being, likelihood of success, and general survival abilities (Marmot, 2004). In other words, falling (physical pain) and failing (social pain) evoke the same neural responses; they put the brain into a threat state, activating the emotional and protective limbic system (Muscatell et al., 2015).

When unsolicited feedback causes an employee to feel embarrassed or defensive, the brain may shift its attention to alleviating the pain by rejecting the feedback. Thus, unsolicited feedback can often have the effect of priming people for a fixed mindset, in which they are resistant to change and unwilling to learn from errors. (Dweck & Elliott, 1988; Moser, Schroder, Heeter, Moran, & Lee, 2011). Consequently, the person giving the feedback is less likely to share honest information, since their focus must shift from giving feedback to settling the overwhelming state of arousal.

Optimal levels of arousal occur when employees are in a state of psychological safety, the belief that the current environment is a safe place to take interpersonal risks, such as being honest about someone else’s weaknesses or vulnerable about one’s own (Kahn, 1990). For psychological safety to occur in the brain, social threat must be minimized in the five domains from which people draw social value: status, certainty, autonomy, relatedness, and fairness (Rock, 2008).

**Status**

As human beings, we draw value from being perceived as better than others, or better than ourselves in the past—to be stronger, smarter, or more attractive than that which we are compared to. This is our sense of status. Our status within the community has both physical and social benefits: Higher status individuals tend to attain more power and resources, and in turn, are treated with more respect. (Baumeister & Tice, 1985; Marmot, 2004).

Status threat: Being told of our weaknesses; looking bad.

Status reward: Being told of our strengths; getting better.

**Certainty**

Second, there is value in being able to accurately perceive our surroundings. This is our sense of

certainty. Being able to say that our experience is accurate and to predict outcomes can increase our sense of safety and confidence, and reduce anxiety. (Swann Jr, 1983).

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Certainty threat: Not knowing what an outcome will be; ambiguity.

Certainty rewards: Knowing what’s about to come; specificity.

**Autonomy**

Third, we tend to seek control over the self, or the power to create our own outcomes. This is the need for autonomy. People who feel autonomous experience greater self-esteem and emotional stability, as well as self-efficacy—the belief in one’s own ability to succeed (Judge, Bono, & Thoresen, 2002). When we feel we cannot control the self, we often seek to control our surroundings—including controlling others.

Autonomy threat: Being told what to do.

Autonomy reward: Having choices.

**Relatedness**

Fourth, we require a sense of belonging. This is what is called relatedness. Whether we are included within a group or excluded from it has deep roots in survival and correlates directly to well-being and performance. (Baumeister & Leary, 1995)

Relatedness threat: Being rejected by others.

Relatedness reward: Being accepted by others.

**Fairness**

Finally, we are sensitive to how appropriately we are treated. This is the need for fairness. Though arguably the most tenuous of the five, fairness indeed seems to hold weight as an operating social principle. When we experience unfairness—for example, when one person receives a lower reward than someone else for completing the same task—the brain processes the experience as painful (Rilling & Sanfey, 2011).

Fairness threat: Having one’s point of view misinterpreted.

Fairness reward: Having one’s point of view understood.

Together, status, certainty, autonomy, relatedness, and fairness form The SCARF® Model of social motivation (Rock, 2008), which can be used to label

9

why an interaction succeeds or fails.

Because giving unsolicited feedback can be threatening or unproductive for both parties, it can be challenging to get people to engage in feedback conversations with the needed frequency. But our research found that it is not that people dislike receiving feedback; rather, they dislike having their status threatened. Likewise, people don’t dislike giving feedback; rather, they dislike upsetting other people. And employees do like learning, and managers do like helping people. If feedback could be provided without triggering the threat response, it could occur far more often.

A science-based strategy to provide feedback without triggering the threat response is for feedback to be asked for rather than given. When employees ask for feedback, the quality of conversations increases because they can become easier and more useful to both parties. And when both sides no longer fear feedback conversations, they can occur more frequently, so people get the information they need, when they need it, in a more motivating way.

Why ask for feedback

1. Asking for feedback is better for the asker.
2. Asking for feedback is better for the giver.
3. Asking increases the quantity of feedback.
4. Asking for feedback is better for the asker

Asking for feedback can lower the threat for the receiver, allowing for greater cognitive capacity to process information. Whereas being given unsolicited feedback has the potential to strongly evoke all five domains of social threat, asking for feedback can actually create reward in some areas while significantly mitigating threat in others.

For example, when someone asks their colleague for specific feedback, they may experience reward within the domains of certainty and autonomy: They are getting the information they need (certainty) on their own terms (autonomy). This results in a stronger motivational outcome than receiving information that they didn’t ask for, at a moment when they may not be mentally or physically prepared to digest it. Asking for feedback can also create a feeling of relatedness between the two parties; the asker is communicating to the giver that they value their perspective, and the giver is motivated to provide

information that is useful and framed for positive impact. Additionally, whereas the giver can spark a fairness threat by only considering their own point of view, the asker can increase fairness by giving context before the giver offers feedback. Finally, although asking for feedback may still feel uncomfortable in terms of protecting one’s sense of status, it is more manageable than the acute status threat that occurs as a result of unsolicited feedback.

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In addition to mitigating the threat responses that interfere with optimal processing, asking for feedback also actively enables neurological processes that accelerate learning.

Learning is a highly personal process, both cognitively and emotionally. Feedback that is provided on the giver’s terms makes improvement unlikely, based on the very fact that it is *given*. On the other hand, when people are more in control of the information they receive and when they receive it, that information becomes more valuable to them. Research on the neural mechanisms of learning consistently show that when people are in control of the information they receive, they learn more (Voss et al., 2011). Information is more deeply embedded when people voluntarily engage in a task (Keller, 2008) and when they are curious, or intrinsically motivated, to acquire that information (Kang et al., 2009; Gruber et al., 2014). The brain places higher value on information it desires to acquire, and is therefore more likely to encode it into memory and use it to guide future behavior (Marvin & Shohamy, 2016).

Greater control over the learning process also creates a sense of agency in the learner. This is the sense of the self as subject, rather than the self as object; it is the mental state of being in control of one’s life. Recall that autonomy can lead to greater self-esteem, emotional stability, and self- efficacy. These are all states that lead to greater job performance and higher job satisfaction (Bono & Judge, 2003). The psychological benefits of autonomy alone can make us more receptive to feedback and more likely to learn from it.

Further, autonomously asking for feedback can empower the learner by helping sidestep the “one- size-fits-all” approach in which feedback is given in a standardized way to everyone, regardless of whether the feedback procedure works particularly well for any one person. Because learning is such

10

a personal process, outcomes are enhanced when the learner is in control of the content and the context. By eliciting feedback rather than passively accepting it, one can more easily “make the most” of the time they have with the feedback giver by tailoring the interaction to their individual needs (Branch & Paranjape, 2002).

Finally, because of the inherent increased autonomy, asking for feedback can put the asker in a reward, or “toward” state. The state of being in control can invoke psychological safety, which allows an individual to more easily process and learn from incoming information (Edmonson, 1999), rather than become defensive.

1. Asking for feedback is better for the giver

In a giver-driven paradigm, there is almost as much potential for the giver to experience social pain as there is for the receiver. Even though peers can have some of the most useful feedback to give, it is very easy to talk oneself out of giving it. We have all used excuses to sit on a piece of feedback that could have helped someone: “It’s not my place,” “It’s too awkward to bring up,” “If I ignore it, maybe it will go away.” One reason for this is that humans, unlike robots, have a basic need to maintain positive social relationships and to avoid behaviors that threaten them. As giving feedback threatens this need, people shy away from offering it despite its potential to help others grow.

Inanasker-drivenmodel, thequality oftheexperience is lifted for the giver, as they can focus less on not offending the receiver and can instead engage as an equal partner in the conversation. Being asked for feedback can generate positive relatedness and status signals for the giver, communicating that their viewpoint is desired and valued (Cox et al., 2016). Because both parties in an asker-driven model have the same goal—to create clarity around the asker’s current behavior or ideal outcomes—the conversation creates a high degree of relatedness between the two individuals. The giver is also likely to feel a sense of pride or responsibility toward the asker to help them, eliciting a status reward that, importantly, does not proportionally reduce the status of the asker.

Additionally, when someone asks for specific feedback, the giver’s uncertainty about what

information to provide is diminished. Less mental energy is spent thinking about what the receiver is or is not aware of and how they will react to hearing information that challenges their existing view. They can instead focus on answering the question at hand and reacting naturally as the conversation progresses.

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Ultimately, receiving explicit and detailed questions from the asker can provide the feedback giver an increased sense of psychological safety, just as it does in the asker. This tends to increase positive affect and prosocial motivation (Cox et al., 2016). Prosocial motivation, the innate concern for the welfare and benefit of others, has been shown to increase perspective-taking and creativity, and thereby may lead to more effective problem-solving when a feedback asker and giver are discussing performance solutions together (Grant & Berry, 2011).

How to ask for feedback

**Explicitly**

One way we can elicit more useful information is by framing the conversation with explicit requests. First, we can direct attentional focus to the kind of feedback we prefer, whether evaluative (“Do you like this?” / “Is this right?”) or developmental (“What should I do more of?” / “Where should I refocus?”). Receiving one when expecting the other can be either threatening or unhelpful, and it can be difficult for a giver to know which kind is expected. Explicitly asking for the kind of feedback we need increases certainty, sets clear expectations, and prepares the brain to process the information.

Additionally, framing the request for feedback as an opportunity for learning and development (e.g., “I’m asking for your feedback in order to improve my presentation skills”) enables the asker to promote a growth mindset for both parties. A growth mindset is the belief that one’s abilities can be developed over time, whereas a fixed mindset is the belief that one either has those skills or they do not (Dweck & Leggett, 1988). Although a shift in mindset may seem like a subtle change, the lens through which we receive information can make a substantial difference in what we do with feedback.

For example, in one neuroimaging study, adult participants with a fixed mindset showed increased activity upon error detection—their brains were focused on the fact that they had made a mistake—

11

whereas those with a growth mindset showed increased encoding and retention of information about error correction—their brains were focused on the opportunity to improve (Mangels et al., 2006). Because of this, on the tasks in that study that followed, individuals with a growth mindset outperformed their fixed mindset counterparts upon receiving corrective feedback.

Additionally, we can request feedback at the level of construal we desire. Construal level is the spectrum of abstract to concrete (Trope & Liberman, 2010). When we think abstractly, we view information in terms of its purpose, higher goals, or broader meaning. When we think concretely, we view information in terms of its details, low- level implications, and specific contexts. High- level feedback could be something like, “Ensure clarity of the client’s needs.” This speaks to “why” certain behaviors matter. Communicating at this level allows the learner to draw connections to how to apply the feedback on the behavioral level, and generalize across contexts. A low-level version could be “Ask the client more questions before you start presenting.” This communicates “what” or “how.” This level allows the learner to know exactly what behavior to engage in, in that specific context.

While certain performance situations are more suited to high or low construal, importantly, some people have a natural orientation toward one or the other (Fujita, Trope, Liberman, & Levin-Sagi, 2006). The “fit” between one’s preferred construal level and the level at which information is communicated matters; when there is correspondence between the two, the receiver is more likely to respond favorably to the message itself (Lee, Keller, & Sternthal, 2010). Construal fit can lead us to perceive the information as being more relevant and useful, and to be more likely to encode the information into memory. Therefore, by specifying the request for feedback to our preferred level of construal, we can more easily process and learn from the feedback.

**Broadly**

By autonomously asking for feedback, we can receive feedback that is less biased than if we relied solely on our manager, because we are able to seek a broad array of perspectives.

For better or for worse, biases exist to various extents in everyone, because all brains are biased

(Lieberman, Rock, Halvorson, & Cox, 2015). Feedback that comes from just one person, therefore, is necessarily biased, and thus not comprehensive. Biased information is not necessarily wrong; it is simply information that is skewed by one person’s experiences, values, expectations, and goals. The problem is that since our biases exist to protect us, they are self-serving. That means that each person is generally driven to perceive the world through a self-serving lens rather than an objective one.

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The ideal approach is to gather multiple points of view from a diverse set of people, not just those who are likely to agree with us. Whether they are a manager, a peer, a direct report, or a desk attendant, if they interact with us, then they have a valuable point of view to share. This strategy reduces the impact of self-serving biases (Antonioni, 1996), increasing the quality of the information we can receive about our performance.

Asking broadly not only exposes us to a wider set of perspectives but also requires us to synthesize those distinct points of view, which can actually lead to smarter, more creative solutions (Cox et al., 2016). In addition, asking broadly can reveal novel information that otherwise would have remained in our blind spots, which offers us a more comprehensive picture of our behavior and its impact.

**Often**

Asking for feedback frequently can have both short- term and long-term benefits for improvement. In the short term, it permits more immediate course correction, rather than allowing weeks or months to go by without having learned from others’ viewpoints. Timing can also increase the odds that the feedback we receive is accurate, as individuals have a better memory for events that happened recently (Morris & Ridgway, 1976).

In the long term, asking often creates a regular routine of feedback-seeking, which is what builds a behavior into a habit (Yin & Knowlton, 2006). Making a habit out of feedback can decrease the stress associated with both receiving and giving. Decreasing stress is imperative for processing information needed to make changes (Schmader & Johns, 2003). The less stressful the experience is, the more likely we will be motivated to engage in it frequently, and the more likely that it becomes a habit.

12

In theory, people could be encouraged to give feedback at every opportunity. However, without the proper mindset, frequent unsolicited feedback can come in as a status threat *(This person thinks I’m not good at my job)* or an autonomy threat *(I didn’t ask for their opinion)* (Rock & Cox, 2012). This can spark the self-defense mechanisms introduced earlier, and therefore deter growth. But because asking can reduce that threat, people should be both more likely to engage rather than resist and to find more benefit each time.

1. Asking increases the quantity of feedback

**When organizations try to solve for giving**

As organizations attempt to solve the feedback gap at scale, a focus on giving feedback can actually decrease the quantity and quality of feedback conversations that happen. The science of learning and motivation has long held that the outcome of a behavior can encourage or discourage our repetition of that behavior (Holroyd & Coles, 2002). That is, we are more likely to repeat actions that have positive outcomes, and more likely to avoid behaviors that have negative outcomes. This is the long- standing process of conditioning, or reinforcement learning—the basic learning mechanism of pairing desired or undesired behaviors with pleasure or pain, respectively (Skinner, 1953; Schultz, 2008).

Due to increased potential for threat and bias, receiving unsolicited feedback is more likely to elicit a negative cognitive state—that is, to be paired with pain. There are certainly cases where giving and getting unsolicited feedback go well, but negative experiences have a stronger motivational pull than positive ones (Rock, 2008). Just one negative experience can reframe the positive association our brain had with feedback, making us less likely to give feedback in the future. Multiple negative experiences of feedback can strengthen resistance against engaging in that behavior, decreasing the likelihood and frequency of people giving feedback and receiving it well across the organization.

**When organizations solve for asking**

Whereas the frequency and quality of feedback conversations can decline over time in a giver- centric model, they may actually increase over time in an asker-centric model due to its psychological benefits (Garland et al., 2010). As discussed, the

brain’s response to asking for feedback is more likely to be positive and align with the mental state necessary to learn and improve. Additionally, as conditioning encourages actions that have positive outcomes to be repeated (Holroyd & Coles, 2002), and as repetition builds habits (Yin & Knowlton, 2006), feedback conversations may become easier, more useful, and more frequent over time. Feedback can therefore become less intimidating, and instead evolve into an experience that is associated with feelings of reward, thereby fostering improvement and a sense of personal empowerment.

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In turn, this should lead people to feel more comfortable asking for more feedback in the future, and should lead to more positive reinforcement, and so on, in a self-reinforcing cycle. Consequently, solving for asking may create an upward spiral in the frequency of quality feedback conversations across an organization. In so doing, we can help to create a feedback-friendly culture where everyone in the organization can work together to achieve their full potential.

It is important to acknowledge that this approach is not a one-click solution. There are of course certain obstacles that will be unique to an asker-driven approach, and we have acknowledged and attempted to address some of those obstacles that may arise.

Potential obstacles

**What if I have to give feedback when someone hasn’t asked for it?** Asking for feedback requires a certain level of self-awareness, and an active desire to improve. So certainly, there will continue to be times when people will need to give feedback that hasn’t been asked for. In these cases, the giver can still simulate the experience of the receiver having asked for feedback, subduing the otherwise inherent threat responses. For example, the giver can take measures to increase autonomy in the receiver, like asking for permission, and allowing the receiver to frame the conversation at their preferred level of specificity. Following these same principles can help to bypass the instinctive defense mechanisms in being given unsolicited feedback, and set the stage to more easily receive the information.

**What if people lean too far into asking and come off as overbearing?** Feedback at every turn would bring the organization to a standstill. It is important

13

to recognize the threshold of importance for which feedback is really needed. Many basic tasks, like day-to-day decision-making, might benefit from some feedback, but are not important enough to merit the additional effort involved. For those tasks important enough to the organization, however, like high-stakes decision-making, staying with the status quo in terms of performance quality is unacceptable. We believe that it is necessary to consider whether a task is above that threshold of importance to the organization or to one’s work when deciding whether to ask for feedback. If it is, improvement is necessary, and so feedback is a must. If it is below threshold then it may be better to let it go as we cannot afford to lose productivity by asking for feedback on every task we do.

**Wouldn’t someone feel threatened if they’re randomly asked for feedback, or asked by a superior?** It is true that the giver may experience a threat response if they are asked for feedback without feeling prepared to share. Therefore, it is important for the asker to recognize this possibility and to make an effort to reduce the potential threat the giver may feel. One way they can do this is by allowing the giver an easy out if they do not have feedback to share. For example, phrasing the question as “Do you have any feedback in mind on how I might engage the client better next time?” allows the giver to say “Thanks for asking, but I actually don’t have anything useful for you yet.” In addition, the asker can grant permission for the giver to approach them once they do have something useful to share, allowing both sides the required certainty for processing and sharing useful information. Further, we argue that although this may happen the first one or two times a person is asked, after some experience with asking for feedback they will better understand the dynamic that research suggests is likely to unfold—one that is more conducive to sharing, learning, and collaborating on improving performance. This should make such encounters less threatening and more rewarding over time.

**The culture is not ready.** This is perhaps the most important potential obstacle as it touches every aspect of feedback. Many organizations want a culture where people freely and frequently give and receive feedback. An asker-driven approach, in which individuals and teams take shared

responsibility for helping one another improve, may be novel, and therefore not yet in accordance with current habits and cultural norms. Asking for feedback in those cases is a habit that needs to be built. In order for this approach to scale most easily, the environment has to be supportive during habit formation. This is how the practice can become normalized and self-reinforcing.

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Certain aspects of a company’s culture may make it more difficult to attain a culture of feedback. For example, a culture of perfection, where mistakes are seen as failure rather than learning opportunities; a culture of expedience, where quickness is more valued than quality; or a culture of competition between individuals or silos, where people are incentivized to be self-serving rather than generous. These environmental norms can make it so that, despite best efforts to improve, someone may be set up for a challenge. We would not want to teach people to ask for feedback in an unsupportive culture just as we would not teach someone to ride a bike on a highway. In order for this approach to be successful, there ought to be agreement and reinforcement between the new practice and the environment in which we practice.

#### ... as conventional wisdom has devoted its energy toward fixing feedback by focusing on the giver, science suggests that we gain much more by giving the right tools to the asker.

An organizational culture is defined in part by its shared values, norms, and goals. In order for asking for feedback to become a part of the culture, it therefore needs to be emphasized as a value,

14

normalized into daily work, and worked on over time. The specific techniques for attainment will vary by company, but there are a few standard principles that should be relevant throughout. We can establish value by engaging in public social acknowledgement and reward; our assessment of something’s value is highly determined by what we believe our community values (Zaki, Schirmer, & Mitchell, 2011). We can accelerate normalization by ensuring frequent exposure, and by managers role modeling the desired behavior. Learning does not just occur through explicit instruction; it also occurs through observation, especially of those with higher status (Bandura, 1971). We can assist progress toward quality feedback by propagating a growth mindset across all practices—the attentional focus on learning from mistakes, helping one another, and improving over time (Dweck & Leggett, 1988). Ultimately, creating a feedback-friendly culture requires examining systems and processes to see how they can best support rather than interfere with the science behind learning from one another.

Conclusion

In the last several years, companies have realized that their success depends on their employees’ agility, which comes down to people’s ability to improve—fueled in part by the quantity of quality feedback they receive. Frequent, quality feedback is more important than ever, but many feedback practices do not improve performance the way they are intended. However, as conventional wisdom has devoted its energy toward fixing feedback by focusing on the giver, science suggests that we gain much more by giving the right tools to the asker.

On the surface, this is a seemingly simple proposal. But asker-driven feedback—where both parties have reduced threat levels—has neural benefits. First, asking for feedback can make it easier for the receiver to process and learn from self-challenging information. They can further ensure high quality and quantity of feedback by asking explicitly, broadly, and often. Second, asking can make it easier for the giver to give more useful information, having been invited to share their point of view and asked explicitly for the kind of feedback the receiver needs. Third, because of the increased ease, asker- driven feedback should lead to a higher quantity of feedback. Because our brains have developed to

repeat rewarding behaviors, the positive responses to asking for feedback can create an upward spiral in the quantity and quality of feedback that happens, making it easier and more likely to occur every day. Therefore, initiatives that train everyone to *ask* for feedback—and ensure a feedback-friendly culture— should be more likely to be successful at scale, and increase an entire organization’s ability to improve.

With this in mind, let’s revisit our friend Josh.

**. . . . .**

Even though Josh feels uncomfortable thinking about his performance, he notices that this is a learning opportunity. So rather than brush it off, he leans in to see what he can learn from Sam.

**Scenario 3: Josh asks for feedback.**

Josh looks up from his phone and turns to Sam. “You busy?”

“No,” Sam replies, “What’s up?”

“So, I’m replaying how that went back there, and I think I could do better at keeping the client engaged next time.”

Sam nods along as Josh continues, “You’re an experienced presenter—would you mind sharing your point of view? Did you notice any specific behaviors that I could build on or rethink to keep her attention?”

Sam is unrehearsed, but is both relieved and flattered that Josh has asked. “Sure, I’d be happy to try to help.” She takes a moment to gather her thoughts. Josh thanks her and prepares to listen for ways he can improve.

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“I did notice her engagement levels go up and down. She was nodding along when you were helping her clarify her needs—you really did a great job there. But she seemed to drift a bit when you were talking through the data points. So I think you can build on the behaviors that make the client feel like she’s participating—asking questions, listening, and helping to reframe—and rethink how much time you allocate to listing off numbers.”

“Hm, thanks—“ Josh takes a moment to reflect. “Yeah, now that I think of it, I guess I could follow up with those numbers offline, and use the in-person time to connect more personally.”

“Great insight!”

15

Both Josh and Sam feel rewarded by the interaction. Josh goes on to try out new strategies, and follows up with her a few times on what’s working. Sam sees how useful this is for him, and since she was generous in offering her time, Josh is happy to reciprocate when she asks him for feedback. Over time they get better at asking, their colleagues get better at giving, and so on, and the conversations become easier.

By the time management is considering candidates for the VP position, the quantity of quality feedback Josh has received has grown perhaps tenfold— so that when he meets with his manager, he can clearly illustrate how he’s improved. He’s made a quarter more sales than last year, engaging clients and growing relationships throughout the region. And as Josh settles into his new desk, as the new VP of sales, he tips his hat to the first time he decided to just ask.

Appendix

|  |  |  |
| --- | --- | --- |
| **Model** | **Description** | **Attribution** |
| **The Sandwich Model** | Give a Compliment, Criticism, Compliment | Unclear |
| **Stop, Start, Continue** | Say what behaviors to Stop, Start, or Continue | Unclear |
| **SBI** | Give a description of the Situation, Behavior, Impact | Center for Creative Leadership |
| **STAR/AR** | Give a description of the Situation, Task, Action, Reaction/Alternative Action, Reaction | Development Dimensions International |
| **AID** | Focus on Actions, Impact, and Desired Action | Mark Landsberg (2009) |
| **BROFF** | Behavior, Reason, Outcome, Feelings, Future actions | Unclear |
| **BIFF** | Behavior, Impact, Future, Feelings | Unclear |
| **DISC** | Describe, Impact, Specify change, Consequences | John Wiley & Sons (1970) |
| **RISE** | Reflect, Inquire, Suggest, Elevate | Emily Wray (2013) |
| **CARE** | Context, Action, Results of Action, Esteem | Unclear |
| **COBS** | One should give clear feedback, which they own and have made balanced and specific | Hawkins and Shohet (2000) |
| **Pendleton’s Rules** | Seven guidelines map the entirety of a feedback discussion | Pendleton (1984) |
| **ABC** | Discuss plans using Action, Because, Could we | Sommer and Rockey (2011) |
| **The Feedback Model** | Four steps that encourage clear and appropriate feedback | Horstman and Auzenne (2006) |
| **Said/Heard, Meant/Felt** | Illustrates a pattern of a conversation regarding feedback | Garber (2004) |
| **FeedForward** | Give feedback that focuses on the future not the past | Goldsmith (2014) |
| **SARA** | Receiver of feedback experiences Shock, Anger, Denial, Acceptance | Kubler Ross Grief Research (1969) |
| **Johari Window** | Understand the others and the self | Luft and Ingham (1955) |
| **PEAR** | Give Praise and Examples then Ask and Reinforce | Wildman (2003) |
| **CEDAR** | Give Context and Examples, then Diagnose, Ask, and Review | Wildman (2003) |
| **BOOST** | Give feedback that is Balanced, Observed, Objective, Specific, and Timely | Braincraft (2012) |
| **FUEL** | Four steps to guide the feedback conversation | Zenger Folkman (2012) |
| **One Minute Redirect** | Give personalized feedback focusing on “what” and “how” | Ken Blanchard (2015) |

16

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17

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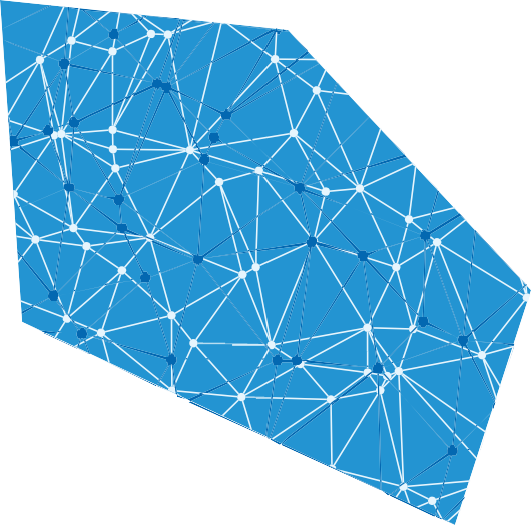
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18



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NeuroLeadership**JOURNAL**



THE SCIENCE OF INCLUSION:

##### How we can leverage the brain to build smarter teams

by Christine Cox Josh Davis David Rock Camille Inge Heidi Grant Kamila Sip Jacqui Grey

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2

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In an increasingly global marketplace, diversity and inclusion are being recognized more and more as imperative for business success. Diverse and inclusive teams are smarter, more creative, and make better decisions. While an increasing number of organizations are embracing the notion of diversity, the practice of inclusion is often overlooked. Being respected, valued, and welcome to contribute equates to more than just good feelings; humans have a biologically based need to belong—to feel included, supported, and valued by others socially. In fact, research shows that social exclusion can negatively impact performance, productivity, and pro-social behavior, among other consequences. The challenge is, we often make others feel excluded without realizing it. First, the language, nonverbal cues, and subtle interactions we engage in can communicate signals of exclusion. Second, initiatives that focus on minimizing exclusion can actually increase feelings of out-group. Essentially, if we’re not actively including, chances are we’re accidentally excluding. To address this challenge, rather than focus on how to not exclude, we provide a neuroscience-based approach focused on what to do more of in order to achieve an inclusive workplace.

3

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THE SCIENCE OF INCLUSION:

###### How we can leverage the brain to build smarter teams

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4

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A positive trend has emerged recently, with major organizations prioritizing diversity in an unprecedented manner.

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In 2015, for example, Intel’s CEO publicly proclaimed the company would achieve gender parity by 2020, and within one year of the announcement, Intel implemented pay parity across genders (Zarya, 2016). Apple followed suit, announcing it would devote $50 million to the cause (Lev-Ram, 2015). Not to be outdone, Google pledged $150 million (Kelly, 2015). In part, these high-profile examples illustrate an important moral shift toward better recognizing the potential of people from diverse backgrounds. But that is only part of the story. Additionally, it turns out that there is evidence of quantifiable value of greater diversity to the bottom line. Across 15 years of data, for innovation-focused firms in the S&P 1500, having women in senior leadership leads to an average of over $40 million in increased value (Dezsö & Ross, 2012). Among 500-plus U. S. companies, every unit increase in racial diversity was correlated to a 9% increase in revenues—even while controlling for establishment size (Herring, 2009). In that work, combining gender and racial diversity accounted for 16.5% of the variance in revenues. And a global study of over 2,000 companies showed that those companies with women on the board had on average 4% higher return on equity and 4% higher net income growth (Curtis, Schmid, & Struber, 2012). However, data also show that we are unlikely to see the benefits of diversity without inclusion (i4cp, 2015).

Studies report that workplaces that are both diverse and inclusive benefit from a 12% increase in discretionary effort, a 20% increase in intent to stay, and about 50% improvement in team collaboration and commitment (CEB, 2012).

A D&I Paradox

*Why do we feel more effective in homogeneous groups, but perform better in diverse groups?*

There is a potential objection to seeking diverse teams that may be on the minds of many readers. It is captured in this idea: “Isn’t there value in having a team that easily understands one another, and feels comfortable together?” Probably most people will have had an experience in which it just felt easier to be on a homogeneous team. That

5

would seem to run counter to the above findings about the benefits of diverse and inclusive teams. How can both be true—that diverse teams are more effective, and that we have had experiences of feeling more effective on homogeneous teams?

An important part of the answer lies in our brains’ wiring—we have automatic, non-conscious responses to many situations because these largely save us a lot of time and neural processing resources. The problem with these decision- making tendencies lies in the fact that they leave our thoughts, decisions, and behavior vulnerable to a large number of unconscious biases. Highly relevant to a discussion of diversity and inclusion are in-group and out-group biases—biases of “Similarity” that lead us to prefer people who we perceive as being more similar to ourselves, and on the other hand, to be suspicious of and less likely to prefer dissimilar others (Lieberman, Rock, Halvorson, & Cox, 2015).

Our tendency toward “in-group preference” leads to a D&I paradox: We expect teams of people who are composed of more similar individuals to outperform those that include people we see as different (i.e., more diverse groups). One research study investigating this paradox created groups of “old-timers” and compared how the old-timers- only group performed vs. a group in which they introduced a “newcomer” who was socially different from members of the existing group (i.e., they created a more diverse group by adding an out-group member) (Phillips, Liljenquist, & Neale, 2008). Their findings showed a direct contrast between what group members perceived to have happened compared to what actually happened to performance. The newcomer (more diverse) group members thought that their group interactions were less effective, and they had less confidence in their decisions. However, this more diverse group consistently outperformed the old-timers-only (less diverse) group on a complex task (i.e., solving a murder mystery).

The findings from this study highlight some of the main roadblocks to taking full advantage of the benefits of diversity and inclusion: our own brains and our susceptibility to unconscious bias. For an in-depth discussion of the neural basis of unconscious bias and evidence-based mitigations strategies, see the paper previously published in

this journal detailing The SEEDS Model® of breaking bias (Lieberman et al., 2015).

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A closer look at the research on the psychological effects of diversity helps show what we gain when we include diverse perspectives, and why inclusion is so key.

**Creative problem solving.** In one study, participants were asked to come up with creative solutions for improving an area as a tourist destination. Ethnically diverse groups outperformed ethnically homogenous groups in terms of how feasible and how effective their ideas were judged to be (McLeod, Lobel, & Cox, 1996).

**Error detection.** In mock jury research, racially mixed groups have been shown to identify more facts of the case and make fewer errors than homogeneous groups (Sommers, 2006).

**Logical problem-solving.** Groups working together can be tested for “group intelligence” in much the same ways that individuals can be tested for intelligence—through logical and analytical challenges. For example, these can include matrix reasoning—detecting an option to complete a set— moral reasoning, planning for a typical event, and so on (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010). Groups who are more inclusive—socially sensitive and balanced in terms of who gets a chance to speak—end up testing as more intelligent.

#### “... as far as the brain is concerned, social rejection actually hurts.”

*The role of inclusion in these psychological benefits.* One critical factor contributing to this increased performance is an increase in perspective-taking— the highest performing groups are those with the most social and emotional intelligence (Woolley et al., 2010; Woolley & Malone, 2011). They take turns and listen to one another. That is, they include more of the voices at the table in a meaningful way. Interestingly, the individual IQ of any one member of a team did not predict performance in the team intelligence work, but social intelligence did

6

(Woolley et al., 2010; Woolley & Malone, 2011). This latter finding is underscored by a recent New York Times article chronicling Google’s research into what characterizes the best performing teams:

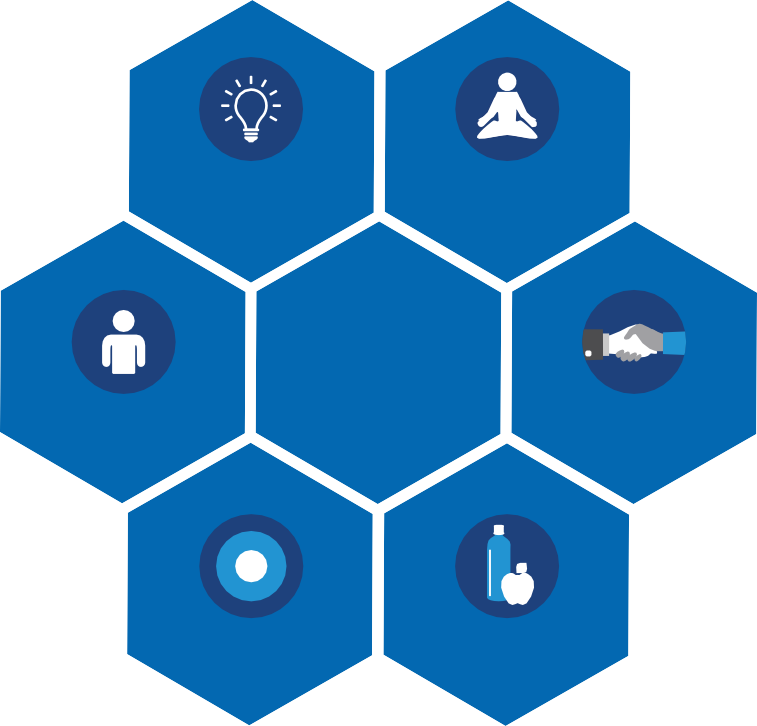
*The paradox, of course, is that Google’s intense data collection and number crunching have led it to the same conclusions that good managers have always known. In the best teams, members listen to one another and show sensitivity to feelings and needs (Duhigg, 2016).*

While it is encouraging that research shows diverse teams are better at creative problem-solving, error detection, logical problem-solving, and have more business success, focusing on diversity is only a first step. Without inclusion, we stand to miss out on those benefits.

What compounds both the importance and challenge of successful inclusion are the many ways we exclude without even realizing what we are doing; this inadvertent exclusion can have consequential, meaningful impacts on workplace performance.

The benefits of inclusion and costs of exclusion

The human brain is exquisitely sensitive to social information, specifically cues in our environment that trigger a sense of social reward (e.g., feeling that we are valued by our team members), and a sense of social threat (e.g., feeling that members of our group think negatively of us) (Lieberman, 2013; Rock, 2008). For example, social isolation and loneliness significantly change the structure and function of brain areas important for social perception and memory, such as the hippocampus and superior temporal sulcus (S. Cacioppo, Capitanio, & Cacioppo, 2014; Kanai et al., 2012). As we’ll see, research explains what happens behaviorally, cognitively, physiologically, and neurally when we feel included and, by contrast, when we feel excluded. Often these benefits and costs are non-obvious, so we can profit from understanding how our brains process signals of inclusion and exclusion, and how specific (many times subtle and unintentional) actions can drive these signals.



**Intelligent thought and reasoning**

**Self-care and self-improvement**

•

**Well-being**

**SIX BENEFITS OF INCLUSION**

**Pro-social behavior**

**A sense of purpose**

**Self-regulation**

Figure 1. The above six benefits of inclusion point to its value for better organizational as well as individual performance.

Social exclusion is painful

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Arguably, one of the most profound contributions from neuroscience to the study of inclusion comes from findings involving pain networks in the brain. Research suggests that the limiting consequences of exclusion on mental function are likely greater than we previously realized. That research leverages a widely used paradigm for eliciting social exclusion—a virtual ball tossing video game (“cyberball”) (Williams, Cheung, & Choi, 2000). In its simplicity, the game highlights just how easily real effects of exclusion can occur. Participants believe they are playing the video game with other live players via a computer. On the computer screen, the participant sees a cartoon of the two other players, and initially all players take turns throwing a virtual ball back and forth to each other—a simple game of catch. Unbeknown to the excluded participant, the game is pre-programmed and the other two players are not real humans. Without warning, the other two players exclude the participant and only throw the ball to each other, which consistently elicits strong feelings of social ostracism (Hartgerink, van Beest, Wicherts, & Williams, 2015). This strong sense of social exclusion has been shown to activate the brain in a similar way to experiencing physical

7

pain (Eisenberger, Lieberman, & Williams, 2003), suggesting that, as far as the brain is concerned, social rejection actually hurts (Eisenberger, 2015).

The troubling consequence is that when we are in pain—physical or emotional—it can be very hard to operate at our best cognitively. While not all researchers agree with the conclusion that social exclusion and physical pain are in some ways the same thing (S. Cacioppo et al., 2013), there does appear to be a relationship between particular brain areas involved in processing both pain and social exclusion, specifically the dorsal anterior cingulate (Lieberman & Eisenberger, 2015). This research suggests we can at least expect some of the consequences of social exclusion to be the same as those of physical pain.

After seeing that the brain is highly reactive to social inclusion and exclusion, it is easier to understand why inclusion can have so many behavioral consequences. Specifically, we highlight six areas of mental function relevant to how individuals perform at work, which are highly affected by feelings of inclusion or exclusion.

Six areas affected by inclusion and exclusion

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1. Intelligent thought and reasoning

Research shows that whether someone feels included or excluded has a profound impact on their ability to think intelligently and perform tasks

requiring logical reasoning. In a series of studies, participants were asked to take a personality test and given (false) feedback about whether or not they were likely to have rewarding relationships throughout life, or likely to end up alone in life (belonging vs. social exclusion conditions). When told they were likely to end up alone, people were significantly impaired on measures of intelligent thought (IQ and standardized test performance) compared to people who believed they would have a sense of belonging in their futures. The excluded group had a harder time with tasks requiring effortful logic and reasoning, while the included group showed none of the same impairments. Importantly, these cognitive impairments were unique to social exclusion (i.e., “You’re the type who will end up alone later in life”). The same declines in performance were not observed when told they were likely to be misfortunate in the future (i.e., “You’re likely to be accident-prone later in life”) (Baumeister, Twenge, & Nuss, 2002).

Exclusion also creates an environment in which people from groups associated with negative stereotypes may be more likely to underperform. A body of research shows that group differences in logical thinking result from self-perception rather than the ability to perform a task (Steele & Aronson, 1995; Steele, 1997; Davies, Spencer, & Steele, 2005). For example, women unconsciously rely on the stereotypical view that they are worse at math than men instead of on their own potential, which results in poorer performance on standardized tests. In essence, stereotyped individuals unconsciously fulfill the external expectation.

One way to avoid such a self-fulfilling prophecy is by increasing inclusion. By making the out- group member (e.g., a member of a minority group) an in-group member—i.e., by creating a feeling of inclusion instead of exclusion—we are essentially counteracting the negative stereotype and increasing a sense of belonging, social value,

8

and psychological safety. This recategorization from part of the out-group to part of the in-group decreases the psychological distance between former out-group members, making them closer and more included in the new in-group (Gaertner et al., 1993; Gaertner & Dovidio, 2014).

1. Self-care and self-improvement

Feelings of inclusion and social connection lead to acting in your own best interest, while social exclusion tends tolead toself-defeating behavior.



Using the same alone-later-in-life experimental setup discussed above, researchers showed that people were significantly more likely to choose bets that were safer and more optimally beneficial when they felt included. People were much more likely to engage in irrational, fooling, and self-defeating risky behavior when they felt socially excluded—i.e., choosing a long-shot lottery with more aversive outcomes. Socially included participants were more likely to choose healthy behaviors (e.g., a granola bar for a snack), while excluded participants chose unhealthy behaviors (e.g., a candy bar). Socially included participants were more likely to begin preparing for an upcoming test (e.g., practice arithmetic problems), while excluded participants procrastinated longer (e.g., reading entertainment magazines). Again, these findings were specific to social exclusion, and not just receiving any negative news about the future (Twenge, Catanese, & Baumeister, 2002).

Exercising self-care and willpower can also prove challenging if we feel depleted and under stress (Bhanji, Kim, & Delgado, 2016). Research tells us that perceived control over our choices positively affects our perception of setbacks (Bhanji, Kim, & Delgado, 2016), the choices we make in situations of hardship, or when none of our choice options are preferred (Leotti & Delgado, 2011). Therefore, if we can limit the highly stressful experience of being in an exclusive environment and increase feelings of inclusion, we can dramatically increase the quality of decision-making and self-regulation. Limiting stress encourages optimal prefrontal cortex function, which is critical for logical reasoning and creative thinking.

1. Pro-social behavior

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When people feel excluded (e.g., being told “No one chose you as someone they wanted to work with”), they donate less, volunteer



less, are less helpful, and are less cooperative (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). When excluded, we are less willing to lend a helping hand to people in our group and to allocate resources (e.g., money, time, effort) to them (Brewer & Kramer, 1985). The opposite is true in cases of social inclusion (e.g., being told “Everyone chose you as someone they’d like to work with”), which leads people to give more to charitable causes (e.g., a student fund), be more willing to participate in voluntary tasks (e.g., other laboratory experiments), help others more after a mishap (e.g., picking up a cup of pencils that was knocked over), and be more likely to act cooperatively (e.g., dividing up money with someone else). These consequences may be influenced by the fact that we also understand others better when we feel included. We are better able to identify the emotions of in-group members. Additionally, regions of the brain important for social processing and perspective-taking (e.g., superior temporal sulcus) are more active when we are trying to understand the minds of in-group (vs. out-group) members (Adams et al., 2010). Thus, a person who is included is more apt to recognize when someone needs a hand, is struggling, or by contrast, is engaged, or responding well to team dynamics.

Neuroscience evidence may help explain why inclusion leads people to more pro-social behavior. The closer we are, the more we feel rewarded for sharing. Closeness tends to come when we are more inclusive. When we share resources or cooperate with those we are close to, there is a distinct neural signature. In a study involving a simple card guessing game, for example, participants experienced a feeling of reward when splitting their earnings with a close friend, and this was progressively stronger the closer their relationship was (Fareri et al., 2012). These findings were also reflected in increased activation in the brain’s reward network. Strong, trustworthy, and inclusive relationships with others deepen the satisfaction we feel when we share resources.

9

1. Self-regulation

When we feel socially included, we are much better at engaging in self-regulation, an ability that is profoundly impaired when we feel



excluded. People who feel included are better able to overcome a present urge in the service of a different goal. For example, they are more able to drink something healthy but that tastes bad, better able to refrain from eating unhealthy foods (eating from a plate of cookies when left alone), and more likely to persist on a frustrating task (an unsolvable puzzle). People who feel excluded are worse at all of these tasks requiring self-regulation: They consume less of the healthy drink, eat more cookies, and quit a frustrating task more quickly (Baumeister, DeWall, Ciarocco, & Twenge, 2005). Compared to people who feel included, those who feel excluded are also worse at regulating their attention. When presented with different streams of auditory information to each ear (i.e., a political speech in the right ear and a series of spoken words in the left ear), socially rejected individuals are worse at being able to ignore the political speech in order to correctly identify the words. Interestingly, it’s not that social rejection completely eliminates self-regulation—further findings showed that social exclusion appears to reduce a person’s motivation to make the effort to regulate (Baumeister et al., 2005).

1. A sense of purpose

In contrast to feeling included, socially excluded individuals are put into a defensive state, with the cognitive consequences of an increased sense



of meaninglessness, lack of emotion, avoidance of self-awareness, lethargy, and altered time perception. They are more likely to agree with the statement, “Life is meaningless,” choose fewer emotional words, turn away from a mirror, and overestimate time intervals (Twenge, Catanese, & Baumeister, 2003). These indicators of a lack of purpose in one’s experience of the world are not present when you are able to promote feelings of inclusion.

1. Well-being

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While social connection and inclusion are beneficial in many domains of cognitive and social functioning, social exclusion is associated with increased



•

social anxiety, jealousy, loneliness, and depression, as well as reduced self-esteem (Leary, 1990). As exclusion can lead to loneliness, that may compound the consequences. A wealth of evidence demonstrates that people who experience more loneliness also show increased stress and threat processing, reduced physiological functioning, reduced sleep quality, impaired executive functioning, and are much more at risk for disease, disability, poor health, and even death (J. Cacioppo & Cacioppo, 2014; Hawkley & Cacioppo, 2010). On the positive side, social connectedness reduces loneliness, which thereby reduces negative mental health outcomes, such as depression (Jose & Lim,).

#### “... we accidently exclude others in many more ways than most of us are aware.”

To illustrate, suppose you are leading a product development team. On that team, you have engineers, marketers, designers, and others. You need everyone’s input to make the product a success. And the team members’ perspectives will likely vary on a number of points: what are must- dos, what comprises a worthwhile investment, what’s the best way to proceed, etc. Now imagine you have accidentally excluded members of your working team. They are less likely to be thoughtful, to self-improve, to help others, to understand others, to regulate their own behavior, to have a sense of purpose, and to be in optimal mental health. These are not small deficits. Put more simply, if your excluded team members feel that they aren’t part of the in-group, would they still have the team’s best interests in mind? Or would they be more likely to let you and/or the team fail?

10

Note that the findings on the consequences of inclusion vs. exclusion are universal to all people. They are such that it is worth applying these lessons to all employees, and not just those who are part of an underrepresented group. All employees need to feel included, because all humans are sensitive to and feel threatened by exclusion, and people tend to underperform when feeling excluded.

We exclude others more than we may realize

Especially challenging is the fact that we accidently exclude others inmany more ways thanmostofus are aware. Whether through language, nonverbal cues, or the manner of our interactions, we frequently— and often unconsciously—communicate to others that they are excluded.

These exclusionary behaviors have been termed “microaggressions,” (Sue et al., 2007; Sue, 2010; Treadwell, 2013) to highlight how insidious they can be, by flying under the radar. Often the person giving them has no idea he or she has done so. But to the receiver, they are loud and clear messages. Everyone has some way in which they would rather not stand out in certain contexts—be it weight, age, gender, race, ability, accent, style, and so on. Even a well-meaning comment, such as “your English is very good,” calls attention to a potential deficit you have in communication. It can land as a message that you are not really a member of the group, and your presence is more tolerated than desired. The person giving the comment is likely unaware it may have landed that way.

In contrast, with intentional acts of bigotry, these negative interactions are often inadvertent and carried out by people who are unaware of their behavior (Sue, 2010). These types of behaviors are usually reflective of general stereotypes and prejudices against any marginalized group of people; for instance, turning to the one woman in a group of men for input only on topics such as how people may react emotionally to some initiative. The stereotype that women are more emotionally intelligent but less rational can drive a team member to make those requests of her without realizing he is acting on stereotypes. In so doing, he will send an unintended message that she is not a valued member of the group, but only a token representative of her gender.

Even when the stereotypes are positive—extreme athletic ability, for example (Waytz, Hoffman, & Trawalter, 2014)—there can be a downside. Although usually thought of as positive, seeing someone as “superhuman” has negative effects, such as the denial of his ability to feel pain (Waytz et al., 2014). That these interactions are typically unintentional and that their perpetrators are usually oblivious to their negative effects are compelling reasons why they contribute to the persistence of exclusion.

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Effectively, if you are not actively working to make your team members feel part of an inclusive, supportive group, then there are a number of ways (many subtle and unintentional) that you may be creating an environment of social exclusion and its resulting negative consequences. More specifically, we do this verbally, nonverbally, and through the ways we interact. Below are examples that help illustrate.

In the verbal context, for example, how you use the word “we” can either include the person being addressed or exclude that person (Nordquist, 2016). How would you feel if you heard these two sentences?

* 1. *“We are in this together.”*
  2. *“We will let you know.”*

Using the inclusive “we” (sentence No. 1) signals that the other person is part of the group. Using the exclusive “we” (sentence No. 2) sends a direct signal of exclusion.

Other verbal expressions driving perceptions of inclusion and exclusion include the following: pronoun usage (e.g., always using male pronouns), pronoun order (e.g., always saying “he or she”), and word suffixes (e.g., policeman) (Tasmanian Department of Education, 2012). If you consciously or unconsciously use language that can be confusing or unclear, such as jargon or acronyms, or don’t define what you are referring to (presupposition), you can be excluding the people to whom you are talking. A variety of research findings indicate that our brains are not only sensitive to hearing our own names, even in noisy environments (Mack, Pappas, Silverman, & Gay, 2002), but that brain networks involved in mentalizing (taking the perspective of others, understanding others’ thoughts and emotions) are also activated when other people address us by our names (Kampe, Frith, & Frith, 2003; Parise, Friederici, & Striano, 2010; Perrin et al., 2005). These brain networks are associated

11

with affiliation, attempts at mutual understanding, and empathy. Addressing someone by name sends signals of inclusion and belonging, while failing to do so can unintentionally signal exclusion.

In addition to the linguistic signals we send, we communicate a great deal about inclusion or exclusion with our nonverbal behavior. For example, making eye contact with someone is indicative of how included or excluded they are. When a person doesn’t make eye contact and averts her gaze from another, it can cause the other person to feel ostracized, have lower self-esteem, and even develop a greater temptation to act aggressively toward the excluder (Wirth, Sacco, Hugenberg, & Williams, 2010). Making direct eye contact is also associated with a neural signature associated with approach behavior, while averting your gaze elicits more avoid-related brain activation (Hietanen, Leppänen, Peltola, Linna-aho, & Ruuhiala, 2008). That is, aside from the clear case where approach behavior represents a plan of attack, making eye contact is an inviting behavior that can facilitate warmth and inclusion. Avoiding eye contact, conversely, can signal disinterest and exclusion.

Other physical actions (or reactions) to others send messages of inclusion or exclusion in social interactions, even if we are unaware that we are doing them. Nonconscious social mimicry, such as adopting the same posture or facial expressions as the person we are interacting with, is one signal of the desire for social affiliation—signaling inclusion. When people want to be included, they are more likely to imitate the nonverbal physical behavior of the in-group members. This is especially true after people feel that they have been socially excluded in some way (Lakin, Chartrand, & Arkin, 2008). Bodily posture, such as crossing arms or legs (“closed posture”), can indicate discomfort, anxiety, or uncertainty, as well as a sense of distance or disconnection between people (Meadors & Murray, 2014)—all exclusionary signals.

Research concerning the effects of impaired social mimicry skills reveals just how important nonverbal cues are for building social and emotional connections. A series of studies investigating the effects of Botox on expressing emotions (Oberman et al., 2007; Davis et al., 2010; Havas et al., 2010; Neal & Chartrand, 2011) showed that while this wrinkle- smoothing treatment significantly diminishes

your ability to frown and smile by paralyzing your facial muscles, it also unintentionally handicaps a crucial social skill—empathy—that enables building fruitful connections with others by responding appropriately to their socio-emotional expressions (Neal & Chartrand, 2011).

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Language and nonverbal cues are not the only media through which we subtly send exclusionary or inclusionary signals. How we interact does so, as well—for example, through turn-taking. In conversation, turn-taking is a finely coordinated dance indicating the status of who is speaking and how speaker status gets transferred to others (Sacks, Schegloff, & Jefferson, 1974). This structured dance consists of three types of cues: 1) the speaker sends signals that she is ready to yield her turn to another (e.g., a change in intonation or a concluding hand gesticulation); 2) the speaker sends signals that suppress others’ attempts to take her turn (e.g., continuing to engage in hand gesticulations); and

3) the listener sends “back channel” signals to avoid taking her turn in the conversation (e.g., saying “mm- hmm,” nodding of the head, making brief requests for clarification) (Duncan, 1972). Understanding this system of subtle signals and cues for turn-taking is critical for effective social communication and, indeed, for making conversations more inclusive. But notice how easy it is to send the wrong signals. If you’ve ever been speaking during a meeting, only to find your colleagues preoccupied with email, you know all too well how such behavior breaks conversational flow and creates a sense of exclusion.

Recall that one of the defining features of the smartest and best performing teams is equal contribution by all team members to discussions (Woolley, Malone, & Chabris, 2015)—specifically, how equally distributed conversational turn-taking is in the group (Woolley et al., 2010). Equal turn- taking is one critical component in creating a sense of psychological safety (Edmondson, 1999), which turned out to be the most important predictor of the most successful teams at Google:

*The behaviors that create psychological safety—conversational turn-taking and empathy—are part of the same unwritten rules we often turn to, as individuals, when we need to establish a bond.And those human bonds matter as much at work as*

12

*anywhere else. In fact, they sometimes matter more (Duhigg, 2016).*

Not surprisingly, violating the rules and signals for turn-taking can send strong messages of exclusion, even if they occur unintentionally.

#### “... instead of trying to avoid exclusion, we are much better off putting thoughtful effort to enhancing inclusion.”

After reviewing the findings that illustrate the harm exclusion has on productivity and the contrasting benefits of inclusive behavior, we believe it is helpful to again stress that these findings need not just be applied to understanding diverse employees. More importantly, we in fact suggest that for optimal team productivity, all employees need to feel included (e.g., valued, respected, and safe), as all humans are sensitive to and feel threatened by exclusion, and everyone tends to underperform when feeling excluded.

With so many reasons why it is worthwhile, from a brain perspective, to limit exclusion, it follows naturally that well-meaning people will put great effort into avoiding excluding others in their organizations. Ironically, however, this may not be the best approach. When we focus on not excluding, we may end up making the situation worse, in a few different ways. First, when we aim not to exclude, we can be more likely to call attention to differences between people. As reviewed above, language that highlights how someone is not part of the group is often construed as exclusionary (Nordquist, 2016). We end up putting the person on the spot instead of bringing him into the fold. Second, when focusing on not excluding, we may actually create a state of threat in ourselves as we try to be hypervigilant of doing or saying the “wrong thing”— becoming self-conscious and wary. This can result

in overcorrection or awkwardness that singles the person out that we wish to include. Finally, this well-intentioned but misguided strategy may not only strengthen feelings of exclusion and “not belonging” but can also breed further resentment as people pay more attention to the ways that others in the organization exclude one another. Therefore, instead of trying to avoid exclusion, we are much better off putting thoughtful effort to enhancing inclusion.

With so many ways in which we can exclude people without even realizing it, we believe that if we’re not actively including, we’re accidentally excluding.

How to actively include

It can be challenging, if not impossible, to individually become aware of all the linguistic, nonverbal, and interactive signals we give off. Rather than aim to recall a long list of individual signals, we offer a set of organizing principles to simplify that task. We provide a framework below intended to guide how to think about and act on your intention to be inclusive. That framework builds on The SCARF® Model of social motivation (Rock, 2008). The SCARF® Model organizes the ways in which a person can feel threatened or rewarded socially into five categories: **Status** (where do I stand?), **Certainty** (can I predict another’s behavior?), **Autonomy** (who has control?), **Relatedness** (are we on the same team?), and **Fairness** (are resources equitably distributed?).

That taxonomy has been adopted by hundreds of organizations and shared with hundreds of thousands of employees, because, feedback suggests, it is very easy for people to recall and make use of. It helps people anticipate when another will feel socially threatened or rewarded, which is of particular value when aiming to build inclusion.

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#### “... if we’re not actively including, we’re accidentally excluding.”

Positive SCARF® signals

Leveraging The SCARF® Model, we suggest it is possible to learn to send socially rewarding signals that will build inclusiveness. We focus specifically on the positives—signals that increase inclusion—rather than on trying to decrease exclusion. Research shows that aiming to avoid negative thoughts or behaviors can have paradoxical consequences (Wegner, Schneider, Carter, & White, 1987). Trying to not do something makes it more likely you will think about and then do that very thing. When we focus on what not to do, we prime the neural activity associated with what not to do. “Don’t picture an elephant” requires thinking about an elephant, picturing it, and then applying willpower. Rather, when your aim is to avoid doing something, you are far better off simply shifting focus onto what you would prefer your brain attend to (Wegner et al., 1987). Thus, rather than trying to hold in mind the exclusionary messages to avoid sending, we focus on thinking about the inclusionary messages to send.



Positive relatedness signals

We start with relatedness because, of the five SCARF® domains, it is the most directly associated with inclusion. Relatedness refers to whether or not people see one another as being on the same team— related to one another through inclusion in the same group. A strong and effective way to increase feelings of inclusion, therefore, is to send positive relatedness signals—make a person feel like she belongs to the group and is valued. Relatedness can be signaled by actively increasing one’s perceptions that she is part of the in-group and by strengthening her sense of group identity, which changes the way the brain processes other members of the group (Van Bavel, Packer, & Cunningham, 2008). Creating stronger bonds between group members and increasing a person’s sense of belongingness can be accomplished by strategies that focus on highlighting commonalities between people instead of differences.

Positive relatedness signals can come from actively being warm and curious toward others, being interested in others, and finding shared experiences. Setting up situations that are conducive to these kinds of social interactions and implementing

13

systems that focus on identifying common overarching goals are some ways that organizations can promote inclusion through sending positive relatedness signals.

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Developing common goals is one of the most effective strategies that consistently brings people together and increases collaboration (Pearsall & Venkataramani, 2015; M. Sherif, Harvey, White, Hood, & Sherif, 1954). However, by bringing two initially separate groups together, it is vital to establish common goals as well as common resources to avoid a fight for now limited goods (attention, resources, etc.) (M. Sherif, Harvey, White, Hood, & Sherif, 1961). Importantly then, you can build relatedness and eliminate the natural increase in anxiety and mistrust by promoting equal status, fair resource distribution, cooperation, and support between all members (Allport, 1979).

Practicing perspective-taking can be very helpful in navigating group transitions (Amodio & Frith, 2006) and is one key way to increase positive relatedness signals. Most of us have the ability to think about what others think, know, want, and fear. Thanks to one area of the brain—the medial prefrontal cortex—we posses a uniquely human skill to mentally put ourselves in the shoes of others (Ruby & Decety, 2004). This practice of perspective- taking can reduce prejudice and stereotypes while enhancing empathy (Galinsky & Moskowitz, 2000; Gilin et al., 2013)—critical for building relatedness and increasing a sense of inclusion.



Positive status and fairness signals

Status and fairness signals can be grouped conceptually, further simplifying what a practitioner needs to hold in mind. Fairness pertains to the equitable distribution of resources, time, attention, and other factors people value. Status is often communicated by unequal distribution of these valued factors (i.e., higher status individuals receive more). Moreover, people often feel as though they are being treated unfairly when their status is diminished. For example, an employee who has worked hard and held herself in high-esteem as an important member of the company will likely feel unfairly treated if, come annual review time, she

14

receives a grade for the year that is below the grade others received who are no more important to the team than she is. The status drop she feels due to the grade creates a sense of unfairness. In these ways, status and fairness often go hand in hand.

Helping someone feel that they are respected and valued as part of the group, and that they are fairly recognized for their contributions are critical for that person to feel included. Doing so builds psychological safety, which is a defining feature of the most successful, most cohesive, and smartest teams (Duhigg, 2016; Edmondson, 1999). Positive status signals communicate that a person’s social status relative to others—her social value—is not at risk; and positive fairness signals mitigate the stress, anxiety, and anger that come with feeling that your contributions are not acknowledged. These are important factors that contribute to creating a psychologically safe work environment, which we argue is a prerequisite for an inclusive work environment.

You can send positive status and fairness signals by implementing processes that ensure that everyone is asked to contribute, that opportunities are shared, and that everyone receives credit for their contributions.

Positive certainty and autonomy signals

Certainty and autonomy are often linked. Feelings of certainty and autonomy are the ways in which people know that they have some sense of what they can expect (e.g., feeling that they have been provided with enough information), and importantly, that they have a degree of choice in and control over what happens to them. Certainty and autonomy signals also can be grouped to simplify the process of sending positive SCARF® signals. The more certainty we have, the more we can predict what is coming in a social situation and what to expect from others. That predictive ability makes it easier for you to control your own destiny—how you will prepare, what role you will take, and so on. Likewise, the more autonomy (i.e., control) you have over your own contribution, the more certainty you can have about what is to come.

#### “To better include others, we can focus on just five factors that simplify thinking about the meaning of the signals we send.”

Increasing certainty in and of itself signals reward in the brain (Bromberg-Martin & Hikosaka, 2009). And the perception of greater autonomy not only elicits neural reward signals (Leotti & Delgado, 2011) but also leads to health, well-being, job satisfaction, reduced stress in the workplace, and increased motivation (Diener, Ng, Harter, & Arora, 2010; Gagné & Deci, 2005; Wood & de Menezes, 2011). Sending positive certainty and autonomy signals tells a person that he is in the loop and that his contributions matter. These kinds of positive SCARF® signals come from implementing strategies that keep people informed and give people a feeling of control (e.g., keeping people in the loop, explaining your choices, etc.).

Conclusions

The financial and psychological benefits of diverse teams and diverse leadership are well documented. However, the real power in diversity lies dormant without creating an environment where people feel integrated, feel that they belong, and feel open and safe enough to express their ideas—where inclusion is a reality.

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Without realizing it, we exclude others in many ways through our verbal language, body language, and interactions with them. Subtle cues communicate whether others are welcome in the group or seen as outsiders. And those who are sensitive to being different in some way may also interpret ambiguous cues as exclusionary.

As highlighted above, unless you actively include, we believe it’s reasonable to say you accidentally exclude.

Fortunately, scientific research helps us identify and understand the actions that send strong messages

15 of inclusion. There are many individual ways we

speak, behave, and interact that communicate inclusion or exclusion—probably far too many to keep track of during a social interaction. In this article, we have provided a framework to simplify how a person aiming to include can think about the signals they send and then act differently. To better include others, we can focus on just five factors that simplify thinking about the meaning of the signals we send. We can consider whether we are sending SCARF® signals—messages that affect a person’s status, certainty, autonomy, relatedness, or fairness. By sending positive SCARF® signals—signals that communicate an increase in one or more of the five SCARF® domains—individuals can take advantage of the neuroscience of social threat and reward to benefit from the smarter, more cohesive, more productive, and happier diverse and inclusive teams that they will help build.

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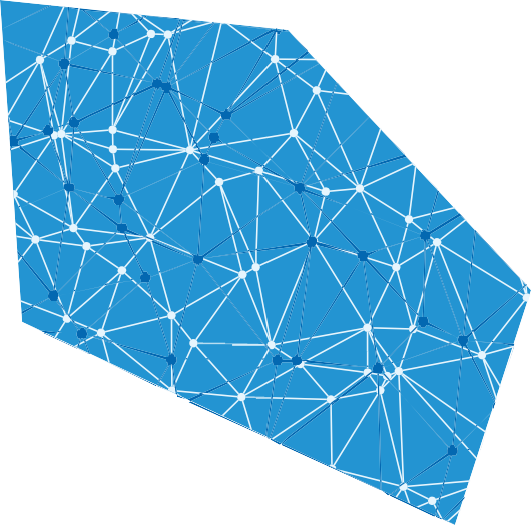
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18



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WHY INSIGHT MATTERS:

How and why the ‘aha!’ moment is central for leading behavior change

by Josh Davis Christine Chesebrough David Rock and Christine Cox

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There is increasing demand for employees in organizations to change their behaviors quickly. Markets, technology, and business processes change in what seem to be faster and faster cycles. Guiding employees to adapt their behavior simply cannot be addressed rapidly enough with older approaches to behavior change, such as annual reviews, goal setting exercises, or pay-for-performance schemes. Rather, a much quicker, more flexible, and employee-driven approach to regular—as needed—change is warranted. A surprising solution comes from research into how people change their thinking. We review existing research about self-generated insight, and conclude that it may be one of the more useful tools in changing behavior. It is possible to facilitate an insight through a series of steps that will prepare the brain of the listener to be more likely to come to a creative solution (e.g. Mark Jung-Beeman, Collier, & Kounios, 2008). Here we describe four groups of findings that illustrate why self-generated insight should be a primary aim in efforts to help people change their behavior. First, research shows that the moment of insight can create greater learning than learning through non-insight. Second, insights can lead to a strong sense of engagement with an idea that has emerged via insight, motivating people to take action. Third, insights can become generalized rules that are then applied to many situations, which may not happen with non-insight learning. And finally, insights are capable of yielding relatively wide- scale systemic change in the brain.

**WHY INSIGHT MATTERS:**

###### How and why the ‘aha!’ moment is central for leading behavior change

**by Josh Davis Christine Chesebrough David Rock and Christine Cox**

The ability to drive behavior change quickly and at scale is at the heart of many of the challenges organizations face in today’s rapidly changing work environment. Traditional approaches to behavior change include things like annual reviews and giving tough, direct feedback to help a person see where they have gone wrong in the past year. These are not bad ideas in principle. But in practice, managers struggle to actually drive behavior change with them. For example, a 2011 study of over 12,000 leaders found that 43% of leaders were ineffective at driving change, identifying and developing future talent, or coaching and developing others (Boatman & Wellins, 2011). In 2014, only 25% percent of HR professionals across 2,000 organizations viewed their organization’s leaders as “high- quality” (Development Dimensions International, 2014).

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For over a decade, we at the NeuroLeadership Institute set up informal classroom exercises to track managers’ effectiveness at having conversations that enabled change in others. What appears to emerge is that even when managers think they are effective, the person on the receiving end seldom thinks something has truly changed for them. Empirical research will eventually show how much that is the case, but it is an area in which we encourage every company to explore their own effectiveness. This may be because managers often don’t know what ingredients they should be aiming for in a behavior change opportunity. When we ask about what makes for a successful interaction that may lead to change, anecdotally, managers say things like trust, rapport, empathy, listening skills, or a two-way

3

conversation. Those are all helpful things to have for a conversation of any kind to flow naturally, but they seem to not hit the mark in regards to creating lasting change.

In this paper, we propose that the current model for successful change needs updating. Conditions such as trust, empathy, or rapport are helpful and important, but may not be *sufficient* conditions for a successful change interaction. Rather, we will argue that a central experience that leads to a successful change is a moment when an employee sees something they hadn’t seen before—when a new perception occurs, or re-occurs more deeply, or when an employee suddenly comes to a conclusion, a realization, or a discovery. That is, when an employee has a moment of insight.

In this paper, we will explore the science that explains how insight can help us learn new behaviors, become engaged, generalize new solutions as needed, and thus create systemic changes in how we think and work. We will discuss why insight matters in these ways when seeking change, from a neuroscience perspective. We will then discuss the principles involved in how a manager may help lead someone to insight.

**The four effects of insight on the brain**

When a person comes to his or her own insight regarding the solution to an impasse, the brain and behavior of the person who had that insight can change in four key ways. It may be helpful to have a specific work scenario in mind as we discuss these effects.

Imagine the following scenario:

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An employee in a design firm has been producing high- quality visuals for marketing, but not delivering to client specifications. His manager has been through this kind of situation, and knows that while the designer might have the more aesthetically pleasing materials, the best thing to do is to work within client constraints and maximize the aesthetics within those constraints. The manager even had an epiphany about that issue years before—that it is actually a more interesting challenge as a designer to have constraints, and thus the mark of a great designer is to make those constraints work1. So the manager gives that advice to the designer, hoping that it will help. She says “You give me beautiful work, but I can’t sell it. You know what the client wants. I need you to make what they want. You’ve got to see the client’s criteria as a set of constraints. You have to think of this as a more interesting challenge because of those constraints.”

Chances are the designer was already aware that he wasn’t meeting the client specifications, and had some good reasons for it. The advice from his manager will likely come across as trying to spin the assignment as being more interesting than it is, and the designer, although he may comply, may feel like he’s being condescended to and asked to produce sub-par work because the client has no taste.

By contrast, had the designer come to those or similar insights on his own, we believe he would likely have experienced it much more like the epiphany his boss had years before. By having his own insight, we suggest that the solution is more likely to stick in memory. Just as it did for the boss, through her epiphany, it will become well- learned and thus easy to recall when future situations call for it. Following an insight, we propose that it is reasonable to expect a period of excited energy, in which the designer would likely be highly engaged with the challenge of how to rethink the solution. Finally, he may be more likely to generalize the solution across multiple contexts. Had his boss simply told him what to do, he may well stay within the client specifications for that one project. But if he had his own insight, we would argue that he is more likely to listen to client constraints, management constraints, co- worker constraints, and maybe even constraints his family has about designing his own house, in an entirely different way.

It seems fair to say that the desired outcome of most change conversations is that an employee becomes engaged in a new action, becomes smarter about a specific challenge, gets on board with a new strategy, or increases his performance by embarking on a new approach to his work. In each case, a new idea needs to be easily recallable, and this idea needs to be something

4

the employee is motivated to engage in, ideally becoming the basis of a new rule for how to behave.

Below we argue, based on neuroscience research, that having an insight helps people learn for better recall, be engaged, and generalize their solutions. Having an insight thus systematically changes the brain on both a temporary and lasting timescale. Unlike directive feedback, insight gives an idea LEGS it would not otherwise have—it guides one to Learn, Engage, and Generalize, thereby causing a long-term Systemic change in the brain..

**Learn**

Insights are heavy hitters for lasting learning. They’ve been shown to enhance recall for a number of types of information. Early research on this topic showed the effect with sentence comprehension (Auble, Franks, & Soraci, 1979). Sometimes we hear or read something that doesn’t make total sense at first, and then some new way of looking at things comes to light, and suddenly our comprehension snaps into place. Auble et al. showed people sentences such as, “The boy was hungry because the pole splintered”(p.434 Auble et al., 1979). At first, this sentence would not make sense to most people. However, after five seconds, participants were shown a cue that would help make sense of the sentence, in this case the word was “fishing.” For many people, there is a moment of insight when the sentence that did not make sense suddenly comes to make sense. To have a useful comparison condition, sometimes the cues came five seconds after, and sometimes the cues were worked into the sentence, so participants might read all at once that a boy was hungry because his fishing pole splintered. In either case participants could come to understand the sentence, but in the case where the cue came after five seconds there was an experience of insight. Participants recalled significantly more sentences that they came to understand through insight. In subsequent studies, the experimenters showed that this memory effect was not just due to spending an extra five seconds puzzling over the answer, but it was the insight experience itself that made the difference (Auble et al., 1979).

Conceptual replications of the memory finding have shown insight to enhance memory among members of a group (Wills, Estow, Soraci, & Garcia, 2006) who talk things out until reaching insight, and that this effect also applies to different modalities of learning. In addition to the sentences described above, pictures, for example, are also better remembered after insight—such as in the discovery of a coherent image after connecting the dots in a pattern (Wills, Soraci, Chechile, & Taylor, 2000).

1Interestingly, research has shown that added constraints do lead to greater creativity (Finke, 2014).

Insights have also been shown to enhance memory regarding the formation of a new association between ideas. For instance, there’s a common research paradigm in which participants have to play a game like the kind you might play when you have friends over—they are called compound remote associate problems, derived from the classic Remote Associations Test (RAT) (Mednick, 1962). Participants are shown a few words that seem not to relate (e.g. rubber, metal, electron) and asked to say the word, category, or concept that would make them fit together (e.g. band). When research participants came to a solution word via insight, they remembered it better than when they came to the solution word other ways (Du, Zhang, Wang, Luo, & Luo, 2015). Finally, separate research has shown that when participants learned the basis of a magic trick in a moment of insight rather than in a non-insight way, they showed a 12% increase in memory for what they had learned (Danek, Fraps, von Müller, Grothe, & Öllinger, 2013).

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The mechanisms by which insight leads to a memory boost are partially known. There is a robust and well- replicated finding that people are more likely to remember an idea that they generated themselves—even if not in a moment of insight—than one that was freely presented to them. This is known as the generation effect and has been documented in both behavioral (Hirshman & Bjork, 1988; Slamecka & Graf, 1978) and neuroscience research (Davachi & Dobbins, 2008; Davachi & Wagner, 2002; Jensen, 2005). Generation is so powerful because the learner creates rich neural connections to his own existing knowledge representations (Davachi, Kiefer, Rock, & Rock, 2010; Davis, Balda, Rock, McGinniss, & Davachi, 2014). The rich connectivity possible when forming one’s own links to one’s own knowledge likely forms part of the mechanism by which insights enhance memory.

A second mechanism by which insight may lead to learning is more technical. The moment that an insight occurs in the brain corresponds with a burst of high frequency (gamma-band) brain waves, originating from the right anterior superior temporal gyrus, an area that is associated with making connections across distantly related concepts (M. Jung-Beeman et al., 2004). Thus, on a neural level, having an insight can help us make associations between concepts that ultimately deepen our understanding. In addition, the gamma-band brain waves that originate in the anterior superior temporal gyrus and propagate over the entire brain are linked to high-level cognitive processing, integration of information, and memory creation (Herrmann, Frund, & Lenz, 2010; Herrmann, Munk, & Engel, 2004; Lee, Williams, Breakspear, & Gordon, 2003). So the generation of gamma waves in the appropriate brain regions—associated with the moment of insight—appears to play a role in both the creation of new

5

ideas as well as their commitment to long-term memory.

A third mechanism by which insight may enhance memory is due to how insight affects the hippocampus. The hippocampus is a brain region known to be necessary for the formation of long-term memories of events, experiences, and knowledge we can call to mind consciously (Davachi et al., 2010). Because insights can be induced, such as in the research examples above, it is possible to scan participants’ brains when they are experiencing insights. In one study, participants read Japanese riddles—those they couldn’t solve they were later shown again while having their brains scanned (Luo & Niki, 2003). A few seconds later, participants were shown the answer, a process that had been shown previously to bring about an insight experience. Brain scans during the experience of insight showed that having an insight about the answer activated the hippocampus. Since the time of that study, Milivojevic et al., using a different method for inducing insight, have also found activity in the hippocampus to play a part in how insight leads to new understanding (Milivojevic, Vicente-Grabovetsky, & Doeller, 2015).

#### ...on a neural level, having an

*insight can help us make associations between concepts that ultimately deepen our understanding.*

Finally, evidence suggests that insights are memorable because of their inherent emotional quality. In general, learning is more likely to stick when there is an emotional component (Davachi et al., 2010). Activity in the amygdala— which is associated with emotional arousal in the brain— is strongly related to later memory for information that is encoded during the experience of an insight. When research participants had an insight that allowed them to identify an image, greater activity in the amygdala at the time of insight predicted their memory for that image a week later (Ludmer, Dudai, & Rubin, 2011). The emotional surge from an insight, an experience that is arousing and salient, seems to be helpful in making that information stick in memory.

In summary, it appears that insight enhances our ability to retain what we have learned, and this pertains to learning of many types and in many modalities. Insight is a powerful way to self-generate a rich web of associations that help with memory retrieval, insight is associated with brain wave and hippocampal activity implicated in memory, and insight leads to emotional arousal that has been shown to aid learning.

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**Engage**

We have all had insights and felt that burst of happiness when we finally “get it.” It’s more than just a good feeling.

Insights have the capacity to activate the brain’s reward systems. One of the more consistent lessons from the literature on engagement is that activating the reward circuitry is motivating (Ikemoto & Panksepp, 1999; Robbins & Everitt, 1996). We noted earlier that insights correspond to a burst of gamma-band brain waves. Evidence from neuropsychological research (Herrmann & Demiralp, 2005) suggests a strong relationship between gamma-band activity and the release of dopamine—a neurotransmitter that plays an important role in the brain’s reward circuitry (Wise, 2004).

Moreover, we believe it is reasonable to say that insight- based motivation is intrinsic motivation—the gold standard of motivation (Eccles & Wigfield, 2002)—as insights are self-generated. Although this point is more speculative, if one grants their intrinsically rewarding value, this provides one avenue by which insights can motivate well. Research on motivation suggests that people will engage in an activity longer and more diligently if they are intrinsically motivated to do so, rather than for some extrinsic reason, such as the classic carrot and stick—e.g., the reward of money or the avoidance of threat (Deci, Koestner, & Ryan, 1999). In this sense, insights should actually be more likely to engage an employee than a more extrinsically motivated approach, in which monetary rewards or threat are used as motivators for future behavior.

Supporting this line of thinking, research shows that the simple act of searching for one’s own answers—which is an element of insight problem solving—has been shown to be engaging. In one study, participants could either pay a token to get the answer to an interesting trivia question or wait a certain amount of time for the answer to be revealed (Kang et al., 2009). The findings suggest that people were more engaged, or curious, when they sought out these answers for themselves. Hearing interesting new facts corresponded with increased neural activation in areas of the brain that process rewards, and this effect was especially strong when the subjects were engaged and were willing to sacrifice something (e.g., money, time) to learn the answer. Importantly, the information that the participants were most engaged with was the information

6

that was much better remembered in a follow-up session up to two weeks later—providing evidence that engagement and lasting learning go hand-in-hand. For the purpose of helping to really engage employees in behavior change, insights should outperform those situations in which managers merely hands out solutions, because insights should involve more employee answer- seeking.

Thus, based on the evidence from brainwave research, intrinsic motivation, and answer-seeking, we suggest that an opportunity to generate insight is likely to create a reward response in the brain of the employee. That reward response should help engage the employee in the new solution and help the employee recall that information at a later date. Ultimately, an employee should be more interested—perhaps eventually eager—to participate in a behavior change conversation if she knows that the conversation will be rewarding and useful.

*Giving directive feedback may be motivating in the short term because it is painful, but it*

*is the wrong kind of motivation if the*

*goal is engagement.*

One final note is that while insights appear to motivate, the primary alternative—telling an employee a solution—is not neutral, but is actually likely to get in the way of change. There are several pieces of social information shared non-verbally when a directive is handed down along with feedback. The employee’s status likely decreases relative to the employee’s manager as the manager appears more competent; the employee sacrifices autonomy when that manager assumes control of the solution; and the employee likely becomes concerned about her place on the team, with the message being that she’s shown herself to be incompetent in some way (Rock, 2008; Rock & Cox, 2012). Each of those messages puts the brain in a state analogous to what happens during a physically threatening situation. That brain state is not conducive for having a growth mindset—a belief that development is possible (Rock, Davis, & Jones, 2013)—or being in a toward-state (Rock & Cox, 2012)—thus harming

two factors that can facilitate insight. The perception of threat to one’s status, place on the team, or one’s sense of competence can reduce employee engagement (for a review of that literature, see Rock & Cox, 2012). Giving directive feedback may be motivating in the short term because it is painful, but it is the wrong kind of motivation if the goal is engagement. Facilitating employee insight is one way to engage the brain’s reward system and mitigate the detrimental effects of threat and stress associated with the common models of feedback.

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**Generalize**

As any manager knows, an employee on her team who needs to be taught the same lesson for every new context is a drag on resources. Performance enhancement is best when people in an organization learn how to drive business results on their own. Successful behavior change occurs when the person who will change leaves with the capacity to generalize her learning to novel situations, wherever relevant. Here we present a neuroscience-based argument that having insights may help us generalize our problem-solving methods and the solutions we find, thereby becoming systematically more efficient at solving problems on our own. Additionally, we suggest that there are strategies that can be leveraged to encourage having more insights, and that practicing solving problems via insight helps us become more adept at having insights in the future. Thus, insight can both help a person to generalize from a particular solution and can make a person more likely to come to further insights on their own, thereby also increasing the chances of generalizing from their learning.

Suppose you are the manager of an employee who needs to listen more in her weekly executive level meetings. Tell her to do so and she might do it in the meeting. But if she has the insight herself, chances are she’ll listen in meetings, at home, and in the taxi. Through insight, the solution she came to might very well become a generalizable mental tool for any two-way interaction where she will be called on to take part. In fact, research suggests that generalizing information you have learned to help you solve new problems depends on that information being learned in a relevant context (Stein et al., 1986) and with the intention of trying to solve a problem (instead of trying to memorize the correct information or solution) (Needham & Begg, 1991). These important factors—relevance and a focus on problem solving—for encouraging generalization are inherent in the type of interactions we have been describing: interactions that encourage insight.

One main reason that solving problems via insight may be effective for generalizing to new solutions is because insights can cause us to recognize new patterns in the problems we encounter and the strategies we use to

7

solve them (Knoblich, Ohlsson, Haider, & Rhenius, 1999). Having an insight about the nature of a problem can change our existing mental representations, allowing us to search for a novel solution we wouldn’t have seen before. Once we recognize a new pattern and shift our mental representation of a problem, we are then able to recognize it in subsequent contexts, and leverage the best strategy to solve it.

In one study, when research participants had an insight that changed their mental representation of a particular type of problem, they were more adept at solving subsequent problems that required a similar shift in mental representation (Ollinger, Jones, & Knoblich, 2008). Thus, insight allowed the participants to generalize their problem-solving method and apply it to solve problems in other contexts. An example of this kind of solution generalization in the workplace might look like this: consider the daunting task of keeping track of emails. A client relationship manager might waste a lot of time at first searching for past individual conversations with new clients. One day, she has the insight that she can keep track of emails pertaining to a single client more easily by tagging the subject lines with a specific keyword (such as the client’s name or date). It’s a simple solution that can save a lot of aggravation and time. Later, she might find herself looking for other ways to tag emails so she can search for other things more efficiently, and applying her tagging techniques to her personal files on her computer and in other applications. She has recognized a new pattern for organizing information on her computer and generalized that solution to other contexts.

Research also points toward how we can enhance our ability to generalize from an insight. We can practice something called “metacognition.” Metacognition is a term for thinking about thinking—e.g., being self-aware, having a feeling of knowing something, learning the limits of our knowledge, and so on. Practicing metacognition may enable both insightful thinking directly and increase awareness in such a way as to facilitate solution generalization. One recent study suggests that practicing metacognition can improve the rate of useful, novel idea generation by enhancing one’s self-awareness during periods of cognitive wandering (such as introspection and mind wandering), and therefore help us notice and evaluate ideas that are potentially useful and personally relevant (Fox & Christoff, 2014; Baird et al., 2012). Supporting this notion, independent research shows that training individuals to think more metacognitively— to recognize and be more aware of their mental states during problem solving—can lead to an increase in the number of problems solved through insight (Dominowski & Ansburg, 2000).

There is another way in which insights can be thought

to increase the likelihood of other insights, and therefore lead to generalizing from one solution to other relevant solutions. Key conditions for facilitating insight are to focus internally, create a positive emotional state, quiet the mind, and not actively think about the challenge (Rock, 2011). These conditions allow space for weakly activated neural signals pertaining to novel solutions to come to the focus of conscious awareness. The experience of having an insight appears to lead to the perpetuation of two of these conditions: 1) When we discover insights, we are internally reflecting and thinking about our own thoughts, and 2) the reward experience from having an insight seems to bring about the positive emotion that has been shown to facilitate further insight. The increased positive emotion and concurrent confidence in one’s own problem solving abilities that come along with the experience of insight are associated with increased processing fluency, or the ease with which we are able to process information (Topolinski & Reber, 2010). Therefore, through having an insight, the conditions are likely to be enhanced for more insights—and for thus generalizing the solution more than might have otherwise happened. All, then, that should be required is to continue to allow for situations in which we quiet the mind and don’t actively search for a solution, so that those new weak signals can be heard.

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#### When we learn such that we remember well what we learned, there are literally new neural connections formed, others strengthened, and irrelevant ones pruned away.

**Systemic change**

When we learn, engage with, and generalize from a solution we came to via insight, the brain changes. Changes of that kind are holistic, restructuring the thought schemas that the person who arrived at the insight uses to think about experiences or solve similar problems.

A few commonly experienced insights will help provide

8

illustrations of what it is like to see how this kind of systemic change may influence behavior. Here are a couple of examples that may resonate:

For those who love food, from time to time we learn how a particular ingredient tastes, and as a result taste it more regularly when eating that food forever after. There is a Cuban dish of grilled corn rubbed with a white sauce and sprinkled with crumbled cheese. It’s delicious. After loving it for some time, one of the authors of this paper later realized that the white sauce was mayonnaise. While it’s still delicious, every time he eats it now, he tastes the mayonnaise as a separate ingredient.

Or consider the example of a family in which a middle-aged child had begun to get worried about his mothers’ apparent cognitive lapses. She seemed to be misunderstanding things more and more often. Then, one day, she happened to be at the doctor for a routine physical, who discovered she had some hearing loss. One more challenge with aging, the son thought at first. But, after a few weeks of his mother wearing a hearing aid, the son noticed that his mother was not having cognitive lapses. He had a realization at that point that dramatically changed how he thought about a number of previous events. His insight was that what looked like cognitive deficits were actually just a function of the fact that his mother did not respond because she did not hear properly.

We believe it is fairly reasonable to suppose that forever after, in the corn and mayonnaise example, the consumer will taste the separate ingredient of mayonnaise. And forever after, in the cognitive deficit example, the man will consider whether hearing loss is a plausible alternative explanation. The first example is trivial and silly, and the second more serious. But they both highlight our intuitive experiences that the effects of an instantaneous insight can be broad and lasting. How does this occur?

One answer is to refer to the sections above about learning and generalization, which have illustrated some mechanisms by which insights help embed memories and lead to the generalizability of an idea. When we learn such that we remember well what we learned, there are literally new neural connections formed, others strengthened, and irrelevant ones pruned away (Davachi et al., 2010; Davis et al., 2014). Thus, learning forms changes in the systems guiding our behaviors. And when we generalize, we perceive problems through a new conceptual filter that has been created in the brain. New neural connections and new conceptual filters represent changes to the systems we use to think and solve problems. In that way they are systemic, and these systemic changes may help explain why a single insight can have lasting and broad application. However, we can also add one more

argument here that speaks to the notion of systemic change in a different sense—in the sense of reorganizing how information is linked across and within different brain regions.

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When we come to insight, we suddenly see things in a way we had not before—the information we hold in mind becomes reconfigured. When we reconfigure information, we might ask, what changes in the brain? Milivojevic and colleagues addressed this question by working with narratives that did not make sense until some missing information showed how the pieces linked up (Milivojevic et al., 2015). For example, if you have ever walked in on a story being told about someone who embarrassed himself, but you missed who and how, you may have struggled to make sense of the various players in the story, where events were happening, and what was relevant to focus on. The pieces of information may not have fit together coherently. Then a missing piece of information—that the protagonist was the wife of the speaker and the event was his honeymoon—presented itself, and suddenly you understood it all. Milivojevic and colleagues examined patterns of brain activity when this kind of narrative insight occurs.

Essentially, we change our memories of a narrative when we are suddenly able to see how all the pieces fit together. Milivojevic et al. found that those elements of a narrative that ended up forming part of a cohesive story were accompanied by activity across two critical memory regions of the brain—activity, moreover, that was very similar for the different parts of the narrative. Those two regions were the posterior hippocampus, which is involved in forming long-term memories of facts and events, and the medial prefrontal cortex, which is involved in memories about ourselves. Narrative elements that did not form part of a coherent whole were accompanied by dissimilarities in these regions. So, insights had the effect of creating new links among memory-related brain regions for information that formed part of the insight, and helped weaken links to distracting information that did not fit into the insight. The authors describe this as reorganizing neural representations of information across brain systems as a result of an insight.

Since behavior change depends on restructuring perspectives and responses for the long-term, stimulating insight-based solutions is a compelling route for lasting, motivating, and widespread change.

**How to stimulate insight**

Research has revealed that insights are not just sudden and random, as they appear to us experientially, but they follow from some predictable processes in the brain (Mark Jung- Beeman et al., 2008). As a result, research has pointed

9

toward conditions that increase the likelihood of insight (Rock, 2006, 2011). In brief, the conditions that promote insight are that the mind be slightly happy, inward looking, quiet, and not effortfully focused on finding the solution (Kounios & Beeman, 2014; Rock, 2011; Schooler et al., 1993; Subramaniam, Kounios, Parrish, & Jung-Beeman, 2009). Research on mind wandering suggests that, despite its negative stigmas, letting your mind drift from your immediate concerns can catalyze both autobiographical planning and creative thinking (Mooneyham & Schooler, 2013; Ritter, van Baaren, & Dijksterhuis, 2012). One study found that providing an incubation period—a distracting, undemanding, and unrelated break—after an initial attempt at creative problem solving significantly improved performance (Baird et al., 2012). That is, it may not be a demand for intense focus, but rather a step away from the immediate problem toward unmonitored, tangential mind wandering that is a key to insightful problem solving.

#### ...facilitating insight should be central to the endeavor of behavior change.

Rather than giving directives or arguing for why the person performed poorly and needs to change, the steps to facilitate insight are to 1) *limit the perception of threat* to manageable—fairly low arousal—levels (a best case scenario if positive emotion is unlikely), 2) ask questions that guide employees to *look inward* and reflect, 3) provide some quiet time to think, and 4) allow the space so that solutions need not come in the moment—once the impasse is known, some time in which there is *less mental effort* on the problem increases the likelihood of insight (Baird et al., 2012; Mark Jung-Beeman et al., 2008; Rock, 2011; Schooler et al., 1993).

**Implications for behavior change**

Due to the effects of insight that we have discussed in the areas of learning, engagement, generalization, and systemic brain or thought pattern changes, we propose that facilitating insight should be central to the endeavor of behavior change. There are many contexts in which we need novel solutions to complex problems, and in which it is important that people on our teams learn those solutions in ways that stick, are engaged and motivated to implement those solutions, and will generalize from those solutions to similar but as yet unexpected scenarios. We believe that ideally leaders would want these kinds of solutions to emerge from learning initiatives, workshops,

group meetings, brainstorming sessions, competitions, mentoring relationships, coaching, one-on-one conversations, five-minute check-ins, independent work, and speculative side projects. There is nothing in the four steps to facilitate insight that precludes them from being applied in any of those contexts. To illustrate what it may look like to put this into practice, consider a common feedback conversation.

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Suppose a manager has discovered an area for change and so says to an employee, “We need to talk.” Perhaps her employee needs to find a way to delegate more effectively, a complex challenge with no one right solution. The manager probably believes she has a solution, and will typically then give directives about what the employee has been doing wrong and what to do differently. In preparation for the conversation, she will anticipate objections, and look for evidence of failures and areas where performance wasn’t ideal, to martial an argument that change is needed. The employee meanwhile, will aim to anticipate these attacks, and provide counter-evidence, as well as to document successes that might have been overlooked. Both sides prepare for an argument that somewhat resembles preparations for legal proceedings, and then they meet and try to force the other person to accept their argument.

#### It’s the classic “teach a man to fish” concept, but with a twist...

How open are you to learning when someone is trying to get you to accept an argument that you have been sub- par? And afterwards, do you spend your time arguing to your friends and family that your manager or company does not acknowledge your hard work, or do you sit with the information and explore ways to grow? That kind of a directive feedback conversation is one with all the hallmarks of what we would expect to interfere with insights about useful change. It should create a threat state, with the need to defend one’s status and talent level. It should also narrow focus on winning the argument. It leads to a highly aroused, negative emotional state that can also interfere with allowing the mind to be quiet and receptive to making novel connections. In directive conversations, there is also no time set aside for internal reflection.

By contrast, the same agenda can be approached via different means. Suppose again that the manager has

10

identified an area for change. She can let the employee know of the need, but then quickly move into creating the conditions for insight. She may ask questions that help her employee meta-cognitively reflect on what ideas he already has for a solution. She can keep him focused on the solution to help him stay in a relatively positive frame of mind; she can give him a chance to quiet his mind and just reflect, without pressure to focus on the problem or on defending himself; and she can trust that, after the conversation, he may be more likely now to benefit from some time where his non-conscious mind can mull over the challenge while not directly thinking about it. This approach is based on creating the conditions that research has shown are likely to enhance the chances of insight. If her employee does come to a useful insight, research suggests he will retain it well, be engaged about acting on it, generalize from it, and shift his overall mental and neural frameworks for thinking about the challenge. From a research-based perspective, it is a far more effective way to arrive at meaningful behavior change.

Once a manager and direct report experience a dialogue such as this, in which they feel they are working together on a solution rather than as adversaries, that elusive quality of trust can build (Pantali & Sockalingam, 2005). We suggest that a natural outgrowth of such a process is that one such conversation will lead to more open dialogue, and thus facilitate future similar conversations, so that performance enhancement can be ongoing.

In one major technology company who has adopted brain-friendly change conversations in place of heritage performance management, employees routinely look forward to the days during which they have these change conversations. The meetings are optional, and 88% of employees choose to take part. What percent of your company would voluntarily take part in your current performance management process?

After the type of conversation we’re proposing here, the employee will likely be highly motivated to work towards the achievement of ideas and goals he arrived at via his insight, and that employee’s manager will, counter- intuitively, likely have to do less work thinking of solutions and convincing her employee that she is right. It’s the classic “teach a man to fish” concept, but with a twist—that if you help him have his own insight about how to fish, he’ll take to it voraciously.

**Conclusion**

An understanding of what does drive meaningful changes in employee behavior is emerging, and structures can be built to enable what works. Fostering insight in change conversations is key because an insight may give a solution LEGS it wouldn’t normally have. By enhancing learning,

deepening engagement, promoting generalization, and fostering systemic changes in the brain, insight is a powerful tool—one that we propose will lead employees to be more intrinsically motivated in their own growth and personal investment, leading to long-lasting positive changes in performance and adaptability to change.

Lessons regarding how to work with the needs and quirks of the brain reveal quite a bit about how to facilitate insight. To set the stage for insight we encourage asking the kinds of questions that allow for the four conditions the brain wants to support insight: to be slightly happy (or at least feel reduced threat), to reflect internally, to quiet the mind, and to have time to not focus on the challenge and let the mind wander. We don’t mean to suggest that facilitating behavior change in others will not benefit from interpersonal skills like listening, empathy, clear and direct communication, and acknowledgement. Those are highly useful for understanding where the insight is needed and in creating the communication that allows two parties to collaborate. They help form the setting for behavior change, but they do not do the change work as much as the insight. We also do not mean to suggest that extrinsic reward and punishment will not influence behavior change, but that insight may be far more effective for many of the complex and personal challenges that modern workers must solve.

Work today requires constant learning, and novel challenges. Impasses will necessarily follow. A manager can no longer just manage time, money, and head count on projects. She needs to help employees change to meet their ever-changing needs. The good news is facilitating insight should actually take less of a toll on a manager and an organization than other approaches to behavior change.

11

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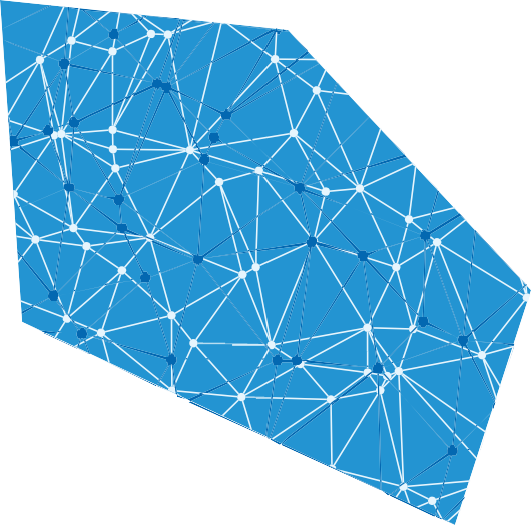
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THE NEUROSCIENCE OF LEADING EFFECTIVE TEAMS

by Jay J. Van Bavel Dominic J. Packer Christine Payne and David Rock

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Most organizations have long realized that most work in the modern era is done in teams, where cooperation and collaboration are critical for success. Scientists have recently found that certain teams flounder while others flourish at solving problems. We argue that leadership is fundamentally about creating a feeling of common purpose—known as a social identity. The current paper provides a road map for leaders to become entrepreneurs of identity, who creatively structure, motivate, and coordinate groups. Specifically, we describe three key elements for building effective teams, including how to 1) structure effective teams, 2) motivate individuals to identify with the team, and 3) encourage individuals to cooperate and coordinate with team members. Organizations that use these strategies can create teams that are the greater than the sum of their parts.

THE NEUROSCIENCE OF LEADING EFFECTIVE TEAMS

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**by Jay J. Van Bavel Dominic J. Packer Christine Payne and David Rock**

**Key takeaways:**

1. Although people believe that there is a simple relationship between talent and team performance, some teams underperform or over-perform based on much more than the aggregate talent quotient of a given team.
2. When structuring effective teams, diversity can facilitate increased performance — but only when the team shares a common social identity.
3. Groups that fulfill the need to belong, while remaining distinctive, motivate individuals to identify with the team.
4. Clarifying group goals and rewarding individuals who promote team success can encourage individuals to cooperate and coordinate with team members.

4

Introduction

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Most leaders have long realized that focusing on individual performance is hardly sufficient for producing the best results. Most work in the modern era is done by teams, where cooperation and collaboration are critical for success. Indeed, the time spent by managers and employees in collaboration has ballooned by more than 50% in recent years. Moreover, scientists have found that certain teams flounder while others flourish at solving problems—a trait known as *collective intelligence* (Woolley et al., 2010).

There have been numerous attempts over the years to codify—and decipher—the key ingredients in team development. Conventional wisdom has produced countless tips for constructing successful teams, from “putting introverts together” to “building friendships outside of work.” But when these nuggets of wisdom were put to the test in a large study at Google, they were found to be completely uncorrelated to team success (Duhigg, 2016). Moreover, a survey of human resource professionals found that they drew on 250 different models and theories of team and team building in their practices (Offerman & Spiros, 2001).

This underscores just how fragmented our knowledge is in the domain of team development. The most popular model describes five stages: *Forming* (establishing relationships, setting rules and standards), *Storming* (resistance and internal conflict), *Norming* (conflict is overcome by adopting shared perspectives and developing a group identity), *Performing* (when the group begins to excel at task performance), and *Adjourning* (when the group disbands) (Tuckman, 1965; Tuckman & Jensen, 1977). Unfortunately, this framework was developed over 50 years ago in a radically different work environment and focuses on describing the overall arc of the team dynamics without clarifying how leaders can cultivate effective teams.

One definition of leadership is the “act of leading a group of people or an organization.” And yet, there is little consensus about how leaders can successfully coordinate and motivate teams within an organization. The dominant models of team development are largely descriptive; they

5

offer very little insight into how leaders can inspire individuals and groups to ensure their success and harness the benefits of diversity in the modern workplace. In this paper, we bring cutting-edge research from psychology, neuroscience, and management to help people lead effective teams. This modern approach to leading teams offers a fresh perspective on an ancient problem.

Our research explains why team formation often proceeds with relative ease—given the role of group formation in human nature. Thus, we argue that leadership is fundamentally about creating a feeling of common purpose—known as a social identity. We also specify various strategies leaders can use to maximize the time teams spend “norming” and “performing” rather than “storming.” In particular, we describe three key areas for leaders to leverage when building teams: 1) how to structure effective teams, (2) how to motivate individuals to identify with the team, and (3) how to get individuals to cooperate and coordinate with team members. From this perspective, leaders are *entrepreneurs of identity* (Haslam, Reicher & Platow, 2011), who creatively structure, motivate, and coordinate groups.

Structuring effective teams

There is an element of team building that involves selecting the right people. But to focus on assembling individuals simply based on elite individual performance would be a mistake. As the legendary football coach Knute Rockne once said of his team, “As a coach, I play not my eleven best, but my best eleven.” Indeed, the groups with the greatest collective intelligence are not those with the smartest person or even the smartest group of people but groups who have the capacity to solve problems through social coordination (Woolley et al., 2010). This is why, for example, teams with a mix of women and men outperform teams that are composed entirely of men on group problem- solving tasks: Having women on a team increases overall collective intelligence (Woolley et al, 2011), the presence of female directors on a company board correlates with decreased chances of declaring bankruptcy (Wilson, 2009), and having women in senior leadership roles improves board and organizational financial performance, innovation, and decision-making (Bourke et al, 2016; Noland et al, 2016).

Conventional wisdom has focused on building teams full of superstars. However, there is good reason to believe that this strategy can backfire. For instance, biologist William Muir (2005) found that breeding the most productive chickens— widely referred to as “super chickens”—with one another could have disastrous consequences. In his study, the most productive hen in each cage was used to breed with the most productive hens from the other cages. This strategy backfired. After six generations of breeding super chickens, only three hens were left—six had been murdered and the remaining hens were nearly bare of feathers after attacking one another viciously (Heffernan, 2014). By contrast, when the most productive cages of hens bred freely, they were healthy, and their egg production increased dramatically. The reason is that super chickens—and many superstars—are bullies, hoarding resources to achieve their productivity while suppressing the productivity of the other hens.

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#### ... leadership is fundamentally about creating a feeling of common purpose–known as a social identity.

Unfortunately, the same dynamic plays out in organizations around the world. Superstars are aggressively recruited and set against one another in a fiercely competitive world of performance reviews. Indeed, this might help explain why psychopaths are often able to achieve promotion and success in certain organizations through manipulation and aggression—even though they turn out to be terrible managers and leaders (Hare & Babiak, 2006). Although people believe that there is a linear relationship between the amount of talent on a team and performance, this is not always the case (Swaab et al., 2014). Of course, when people on a team are working independently, with little coordination necessary, more talent is associated with greater performance. But when team members are required to work together, as

6

in sports like football and basketball, the addition of talent facilitates performance up to a certain point. After that point is achieved, adding more talent has little positive effect, and can even backfire—this is known as the “Too-Much-Talent- Effect” (Swaab et al., 2014).

Rather than selecting similarly talented individuals, extensive evidence suggests that diversity is key to team success. Research shows that assigning people to more diverse, mixed-background teams can be more effective for driving team creativity, intelligence, and problem-solving (Lieberman et al, 2015). Belonging to the same team can help overcome potential biases that might otherwise impair performance and hinder collaboration. It helps prevent problems like groupthink by harnessing a diversity of perspectives. Indeed, in a study involving 366 companies, organizations that lacked diversity were less likely to achieve higher financial returns (Hunt et al., 2018).

One reason may be improved decision-making processes used by diverse teams. In a cloud- based enterprise decision-making platform, team diversity was associated with an increase in the quality of decisions by 87% compared to very homogenous teams (e.g., an all-male team) (Cloverpop, 2017). In short, teams whose members are diverse in age, gender, and geography deliver better outcomes as they frame decisions, weigh in with feedback, record details, and track results of their decisions (Cloverpop, 2017). But it’s important to note that recent research has found diversity only facilitates performance when the team shares a common social identity (van Veelen & Ufkes, 2017). Sharing a social identity increases learning and team efficiency, allowing leaders to harness the benefits of diversity.

Similarly, we have found scientific evidence that a common social identity can help override some of the implicit biases that normally accompany interactions with diverse individuals. For instance, assigning people to mixed-race teams can even override implicit racial biases—leading people to have positive automatic reactions toward all team members, regardless of their race (Van Bavel & Cunningham, 2009). One reason this might occur is because people start to pay attention to their team members, seeing them as individuals rather than members of a racial out-group (Van

Bavel & Cunningham, 2012). Likewise, becoming a member of a racially-diverse group changes brain activation within minutes—activating the amygdala and facial processing regions of the brain when people see team members of any race (Van Bavel, Packer & Cunningham, 2008; 2011).

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Cultivating common social identity provides a strategy for promoting cohesion in diverse environments—and can reduce the sorts of unconscious biases that are often a source of tension and conflict within groups. Coca-Cola, for example, aims to create a social identity through diversity and inclusion as a corporate value. The statement “diversity is an integral part of who we are” is a perspective that is outlined in the company’s Global Diversity Strategic Framework and implemented in its workplace strategy for attracting, retaining, and developing diverse talent around the world (Coca Cola, 2013). Countless companies are implementing similar strategies to try to cultivate and harness a shared group identity around diversity.

Business leaders should use this knowledge to their advantage in deciding how to structure their teams. Diversity may come from any number of domains, from simple demographics (race, gender, age, education) to different viewpoints. It may take time to build diverse teams. For example, Siemens, a German conglomerate with more than 350,000 employees around the world, set out to create a diverse management team a decade ago. Today, the 20-person supervisory board includes 13 external members (people who do not work at Siemens or individuals who had begun their careers elsewhere), six women, and four individuals born outside of Germany; the board members range in ages between 44 and 74 years old (Lorenzo et al, 2017). But this commitment often pays off in terms of performance, creativity, and effective problem-solving.

Not only does structuring a more diverse team have the potential to reduce the tendency toward groupthink, but it can also reduce bias, increase collaboration, and generate creative solutions. There are now numerous studies reporting that diversity is associated with economic benefits across sectors. However, harnessing diversity to create effective teams works best when group members strongly identify with the same team.

7

Identify as a team

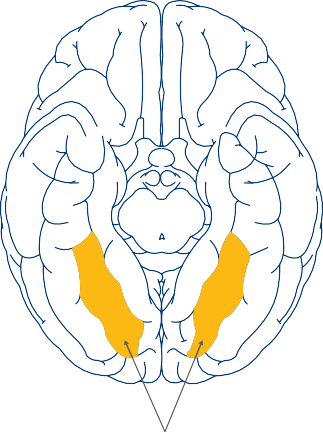
Perhaps the most important element of effective leadership is the management of group identities— great leaders are usually *“Entrepreneurs of Identity”* (Haslam, Reicher & Platow, 2011). Many experiments have found that members who identify with a group will act to benefit their groups, even when doing so exacts personal costs (Brewer & Kramer, 1986; Kramer & Brewer, 1984; Van Vugt & Hart, 2004; Zdaniuk & Levine, 2001). One reason is because we share in the success and rewards of our in-group members. For instance, university students are more likely to wear their university sweaters and other apparel or use the pronoun we after their school’s football team scores a victory— known as basking in reflected glory (Cialdini et al., 1976). Similarly, people who strongly identify with a group experience greater activity in the reward centers of the brain when they see a fellow group member receive a monetary prize (Hackel et al., 2017). This is likely similar to the joy we feel when our children take their first steps or secure a spot on the honor roll. We care because we identify with them. Similarly, when people identify deeply with a group, people are often willing to make sacrifices for the collective good, devoting time and effort, sweat and toil, without necessarily expecting great personal reward. Seeing the group succeed is its own reward.

While creating a sense of shared purpose and common identity is not enough on its own to create a high functioning team, it is a key ingredient. Thankfully, the ease with which people form and identify with groups—our tribalism—is one of the most remarkable features of human nature and is found in every society on earth (Brown, 1990). In a famous series of experiments, scientists found that people will form groups under the most minimal of conditions (Tajfel et al., 1971). This is true even when the groups are completely arbitrary, like when students on the schoolyard break into teams for recess. At the flip of a coin, people favor in-group over out-group members (Brewer 1979). Our preference for group members sets us apart from other primates and is so deeply ingrained that it may not even be fully conscious. In fact, there are now many studies showing that people develop strong automatic preferences for members of their own group

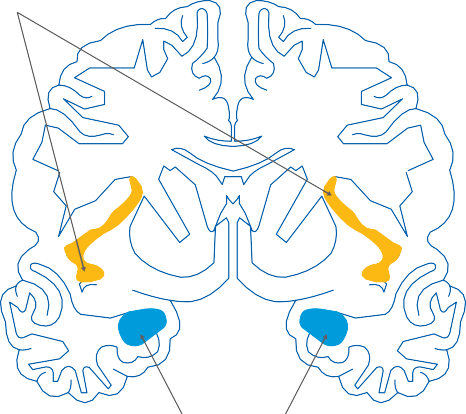
Insula

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Anterior cingulate



Fusiform gyri

Amygdala



OFC

Ventral striatum

mPFC

within minutes of joining the group (e.g., Ashburn- Nardo et al., 2001; Otten & Moskowitz, 2000; Van Bavel & Cunningham, 2009). It seems like second nature for humans to draw boundaries between *us* and *them* and to treat others according to these categories.

When we see ourselves as part of a team, this new identity can be more relevant than other identities that are deeply entrenched in our minds. Nearly a decade ago, we conducted the first study using functional Magnetic Resonance Imaging to track brain activity while examining this distinction (Van Bavel, Packer, & Cunningham, 2008; 2011). We told people that they would be part of a group— the leopards or the tigers—and then showed them faces from their in-group (e.g., leopards) and the out-group (e.g., tigers). Within minutes of joining a team, people had heightened activation in the fusiform gyrus and the amygdala when seeing in- group faces compared to out-group faces, which suggested that people were paying more attention to in-group members. Interestingly, we also found that activity in the orbitofrontal cortex—a brain region involved in processing value—predicted how much people wanted to become friends with their fellow in-group members (see Figure 1). These striking results confirmed predictions from three decades of psychological research, showing that the human brain is highly attuned to our current social identity.

The true potential of groups is realized when members’ self-concepts shift—via identification processes—from the individual (“I” or “me”) to the collective level (“us” or “we”) (Tajfel, 1984; Turner, 1987). Identification with a group involves a fundamental shift of one’s goals and values— including cooperation and even altruism (Packer & Van Bavel, 2015). Group identity can explain a range of striking behavior, ranging from putting in long hours at work to sacrificing one’s life for one’s country. Events and decisions that were once evaluated with reference to oneself (“what’s in it for me?”) are now evaluated in reference

Figure 1. Anatomical images of several key brain regions associated with group membership, functional relations between groups, empathy, and pro-social and antisocial behavior. These three brain images are meant to serve as a guide to the location of various regions we reference

frequently (not to represent a neural circuit supporting one process in particular). mPFC = medial prefrontal cortex.

OFC = orbitofrontal cortex.

8

to the group (“what does this mean for us?”). In fact, research shows that even the most selfish individuals can become extremely cooperative when they identify with a group (van Vugt, 2010)!

Once the self becomes fused with a group, they become motivated to pursue what they understand to be the goals of the group.

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When we teach the concept of group identity to an audience, we ask them how often they have seen their father or grandfather express great joy or sorrow. Consistent with North American norms that promote emotional reservation among men, our students rarely report seeing such emotional displays. But when we ask whether they have seen their father jump for joy watching a football game or their grandfather cry during a soccer championship—most report that they have! Group identities are powerful and can make us behave in ways that seem otherwise out-of-character. They can even change how we perceive the world around us, changing our interpretations of everything from sporting events to our taste for certain cultural foods (e.g., Xiao, Coppin, & Van Bavel, 2016). It is also fair to say that some of the strongest expressions of emotion stem from group rather than individual identities—even when we are seated in front of a TV thousands of miles away from the game.

#### Rather than selecting similarly talented individuals, extensive evidence suggests that diversity is key to team success.

This same ancient psychology is at play in organizations around the world every day. Humans are hardwired to identify with groups because it was how our ancestors survived. To cultivate a strong group identity in the modern work environment, leaders can promote three things: allow members to satisfy basic psychological needs via the group (e.g., social support and belonging), remove obstacles to cooperation, and reward individual contributions to the group. By balancing individuals’ need to belong with their desire to stand out, a leader can build a sense of

9

“optimal distinctiveness” among group members (Brewer, 1991). This is a powerful combination for building a committed and effective team.

**Satisfy psychological needs via the group**

Organizations have traditionally focused on monetary rewards, but great leaders need to focus on the social needs of their employees (Rock, 2008). Groups can fulfill one or more fundamental human needs, including the need to belong (Leary & Baumeister, 1995), to obtain status and feel positive self-regard (Tajfel & Turner, 1979), to feel distinctive (Brewer, 1991), or to obtain certainty and control (Hogg, 2000). The more these needs are satisfied by the group, the more fulfilled and committed the group members (Prentice, CITE). Leaders seeking to increase members’ group identification need to first consider the basic social needs of their members and then determine how the group might do a better job meeting them. There is no single solution here—wise leaders will need to identify the key needs of their team and help to fulfill those needs.

One thing to consider is that social categories are multifaceted and hierarchical. Organization employees are usually members of smaller divisions composed of departments and project teams. In many cases, the loyalty of employees lies with their department or project team, rather than the whole organization. Indeed, satisfaction of fundamental needs may often orient people toward smaller teams within the organization (e.g., van Knippenberg & van Schie, 2000). Internal divisions can be useful at times: A bit of healthy competition between departments can drive people to work harder. But internal competition can lead people to lose sight of core organizational goals or cultivate conflict or sabotage between departments (Sherif, Harvey, White, Hood, & Sherif, 1961). This challenge requires visionary leadership that outlines the superordinate goals of the organization and explains how all the divisions, departments, and project teams are necessary for achieving these goals (Hogg, Van Knippenberg & Rast, 2012).

One way to connect employees with a company’s superordinate goal is to align them around a commonly shared mission and use it as an anchor for collaboration, community building, and decision-making processes. For example,

Zappos strives to focus people’s efforts around its mission of “delivering happiness” to customers by surprising some customers with free overnight deliveries (PBS, 2017). One example for the way Zappos engages employees with the overall company goal is by crowdsourcing the company’s values, creating “purpose statements” based on them, with the result that, *“You can pick any role anywhere in [Zappos’] purpose hierarchy, and there’s an entire set of purpose statements that all link ultimately back up to the company purpose.”* (PBS, 2017)

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More recently, some organizations have begun to define their mission and purpose even beyond business and financial objectives. By defining a mission, looking to provide benevolent benefits, providing a culture of development and growth for employees, and delivering sustainable business performance, these organizations aim at making a difference for society at large and thereby offer goals that are bigger than the company’s individual silos (Game Changers, n.d.). This helps fulfill the identity goals of employees, providing them with greater meaning and purpose— which increases well-being, effectiveness, and persistence (Schwartz, 2015).

**Remove obstacles to collaboration**

In today’s technology-rich and quickly changing business world, collaboration between teams and individuals is not only expected, but recent neuroscience research suggests that it is inherently rewarding. In one study, cooperation elicited a greater response in the orbitofrontal cortex than competition, which the authors interpreted as indicative of a reward response (Decety, Jackson, Sommerville, Chaminade, & Meltzoff, 2004). Similarly, other studies have found that the ventral striatum—also associated with reward registration—is activated when individuals observe cooperation (Rilling, Gutman, Zeh, Pagnoni, Berns, & Kilts, 2002). We suspect that the act of cooperation might trigger increased identification and thus further cooperation with the group, creating a virtuous feedback loop.

This is precisely why both organizations and their leaders should think of creating ways to allow individuals to cooperate rather than simply pitting them against one another. Leading by example from the top ranks can send a strong message

10

about collaboration throughout the organization: IBM’s study with 1,600 CEOs in 64 countries concludes that the ability to collaborate with colleagues is one of the top three most important leadership traits (Levin, 2017).

Rewarding though it may be, cooperation also tends to be parochial—meaning that we readily cooperate with fellow in-group members while withholding cooperation from the members of other groups (De Drue, Balliet, & Halevy, 2004). Within the group, this is great news, but the support we lend to in-group members is rarely extended to the out-group (e.g., Choi & Bowles, 2007; Tajfel & Turner, 1979; Valdesolo & DeSteno, 2007). Countless studies have found that people give more resources to the in-group even when doing so offers no material benefit for themselves and when there is no competitive need to give less to the out-group. If the competition is fierce, people show decreased empathy when witnessing out-group members in physical and emotional pain (see Cikara, Bruneau, Van Bavel, & Saxe, 2014). In one neuroimaging study, Boston Red Sox and New York Yankees fans—arch-rival baseball teams—reported pleasure and exhibited activity in the ventral striatum when watching their rivals fail (Cikara et al., 2011). Similarly, soccer fans exhibited activity in the ventral striatum (which is associated with a reward experience) when watching a rival team’s fan receive a painful electric shock (Hein, Silani, Preuschoff, Batson, & Singer, 2010). These results suggest that in a very deep way, people may even enjoy watching an out-group suffer.

Effective leaders in organizations will consider how to remove obstacles to cooperation in order to create stronger group identity among team members. Increased cooperation not only strengthens team cohesion, engagement, and effort toward the achievement of group goals, but it elicits empathy and support for in-group members (Cikara et al., 2014). Leaders can create time and opportunity needed for team members to discuss, discover, and build creative collaboration. They can also promote practices that will highlight collaboration instead of competition, such as focusing on group goals, rewarding group success, and cultivating a common purpose.

Other strategies that organizations can consider to encourage cooperation among employees include creating more matrixed team environments to bring a variety of people together on projects or rendering traditional talent processes more collaborative by asking managers to discuss goals, performance expectations, and developmental opportunities *with,* instead of for, employees (Gallup, 2017). Lastly, as physical meetings are declining and people increasingly work and collaborate virtually, organizations are encouraged to consider tools and technologies that render collaboration and teamwork “easy” and user-friendly; for example, by investing in collaboration technology platforms and real- time collaboration tools (Agarwhal et al, 2018; Mercer, 2018).

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**Create optimal distinctiveness**

Human beings have competing desires—to be distinct from others and to belong. Research suggests that people seek a level of optimal distinctiveness in groups—in which they simultaneously feel immersed in a collective (something larger than themselves) but retain a degree of individuality (Brewer, 1991). Consider Apple’s “Think Different” campaign—it aimed to create a brand in which millions of people could feel special because they were part of a group associated with thinking differently. Groups that provide a sense of belonging and distinctiveness are especially appealing to people. Even very large groups can accomplish this goal by clearly defining boundaries, building distinct identities around their past and future, and creating opportunities for members to make unique contributions to the success of the group.

Team leaders can promote optimal distinctiveness—and strengthen group identity— by highlighting things such as team characteristics or achievements that set members apart from others but illustrate team cohesion at the same time. For example, a leader might bring attention to the fact that the team surpassed the performance goals of other teams (distinctive) and point out how each team member critically contributed to the achievement of the overall team goal (belonging). Striking this balance is a powerful way to unleash the power of groups and it costs almost nothing.

11

Running an organization filled with highly identified employees—people who place organizational interests ahead of their own and make sacrifices on behalf of the organization— is a desirable state for many leaders. Moreover, group identity can stimulate a clear—and shared—understanding of “how we do things around here.” Importantly, the upsides of strong identification with a cohesive group are not one- directional: Members also tend to benefit by experiencing a positive self-image and improved psychological health. Indeed, recent research suggests that identifying with strong groups can have a major positive impact on physical health outcomes as well (e.g., Haslam, Jetten, Postmes & Haslam, 2009; Jetten, Haslam & Haslam, 2012). Thus, cultivating a strong group identity among employees is a powerful tool for achieving organizational success.

Behave as a team

Group cohesion is a great strength for organizations—allowing unified, effective collective action. Group cohesion, however, can sometimes also be a weakness—suppressing independent thought and dissent and thus, reducing innovation and adaptability. Building an optimal team structure and fostering a strong group identity are only parts of the equation: Creating effective teams also involves getting individuals to behave as a team. This can be accomplished by encouraging the team to (1) pursue group *goals* rather than group *norms*, (2) evaluate events and decisions with respect to “us” rather than “me,” and (3) reward individual contribution to *group success*. Leaders who employ these strategies are more likely to unleash the power of their teams.

**Pursue group goals rather than group norms**

How can leaders capitalize on the benefits of group cohesion while avoiding its drawbacks? Our research suggests that there is no inherent incompatibility between a member identifying with a group and questioning what the group is doing (Packer, 2008). Very often, highly identified group members look to other members and group norms to help them figure out how to behave and what is appropriate, which can lead to unthinking conformity. However, if their attention is drawn to how group norms are suboptimal to the group,

they are very often willing to speak out against them in an effort to change the group (Packer & Chasteen, 2010). Thus, constructive dissent needs to be explicitly valued in the organization to avoid groupthink and bad decision-making.

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The key is to direct attention in the right way. We believe that leaders should encourage their employees to pursue organizational *goals* rather than simply follow organizational *norms* (Packer & Miners, 2014). This means that leaders must work hard to create a shared sense of what the organizational goals are. Norms are generally easy to perceive and follow. Unless they are made explicit, however, goals are harder to perceive and making them clear and consensual is thus a critical leadership task. When organizational norms (how we are behaving) and organizational goals (what we ultimately want or need to achieve) conflict, this shared understanding gives identified members the ability and the courage to speak up.

Goal setting beyond individual performance expectations can also enable cooperation. For example, Google defines goals or objectives and key results (OKR) at several levels: personal OKR are what individuals are working on; team OKRs set priorities for the team rather than just collect individual OKRs; and company OKRs establish top goals for the company (Niven et al, 2016). Additionally, goals are openly noted in the internal company directory, which increases synergistic objectives and collaboration (Schneider, 2018).

Effective team leaders will discourage conformity and groupthink and instead encourage team members to voice concerns, counterarguments, and alternative points of view. Leaders can normalize this kind of constructive dissent by discussing these kinds of research findings with the team.

The classic idea of a designated contrarian is an example of one such approach to ensure groupthink does not dominate the discussion. Indeed, teams in which one team member subtly presents opposing views outperform others in a study by Stanford University as the presence of a so-called “devil’s advocate” helps process information more deeply, consider various angles of a problem, and explore new solutions (Brooks, 2015). However, authentic contrarians

12

who genuinely share the values of the group are far more effective (Nemeth, Brown, & Rogers, 2001). Because of the inherent negativity involved in dissent, it is often the people who are the most committed to the team who are willing to speak up and ensure that the team is performing at its best.

**Evaluate based on “us” rather than “me”**

People are highly sensitive to the reward contingencies in their environment. It is not enough to simply rely on slogans like, “There’s no I in team.” If all the reward contingencies in the organization (performance reviews, pay raises) are focused on individual-level activities, the team will be motivationally less important. In these organizations people will likely respond to the real rewards and ignore the goals of the group (see Packer & Van Bavel, 2015). Leaders need to set up a reward structure to reinforce the goals of the organization and the team, rather than selfishness.

Effective team leaders will find ways to provide at least *some* rewards—bonuses, recognition, raises, more flexibility, development opportunities, etc.— that are based on the *entire team’s* performance. To avoid free-riding, individual rewards can, of course, also be given to individuals who make significant contributions to the team’s success. This rewards indispensable team members—the types of group members who step up when work needs to get done, cover for colleagues, and enhance the success of the group. This promotes stronger group identity and cohesion, but it also reinforces the notion that individuals should behave as a team. When rewards for everyone are contingent on the whole team performing at its best, then individual members are encouraged and motivated (not only monetarily, but also socially) to pursue the team’s goals and help the team succeed.

**Reward individual contribution to group success**

In 1968, the Ohio State Buckeyes started one of the most cherished traditions in American College Football. According to lore, the team was on the cusp of a championship when a member of the training staff conceived of a strategy to help motivate the players. After each game, the coaching staff awarded players small stickers resembling buckeye leaves to place on their helmets. The

coaching staff reasoned that rewarding stellar individual performances would provide the right incentive to excel. However, by 2001, the once dominant team had fallen into disarray. A new coach, Jim Tressel, completely revamped the criteria for earning a buckeye, favoring teamwork over individual performance. Instead of rewarding a player for scoring a touchdown, the coach gave every player on the team a sticker after each win or every member of the offensive unit a sticker if they scored over 24 points. This team-based reward system paid off almost immediately, and the team won a national championship the following year.

The focus on rewarding individuals for performance is the dominant compensation strategy in most organizations, from sports teams to companies to universities. As we write this, the majority of Fortune 500 companies reward the most productive individuals, not the most effective groups or important group members. We believe most organizations are ignoring the potential power of groups at their peril. If organizations reward selfish behavior, it is not surprising to end up with an organization where employees elbow one another for a chance to grab a raise or promotion. If outcomes are at the group level, however, people are more apt to identify with the organization and to pursue collective goals (Packer & Van Bavel, 2015). In these groups, people are more likely to make self-sacrifices for the success of the group. The fact that most reward systems are targeted at individuals suggests that leaders are missing opportunities to promote the goals of their organization and that they are ignoring a critically important component of team leadership.

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Conclusion

The bottom line is that leaders can benefit enormously by understanding the group psychology that evolved in the human species over eons. The ease with which people categorize the social world into groups speaks to the tribal nature of the human brain and provides a powerful potential toolbox for leaders to create effective teams. In our own lab, we have observed changes in brain function within minutes of assigning people to a group. This suggests that leaders have substantial power to configure and reconfigure work teams to tackle novel challenges and problems. The human mind is receptive to joining new groups and is able to quickly recategorize the social world as new groups become relevant (Turner et al., 1994). Our ingrained tendencies to identify with the groups to which we belong provide the foundations for cooperation and coordination with others. Thus, great leaders must become *entrepreneurs of team identity* (Haslam, Reicher & Platow, 2011). By understanding the tribal dynamics of the human brain, leaders can foster more productive, collaborative, and healthy organizations.

13

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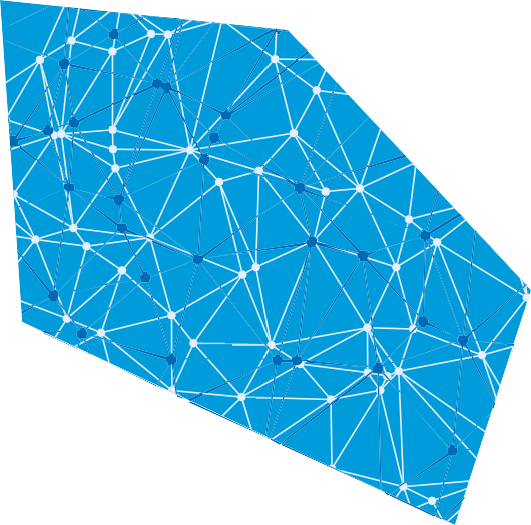
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15



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Managing Threat Response in the Workplace

Reduce the impact of threat responses on our perceptions, decisions, and behavior.

by Kamila Sip Ryan Curl Viktoriya Babenko David Rock

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We are very sensitive to potential threats in our environment, and for good reason. Our ability to detect threats and respond quickly and efficiently increases our chance of surviving dangerous situations. In the workplace, while physical threats are rare, social threats are common. Unfortunately, our threat detection system doesn’t discriminate between social and physical threats, often resulting in a maladaptive physiological and behavioral response to social threats.

In the workplace, these maladaptive responses can impact our emotional and physical well-being and inhibit our ability to be productive and innovative. That’s why it’s important to understand the threat response, learn how to regulate our emotions, and implement preemptive measures to counteract and prevent detrimental responses.

In this paper, we explain the neuroscience, physiology, and behavior of the threat response and provide tools to help mitigate and prevent detrimental threat responses in the workplace. We give advice on how to determine the severity of threat responses and engage in mitigation strategies, including emotion labeling and reappraisal, as well as the benefits of using a shared language to discuss and defuse socially threatening situations.

Managing Threat Response in the Workplace

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Reduce the impact of threat responses on our perceptions, decisions, and behavior.

**by Kamila Sip, Ph.D. Ryan Curl, Ph.D. Viktoriya Babenko, Ph.D. and Dr. David Rock**

**Key takeaways:**

1. In times of heightened uncertainty and emotions, our responses and reactions are often derailed by swift threat responses.
2. Threat responses, while needed for our survival, may detrimentally shape our perceptions, choices, and work performance.
3. The levels of threat response can be managed using a shared language to optimize performance and improve engagement.
4. The first step toward managing your own threat response is learning to identify your threat response level so you can implement the appropriate strategy.
5. Managing threat responses can also be collaborative. Utilizing a shared language together can help manage tension across your workforce, from one-on-one interactions to teams

and organizations.

4

Introduction:

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We are wired to scan for threats

Imagine you are taking a jog down your favorite nature trail. You feel good, taking in the sights while exercising, when something ahead catches your attention. You

feel a jolt in your belly, and your body tenses up — your alertness skyrockets. You can’t quite tell what it is, but it appears to be slender and long, sticking out of some bushes on the side of the trail, and you think, “It’s moving!



It’s alive! It’s a snake.” This thought sends your mind reeling, and your jog comes to a screeching halt. All of this took a split second. Quickly, you veer to the other side of the trail as you approach the object. Your heart is racing, and you are less sure of yourself as you get closer. But the image becomes more apparent as you approach: It’s the branch of a bush blowing in the breeze. Just as you feel a sense of relief and begin jogging again, you realize you aren’t running on the trail anymore, and your foot hits a root, causing you to fall hard to the ground.

Now, imagine you are a team manager in your organization and are about to present some exciting data to the board of directors and CFO, with whom you have had rocky interactions. Before you open your mouth, the CFO asks what you thought about a negative newspaper article on your company that was published the day before. Instantly, you feel a robust reaction: Your face flushes, your heart rate increases, and your throat feels dry. You tell the CFO you haven’t read the article yet and offer to continue with your presentation. But as you begin, your thoughts become jumbled, and you start stuttering. You are still thinking of what the article might have said, which derails your entire presentation.

Most of us can relate to experiencing a version of these situations. The jolt in the stomach and the rushing or freezing mind don’t only kick in when we mistake a branch for a snake. This “better safe than sorry” reaction has one goal: survival. Our brain processes information in a split second and triggers a cascade of physiological responses (i.e., fight, flight, or freeze) to keep us alive, even when what we experience may not threaten our lives ([Mobbs et al., 2015](https://doi.org/10.3389/fnins.2015.00055)). While our threat response is fast, efficient, and necessary, it can also lead to errors in judgment. The response to a possible snake would be justified, but it’s hard to

5

say a stress-inducing email poses a real threat to our survival. Yet, it often is processed by the brain with a similar intensity as if it were a snake.

In our modern world, especially in the workplace, such an immediate threat response can be counterproductive. Only later, when we have time to assess the situation rationally, can we make sense of what happened. But why is that?

Why we react before fully processing

The split-second reaction to a real or perceived physical threat is rarely distinguishable for us in the moment. We might have that same reaction when asked a question that we are not prepared to answer or after receiving an email that portrays a bleak future for our organization.

#### Our brains assess potential threats to keep us alive.

These fast, intuitive responses to different contexts are coded intothe old software we came equipped with for a good reason: They helped us survive ([Mobbs et al.,](https://doi.org/10.3389/fnins.2015.00055) [2015](https://doi.org/10.3389/fnins.2015.00055)). The challenge, nowadays, is that the software does not undergo sufficient updates to override the hidden code and triggers intense physiological and emotional reactions to social situations as if they were physical dangers.

We are wired to survive

We encounter various events throughout our lives, some of which may have negative aspects. Our brains tend to generalize a threat response to similar situations or stimuli associated with these events. This generalization can result in perceiving similar events as threatening, even when they might not be ([Dunsmoor](http://dx.doi.org/10.1101/lm.2016411) [et al., 2011](http://dx.doi.org/10.1101/lm.2016411)). It is no coincidence that there is an uncanny resemblance between your physiological and psychological responses to something you took to be a snake and your responses when the senior leader asked you about the newspaper article. Even though real physical threats are relatively rare in our modern world, our brains evolved under conditions when physical threats were plentiful, and even minor injuries (by today’s standards) could be life-threatening.

#### In the modern world, especially the corporate world, we rarely face physical threats. Yet, the same neural system processes all threats,

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*whether they are real, perceived, physical, or social.*

Since the brain’s primary goal is to keep us alive, it constantly scans the environment for potential threats. When it does register a possible danger, either real or perceived, it responds fast with a rapid shift in our attention to the source ([Blanchard et al., 2011](https://www.sciencedirect.com/science/article/abs/pii/S0149763410001806)). While this is a highly evolved process that is essential to our survival, it often goes awry. Overestimating the severity of a threat, or failing to mitigate a counterproductive response, can negatively affect executive functioning, such as cooperation, critical thinking, creativity, and emotion regulation ([Arnsten, 2009](https://doi.org/10.1038/nrn2648); [Schmader et al.,](https://doi.org/10.1037/0033-295X.115.2.336) [2008](https://doi.org/10.1037/0033-295X.115.2.336); [Vogel & Schwabe, 2016](https://doi.org/10.1038/npjscilearn.2016.11)).

What is the biology behind our response?

The evolutionary origin of the threat response can be examined by studying animals. Animals’ threat responses, both physiological and behavioral, are contingent on the perception of the severity and imminence of the threat ([van Wingen et al., 2011](https://doi.org/10.1038/mp.2010.132)). For example, threat assessments in prey animals are based on the predator’s directionality, lethality, velocity, and previous experiences the animal has had with the predator ([Stankowich & Blumstein,](https://doi.org/10.1098/rspb.2005.3251)  [2005](https://doi.org/10.1098/rspb.2005.3251)). Similarly, humans assess physical and, by default, social threats in this way ([Mobbs, 2018](https://doi.org/10.1016/j.cobeha.2018.02.008)) because we only have one neurological system to

process threats, regardless of their source. Assuming you unconsciously view having to give a presentation as a threat, you could consider, for example, the presence of a board member who asks tough

6

questions as an indicator of the threat’s severity and the schedule for your presentation as an indicator of the threat’s imminence. You might feel less

threatened if you find out the board member will not be attending the meeting or that the presentation is months away.

Our brains constantly scan our environment for potential threats to launch an adaptive response, which we often have little control over. There

is a reason for this: These “behind-the-scenes” neurological processes trigger a response before we can consciously process what is happening to us (e.g., our eyes see a potential snake before we become consciously aware of the fact) (Mobbs et al., 2015). In many ways, our threat response

is contingent on our conscious or unconscious perception of the threat. Once we detect a possible threat, in addition to changes in our brain’s locus of activity, our heart rate increases, we begin breathing more rapidly, our digestion decreases, and our liver releases glucose for energy. These responses all have one goal: to allow us to react quickly to avoid danger. Yet, they come at a cost because they impact how we interact with others, how we process the flow

of information, and what decisions we make under pressure.

When we assess a potential threat, we rapidly proceed through three steps:

We identify the presence of the threat, determine its severity,

**1**

**2**

and decide how imminent it is.

**3**

This is important because we respond differently depending on these factors. The threat assessment system dictates which behavioral response to initiate: freezing or fight-or-flight responses. Different situations have been shown to elicit specific responses to a threat, and it is clear that neural processes dictate these responses ([Blanchard et al., 2001](https://doi.org/10.1016/S0149-7634(01)00009-4)).

The neurological responses associated with processing threats are complex. While many areas in the brain are activated, certain situations and behavioral responses are associated with more or less activity in specific regions of the brain: the prefrontal cortex (PFC) and the set of areas commonly known as the limbic system ([Herman et al., 2005](https://doi.org/10.1016/j.pnpbp.2005.08.006); [McEwen &](https://doi.org/10.1016/j.neuron.2013.06.028) [Morrison, 2013](https://doi.org/10.1016/j.neuron.2013.06.028)). The PFC is responsible for our more sophisticated and complex cognitive abilities. In the

context of a threat response, the PFC is particularly beneficial when assessing whether a threat is present and weighs complex options regarding how we might deal with the threat.

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The limbic system is responsible for, among other things, memory, emotions, and the connection between the two ([Starcke & Brand, 2012](https://doi.org/10.1016/j.neubiorev.2012.02.003)). In terms of threat assessment, it rapidly compares our current situation to ones from our past to gauge whether we are facing a threat, the severity of the threat, how we respondedto similar situations in the past, andthe result of those responses. However, our threat response is not a zero-sum response. Instead, different behavioral and neural responses correspond with the intensity of our perception of the threat. In fact, researchers have identified three levels of the threat response that have neural, physiological, and psychological signatures ([Mobbs et al., 2007](http://dx.doi.org/10.1126/science.1144298); [Mobbs et al., 2010](https://doi.org/10.1073/pnas.1009076107)).

Three levels of threat response

One study explained the levels by having participants navigateavirtualmazewhilebeingchasedbyapredator. When the predator “caught” the participants, they received an electric shock. The researchers discovered that as the predator approached the participants in the virtual maze, the increase in threat imminence was associated with distinct neurobiological activity patterns in functional magnetic resonance imaging (fMRI) scans of the participants’ brains ([Mobbs et al.,](http://dx.doi.org/10.1126/science.1144298) [2007](http://dx.doi.org/10.1126/science.1144298)). These findings were reaffirmed by another study in a real-world threat encounter scenario. The researchers showed these same distinct neural patterns were found when a tarantula approached participants. As the tarantula got closer and the threat became more imminent, the neural patterns changed in ways that represented an increase in threat level. The neural pathways responsible for our ability to detect and respond to potential threats is complex but can be summarized by a progressive shift of activity from the PFC to the periaqueductal gray (PAG) as our perceived level of threat increases ([Mobbs et al., 2010](https://doi.org/10.1073/pnas.1009076107)). The PAG is most active when experiencing a high level of threat because it is the main contributor to our ability to elicit the most extreme reactions to threat (e.g., fight or flight) ([McNaughton & Corr, 2004](https://www.sciencedirect.com/science/article/pii/S0149763404000326?casa_token=CYSaDMPy5UUAAAAA%3A7u23kgC3gFBCS6e71vuCWvmQno-ZSytN3nD6tnwSRA-SyqGDZUMmZ39yz4hWC27kpyCjzi_PXPzQ); [Mobbs et al.,](https://www.science.org/doi/10.1126/science.1144298) [2007](https://www.science.org/doi/10.1126/science.1144298)).

7

While there aren’t clear boundaries between levels of a threat response, there are behavioral and biological changes that can be grouped into increasingly extreme threat responses ([Mobbs et al., 2015](https://www.frontiersin.org/articles/10.3389/fnins.2015.00055/full#F3)).

**1**

**Level 1 Threat: Alert but not alarmed**

At Level 1, we notice danger but it does not impact us immediately. We become more alert but we are still in control of our emotions and ability to be deliberate in our responses. This is the level of threat we want to maintain for productivity and during times of conflict.

**2**

**Level 2 Threat: Somewhat Alarmed**

At Level 2, as we begin to feel alarmed, the body prepares for a fight-or-flight response. Perception and cognition are impaired and we become more likely to react out of emotion rather than reason.

**3**

**Level 3 Threat: Highly Alarmed**

Level 3 is survival mode. We are now very alarmed, and the body is recruiting all its resources to fight or flee. At this level, it is nearly impossible to control our emotions and make thoughtful decisions.

 ***Level 1 – Alert, not alarmed***

This levelofthreatresponse shares commonalities with an optimal level of arousal and is indicative of being alert but not alarmed. You are alert enough to notice potential risks, but they do not immediately impact you. For instance, imagine having an approaching deadline that motivates you to work efficiently without feeling overly stressed. Your PFC would be highly functional at this level of threat response, allowing you to strategically navigate your environment.

This is the optimal response level during times of emotional and psychological pressure, and it helps sharpen your focus and attention without taxing your system with a physiological response. A Level 1 threat is akin to what we call the “sweet spot” for learning and cognitive performance. The right balance of tension and heightened attention allows our brain to process information with more salience.

We have evolved various mechanisms that help keep us at a Level 1 threat state, avoid potential threats, or optimally respond when we encounter one. The first of these tools allows us to predict possible threats. This mechanism is highly developed in humans ([Corballis, 2013](https://www.frontiersin.org/articles/10.3389/fpsyg.2013.00485/full)) and allows us to envision future scenarios and modify our behavior to prepare for or avoid potential threats ([Suddendorf & Corballis,](https://www.cambridge.org/core/journals/behavioral-and-brain-sciences/article/abs/evolution-of-foresight-what-is-mental-time-travel-and-is-it-unique-to-humans/85E9D236BCAE38AF71442FA31E4F2E3B) [2007](https://www.cambridge.org/core/journals/behavioral-and-brain-sciences/article/abs/evolution-of-foresight-what-is-mental-time-travel-and-is-it-unique-to-humans/85E9D236BCAE38AF71442FA31E4F2E3B)). Our ability to do this stems partly from the neural connectivity between the medial PFC and the fusiform gyrus (responsible for object and facial recognition). Researchers have shown that the connection between these brain areas is responsible

for matching what we anticipated to what we are currently observing ([Summerfield & Koechlin, 2008](https://www.sciencedirect.com/science/article/pii/S089662730800456X)). This suggests that the brain makes predictions about what we are likely to encounter, allowing us to make faster and more accurate decisions about potential dangers ([Mobbs et al., 2015](https://www.frontiersin.org/articles/10.3389/fnins.2015.00055/full#F3)).

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The next mechanism involves changing our environment to avoid future threats. This includes both building physical structures to prevent threats ([Odling-Smee et al., 2003](https://www.degruyter.com/document/doi/10.1515/9781400847266/html?lang=en)) and forming social groups to work cooperatively to stave off threats ([Hamilton, 1971](https://www.sciencedirect.com/science/article/pii/0022519371901895)).

While these mechanisms have been elucidated through research on how humans and other animals avoid and prepare for physical threats, they also play a role in how we manage social threats. For instance, recall the scenario where your CFO mentions the negative newspaper article and asks you about it during your presentation. Now, imagine you had a similar experience a while back that you can relate to the current situation — one that seemed insurmountable at the time but, upon reflection, had no adverse results. Based on that experience, you can swiftly prevent the slight rush of adrenaline from derailing you because you know you can “survive” the questions and manage the aftermath. This allows you to avoid an overwhelming physiological response and instead use the slight boost of adrenaline to focus your mind as you prepare your response — keeping yourself from escalating above a Level 1 threat state.

 ***Level 2 – Highly alert and somewhat alarmed***

At this level, you become hyperalert, feeling alarmed and distracted, which shifts the balance of your cognitive resources. Your PFC is less active, and your limbic system becomes more active as you process potential behavioral responses. This causes your perception and cognition to be temporarily impaired, and you are more likely to react emotionally than rationally.

The shift in our cognitive resources is designed to help us prepare for flight, fight, or freeze, but it is otherwise maladaptive when we would greatly benefit from doubling down on logical thinking.

8

This level of threat response can be harmful to collaboration, problem-solving, and creativity because our attention is preoccupied with managing our stress and anxiety instead of the high-stakes talk we are giving to the board.

In this scenario, a Level 2 threat could be induced even if you predicted you’d be asked difficult questions. Questions about your presentation won’t entirely catch you off guard, but you were not prepared for a novel context (the negative newspaper article) to arise. You may be able to construct a reasonable response in a Level 1 threat state, but once you progress to Level 2, you may no longer have the optimal level of PFC activity necessary to do so. Your thoughts may become scrambled, and you may struggle to compose yourself and provide thoughtful responses. Afterward, when your threat level diminishes, you may construct better responses that you wish you could’ve come up with in the moment.

 ***Level 3 – Highly alert and highly alarmed***

This level of threat response often throws us straight into panic mode, causing our reactions and decisions to reflexively divorce from deeper considerations. We experience a temporary yet severe cognitive impairment. Fear and distress overwhelm us, and the PFC’s optimal function is secondary to survival needs. When our brain triggers fast reactions in response to threats, it inadvertently suppresses the optimal engagement of the PFC — otherwise responsible for deliberate, reflective thought and action.

Driven by the limbic system, high alertness will divert resources to fuel a physical response that allows us to get out of a dangerous situation. In other words, we are actively recruiting every bodily resource to fight, flee, or freeze. That is why it becomes nearly impossible to keep our emotions in check and make thoughtful, controlled decisions when experiencing a Level 3 threat.

More specifically, when we believe we are in close proximity to a potential threat, we cease all other behaviors to direct our cognitive resources toward scanning our environment to identify the source of the potential threat ([Blanchard et al., 2011](https://www.sciencedirect.com/science/article/pii/S0149763410001806)). We also heighten our awareness of potential danger posed by other humans or predators in our environment. This involves increased activity in the amygdala and parietal cortex when, for example, perceiving people

with angry facial expressions ([Mohanty et al., 2009](https://www.jneurosci.org/content/29/34/10563.short)). High levels of anxiety have been shown to bias our attention toward potentially threatening stimuli, increasing amygdala activity when experiencing threats ([Bishop et al., 2004](https://www.jneurosci.org/content/24/46/10364.short)).

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Finally, when we don’t have the chance to prepare for a threat before encountering it, we react rapidly to extract rudimentary information about the threat. This involves various cortical regions, including the inferior parietal cortex, which is known to be critical to our ability to quickly direct attention toward novel stimuli in our environment ([Gottlieb & Balan, 2010](https://www.sciencedirect.com/science/article/pii/S1364661310000483?casa_token=ncCmxiLCW9gAAAAA%3AatFO9mq885GS4eDoDIAXde9UTsrIHflvbwGWOf7NQTIDN_njoD9URXJT6ndC1EJkyHv9Rykxe02r)).

In this scenario, you’re giving the presentation to the board with no prior awareness of the article, and you’re completely caught off guard when your CFO brings up the topic. Your threat detection system results in hyper-focusing on facial expressions, where even the slightest sign of negativity triggers ever-increasing fear and anxiety. Your PFC activity is subdued, making it impossible for you to construct a coherent response. You feel a powerful urge to flee from the situation. You claim to need to use the bathroom as you rush out of the room.

This scenario may seem far-fetched to some, but it represents the reality that we only have one threat detection system, which is often maladaptive when faced with social threats. The key is to recognize each level of threat, distinguish them from each other, and regain control if and when you get to these threat states.

How threat response management is useful, and why it matters

**!**

Fast reactions to potential dangers serve us well when our life is threatened by physical forces; however, they also lead us to rely on habits, cognitive biases, and assumptions rather than facts and data when our PFC isn’t functioning optimally ([McEwen &](https://doi.org/10.1016/j.neuron.2013.06.028) [Morrison, 2013](https://doi.org/10.1016/j.neuron.2013.06.028); [Vogel & Schwabe, 2016](https://doi.org/10.1038/npjscilearn.2016.11)). Instead of letting a question about the newspaper article derail your presentation to the board of directors, you can proactively mitigate the impact of a threat response. In this instance, maintaining the ability to think critically may have allowed you to realize you could counteract the newspaper article during your presentation with data showing the company is doing well financially.

9

#### Staying calm under pressure will help manage the impact of a threat response on our behavior.

Therefore, it is critical to understand just how unhelpful the physiological threat response can be when faced with a social threat and what to do instead across all three levels of the threat response.

Managing Level 1:

Reframe and reappraise

When we experience a Level 1 threat, we can often respond thoughtfully and constructively. One helpful method for addressing a Level 1 social threat response is to reappraise the threat itself ([Ochsner, 2008](https://membership.neuroleadership.com/material/staying-cool-under-pressure-insights-from-social-cognitive-neuroscience-and-their-implications-for-self-and-society-vol-1/); [Buhle](https://academic.oup.com/cercor/article/24/11/2981/301871) [et al., 2014](https://academic.oup.com/cercor/article/24/11/2981/301871)). As discussed above, a Level 1 threat is the optimal state of arousal. However, our experiences are dynamic: If we aren’t cognizant of our emotional responses and proactive in how we address them, a relatively mundane situation can devolve into an increasingly threatening experience.

Reappraisal refers to actively changing the meaning of a situation that could elicit an emotional reaction ([Gross, 2015](http://tandfonline.com/doi/pdf/10.1080/1047840X.2014.940781?casa_token=ZegDlQZY2m4AAAAA%3ALuPf3Pmly0L5oJrMDmCIilOu8SogtqO_9gJC4dZSO47nmRTZaC_UVJLyxpomGqx6w-9dfYkGbf7Wc6c)). Simply changing the narrative of the social threat you are experiencing can prevent an escalation of threat. Reinterpreting a situation in a way that decreases your emotional response has been shown to increase PFC function and reduce the response of the amygdala toward negative stimuli. For instance, we can use a similar example that [Dr. Brene Brown](https://brenebrown.com/book/rising-strong/) describes, examining how one seemingly small negative interaction can turn into a moderate threat response and how reappraisal could be used to prevent this escalation. Imagine, after your presentation to the board, you casually approach your co-worker to ask how his weekend was. The co- worker, with whom you are usually on friendly terms, looks at you and rolls his eyes as he walks away.

You instantly worry that you must have said or done something that upset him. You spend the rest of the day ruminating on every interaction you had with him over the past week, and your confusion and fear gradually shift into irritation. While this situation may be perceived as a minor social threat, it can quickly

escalate into interrupting your productivity and mood for the entire day as you ruminate on the possible reasons your co-worker might be upset with you. While this is a reasonable interpretation, it is entirely likely that, instead, your co-worker had a terrible weekend and got very little sleep. His irritation at your cheerful mention of the weekend has nothing to do with you or your actions.

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It is difficult for us to know the cause of somebody else’s mood. It’s not always possible to communicate with the co-worker to immediately resolve the confusion. In those times, it is beneficial to reframe the situation in our minds and recognize that there could be alternative reasons for the co-worker’s behavior outside of our influence.

Reappraising the encounter this way not only helps you process the situation, but it can also fine-tune your coping strategies to better perceive threats (or the lack thereof) in the future. For instance, surmising that you have upset your co-worker may result in feeling threatened next time you encounter him. This can lead to a particularly counterproductive set of behaviors, distancing yourself from a colleague when it’s unwarranted and harming your workplace relationship.

While it’s true that some people are better at reappraising than others, you can improve your ability to reappraise ([Denny & Ochsner, 2014](https://psycnet.apa.org/doiLanding?doi=10.1037%2Fa0035276)). One way is to consider the short-term nature of the stressful situation ([Ochsner & Gross, 2008](https://journals.sagepub.com/doi/full/10.1111/j.1467-8721.2008.00566.x?casa_token=wMepgCOJFbUAAAAA%3AoXuk43k7wgx0p7gDqzipoQTd7pB_JBa6HCry9n-5SanJY6VAc_u2U52NNcavcl3vtWYR19h-yo2FoBY); [Ochsner et al.,](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4133790/) [2012](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4133790/)). For instance, you could focus your attention on the fact that while you don’t know the content of the article mentioned by your CFO, you will soon, and you’re likely not the only one in the boardroom who hasn’t seen it. Also, you can practice focusing on a detail of the situation: Why did the CFO choose to bring the article up with you? Probably because they highly value your opinion. Ultimately, you get better at reappraisal with practice, which starts with the belief that you can do it and that, over time, you’ll see improvements.

Managing Level 2:

Regulate your emotions to rebalance your response

Certain emotional situations have been shown to be better candidates for reappraisal than others. For example, when the emotional intensity of the situation

10

is particularly high, people tend to prefer other strategies, such as focusing their attention elsewhere ([Sheppes et al., 2011](https://journals.sagepub.com/doi/full/10.1177/0956797611418350?casa_token=VZLjppmKvUoAAAAA%3A8E6e6CCsNn2pJAwPJXiAlPKyQ50FrDZWv_OKZk4EZA66jpeNaem2y3CVgce3gcyLm9uVlvrNwLZL9-Y); [Sheppes et al., 2014](https://psycnet.apa.org/doiLanding?doi=10.1037%2Fa0030831)). In fact, the efficacy of reappraisal has been shown to decrease with emotional intensity ([Sheppes et al., 2009](https://www.sciencedirect.com/science/article/pii/S0167876008007162?casa_token=AnXTDBJRTkgAAAAA%3AmSi7A3EAfuOZE13dfc0BZYlUSyJpz0yRlrUK3-8XpY4GcGKdFlNURRfDI5yxqnkTXIHoSUthiTPA)). Said another way, if you’re already in a high threat state, you may not have the ability to reappraise the situation.

This could be because when you are in a Level 2 threat state, you are feeling your emotions too strongly to be able to muster the cognitive effort required for reappraisal. In this case, one simple step to tame a Level 2 response is to label your emotions. Labeling emotions, a well-studied strategy that involves putting feelings into words, can help mitigate our fear response by activating regions of the PFC in charge of self-control while decreasing the amygdala’s response ([Lieberman, 2009](https://membership.neuroleadership.com/material/the-brains-braking-system-and-how-to-use-your-words-to-tap-into-it-vol-2/)). In one study, subjects with a fear of spiders were divided into four groups and asked to get closer and closer to a container with a live tarantula (they could touch the container if they were comfortable) ([Kircanski et al., 2012](https://doi.org/10.1177/0956797612443830)). The first group was asked to say something that described their emotions as they approached the container (for example, “I am frightened by this ugly, terrifying spider”). The second group was instructed to say something that downplayed their fear (for example, “I am not afraid of the spider”). The third group was asked to say something irrelevant about the spider, while the fourth group was told to say nothing. When the researchers retested the subjects again after a week, they found the first group managed to get closer to the container than the other three groups. In other words, by labeling and thus acknowledging their emotions honestly, the subjects from the first group reduced their fear of spiders and tackled the situation more effectively. When experiencing a Level 2 threat in social contexts, this strategy can be effective. So, to tame your threat response, label your emotions.

Research suggests that in some cases, labeling emotional aspects of the situation may be more beneficial than labeling your own emotional experience ([Fitzpatrick et al., 2019](https://www.sciencedirect.com/science/article/pii/S0005796719301330?casa_token=EitCuGo0foQAAAAA%3ASH944yc3VJun1b5Y1xgIO8Rh7FDZtKHXuy5Pv-OAIeMApREl0NtDAh4BKS73XRkUlOjSQKAPVr3S); [McRae et al.,](https://direct.mit.edu/jocn/article/22/2/248/4804/The-Neural-Bases-of-Distraction-and-Reappraisal) [2010](https://direct.mit.edu/jocn/article/22/2/248/4804/The-Neural-Bases-of-Distraction-and-Reappraisal); [Ortner, 2015](https://link.springer.com/article/10.1007/s11031-015-9473-2)). For example, if you’re afraid of approaching a spider, you could say, “This situation is scary,” instead of, “I’m scared.” This could be because labeling external aspects allows one to distance themselves from the situation, diminishing the emotional response ([Ortner, 2015](https://link.springer.com/article/10.1007/s11031-015-9473-2)).

When emotions run high, managers ought to intentionally interact with their employees in a way that reduces threat responses. By understanding the impact a threat response has on cognition and behavior, managers can preemptively offset the threat to decrease the chance of further escalation. You can manage your stress and others’ by communicating in a way that lowers everyone’s reactivity. Specifically, you can implement a shared language to discuss the most common stressors, making it easier for your team to discuss and address tensions more productively across various workplace interactions, including career conversations, power dynamics, performance conversations, and feedback.

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The NeuroLeadership Institute’s SCARF® Model provides an easy-to-remember framework representing the domains of psychological needs we all have: status, certainty, autonomy, relatedness, and fairness ([Rock, 2008](http://dcntp.org/wp-content/uploads/2015/03/Readiness_for_change.pdf); [Rock & Cox, 2012](https://t.sidekickopen60.com/Ctc/Q%2B23284/cdf4j04/Jl22-6qcW7lCdLW6lZ3kSW1w_tmN7015LCW7zJjB-3D1mnCN4Nbg7j2nFvDW4n0bW37C-k5jW3Q42x58rmnZ1W5Dj0g84pKm3FW6b0TDn53Tn6KW8xjCG163LyMFW2RzJd36D8q-JN1ZhYyM7QkTDW2tSgp123d038W3g7_Zz9cBwz3W7Wq-x81BwDK8W5tv8Sx6sYdb-W5myMh73MfChnW63_WCV38RRvxW2H27SC7xtQHZW6SYvFy2CzgCpW9gZ95D824chLW27B5P_7yDfQ9W2SGT-R3VDPJgW6-NSDV6nR9yVW8jC10S7-BGZMW3bBLcl344Bf9f1wVTvn04)). Each SCARF domain can be triggered during, or even in anticipation of, interactions with others. When you’re at a heightened threat level, you’re more likely to misinterpret neutral, positive, or even absent statements. In the earlier example, you might have felt that your status was in jeopardy when you were unaware of the article the CFO brought up that criticized your organization. The emotional charge associated with that threat results in a declining quality of thought processes. This may lead you to lose control of the meeting in the presence of the board of directors and your employees.

The SCARF Model was designed to be used as a tool to label the nature of potential social threats in the workplace, creating a shared language. For instance, all parties could recognize that the CFO bringing up the article could be perceived as a status threat. This could be used in the moment to bring awareness to the threat, detaching the presenter from feeling the emotions of the threat and, instead, labeling the situation. Someone could acknowledge that the article itself is a status threat to the organization, and they should schedule a meeting to discuss it instead of having an impromptu discussion that could result in those involved feeling threatened. Also, knowledge and awareness of how status, along with the other domains of The SCARF Model, could be triggered in social situations might have dissuaded the CFO from bringing up the article right before your presentation.

The opposite of a threat response is a reward response.

11

We can give others a positive boost in any of the five SCARF domains by proactively sending positive signals. For example, the CFO could have given status rewards by approaching you after your presentation and saying they’d really value your thoughts on the newspaper article after you’ve had a chance to read it. By sending SCARF rewards, we can de-escalate a heated discussion and prevent ourselves and others from sliding into a Level 3 threat.

Managing Level 3:

Break out of the threat response cycle by managing physiology

During a Level 3 threat, psychological strategies, such as reappraisal, often fail to disrupt the threat response. For instance, one study found that students demonstrated a significant increase in irrational beliefs during times of high distress, leading to greater levels of catastrophizing, self-doubt, and frustration ([DiLorenzo](https://doi.org/10.1016/j.paid.2006.08.022) [et al., 2007](https://doi.org/10.1016/j.paid.2006.08.022)). These irrational beliefs are amplified during Level 3 threat states, and mitigation requires physical, rather than psychological, interventions to break the threat cycle. Exercising, physically distancing yourself from a threat, disengagement, a change of focus, or simply taking a break can help you manage these kinds of threats better in the moment.



**Reinforcing Cycle**

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A Level 3 threat creates a robust physiological response in the body. Therefore, a physical reaction to release that energy is likely to help. Detaching yourself from the situation and participating in physical movements, such as going for a walk or dancing, can reduce the stress response ([Hanna, 2006](https://www.google.com/books/edition/Dancing_for_Health/HWVZFwZ9oGcC?hl=en&gbpv=0); [Quiroga Murcia et](https://doi.org/10.1080/17533010903488582) [al., 2010](https://doi.org/10.1080/17533010903488582)). Dancing provides a unique combination of a creative outlet along with physical activity, which

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signals your nervous system to release endorphins (commonly called “feel-good” chemicals) that work to decrease your pain and stress response ([Sprouse-](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3104618/) [Blum et al., 2010](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3104618/)). A simple walk around the block can also release endorphins and reduce your threat state. In addition, physically distancing yourself from the stressful situation enables you to remove yourself from the visceral and often irrational psychological response to the stressor and allow new perspectives to arise. Even partaking in a minor action, such as a five-minute walk, can help, as any incremental progress to decrease the threat response can help remove yourself from a Level 3 state.

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How understanding and mitigating our threat response is relevant for business audiences and the bottom line

While there are many ways that organizations can benefit from their employees’ ability to mitigate a threat response, here we focus on one: psychological safety. It might not be obvious just how beneficial threat response management is to an organization until we realize the impact it has on our workforce, interpersonal interactions, and team dynamics.

Psychological safety refers to the perception people have regarding the consequences of taking interpersonal risks, such as proposing a new idea, speaking up when something is wrong, or questioning authority ([Edmondson, 1999](https://journals.sagepub.com/doi/abs/10.2307/2666999)). Mitigating employees’ threat responses is a key aspect of psychological safety. In fact, Dr. Amy Edmondson, best known for her pioneering research on psychological safety, underscores just how important threat management is to instill psychological safety:

“One of the most fundamental challenges organizations face is how to manage the interpersonal threats inherent in employees admitting ignorance or uncertainty, voicing concerns and opinions, or simply being different. These threats are subtle but powerful, and they inhibit organizational learning. For people to feel comfortable speaking up with ideas or questions — an essential aspect of organizational learning — without fear of ridicule or punishment, managers must work to create a climate of psychological safety” ([Edmondson & Lei, 2014](https://www.annualreviews.org/doi/abs/10.1146/annurev-orgpsych-031413-091305), p. 39).

12

The recommendations presented here can be used as strategies to create a psychologically safe organizational culture, and the benefits of a psychologically safe organization are vast. For instance, research shows that psychological safety promotes information and knowledge sharing ([Collins](https://journals.aom.org/doi/abs/10.5465/AMJ.2006.21794671) [& Smith, 2006](https://journals.aom.org/doi/abs/10.5465/AMJ.2006.21794671)), voicing ideas for organizational improvements ([Liang et al., 2012](https://journals.aom.org/doi/abs/10.5465/amj.2010.0176)), organizational learning ([Bunderson & Boumgarden, 2010](https://pubsonline.informs.org/doi/abs/10.1287/orsc.1090.0483)), initiatives to develop new products and services ([Baer & Frese,](https://onlinelibrary.wiley.com/doi/abs/10.1002/job.179) [2003](https://onlinelibrary.wiley.com/doi/abs/10.1002/job.179)), and overall organizational performance

([Carmeli et al., 2012](https://journals.sagepub.com/doi/full/10.1177/1476127011434797)).

Getting better at resolving conflict and tensions within and across your workforce is one of the key differentiating factors that sets great leaders and managers apart from the pack and promotes psychological safety across the organization. We can do that by using simple language to disrupt our thought processes in a frequent, visible, and replicable way. To identify and disrupt our maladaptive thought processes, and also to better understand the mental states of others, we can rely on shared language and terminology.

A shared language helps make things less personal.

To keep ourselves and others in a Level 1 threat state whenever possible, we can turn to frameworks that offer a shared language (e.g., SCARF) to verbalize what may be happening without making the experience personal. Utilizing a shared language to discuss complex or personal challenges aids communication among team members and diminishes Level 2 threats. For example, imagine initiating a new team project. You describe the task to your team, and you notice discomfort on the face of one of your team members. With a shared language, you can quickly identify the source of this discomfort without making it personal. It could be that the team member feels they weren’t given a big enough role in the project, diminishing their status. Without a shared language like SCARF, they may struggle both to identify why they don’t feel good about the assignment and how to communicate their concerns to you. An understanding of SCARF provides a streamlined way to go from the physiological and emotional threat response they are feeling to clarity around exactly why they are feeling this way, which can be communicated to you and the rest of the team. Having a common language that allows

everyone to speak about the same things across your organization will lead to a better understanding of what you can do to minimize a threat response and adjust your strategies accordingly.

Using a shared language to interpret the experiences and reactions of yourself and others aids in your ability to speak openly with your co-workers and ensures they understand precisely where you are coming from. Additionally, it provides members across an organization with a shared understanding of the threat responses faced by their co-workers — whether they are speaking up about their feelings or being made aware of the feelings of others — and provides everyone with the ability to defuse these situations using everyday social rewards ([Rock & Cox, 2012](https://t.sidekickopen60.com/Ctc/Q%2B23284/cdf4j04/Jl22-6qcW7lCdLW6lZ3kSW1w_tmN7015LCW7zJjB-3D1mnCN4Nbg7j2nFvDW4n0bW37C-k5jW3Q42x58rmnZ1W5Dj0g84pKm3FW6b0TDn53Tn6KW8xjCG163LyMFW2RzJd36D8q-JN1ZhYyM7QkTDW2tSgp123d038W3g7_Zz9cBwz3W7Wq-x81BwDK8W5tv8Sx6sYdb-W5myMh73MfChnW63_WCV38RRvxW2H27SC7xtQHZW6SYvFy2CzgCpW9gZ95D824chLW27B5P_7yDfQ9W2SGT-R3VDPJgW6-NSDV6nR9yVW8jC10S7-BGZMW3bBLcl344Bf9f1wVTvn04)).

This involves communicating about what’s happening with their team, their responsibilities, and the overall business. A manager’s elevated threat state often worsens their team’s threat state and ultimately leads to poorer decision-making. This is in part because emotions can be highly contagious, resulting in empathetic responses that cause team members to take on the same emotions as their colleagues instead of formulating a constructive response that diminishes threat in themselves and others (for review see [Banerjee & Srivastava, 2019](https://www.indianjournals.com/ijor.aspx?target=ijor%3Ajmr&volume=19&issue=4&article=003)).

Threshold and frequency matter:

When and how often to intervene

Once we understand the circumstances in which a threat response may be triggered and how it impacts our behavior, we can develop better strategies and language to reduce the threat response in ourselves and others. The contexts to consider are how we might experience threat responses in one-on-one interactions at a team level and at an organizational level.

On the individual level, you may encounter situations where you feel tension with a co-worker or are tasked with giving a high-stakes presentation. At the team level, you may perceive stress among multiple team members, including yourself. And at the organizational level, you may become aware of how the organization responds to significant events, such as how corporate leaders implemented changes in response to the pandemic.

Initially, team members will need to actively track how often these threat mitigation strategies are used, in which situations, and their effects. This will lay a foundation for organizational behavior change, resulting in the strategies being used routinely across the organization. Said another way, being motivated and encouraged to utilize these strategies can result in real long-term culture change, ingraining these beneficial behaviors into the fabric of the organization’s culture. Over time, engaging in these strategies will become less effortful and more routine, improving the way members of the organization interact and handle stressful situations. Ultimately, this results in a more productive and collaborative environmentthatincreasestheoverallwell-beingofthe entire organization.

Conclusion

We have evolved a highly sensitive threat detection system that can be triggered by both physical and social threats. In the workplace, physical threats are rare, but social threats are commonplace. These social threats can result in a powerful and maladaptive threat response. With an understanding of our threat detection system, along with emotion regulation techniques such as reappraisal and emotion labeling, we can minimize the strength and deleterious impact of threat responses, helping to instill a psychologically safe and productive work environment. More specifically, we can ingrain organization-wide behavior, such as the use of a shared language, to help support ourselves and our colleagues’ ability to mitigate threats in the workplace.

13

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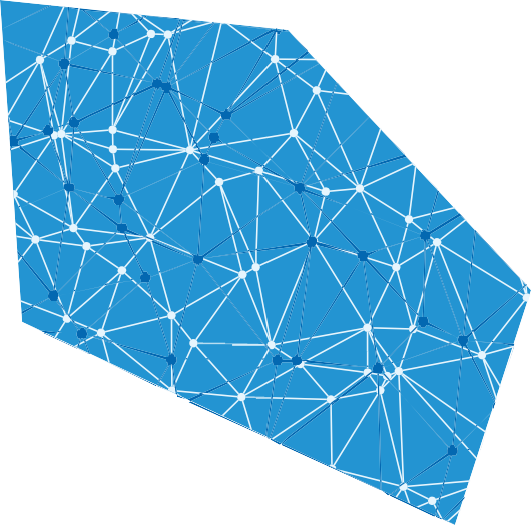
17

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BREAKING BIAS UPDATED: THE SEEDS MODEL®

by Matthew D. Lieberman David Rock

Heidi Grant Halvorson and Christine Cox

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2

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Despite decades of effort and major investment dedicated to reducing bias in organizational settings, it persists.

The central challenge in removing bias from decisions is that most biases operate unconsciously. While raising awareness can help people to realize that they might be biased, it does not enable them to recognize bias in their own thinking—we simply do not have conscious access to the operations of bias in the brain.

In this paper, we propose an alternative solution to mitigating bias, derived from a brain-based perspective. We identify processes that can interrupt and redirect unconsciously biased thinking. We provide The SEEDS Model® for designing and guiding the use of such processes. The SEEDS Model® simplifies the roughly 150 identified cognitive biases and recognizes five categories of bias, each category responsive to a different set of actions that will help mitigate them. To use The SEEDS Model®, we propose three steps:

1. **Accept** that we are biased by virtue of our biology;
2. **Label** the type of bias that might influence a particular decision, using the model;
3. **Mitigate** using the right process.

3

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BREAKING BIAS UPDATED: THE SEEDS MODEL®

**by Matthew D. Lieberman David Rock**

**Heidi Grant Halvorson and Christine Cox**

*Note: This is a revision of a previous article, “Breaking Bias,” published in the NeuroLeadership Journal (Volume Five), May 2014. The SEEDS Model® is a revision of the COSTTM model.*

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A mid-level manager in a financial services firm is trying to hire a new employee. While reviewing resumes, he unconsciously prefers candidates of a similar age and background to his team. The manager tells himself he is trying to build a cohesive team, unaware that he is biased or that this team will make worse decisions as a result.

A senior executive of a real estate firm once voted against investing in a significant new development project. Conditions have changed, and the project would now be an ideal fit for the business. When the project is presented again, she easily recalls the older data that led her to veto the idea, even though newer data, with which she is much less familiar, would suggest that it is now a good investment. She has no idea that she is biased or that a big business opportunity has been lost.

A sales representative in an industrial firm spends most of his time calling on clients in his home city, because he feels he knows the area best, even though there are significantly bigger clients in other cities in his territory. He has no idea that he is being biased and is costing himself and his firm significant revenues.

4

These are examples of common everyday biases. Biases are unconscious drivers that influence how we see the world. Biases are the invisible air we walk through— exerting their influence outside of conscious awareness, adaptive mechanisms evolved to help us make quick, efficient judgments and decisions with minimal cognitive effort. Thus, biases can impact every decision we make. We cannot go shopping, turn on a computer or start a conversation without our biases taking charge.

On the one hand, biases are helpful and adaptive. They help us use previous knowledge to inform new decisions, a kind of cognitive shorthand, as we do not have the cognitive resources to make every decision fresh. However, many of our biases can also be unhelpful. They can blind us to new information or inhibit us from considering a broad range of options when making an important decision.

Writ large, unhelpful biases were at the heart of the 2007 global financial crisis (and dozens of similar crises over the centuries)—i.e., ignoring evidence that current practices were going to have devastating long-term effects (known as the “confirmation bias”), and sacrificing long-term future outcomes for more immediate gains (known as “temporal discounting”). They were at the core of why Japan suffered so much from their 2011 tsunami, and New York City from Hurricane Sandy in 2012—i.e., overestimating the degree to which individuals, the government, etc. would be able to control the negative

effects of these natural disasters (known as the “illusion of control”), and underestimating the time and effort it would take to prepare (known as the “planning fallacy”). And they are at the core of the dysfunction of many great companies and institutions, including the challenges faced by governments the world over.

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In a hyper-connected world where poor decisions can multiply like a chain reaction, breaking free of unhelpful bias has never been more urgent or important—for individuals, teams, schools and institutions, organizations, and for whole societies. Various other pressures of the current world in which we live and work highlight the urgency of mitigating bias. Some examples include: 1) an increase in the complexity, ambiguity, and volatility of the problems we are facing, problems in which our default solutions are unlikely to work; 2) problems requiring slow thinking, cognitive effort, and the ability to approach potential solutions from multiple perspectives; 3) the parallel increase in the need for diversity of thought as our reliance on technology and social networks increases; and 4) reduced opportunities to slow down and engage cognitive effort in bias mitigation as demand for speedy decision-making increases.

In our large organizations, increasingly large sums of money and resources are spent educating people about biases. For example, U.S. companies spend an estimated

$200-300 million a year on diversity programs (Flynn, 1998; Vedantam, 2008). This spending is in the form of diversity or sensitivity training, where executives, managers, and all employees are being told to watch out for biases, in particular around hiring and promotion decisions. These programs tend to be more narrowly focused on people-related bias in decision-making (e.g., the unconscious influence of negative evaluations of others who are dissimilar from oneself and positive evaluations of others who are similar to oneself [Ross, 2008; Lublin, 2014]). One motivation for the development of our model of Breaking Bias that we will present here is to expand the scope of bias awareness and mitigation strategies to include a wide range of biases, not only those related to “people decisions.”

While many executives are beginning to recognize that there is a real bias problem, and very specific, case- directed training has shown some promise in reducing bias (MacLean et al., 2013), there is little evidence that just educating people or raising awareness about bias currently does much to reduce those biases (e.g., Pronin et al., 2002; Kahneman et al., 2011). Partly, this is because biases occur outside of conscious awareness. We literally are unaware of the fact that we are being biased at any moment. Not only does educating people about biases do little, there is a bigger challenge here: Currently there is no theory in practical use for bias mitigation. To illustrate

5

this point, a search for “bias mitigation” on Wikipedia states, “[t]here is no coherent, comprehensive theory or practice of cognitive bias mitigation.” (We note that Wikipedia is not an accepted academic source, but our intention is to highlight the information that is available to those searching online for information regarding bias mitigation.) While there are commercial initiatives that offer cognitive bias modification services, “there is no evidence that th[ese] service[s] [are] backed by peer- reviewed research results,” although we acknowledge the existence of many research-based education and training programs aimed at reducing bias.

Could it be that billions of training dollars and countless employee hours are being wasted trying to educate employees to do something that just cannot be done with our current approaches? Is there a way to conceptualize and implement bias mitigation strategies that would yield a higher payoff?

The discussion above is based on what we know about bias in the *individual*—people are notoriously bad at knowing that their thoughts, beliefs, interactions, judgments, and decisions are affected by unconscious drivers. Recently, attention has shifted to bias mitigation strategies at the systems, or organizational level. This is reflected in research exploring the idea of “group intelligence,” where a group of people make better decisions as a whole than each individual that comprises the group (Wooley et al., 2010). The importance of implementing strategies for change on the organizational level is consistent with the work of Peter Senge (1990) on organizational learning and systems thinking—team learning, appreciating and valuing the perspectives of others, and leveraging the skills of a group of diverse individuals will improve the organization.

The idea we would like to propose is that organizations or teams may be able to become self-aware of bias in ways that individuals cannot, and that strategies can be put into place that will facilitate this awareness, foster an organizational culture that assumes and accepts bias inherent in human decision-making, and thus mitigate the wide-ranging effects of bias in this context.

In his recent book *The Righteous Mind: Why Good People Are Divided by Politics and Religion,* Jonathan Haidt (2012) sums up this idea nicely:

*“… if you put individuals together in the right way, such that some individuals can use their reasoning powers to disconfirm the claims of others, and all individuals feel some common bond or shared fate that allows them to interact civilly, you can create a group that ends up producing good reasoning as an emergent property of the social system” (pg. 105).*

Strategies that have been suggested for bias mitigation in organizations have thus far either been specific and limited in scope (e.g., Kahneman et al., 2011), or helpful though expansive, calling for radical organizational change (e.g., Lovallo & Sibony, 2010). This is likely due to the overwhelming number of cognitive biases that can currently be found with any Google search (~150) and the difficulty of putting these biases into a useful framework so that they can be easily remembered. Short of going through a checklist of 150 possible biases that could influence major decisions, what is one to do given that these biases exert unconscious influences and are so difficult to detect?

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In this paper, we propose a model that provides an easy-to-remember framework for addressing bias at an organizational level. Our goal is to help systems— organizations, teams, or processes—to address bias in a whole new way that does not rely on individuals having to catch themselves being biased. The model involves three steps:

1. **Accept** that people and systems are deeply biased and do not know it.
2. **Label** the biases likely to occur in any given system or decision, based on the five major categories into which they fall. Our model condenses the

~150 biases into five overarching bins based on the common underlying biology driving a particular bias. We call this The SEEDS Model® of bias.

1. **Mitigate** bias by attacking bias with strategies that go directly to the core mechanisms underpinning that bias.

As we go into detail on each of these three steps, we will outline The SEEDS Model® of cognitive bias and provide real-world examples to illustrate how these major types of bias can be mitigated in an organizational setting. To begin, we must acknowledge and accept that we are biased in the first place.

**Step 1: Accept**

People do not want to believe that they are biased. We all are quick to detect and criticize biased thinking and decision-making in others, but believe that we ourselves are far less susceptible to these same biases (a phenomenon that has been termed the “bias blind spot” [Pronin et al., 2002]). In fact, even high cognitive ability does not protect someone from the effects of bias (West et al., 2012). Most of us recognize that we can fall prey to bias, but we almost never think we are biased in the current moment. As the oft-quoted saying goes, “I always think I’m right, but I don’t think I’m always right.” However, it does little good to recognize that somewhere in the

6

last thousand decisions made there must have been bias if this does not help us to recognize it the next time it occurs, before it has influenced outcomes.

This resistance to evidence of our own susceptibility, paired with the often-unconscious nature of cognitive bias, creates a perfect storm in which bias is perpetuated and rarely adequately recognized or managed. The insidious nature of cognitive bias, and its effect on human judgment and decision-making, has led psychology researchers to propose that research on and efforts to educate the public against such bias should be a top priority in the field of psychology (Lilienfeld et al., 2009).

Why is it so difficult for people to accept that their beliefs, decisions, and actions can be influenced by the unconscious drivers of cognitive bias? A big part of the answer involves the unconscious nature of biases themselves, as indicated above. However there is another, more potentially insidious and problematic answer to this question. In short, *it feels good to be right*.

For example, consider the following problem:

*You have $1.10, a bat, and a ball. The bat costs*

*$1.00 more than the ball. How much does the ball cost?*

Likely, you were able to arrive at a solution fairly quickly, one that felt obvious and satisfying to you (i.e., the bat costs

$1.00 and the ball costs $0.10). Arriving at a correct answer is associated with contentment and certainty. Being right is rewarding and activates the brain’s reward circuitry. Even if people are completing a relatively uninteresting task for no money or other incentives, just a feeling that they are doing the task correctly leads to activation in the ventral striatum, a brain region consistently implicated in processing reward (Satterthwaite et al., 2012). This positive emotion—the enjoyment we experience from being right—is one of the main reasons that we are motivated to overlook our own biases and their contribution to the errors we make.

Not only does it feel good to be right, but *it feels bad to be wrong.* Making errors and mistakes is painful and distressing and activates brain regions associated with processing pain and negative emotion. In a task in which participants had to learn to classify shapes as belonging to one of two categories, making a mistake (misclassifying a shape) was associated with activation in the dorsal anterior cingulate and the anterior insula, brain regions that are part of the “pain matrix” (Daniel & Pollmann, 2012), even when there were no material consequences to being wrong. In addition, we often feel angry and frustrated when making errors. The amount of frustration and negative emotion a person feels after making an error is positively associated with activation in the dorsal anterior cingulate (Spunt et al., 2012).

These two related principles—that being right is rewarding, and being wrong is painful—are central to understanding how our judgments and decisions are so susceptible to unconscious cognitive bias and why it is so difficult to overcome the influence of bias. We are motivated to seek out reward, and we are motivated to avoid pain. The positive emotion and rewarding feeling of being right does not just occur when we are objectively right; it also occurs when we *believe* we are right, when we have a *feeling* of being right, regardless of the objective reality of whether or not we are actually right. The reinforcement we get from believing that we are right (that we have answered a question correctly, that we have made the right decision, etc.) further motivates us to seek out situations in which we feel that we are right. Further, and perhaps more importantly, it motivates us not to seek out information suggesting we might be wrong, and even to ignore disconfirming information that is right in front of us.

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These principles—seeking reward and avoiding pain— are two of the most important contributors to cognitive bias: We make judgments and decisions based on what feels right, even though what feels right may be based on information that is irrelevant, faulty, or just plain wrong.

Individuals in particular have a very difficult time with and may never accept that they are biased, but at the organizational level, a system of individuals may be able to (and need to) operate under the assumption that judgments and decisions are influenced by cognitive bias, and that they can put a structure in place to actively mitigate the effects of bias.

What would it look like for a firm to Accept bias, at an organizational level? Here are several key ideas:

* Recognize that intelligence does not make people less biased. The brilliant researcher or genius engineer is just as likely to be biased as a mid-level employee.
* Recognize that experience or expertise does not necessarily make people less biased. Seasoned executives can be just as biased as new recruits, perhaps more so. Expertise may change the kind of bias present without eliminating it. Systems need to be put in place at all levels of an organization to mitigate bias, all the way from the shop floor to the boardroom.
* Recognize that educating people is not enough. Processes need to be built into organizational systems that mitigate bias.

Above all, the goal of the Accept stage is to educate executives and all employees that biases are a fact of life, and that it is normal to not know you are biased. We

7

need to accept that intelligence, expertise, and education simply do not reduce bias in a meaningful way. With this acceptance, we can get to work on setting up systems that reduce bias at a systemic level. This brings us to the second step in this process, after accepting that our systems are biased, which is to *label* bias in a useful and effective manner.

**Step 2: Label**

To be effective at combating bias, we need an easy- to-remember framework that will allow executives, managers, team leaders, etc. to quickly identify the major *types* of biases that all too often affect major business decisions. To condense the overwhelming number of individual potential biases that have been described, we have developed The SEEDS Model® of bias. This model was developed by beginning to identify the core neurobiologicial correlates associated with the key biases and, through trial and error, organizing a framework that separated the biases into categories. We now believe that biases can be divided into five main types:

1. **Similarity**
2. **Expedience**
3. **Experience**
4. **Distance**
5. **Safety**

Each type is described in detail below, and extensive examples of each type of bias are provided in Appendix

A. We do not mean to suggest that every bias fits into only one category or that every bias is accounted for by this model. But we think there is value in simplifying the vast majority of errors and biases into these groupings. Each category has defining features as well as category- specific mitigation strategies that can be applied.

**The SEEDS Model® of bias**

***The SEEDS Model®: Similarity***

People are highly motivated to feel good about themselves, and to see similar others in the best possible light. Sometimes these self-interested and self-sustaining motives can be in conflict with an objective perception of ourselves, others, and the world.

The “ingroup bias” and the “outgroup bias” are two Similarity biases linked to promoting and protecting one’s own group (e.g., your family, your team, your company), but are also associated with the development and perpetuation of stereotypes and prejudice. The ingroup bias refers to the more positive perception of people who are more similar to you compared to those who are less similar to you. The outgroup bias refers

to the more negative perception of people who are more different than you compared to those who are less different. These biases are reflected not only in the perception of ingroup and outgroup members, but also in one’s behavior toward them—e.g., more resources are allocated to ingroup (vs. outgroup) members. As such, if left unchecked and unaddressed, these can be particularly harmful in organizations. Remember the mid-level manager in a financial services firm mentioned in the opening paragraph of this paper?

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*A mid-level manager in a financial services firm is trying to hire a new employee. While reviewing resumes, he unconsciously prefers candidates of a similar age and background to his team. The manager tells himself he is trying to build a coherent team, unaware that he is biased, or that this team will make worse decisions as a result.*

By only hiring people similar to his existing team, this manager was exhibiting an ingroup bias.

Social neuroscience research has shown that we perceive and relate with ingroup and outgroup members very differently (Banaji & Greenwald, 2013). In fact, the “Relatedness” component of the SCARF® model (Rock, 2008; Rock & Cox, 2012) deals with this topic in detail. Research has shown that merely assigning people to arbitrary teams creates affinity for their own team members, relative dislike of members of the other team, and greater activity in several brain regions (e.g., amygdala, orbitofrontal cortex, striatum) for ingroup vs. outgroup faces. This effect of team membership was seen regardless of other group differences, like race (Van Bavel et al., 2008). People like members of their ingroup more than outgroup members, and they are also more empathic toward members of their own group. Adams et al. (2009) asked Japanese and American participants to perform the “mind in the eyes” test, in which they had to choose the correct emotion expressed by seeing only images of different individuals’ eyes; crucially, they showed images of both Japanese and American eyes. Japanese participants were much better at correctly identifying the emotions expressed in images of Japanese eyes, and Americans were better for images of American eyes. Not only were participants more accurate in judging the correct emotion for their own culture (their ingroup), but a region of the brain important for making these social perception judgments (the superior temporal sulcus) was significantly more active when participants saw images of their own vs. the other culture. There are significant behavioral and neural differences associated with processing information about ingroup and outgroup members, which can impact the way in which we interact with and interpret the people around us.

8

At least three modifications are critical to mitigating the detrimental effects of these largely unconscious biases:

* increasing awareness of Similarity biases, and ingroup/outgroup biases in particular,
* implementing strategies to foster unbiased hiring strategies, team assignments, intergroup interaction across race, gender, age, etc., and
* enhancing communication, conflict resolution, and perspective taking.

(See Appendix A for a detailed list of Similiarity biases.)

***The SEEDS Model®: Expedience***

Expedience biases can be described as mental shortcuts that help us make quick and efficient decisions. The downside to this efficiency is that those decisions may be based on incorrect judgments. Typically, when Expedience biases occur, the brain is using a fast, intuitive system and makes decisions based on what information is easily accessible and feels right. This has been labeled the brain’s System 1: the system that relies on fast, easy associations and intuition (Kahneman, 2011; Satpute & Lieberman, 2006). However, we often need to make decisions based on more objective information, which is often not so easily accessible and takes more mental effort to access and to use when making judgments. The brain’s System 2 is the slower, more effortful overseer of the fast, more intuitive System 1 (Kahneman, 2011). System 2 is sometimes called the “lazy fact checker” since it can be called upon to correct System 1’s mistakes, but it often is not since it requires more cognitive effort to engage.

Remember the “bat and ball” problem that was posed above?

*You have $1.10, a bat, and a ball. The bat costs*

*$1.00 more than the ball. How much does the ball cost?*

Most people will answer quickly and confidently that the bat costs $1.00 and the ball costs $0.10. It is the fast, instinctive answer that comes to mind, and it makes intuitive sense and feels right (System 1). But it is WRONG! If the bat costs $1.00 more than the ball, then the ball must cost $0.05, and the bat must cost $1.05! However, arriving at this answer requires most people to engage their System 2—you must do some mental algebra to come to the right answer. Engaging System 2, fact-checking and correcting System 1’s mistake, is harder work, so if System 1’s answer comes more easily and feels right, why think more about it? Most people do not. In fact, around 50% of students at Harvard, Princeton, and MIT also tend to get this problem wrong (Frederick, 2005; Kahneman, 2003).

The following syllogisms provide another example of an Expedience bias at work.

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*If the premises are true, does the conclusion logically follow?*

1. *Premise: If it rains, the game will be cancelled. Premise: It did not rain.*

*Conclusion: The game was cancelled.*

1. *Premise: All addictive things are expensive. Premise: Some cigarettes are cheap. Conclusion: Some cigarettes are not addictive.*

Most people will (correctly) reject the conclusion from #1, but many people will also reject the conclusion from #2, even though they should technically accept it because it does follow logically from the two premises (Evans et al., 2001). This is an example of the “belief bias”, when our *belief* that the conclusion is not true gets in the way of judging the logic of the syllogism. We know that cigarettes are addictive, so accepting the conclusion that says some cigarettes are not addictive is difficult, even though the truth of the premise has no relevance to the validity of the syllogism. When we reject the conclusion of #2, System 2 is not kicking in to correct the mistake of System 1. We are being guided by an intuitive sense of right and wrong, rather than performing a logical analysis. This is further evidenced by the fact that people who are required to respond within a 10-second time limit (i.e., have less time to engage their System 2) are more likely to make the mistake of rejecting the conclusion of #2 than those who are given more time to deliberate (Evans & Curtis-Holmes, 2005). This finding points to the importance of taking enough deliberative time to make a thoughtful and well-informed decision—something that can be very difficult in a workplace culture of urgency that puts a premium on a fast turnaround, expecting decisions to be made and answers to be given very quickly. The problem with impatience and urgency, as we illustrate with these examples, is the increased influence of cognitive bias and the likely sacrifice of the quality of a decision in favor of quantity.

A classic example of an Expedience bias is the availability bias, or our tendency to make a decision based on the information that’s most readily accessible (i.e., the information that comes to mind most quickly) instead of on objective information (Tversky & Kahneman, 1981). The availability bias is a difficult problem for organizations because it prevents the consideration of all potentially relevant information, impeding objective and perhaps more adaptive decision-making. Remember the senior executive of a real estate firm mentioned in the opening paragraph of this paper?

*A senior executive of a real estate firm once voted against investing in a significant new development*

9

*project. Conditions have changed, and the project would now be an ideal fit for the business. When the project is presented again, she easily recalls the older data that led her to veto the idea, even though newer data, with which she is much less familiar, would suggest that it is now a good investment. She has no idea that she is biased or that a big business opportunity has been lost.*

The executive in this scenario was subject to an availability bias, and lost a business opportunity as a result.

In summary, Expedience biases can be detrimental to decision-making in organizations. If we make judgments based on our quick intuitions about what is right or what we want to be right, instead of taking more time to deliberate, gather relevant information, question our initial assumptions, and make objective decisions, then we are likely to let irrelevant, incomplete, or flat-out *wrong* information guide our choices.

(See Appendix A for a detailed list of Expedience biases.)

***The SEEDS Model®: Experience***

Experience biases are a result of our brains being built to understand the world as a direct and objective representation of what is really out there in the world. It is as if we have an implicit belief that our perceptions and beliefs are objectively true. This assumption that our experience corresponds to reality is referred to as “naïve realism”. The problem with this implicit belief is that it overlooks the varying array of behind-the- scenes processes by which our experience of reality is constructed. Our expectations, past history, personality, and emotional state are just a handful of the factors that color our construal of what is happening out there in the world.

There are two main reasons that Experience biases are especially pernicious. First, they happen outside of conscious awareness, so it is nearly impossible to monitor for them. Second, because we hold a strong conviction that we are seeing reality as it is, we tend to believe that anyone else who sees things differently must either see things incorrectly or pretend to see them incorrectly for some other reason. If two people have different expectations and thus experience two different “objective” realities, then each person is likely to think the other must be crazy, mean, stupid, biased, or lazy (Lieberman, 2013).

Thus, it is very difficult to convince someone who has an Experience bias that, in fact, he or she might be the one who is mistaken. These biases are similar to visual illusions—even if you logically know that it is an illusion (i.e., two lines are the same length even though they *really* look like they are different lengths), in that it is

practically impossible to change your experience of it. It is very difficult to convince ourselves that our intuitive experience is incorrect, even when confronted with strong evidence to the contrary.

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We have already introduced a key example of an Experience bias, the bias blind spot, which describes the fact that it is relatively easy to identify biases in others but not in oneself. People rate themselves as less susceptible to biases than others and see their answers as less biased than the answers of others, even when given information about how biases could (and most likely do) affect them (Pronin et al., 2002). It appears that drawing individuals’ attention to this bias is not enough to make them aware of their own biases or to mitigate their effects.

Another Experience bias is the “false consensus effect,” or overestimating the extent to which others agree with you or think the same way you do. For example, if you prefer vanilla to chocolate ice cream, you are likely to think that more people in the general population have the same preference (e.g., 75% of people prefer vanilla); someone who prefers chocolate to vanilla ice cream, however, will also think that 75% of the general population agrees with him and prefers chocolate. In an organizational setting, this assumption can lead to a variety of problems, especially if leaders assume that others agree with their preferences (e.g., for a certain development strategy) and make decisions without asking others’ opinions or seeking input regarding potentially superior alternatives.

Experience biases may be the most difficult for individuals to accept, label, and mitigate, but are prime targets for an organizational systems approach. If leaders assume that Experience biases will be present and are highly likely to affect decision-making, then strategies can be developed and checks put into place that will minimize their influence.

(See Appendix A for a detailed list of Experience biases.)

***The SEEDS Model®: Distance***

Proximity is also a salient driver of decision-making. It appears there is one network in the brain for all types of proximity—the proximity of owning versus not owning an object, as well as proximity in space and in time (Tamir & Mitchell, 2011). Unconsciously, we assign greater value to those things that we perceive to be closer to us, simply because they are close.

One example of this bias is the “endowment effect”—our tendency to value things more if we own them than if we do not (Kahneman et al., 1990). For example, someone may say that she is willing to pay $1 for a neutral object, such as a bottle of water. However, if you give her a bottle of water (i.e., endow her with it), and ask how much she would be willing to accept as payment for this bottle of water that she now owns, she may say $2.

10

“Temporal discounting” (Kirby & Marakovic, 1995) is another Distance bias, involving proximity in the temporal as opposed to the physical or spatial domains. People tend to value things differently depending on whether they get them now vs. later. For instance, given a choice between $10 right now and $20 paid out in a month, most people will choose the $10 even though no reliable investment strategy will make the $10 worth more than

$20 in such a short period of time. In other words, the

$20 is rationally worth more, but we devalue or discount this future worth because it is off in the distance and less tangible than the money we can receive right now. In our evolutionary past, survival may have benefited more from focusing on current needs, but in the modern world this overdependence on immediate outcomes is often less beneficial in the long-term.

Lastly, remember the sales representative in an industrial firm mentioned in the opening paragraph of this paper?

*A sales representative in an industrial firm spends most of his time calling on clients in his home city, because he feels he knows the area best, even though there are significantly bigger clients in other cities in his territory. He has no idea that he is being biased, and is costing himself and his firm significant revenues.*

By not focusing on more valuable clients in others cities, he was subject to a space-driven proximity bias.

(See Appendix A for a detailed list of Distance biases.)

***The SEEDS Model®: Safety***

Decisions are generally more driven by *negatives* than by positives—in other words, *bad is stronger than good.*

The fact that negative information tends to be more salient and motivating than positive information is evolutionarily adaptive (you will stay alive longer if you remember more quickly that the snake will kill you than that the bunny is cute). Put another way, losing $20 feels worse than finding $20 feels good. “Loss aversion” and the “framing effect” both refer to the fact that humans are highly sensitive to information about whether we expect to lose something or gain something, and that that information changes our decisions.

People will choose to avoid a risky decision if the outcome is positive (i.e., if you expect to win money), but will be more risk-seeking in order to avoid a negative outcome (i.e., if you expect to lose money). In both cases, people are exhibiting loss aversion (Kahneman & Tversky, 1984), and the negative information is what is salient—minimize the risk of *not* winning, and increase the chances of avoiding *losing.*

Similarly, with the framing effect (Tversky & Kahneman,

1981), if information is presented, or framed, as a *gain*, people choose to avoid a risky decision (i.e., do not take the risky bet for a 60% probability of winning $20). However, if information is framed as a loss, then people choose to take the risk to avoid the loss (i.e., take the risky bet for a 40% probability of losing $20). This is true even though the objective information is the same in both cases (i.e., 60% chance of winning, 40% chance of losing).

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(See Appendix A for a detailed list of Safety biases.)

We have outlined the importance of accepting that many of our judgments and decisions are subject to unconscious cognitive biases, and we have provided a framework, The SEEDS Model® of bias, that characterizes the five major types of bias. The final step is to delineate strategies that individuals and organizations can use to mitigate the negative consequences of bias in judgment and decision-making.

**Step 3: Mitigate**

For each major type of bias outlined in The SEEDS Model®, we will now present example scenarios in which these biases are evident in an organizational setting, and provide mitigation strategies designed to address the effects of these biases by targeting the root cause of each type of bias. These strategies are practical ways of helping people activate their brain’s braking system (Lieberman, 2009) and inhibit biased responses.

**Mitigating Similarity Biases**

Similarity biases involve evaluating more positively people you feel are similar to you, or who share similar goals.

These kinds of biases will be common in people decisions. Similarity biases might occur in hiring decisions, in how teams are formed, in who is selected to be promoted, in deciding what kind of clients to work with, or in deciding who to have in a social network. Think of a recruiter who hires a person because he or she resembles others who have succeeded previously, without paying enough attention to that individual’s history or skill set. Or, consider a purchasing manager who feels more comfortable buying from someone who grew up in their hometown, just because it feels safer. Or, consider a board deciding to give a key role to someone who most looks the part, vs. someone who can do the best job.

There are at least two routes to reducing Similarity bias. First, engaging in self-affirmation (thinking about things you value or people who are important in your life) affirms our sense of who we are and makes us less likely to be negative toward dissimilar others. Second, we can find ways to think of those who are different from us and potentially a threat to the self as more similar to us. One example of such a strategy is the “jigsaw classroom”

11

pioneered by Elliot Aronson (e.g., Aronson, 2000), which promotes cooperative learning, engagement, and empathy in an educational setting. Thinking of ways that we and dissimilar others share goals, values, or preferences can help us think of ourselves as part of a larger group, in which case sense of similarity is increased.

#### ...organizations or teams may be able to become self- aware of bias in ways that individuals cannot...

For people decisions such as hiring or promoting, organizations could also make it a policy to remove any identifying and potentially biasing information or features (e.g., name, gender, ethnicity, etc.) from materials. This would be one way to prevent or mitigate Similarity biases at the outset of these types of decisions, but there are limitations to these strategies when face-to-face interactions are necessary (e.g., interviews, etc.).

**Mitigating Expedience Biases**

Expedience biases might occur in everyday decisions that involve complex calculations, analysis, evaluation, or identifying conclusions out of data, for example, building a spreadsheet to analyze a project, working out the cause of a problem with a machine, or identifying the right solution for a client’s needs. Let’s take this last example: identifying the right solution for a client’s needs. If a sales rep is busy and tends to prefer one solution more than others, he might suffer from an availability bias when he hears a client’s problem, and automatically thinks of his favorite solution, instead of really listening to the client and considering other potential solutions that might better fit the client’s needs. Or think of a doctor who has recently seen many patients with a particular virus; she might automatically assume a new patient with similar symptoms also had the same virus without more carefully analyzing the details of his condition.

Expedience biases will be especially likely when people are in a hurry or are cognitively depleted, something very common in many organizations. The key issue with Expedience biases is that people take the easy path. There is no incentive to think more deeply and search for a wider possible set of solutions. If people do think more deeply, they may be able to make better decisions. In

this instance, the goal is to create some kind of incentive for individuals to identify their own mistakes. In other words, we suggest a mitigation strategy of increasing the motivation to engage our System 2, activating the brain’s braking system (i.e., ventrolateral prefrontal cortex [VLPFC], Lieberman, 2009), resulting in more deliberative and thoughtful decision-making, and inhibiting our quick, reflexive System 1—our brain’s tendency to engage easy, less-cognitively effortful habits and default responses.

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In the example above, the sales rep is experiencing unconscious Expedience biases, technically known as availability bias (making a decision based on the information that comes to mind most quickly instead of on objective information) and anchoring bias (relying too heavily on the first piece of information offered when making a decision). A process that might work here would be for the sales rep to lay out the logic of his decision step-by-step and be encouraged to find any potential flaw in his logic, with his manager providing clear motivation and positive reinforcement that finding flaws in one’s thinking is a sign of strength.

#### When individuals are able to engage their mental brakes... the influence of cognitive bias can be mitigated.

Other strategies that may work to mitigate Expedience biases include developing step-by-step approaches that encourage breaking a problem into its component parts. It may also help to involve other people and get outside opinions as part of the typical decision process, as well as implementing a mandatory cooling off period (e.g. 10 minutes of relaxation exercises or a walk outdoors) before making decisions likely to be impacted by Expedience biases. Using a human-centered design process (Brown, 2008), allowing for the opportunity to seek out and evaluate opposing or conflicting views would also be very useful in these cases.

**Mitigating Experience Biases**

Experience biases can happen anytime that you fail to appreciate that the way you see things may not be the way they actually are, and in any situation where you fail to

12

appreciate other people’s perspectives. Experience biases can occur anywhere, as they are about your perception of situations. In the workplace they might commonly occur in any process where you are looking to influence others or sell an idea. A salesperson can easily gloss over that people are not as excited by a product as he is. A presenter to an audience can easily forget that others do not know what the presenter knows. An executive can easily miss the fact that not everyone is as on board with a big organizational change as she is.

While Expedience biases can be mitigated by encouraging more cognitive effort from employees, the same cannot be said for Experience biases. Experience biases occur because of invisible processes, cognitive machinery at work outside of our conscious awareness. Putting in more effort typically does not resolve the problem here.

Instead, when you think an Experience bias might be occurring, what is more likely to help is to get objective, outside opinions from others not on the team or project. Another technique to mitigate Experience biases is to revisit ideas after a break to see them in a fresher, more objective light, and in particular trying to look at yourself and your message through other people’s eyes. In these mitigation strategies, the brain’s braking system (VLPFC) also plays a role in our ability to exercise cognitive control and disengage from our own, self-specific viewpoint. Taking a step backward and seeing ourselves and our decisions from a more objective perspective, putting ourselves in the mind of someone else, is also associated with brain regions associated with mentalizing (e.g., temporoparietal junction, medial prefrontal cortex). It is likely that the most effective strategies for mitigating Experience biases will engage this neural circuitry, promoting perspective taking and self-evaluation.

**Mitigating Distance Biases**

Distance bias can negatively impact organizations by leading to too much short-term thinking and not enough long-term investment. It can also lead managers to neglect projects or people that aren’t in their our own backyard—a particular problem for global organizations whose managers must oversee and develop business and human capital at great distances.

To mitigate Distance biases, you need to essentially take distance out of the equation. In other words, you need to evaluate the outcomes or resources as if they were equally close to you in distance, time, or ownership. This allows the evaluator to recognize the full value of a resource without the influence of temporal or spatial discounting. Of course, that is not to say that time and distance should never factor into a decision. But they should factor into it consciously, without additional unconscious influence that might lead to an inferior conclusion.

**Mitigating Safety Biases**

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Safety biases can happen any time you are making decisions about the probability of risk or return, where to allocate money, or how to allocate resources including time, people and other assets. These might occur in financial decisions, investment decisions, resource allocation, strategy development, or planning for strategy execution. Examples include an executive not being able to let go of a business unit because of resources already invested in a project; or a CEO who is not willing to innovate in a new direction because it would compete with the company’s existing business.

With Safety biases, again we need to get directly at the core biology driving the bias. Strategies that can work for Safety biases include imagining that you are making the decision for someone else; there is evidence that when making decisions for others, you can be less biased because the decision is less attached to the self (Gilbert et al., 2009; Hershfield et al., 2011). Getting greater distance between you and a decision is one strategy that might help. For example, you can imagine that the decision has been already been made in the past, and you are seeing it from a later, more objective and distanced point in time. In fact, studies suggest that recalling yourself in past events, as well as imagining yourself in future events, from a more objective, third-person perspective makes those events less emotional and less tied to the self (Libby et al., 2005; Pronin & Ross, 2006). These strategies also rely heavily on the brain’s braking system (VLPFC), which allows us to exercise the cognitive control needed to take a more objective, outside perspective and to engage our unique ability to project ourselves into a hypothetical future (or past).

***One neural mechanism underpinning bias mitigation?***

We have presented evidence of our behavioral and neural tendencies to seek reward and avoid pain, and how these tendencies contribute to our susceptibility to the effects of bias. Though research on the neuroscience of breaking bias is in its infancy, there is evidence that specific brain regions are involved and show greater activation when people are behaving in a less-biased manner—specifically, the ventrolateral prefrontal cortex (VLPFC), the brain’s braking system (Lieberman, 2009), as mentioned above.

Activation in the VLPFC has been associated with a reduced susceptibility to cognitive bias. Individuals who were able to correctly solve the “bat and ball” problem showed increased activity in the VLPFC (Spunt & Lieberman, in prep). Furthermore, individuals who were less susceptible to the framing effect (De Martino et al., 2006), temporal discounting (Boettiger et al., 2007), overconfidence effect (Beer & Hughes, 2010), and belief

13

bias (Goel & Dolan, 2003) all showed increased activation in the VLPFC. When individuals are able to engage their mental brakes, inhibit their initial automatic responses, take a more objective view and engage their System 2, then it appears that the influence of cognitive bias can be mitigated. This same system is central in regulating emotions and minimizing the impact of threat or reward (Lieberman, 2009). It seems there is one system for both managing emotions and managing biases, some of which may be driven by emotional (threat/reward) responses.

#### These principles– seeking reward and avoiding pain– are two of the most important contributors to cognitive bias...

Interestingly, it also appears that the more mindful a person is (i.e., how aware and receptive to his experiences in the present moment), the more active his VLPFC is during the labeling of negative emotions, which is a common emotion regulation strategy (Creswell et al., 2007). This study also showed that people high in mindfulness were able to neutralize the threat response when labeling an emotion (Creswell et al., 2007). Other studies show that mindfulness training can increase positive judgments and reduce Safety bias (Kiken & Shook, 2011), as well as improve affective forecasting, which is another example of a Distance bias (see Appendix A; Emanuel et al., 2010). One article recently published in this journal reviewed neuroimaging evidence that mindfulness training enhances self-awareness and reduces susceptibility to unconscious bias and emotional reactivity, highlighting the potential usefulness for mindfulness training in corporate leadership (Kirk, 2012).

If increased VLPFC activity is associated with reduced susceptibility to many types of cognitive bias and is also associated with greater mindfulness, individuals as well as organizations can foster mindfulness as a means of mitigating susceptibility to bias across the board. Currently, research supports the beneficial role of mindfulness in mitigating bias at an individual level, but more research needs to be done on strategies for increasing mindfulness in ways suitable to “people managers” at scale. Issues include the packaging of the

idea to be more acceptable to organizations, as well as finding minimum times for practice that can be effective. We are not advising this as a one-size-fits-all approach to any bias, simply as an area for more research. The ideal strategy may be increasing mindfulness of leaders, combined with applying processes that mitigate biases according to the underpinning neural issue driving that bias, according to The SEEDS Model®.

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***Other current models of bias mitigation?***

There are quite a few models and leadership education and training programs that are relevant to cognitive bias mitigation. As mentioned previously, diversity or sensitivity training programs tend to focus more narrowly on people-related decisions and encompass a subset of the Similarity and Expedience biases we discuss in this article (e.g., ingroup and outgroup bias, hot hand fallacy, halo effect; Ross, 2008; Lublin, 2014; Babcock, 2006). Other models and strategies for bias mitigation, like ours, have been more expansive and inclusive of a wider variety of bias. For example, Campbell et al. (2010) identify three “red-flag conditions” that are likely to lead to biased decision-making (i.e., presence of inappropriate self-interest, distorting attachments, and misleading memories) and outline a seven-step process for identifying those red flags. Though an alternative approach that is useful and concise, we believe that our model provides more detail and structure surrounding the neuroscience of bias—not only its cause but potential mitigation strategies—and why different targeted strategies could work for specific categories of bias.

Other comprehensive models of leadership development less directly target unconscious bias, but are nonetheless aimed at reducing the impact of bias in decision-making. Work by William Torbert focuses on “action logic” profiles, or leadership styles characterized by how one interprets his/her environment and how s/he reacts to perceived challenges (Rooke & Torbert, 2005). Though never explicitly discussed as unconscious biases, the descriptions of the problems underlying each style are consistent with the biases we discuss here (e.g., “Opportunists tend to regard their bad behavior as legitimate… reject feedback, externalize blame” [Rooke & Torbert, 2005, pg. 68]—similar to fundamental attribution error, self-serving bias, and egocentric bias). Mitigation strategies in this program stress awareness, learning about the drivers of our behavior, and perspective taking.

Similarly, work by Kegan and Lahey at Harvard highlights the underlying, largely unconscious motivations behind human behavior that can hold people back or even be in direct conflict with their values and goals, resulting in an “immunity to change.” Though again not explicitly characterized as unconscious bias, their model focuses

14

on “competing commitments” and “big assumptions” that people may be unaware of, and their mitigation strategies stress the need for self-reflection, promoting self-awareness, and taking a more objective perspective (Kegan & Lahey, 2001).

#### ...mindfulness training enhances self-awareness and reduces susceptibility to unconscious bias and emotional reactivity...

We believe that our model complements models and programs such as these—bringing the unconscious part of bias to the forefront and presenting a model where people can readily identify different categories of bias (regardless of leadership style or position in the company), understand the neural underpinnings of bias, and highlight specific mitigation strategies and their neural underpinnings as well. Understanding the neural basis of bias and its mitigation can promote awareness and pave the way for the acceptance of strategies to prevent bias in decision-making at the organizational level.

**Summary**

Biases are a significant issue in organizations. In this article, we have presented a serious attempt to organize the roughly 150 biases into a model that can be applied in organizational settings. Our goal is to help individuals in a wide range of positions, from business leaders all the way to front-line staff, and, more broadly, organizations as a whole identify and then mitigate biases based on the underlying issues associated with each broad category of bias. For example, to identify and address Expedience biases, we must appreciate our neural predisposition to make fast and efficient judgments, identify situations in which more deliberative thought and strategies are necessary to avoid bias, and encourage processes that place a premium on engaging cognitive effort instead of going with intuition or gut instinct in these situations. Alternatively, for Experience biases, cognitive effort is generally not the main issue—instead we must appreciate that our brain’s default setting is an egocentric one, which

assumes that our experience and perception of reality is the objective truth. In order to identify and address these biases, implementing strategies that encourage actively seeking out more objective perspectives and others’ viewpoints will be most helpful.

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While this model is just being released and considerably more research and development needs to be done around both theory and practice, we believe this model may be a useful step in reducing the unhelpful biases that are at the heart of many organizational challenges today. We appreciate feedback and input about the model from academics and practitioners alike.

15

**Appendix A. The SEEDS Model® of bias**

***Examples of Similarity Biases***

**Ingroup bias:** Perceiving people who are similar to you (e.g., are of the same ethnicity, practice the same religion, are from the same hometown) more positively than people who are more different from you.

**Outgroup bias:** Perceiving people who are different from you (e.g., are of a different ethnicity, practice a different religion, are of a lower or higher socioeconomic status) more negatively than people who are more similar to you.

***Examples of Expedience Biases.***

**Belief bias:** Deciding whether an argument is strong or weak based on whether or not one agrees with its conclusion. Like the example in the text about the addictiveness of cigarettes, this bias entails letting one’s beliefs influence how one evaluates information.

**Confirmation bias:** Seeking and finding evidence that confirms one’s beliefs and ignoring evidence that does not support those beliefs. Some examples include selectively reading studies and articles that support your views or theories and ignoring those offering conflicting information; and only reading news sources that support your political beliefs.

**Availability bias:** Making a decision based on the information that’s most readily accessible (comes to mind most quickly) instead of on objective information. For example, you might think it’s more likely to die from a shark attack than from falling airplane parts because shark attacks are more widely publicized but happen less often, and deaths from falling airplane parts are less widely reported but happen more often (Read, 1995).

**Anchoring bias:** A tendency to rely too heavily on the first piece of information offered when making a decision. This piece of information is the “anchor”, and other information is interpreted around this anchor. For example, the initial price set for buying a car is the price that subsequent negotiations will follow from.

**Base rate fallacy:** The tendency, when judging how probable something is, to ignore the base rate (the rate that it occurs in general) and to focus on other information. For example, only 5% of applicants are interviewed for a certain job, but you know that you are perfect for the job and are convinced that the probability of your getting an interview is higher than 5%.

**Planning fallacy:** The tendency to underestimate how long it will take to complete a task, how much it will cost, and its risks, while at the same time overestimating its benefits.

**Representativeness bias:** Misjudging that something

that is more representative means that it is more likely. For example, if given a choice between teacher and yoga instructor, we’re more likely to think that someone who is described as being very spiritual, doing yoga, and meditating every day is a yoga instructor because s/he is representative of that group. But in reality, teacher is more probable because there are more teachers than yoga instructors.

**Hot hand fallacy:** Believing that someone who was successful in the past has a greater chance of achieving further success. One example is expecting a gambler who has had a winning streak to be more likely to continue winning, even though the probability of winning has not changed.

**Halo effect:** Letting someone’s positive qualities in one area (e.g., attractiveness, optimistic personality) influence one’s perception of him/her in other areas (e.g., job performance, leadership ability).

***Examples of Experience Biases***

**Bias blind spot:** Identifying biases in other people but not in oneself.

**False consensus effect:** Overestimating the extent to which others agree with you; the tendency to assume that your beliefs, habits, and opinions are “normal” and that others think the same way.

**Fundamental attribution error:** Believing that one’s own errors or failures are justifiable due to external circumstances, but others’ errors are due to their character, or internal factors and are cause for greater concern. For example, “I made a mistake because I was having a bad day; you made a mistake because you’re not a very intelligent person.”

**Hindsight bias:** Seeing past events as having been predictable even though they may not have been; the feeling of “I knew it all along” even though the outcome was mostly likely unforeseeable.

**Illusion of control:** Overestimating the degree of control one has over external events. For example, believing that if you had just left the house 2 minutes earlier, you would have avoided getting caught at every traffic light is an illusion of control.

**Illusion of transparency:** Overestimating the degree to which your mental state is accessible to others. For example, public speakers believe their nervousness and stage-fright were obvious to the audience, but were really not.

**Egocentric bias:** The general tendency for information about oneself to have a disproportionate effect on judgments and decisions. For example, overestimating

our ability to communicate with others, assuming that others understand what we understand.

***Examples of Distance Biases***

**Endowment effect:** Expecting others to pay more for something that we own than we would be willing to pay for the same thing that someone else owns.

**Affective forecasting:** The fact that people are surprisingly poor judges of their future emotional states.

**Temporal discounting:** The tendency to devalue rewards as they move farther into the future. For example, given a choice between $5 now and $10 tomorrow, people choose $10 tomorrow. But given a choice between $5 now and $10 in six months, people choose $5 now.

***Examples of Safety Biases***

**Loss aversion:** Making a risk-averse choice if the expected outcome is positive, but making a risk-seeking choice in order to avoid negative outcomes. For example, if a person is going to win money, s/he is more likely to take a less-risky bet to minimize the chances of losing; if a person is going to lose money, s/he is more likely to take a more risky bet to increase the chances of avoiding the loss.

**Framing effect:** Making a different judgment based on whether the decision is presented as a gain or as a loss, despite having the same objective information. For example, choosing to take a risk to avoid a 40% probable loss, but choosing to avoid a risky decision for a 60% probable gain.

**Sunk costs:** Having a hard time giving up on something (e.g., a strategy, an employee, a process) after investing in it (e.g., time, money, training), even though the investment has already been made and can’t be recovered.

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16

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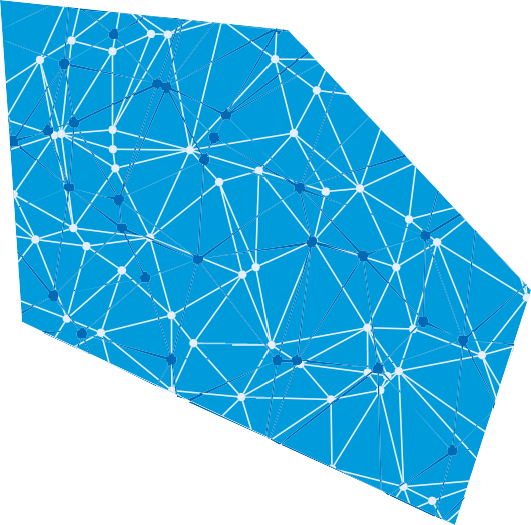
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THE SCIENCE OF SPEAKING UP

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Conventional wisdom suggests that if we see something, we should say something, whether this involves sharing our own ideas, challenging someone else’s ideas that may need correcting, or calling attention to behavior that has negatively affected others. In reality, too many people bypass the “speaking-up moment” and remain silent. This is because there are three roadblocks to speaking up: 1) *ambiguity* about whether speaking up is appropriate, 2) *asymmetrical power dynamics* that lead to fear of sanction from those with more power, and 3) *social threat,* including concerns about being mischaracterized as a troublemaker or being retaliated against. The stress that results from the chronic stifling of speaking-up behavior can exact negative physiological and psychological consequences on employees. This paper describes the science behind why individuals often do not speak up — either when they see an opportunity for improvement or when they see something troubling. It also provides strategies to enable speaking-up moments so that employees, leaders, and organizations can thrive.

The Science of Speaking Up

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**by Michaela Simpson Jennifer Ray**

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**Key takeaways:**

1. When faced with opportunities to share new ideas, or when encountering the questionable decisions or behaviors of others, employees often bypass moments to speak up because they struggle to know *when* and *how* to do it productively.
2. Common roadblocks to speaking up include ambiguity, asymmetrical power dynamics, and social threat.
3. Those whose ideas, decisions, or behaviors are challenged also experience threat states that can make them unreceptive to the challenger’s perspective.
4. Both potential speakers and those who are challenged can learn conversational approaches intended to minimize the threat the other person might experience.
5. Leaders can facilitate a culture of speaking up, often described as a culture of psychological safety, by acknowledging speaking-up moments, by role modeling receiving challenges by inviting input from employees without expressing defensiveness and without retaliation, and by establishing organizational supports that empower speaking up.

4

In 2005, 37-year-old Elaine Bromiley, a married mother of two, entered the hospital for routine sinus surgery. Not too long into the procedure, Elaine’s airway became obstructed. The three experienced surgeons in the operating room proceeded to insert a tube into her trachea to attempt to open her airway. The surgeons continued their attempts for many critical minutes despite suggestions from two nurses that could have changed the course of events. One nurse retrieved a tracheostomy kit from another room and informed the surgeons that a kit was available. The kit would have provided another means by which to open Elaine’s airway. The surgeons ignored her. Another nurse entered the room, immediately noticed that Elaine was in distress, left the operating room, and called the intensive care unit. Once she ascertained that space was available in the ICU, she informed the surgeons that the ICU had a bed for Elaine. According to the nurse’s account, the doctors looked at her as if she were overdramatizing the situation. As a consequence, the nurse canceled the hold on the bed in the ICU. In the end, Elaine sustained severe brain damage and died. During the formal inquiry into what happened, the nurses reported that they knew Elaine was in distress and knew how to handle the situation but did not know how to speak with the surgeons in a way that the surgeons would listen to them (Harmer, 2005).

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What transpired in the case of Elaine Bromiley epitomizes the dire consequences that can result from a lack of communication in work environments, especially ones that favor hierarchy and tacitly discourage speaking up to authority. Unfortunately, the problems at the center of Elaine’s case are not isolated but occur on a daily basis, not just in operating rooms but in all places of work.

Indeed, numerous surveys and research studies document situations in which employees are aware of issues and problems in the workplace, observe questionable behavior, witness wrongdoing, or notice errors in decision-making by their superiors that could have dire consequences (Ashforth & Anand, 2003; Milliken, Morrison, & Hewlin, 2003; Tangirala & Ramanujam, 2008; Schwartz & Wald, 2003). Instead of asking for clarification, providing corrective information, or even challenging a decision — with the intent to create (organizational) change and improvement — they remain silent,

5

bypassing a “speaking-up moment” (Edmondson, 1999). Though conventional wisdom says that if we see something, we should say something, in reality most people keep their mouths shut (Morrison, 2001; Nembard & Edmondson, 2011). This paper describes why there are challenges to speaking up and then explains what leaders can do to reduce these barriers and build healthier workplaces.

Speaking up and different roles in “speaking-up moments”

Speaking up in the workplace, or “employee voice” as it is called in the scientific literature, is described as the discretionary communication of ideas, suggestions, or concerns about work- related issues with the intent to improve rather than to merely criticize organizational processes (Morrison, 2011; 2014). Employee silence, on the contrary, is defined as the conscious withholding of issues and concerns that could be useful or relevant to share (Morrison, 2014).

We propose here that acts of speaking up occur on a continuum, consisting of (1) sharing your ideas,

(2) questioning other people’s decisions, and (3) challenging other people’s behavior. These three types of speaking up have much in common, with the first being easier and the last being the most challenging. We propose that organizations need to do work to make all these types of speaking up easier for all employees and that focusing on speaking up across the continuum creates habits that make the more challenging conversations more likely to occur.

When an organization has people speaking up across the continuum, ideas will be shared more readily, better decisions will be made, accidental bias will be mitigated more actively, people will feel more included, and innovations will happen faster, making organizations more adaptive and agile. On top of this, poor behaviors will be addressed earlier, resulting in fewer poor performers or poor managers, and serious ethical and harassment issues will be caught before they become true problems.

When employees recognize a speaking-up moment and voice their concerns, ideas, or suggestions, they are not complaining. Rather, they are seeking to improve a situation by bringing attention to it. At the same time, through speaking up, employees may fundamentally challenge the status quo in

an organization and question the decisions and behaviors of those with higher formal authority. Because this may cause conflict and friction, people often remain silent or hesitate to speak up.

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Your threat level

**Share**

**ideas**

**Question**

**decisions**

**Challenge**

**behaviors**

Recipient’s threat level

We specify the three types of roles individuals can assume during speaking-up moments. The first role is the person being spoken up to — what we term the “actor,” a person who makes a decision or engages in questionable or inappropriate behavior that has a potentially unintended negative impact on an individual, a team, or the business. Alternatively, an actor’s decision or behavior can be considered questionable if someone perceiving it doesn’t understand what was meant, or said, or the rationale behind it. The actor who commits a questionable behavior or decision may do so without a bad intention in general and may not know or believe he or she has done something wrong. The second role is what we call the “receiver,” the target or the person or people affected by the behavior. The third role is what we call the “observer,” and this individual is a third-party person who has observed the behavior but is not the target of it. A potential speaker who voices an idea or challenges the actor may be either a receiver or an observer.

6

Pathways to silence in a speaking-up moment

From a psychological perspective, there are two primary pathways to silence. The first pathway occurs because of automatic, implicit processes, whereas the second pathway occurs because of conscious, explicit processes. Accordingly, researchers distinguish between spontaneous, in- the-moment decisions to speak up and decisions that result from contemplation (Kish-Gephart, Detert, Treviño, & Edmondson, 2009). They contend that automatic, implicit beliefs tend to be at play during “in the moment” situations at work, when employees either remain silent or speak up (Kish- Gephart et al., 2009).

Generally, implicit processes are shaped by the “taken-for-granted beliefs” or implicit beliefs that often dictate individuals’ behavior (Detert & Edmondson, 2011). Implicit beliefs tend to operate below conscious awareness, whereby individuals hold a belief and act automatically as a result of that belief. These beliefs develop through personal experience and through observing others (Anderson & Lindsay, 1998). For instance, children typically learn from elders how to talk to those with authority, which can then inform their behavior as

adults. Moreover, individuals develop conceptual frameworks around how they are supposed to comport themselves when they interact with someone higher in authority (Fiske, 1992). Because of implicit beliefs, such as needing to be deferential to authority or not embarrassing superiors in front of others, employees may fail to speak up.

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In contrast, conscious, explicit processes tend to be at play when employees have time to contemplate which path to choose and when they feel compelled to make a choice. This can be thought of as the conscious weighing of the costs versus benefits of speaking up. For example, research has shown that employees tend to express apprehension over the thought of proposing a new idea to their boss because they assume their boss is attached to the current state of affairs and will take offense at the new proposal (Detert & Edmondson, 2011). Ultimately, employees’ speaking-up behavior can be shaped by implicit or consciously held beliefs, and both pathways can undermine speaking up.

Roadblocks to speaking up

There are three primary drivers of employee silence identified in our research: ambiguity, asymmetrical power dynamics, and social threat.

***Ambiguity***

Ambiguity comes into play when people don’t know whether the episode they saw or experienced is something worth addressing and, if so, whether they’re the ones who should address it. Employees often maintain their silence because they witness fellow employees remaining silent in the face of questionable behavior or error-filled decision-making.

The phenomenon in which a group of individuals witnesses a situation yet does or says nothing about it is called the bystander effect. Remarkably, research has found that the more people who witness a negative event, the lower the chance that anyone will step in and speak up (Darley & Latané, 1968; Fischer et al., 2011; Rutkowski, Gruder, & Romer, 1983). This is because bystanders (i.e., observers) often struggle to know *when* and *if* to speak up. Indeed, when they look around and see others who are not doing anything to intervene, they may assume that nothing is wrong, that someone else will

7

handle it, or that the situation is less worrisome than they originally perceived. Researchers call this “diffusion of responsibility” (Darley & Latané, 1968). The term applies when responsibility to intervene is not definitively assigned to one person but instead is shared among many people, making it unclear who is responsible for stepping in and speaking up (Darley & Latané, 1968). The outcome of diffusion of responsibility tends to be that no one does anything.

Another phenomenon that affects individuals’ willingness to speak up is called pluralistic ignorance. Pluralistic ignorance occurs when individuals assume that others around them have an opinion that is the opposite of their own (Halbesleben, Wheeler, & Buckley, 2007; Prentice & Miller, 1996). As a result, they convince themselves that while they just witnessed questionable, inappropriate, or unethical behavior, others around them did not perceive the situation in the same way. This can introduce ambiguity and self-doubt about what “really” happened and decrease the likelihood the individual will say something.

***Power dynamics***

Researchers have observed that receivers of, and observers to, questionable decisions or behavior often downplay them (Darley & Latané, 1968; Milliken et al., 2003; Rutkowski et al., 1983) for a range of reasons related to power, or the lack thereof. For example, receivers and observers of organizational problems may fear being labeled a troublemaker or complainer. They might experience feelings of futility, where they believe that if they speak up, it will not make a difference — leaders will not listen to them. They might be afraid of damaging a relationship with a more powerful colleague, where trust, respect, or support will be lost. And — perhaps most important — they might fear retaliation, which could result in less desirable job assignments, being passed over for promotion, or even the loss of a job (Milliken et al., 2003).

Organizations that implicitly or explicitly discourage speaking up perpetuate cultures of silence and fear. The model of organizational silence describes an environment in which employees, based on their observations of the workplace, craft a shared narrative in which it is either dangerous or futile to speak up (Morrison and Milliken, 2000). As previously

mentioned, research suggests that power, status, or authority hierarchies and fear of sanction from those above pose a major barrier to speaking up (Milliken et al., 2003; Morrison & Milliken, 2000; Weiss, Kolbe, Grote, Spahn, & Grande, 2017). Two workplace environments, the operating room and the airplane cockpit, are particularly noted for their hierarchical and potentially silence-inducing structures.

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Consequently, there is a relatively extensive literature that discusses the consequences of hierarchical workplaces (Pattni et al., 2019). Research in these domains frequently finds that the most common roadblock to speaking up for members in lower power positions is, in fact, the hierarchical environment of the organization. For example, recordings from cockpits illustrate how captains ignore the tepid corrective suggestions from copilots who are lower in power (Pattni et al., 2019).

#### ...research suggests that power, status, or authority hierarchies and fear of sanction from those above pose a major barrier to speaking up...

Add gender into the mix and the tableau becomes more complex. For example, one study investigated how the gender of the lead physician in a simulated medically critical situation (similar to that of Elaine Bromiley) influenced whether and how respiratory therapists spoke up to the lead physician (Pattni et al., 2017). The results showed that the respiratory therapists (23 women and six men) spoke up to the female lead physicians more frequently than they did male lead physicians. Moreover, they spoke up in a more confident and direct manner.

In considering these results, we acknowledge the myriad and complex layers inherent in the intersections of speaking up to authority, power, gender (e.g., Richardson & Taylor, 2009), race (e.g.,

8

Richardson & Taylor, 2009), and other identities, such as sexual orientation (e.g., Galupo & Resnick, 2016). An in-depth discussion of these identities as they relate to speaking up and power lies beyond the scope of this article. Nonetheless, we encourage and look forward to further study of these important topics as such research can aid organizations in creating less hierarchical work environments and thereby maximize the likelihood of speaking up.

***Social threat***

Why is speaking up so threatening for receivers and observers (potential speakers) as well as actors (the people being challenged)? The reason is that our brains perceive and respond to social threats and rewards in ways that are similar to how we process physical pain (Eisenberger, Lieberman, & Williams, 2003). Humans are social creatures, and the threat created in a speaking-up situation creates a perceived risk to relationships and to group membership.

Under threat, the prefrontal cortex — the area for executive functioning that facilitates planning, rationalizing, decision-making, and problem- solving — can experience reduced capacity because the limbic system is attempting to process the threat (Arnsten, 2009). The limbic system describes a set of areas of the brain believed to participate in processing our emotional responses. Experiencing threat heightens momentary alertness but decreases our ability to see issues clearly, work with others, and think analytically (Elliot, 2008). A taxed prefrontal cortex might even leave people feeling tongue-tied, where they can’t even think of the words they want to say or they have trouble forming the words in their mouths. The *thought* of speaking up to authority, let alone *actually* speaking up to authority, can induce such threat states and make it difficult to utilize our prefrontal cortex.

We must not forget that speaking up, and its accompanying threat states, can affect not only potential speakers (i.e., receivers and observers) but also actors — the people being challenged about their behavior or decision-making. Actors may have the power to either encourage further speaking up from potential speakers by being open to feedback, or to silence them by signaling displeasure or defensiveness. It can, of course, be difficult for actors

to receive the problem-focused messages they are hearing in a constructive and nonthreatening way (Liang, Farh, & Farh, 2012). This means that in practice, actors may struggle to respond without acting defensively when others speak up to them as they often feel threatened or perceive it as disloyal behavior (Burris, 2012; Morrison & Milliken, 2000). How, then, can employees and leaders learn to conduct more effective speaking-up conversations?

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How to Create a Culture of Speaking Up

Ways to reduce threat in a speaking-up conversation

***Perspective-taking***

Perspective-taking involves the ability to mentalize or infer the mental states of others as well as one’s own mental state (Frith & Frith, 2006). It also requires the ability to understand that another person’s feelings and beliefs are separate from one’s own. A region of the brain that is critical for perspective-taking is the medial prefrontal cortex. Researchers speculate that this region helps people mentalize and predict the actions others might take (Frith & Frith, 2006; Mitchell, Macrae, & Banaji, 2006).

Mentalizing or perspective-taking helps those involved in a challenging conversation to separate their personal, subjective experience from what the other person meant to say or do and to attempt to understand both the impact and the intent. From this standpoint, those who are speaking up can reassure those they are challenging that there is no assumption of any negative *intent*. They can then clarify their goal for the conversation. In the process, they can focus on the specific situation or problem, sharing their *perception* of what occurred and inviting the actor to share his or hers as well. These approaches can help to establish common ground and diminish threat.

***Providing social rewards***

The SCARF® Model delineates five primary types of threat experienced by both potential speakers and actors that need to be managed in challenging conversations to make conversations more

9

productive (Rock, 2008). These primary triggers of threat (and reward) in the brain are status, certainty, autonomy, relatedness, and fairness (Rock, 2008). Understanding this model helps us to organize and anticipate the different domains of threat experienced during speaking-up interactions by *both* parties in the conversation. Moreover, it is essential to recognize that any conversation can contain some or all of the SCARF® threats to each individual. Through perspective-taking, those involved in a speaking-up conversation can anticipate the SCARF® threats that the other person is most likely to experience and take steps to avoid them.

Below, we give some examples of how SCARF® provides a framework for understanding, anticipating, and mitigating threat. It is important to remember that addressing questionable behavior does not have to be approached with a problem- focus. When a conversation consists only of emotional charge, it does not allow for solutions or progress to be made. Again, the key is to frame these challenging conversations in the most productive way, which the language of SCARF® enables us to do. Threats can be managed by compensating for them directly with SCARF® rewards.

***Status:*** *Example threats*

**Status** refers to one’s sense of relative standing in a group. To illustrate, an employee who is contemplating whether to speak up to a boss might think, “I’m afraid of negative career consequences, like not being given the prime projects, if I speak up,” while the manager may be thinking, “Who is this person to tell me how to run my department? I’m the decision-maker.”

***Status:*** *Example rewards*

The employee might begin by highlighting his or her respect for the manager in other aspects of his or her work.

» The manager could express admiration for the employee’s courage in speaking up about the issue.

***Certainty:*** *Example threats*

**Certainty** refers to one’s ability to predict outcomes. A leader who has just been spoken up to by an employee might think, “I’m not sure if this is a serious issue or how to respond appropriately.” At the same time, the employee

may be thinking, “Where will this conversation go once I initiate it?”

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***Certainty:*** *Example rewards*

Employees could offer their perspective on how leaders could take action to respond appropriately. (“What I’m hoping you might be willing to do is X.”)

» Leaders could share their thinking on their next steps with the employees and offer to check back in with them at a later date.

***Autonomy:*** *Example threats*

**Autonomy** refers to one’s perception of control. In this instance, an employee who is about to speak up might think, “This situation might get out of control if I upset this person,” and the peer who is being spoken up to might feel as if they are being told what to do by someone without the authority to do so.

***Autonomy:*** *Example rewards*

The employee speaking up could begin by asking for permission to share his or her perspective about the decision or behavior.

» The peer could ask the employee for options on how to handle the situation better in the future.

***Relatedness:*** *Example threats*

**Relatedness** refers to the extent to which one is in line with group norms or part of the in-group. For example, an employee who feels compelled to speak up might hesitate and think, “I’m afraid they will hate me if I speak up,” and the actor may be wondering, “Who else on the team has been discussing this? Am I being attacked by everyone I trusted here?”

***Relatedness:*** *Example rewards*

The actor could reassure the employee that he or she is grateful for the feedback and that their relationship is stronger because of it.

» The employee could assure the actor that he or she really cares and has only the actor’s best interests at heart in speaking up.

***Fairness:*** *Example threats*

**Fairness** refers to one’s perception that a fair exchange has occurred. To illustrate, a leader who has just been challenged might think, “I’m not being treated fairly — I’m being accused of something I never intended and no one is seeing

10

my point of view,” and the speaker may be upset and feel as if he or she is always the one who is expected to speak up and no one else does.

***Fairness:*** *Example rewards*

Speakers could say they are sharing only their own perspective and would like to hear the perspectives of leaders as well since they may not have the full picture.

» Leaders could say they wish more people would speak up and begin to openly encourage it in team meetings.

When leaders and employees alike understand the threat responses that those speaking up and those who have been spoken up to might experience, they can devise strategies to defuse them through the proactive use of social rewards.

***An example of perspective-taking and SCARF®***

***management: The two-challenge rule***

The two-challenge rule — an operationalized communication system used in cockpit crews — may help employees to speak up constructively and calmly through a combination of threat reduction and perspective exchange. The rule consists of two consecutive challenges, whereby an *advocacy* (an observation or a personal opinion) is paired with an *inquiry* (a request for the other person’s thoughts). The pairing of advocacy and inquiry maximizes the receptiveness of the actor who is receiving the messages while reducing threat on the part of the potential speaker.

For example, an employee could challenge his or her manager first by saying, “I’m afraid that our new marketing strategy may not be as effective because we are not targeting all age groups” (advocacy), which is followed by an inquiry, “I wonder how you see it?” (Argyris, 1977). If the manager does not adequately acknowledge this challenge, the two- challenge rule then consists of a second challenge (again pairing an advocacy with an inquiry): “I am concerned that we will lose many of our older customers because our research shows they do not use the two social media channels we’ve chosen as much as our younger customers do (advocacy). What do you think about this (inquiry)?” Research has shown that using this communication method can improve decision-making in critical situations not only in cockpit crews but also in surgical teams, where the fear of backlash resulting from speaking up is especially high (Pian-Smith et al., 2009).

What leaders can do to make it safer for employees to speak up

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It is incumbent upon leaders to appreciate how hard it is for employees to speak up and to proactively facilitate a speaking-up culture (Edmondson, 2004). They can do this by 1) acknowledging speaking-up moments, 2) role modeling receiving challenges by inviting input from employees without expressing defensiveness, and 3) establishing organizational supports that empower speaking up.

***Acknowledge speaking-up moments***

Leaders can increase speaking up by encouraging employees toshare ideas or tochallenge questionable decisions and behaviors through the lens of what is *right* as opposed to the lens of what is *easy*. Research has demonstrated the importance of the lens or frame through which we form evaluations and assessments. Specifically, researchers tasked participants with evaluating a range of behaviors, such as putting away money for retirement and admitting to having told a lie, through either a moral (what is right) or pragmatic (what is easy) lens (Van Bavel, Packer, Haas, & Cunningham, 2012). The results showed that when evaluating actions through a moral lens, evaluations were faster, more extreme, and more strongly associated with universal prescriptions that nobody or everybody should engage in the action (Van Bavel et al., 2012). Accordingly, leaders can encourage employees to ask themselves: What is the right thing for me to do in this situation? What is the right thing for me, my team, and/or the organization? When forming judgments using this lens, employees are more likely to be decisive and confident about speaking up and are less likely to delay or avoid a conversation just because it’s difficult or requires more effort. Leaders can help to foster a culture of speaking up by inspiring employees to do the right thing, even when it is not easy.

Another condition that empowers employees to speak up is when they feel fully identified with a group (i.e., the organization). Though this may seem counterintuitive, research has shown that people who express a robust affiliation with their group are more likely to speak up when they feel that norms or observed behaviors could harm the group collectively but not when norms or behaviors could harm them personally as individuals (Packer & Chasteen, 2010). Therefore, when individuals

11

strongly identify with the group and are able to see themselves as agents of change, they will be able to positively influence themselves, their colleagues, and their organizations.

In addition, recentresearch studying communication between team leaders and members of healthcare teams has shown that inclusive leader communication affected whether team members spoke up with suggestions, ideas, or concerns during emergency patient treatment (Weiss, Kolbe, Grote, Spahn, & Grande, 2018). For example, leaders’ use of collective pronouns (we, us, our) promoted team members’ speaking up.

***Role model welcoming challenge***

Leaders can also solicit input and practice listening in a nondefensive manner — this signals receptivity toward those speaking up. Research has shown that willingness to speak up, especially to authority, depends primarily on employees’ perceptions of supervisor characteristics related to “approachability” (e.g., “I don’t know how my boss will react when I take a concern to him or her.”) and “responsiveness” (e.g., “My boss takes action to correct the concerns that I speak to him or her about.”) (Saunders, Sheppard, Knight, & Roth, 1992).

Also, inviting subordinates to voice their opinions and appreciating when they shared raised the likelihood of their speaking up by about 26% (Weiss et al., 2018). These findings show the simple and yet very effective communication tools that leaders can employ to facilitate speaking up.

***Empower speaking up***

To establish processes that create a system of organizational support for speaking up, particularly when the obstacles to speaking up are salient, leaders can implement numerous measures.

First, leaders can define explicit procedures for speaking up. For instance, in meetings and in conversations, leaders can ensure that others speak before they do. Second, leaders can establish an Ombuds office where employees may discreetly express their concerns in confidence. Third, leaders can designate a neutral party to review and report employee concerns anonymously to leadership (Milliken et al., 2003).

To boost morale and engender employee trust, however, employees would need to see leadership

instituting organizational *and* individual behavior change. Research suggests that if employees feel organizational support exists for raising issues (Ashford, Rothbard, Piderit, & Dutton, 1998) and that remedial action will be taken (Miceli & Near, 1992; Rudman, Borgida, & Robertson, 1995; Withey & Cooper, 1989), they will be more likely to speak up. Lastly, leaders can assign teams within their organizations to review past interactions with a focus on teaching lower-status members how to effectively speak up to higher-status team members (Weiss et al., 2017). Implementing any combination of these systems could create an environment in which employees feel safer and more empowered to speak up.

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Conclusion

Findings from research suggest that employees feel reluctant to speak up to share new ideas and when faced with problematic decisions or questionable behavior. Reasons for this include fear of ridicule, fear of retribution, fear of damaging a relationship, or the belief that nothing will change if they do speak up. Ambiguity, asymmetrical power relations, and social threat often cause employees to either not notice a speaking-up moment or rationalize it away, leading to individual failure to voice or sometimes even a collective bystander effect.

Insights from the science of perspective-taking and The SCARF® Model provide recommendations as to how employees and leaders can engage in challenging conversations in ways that reduce conflict on all sides. Leaders can facilitate a culture of speaking up by acknowledging speaking-up moments, inviting input from employees without expressing defensiveness and without retaliation, and creating work environments in which employees feel safe and empowered to speak up (Weiss et al., 2018). Adopting these strategies, employees and leaders alike can cocreate workplaces that view ideas, decisions, and behavior through the lens of the right thing to do to empower and embrace speaking-up behavior.

12

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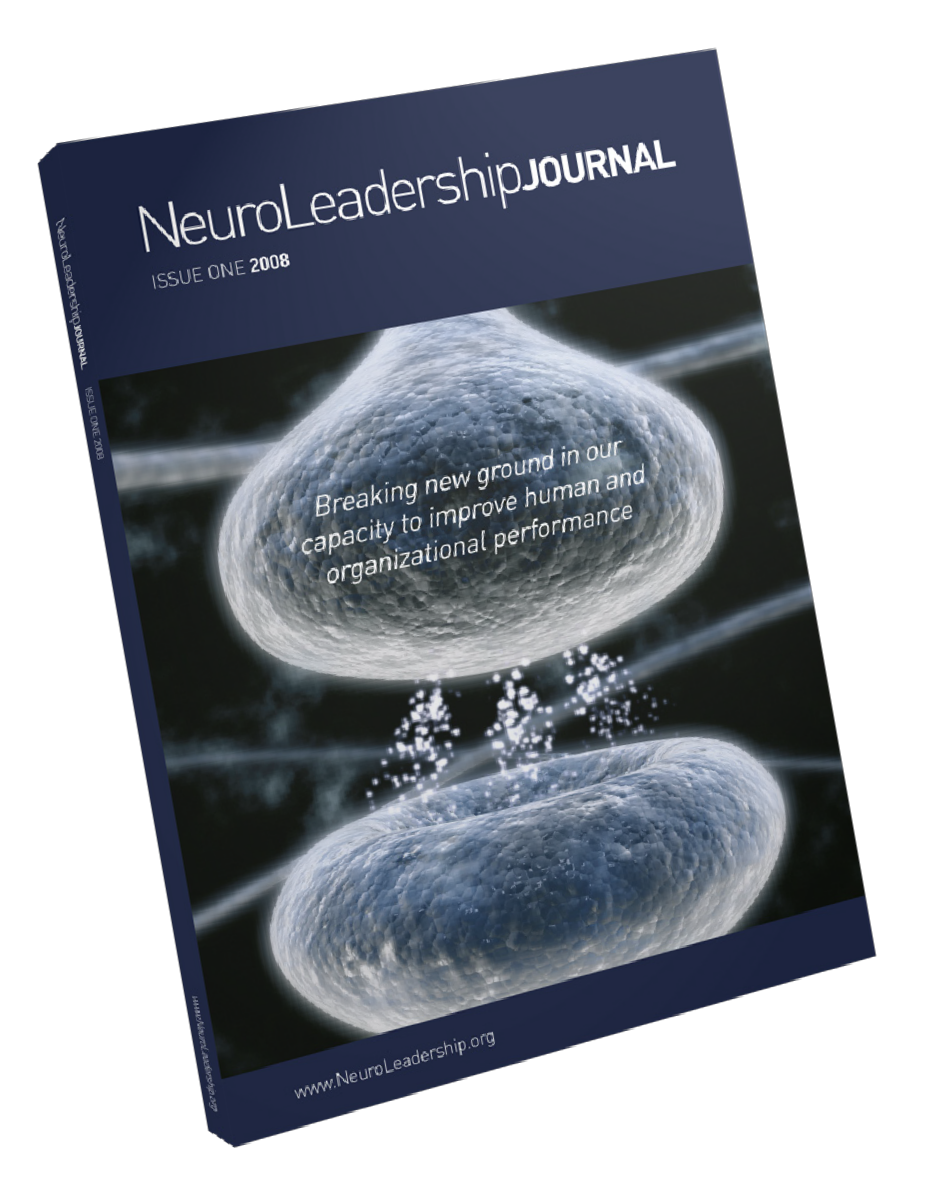
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## sCARF: a brain-based model for collaborating with and influencing others

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## sCARF: a brain-based model for collaborating with and influencing others

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**In a world of increasing interconnectedness and rapid change, there is a growing need to improve the way people work together. understanding the true drivers of human social behavior is becoming ever more urgent in this environment.**

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The study of the brain, particularly within the field of social, cognitive and affective neuroscience is starting to provide some underlying brain insights that can be applied in the real world (Lieberman, 2007). social neuroscience explores the biological foundations of the way humans relate to each other and to themselves and covers diverse topics that have a different degree to which they can be operationalized and unambiguously tested. Topics include: theory of mind, the self, mindfulness, emotional regulation, attitudes, stereotyping, empathy, social pain, status, fairness, collaboration, connect- edness, persuasion, morality, compassion, deception, trust and goal pursuit.

From this diversity, two themes are emerging from social neuroscience. Firstly, that much of our motivation driving social behavior is governed by an overarching organizing principle of minimizing threat and maximizing reward (Gordon, 2000). secondly, that several domains of social experience draw upon the same brain networks to maximize reward and minimize threat as the brain networks used for primary survival needs (Lieberman and eisenberger, 2008). in other words, social needs are treated in much the same way in the brain as the need for food and water.

The sCARF model summarizes these two themes within a framework that captures the common factors that can activate a reward or threat response in social situations. This model can be applied (and tested) in any situation where people collaborate

in groups, including all types of workplaces, educational environments, family settings and general social events.

The sCARF model involves five domains of human social experience: status, Certainty, Autonomy, Relatedness and Fairness.

status is about relative importance to others. Certainty concerns being able to predict the future. Autonomy provides a sense of control over events. Relatedness is a sense of safety with others, of friend rather than foe. And fairness is a perception of fair exchanges between people.

These five domains activate either the ‘primary reward’ or ‘primary threat’ circuitry (and associated networks) of the brain. For example, a perceived threat to one’s status activates similar brain networks to a threat to one’s life. in the same way, a perceived increase in fairness activates the same reward circuitry as receiving a monetary reward.

The model enables people to more easily remember, recognize, and potentially modify the core social domains that drive human behavior. Labelling and understanding these drivers draws conscious awareness to otherwise non conscious processes, which can help in two ways. Firstly, knowing the drivers that can cause a threat response enables people to design interactions to minimize threats. For example, knowing that a lack of autonomy activates a genuine threat response, a leader or educator may consciously avoid micromanaging their employees or students. secondly, knowing about the drivers that can activate a reward response enables people to motivate others more effectively by tapping into internal rewards, thereby reducing the reliance on external rewards such as money. For example, a line manager might grant more autonomy as a reward for good performance.

1

Before exploring the domains of sCARF individually a brief context of the underlying science of the sCARF model, namely, the approach (reward)-avoid (threat) response and the impact of this response on mental performance, is provided.

**Foundations of the scarF model**

***The approach (reward)-avoid (threat) response: a survival instinct***

According to integrative Neuroscientist evian Gordon, the ‘minimize danger and maximize reward’ principle is an overarching, organizing principle of the brain (Gordon, 2000). This central organizing principle of the brain is analogous to a concept that has appeared in the literature for a long time: the approach-avoid response. This principle represents the likelihood that when a person encounters a stimulus their brain will either tag the stimulus as ‘good’ and engage in the stimulus (approach), or their brain will tag the stimulus as ‘bad’ and they will disengage from the stimulus (avoid). if a stimulus is associated with positive emotions or rewards, it will likely lead to an approach response; if it is associated with negative emotions or punishments, it will likely lead to an avoid response. The response is particularly strong when the stimulus is associated with survival. other concepts from the scientific literature are similar to approach and avoidance and are summarized in the chart below.

The approach-avoid response is a survivalmechanism designed to help people stay alive by quickly and easily remembering what is good and bad in the environment. The brain encodes one type of memory for food that tasted disgusting in the past, and a different type of memory for food that was good to eat. The amygdala, a small almond-shaped object that is part of the limbic system, plays a central role in remembering whether something should be approached or avoided. The amygdala (and its associated networks) are believed to activate proportionally to the strength of an emotional response.

The limbic system can process stimuli before it reaches conscious awareness. one study showed that subliminally presented nonsense words that were similar to threatening

words, were still categorized as possible threats by the amygdala (Naccache et al, 2005). Brainstem – Limbic networks process threat and reward cues within a fifth of a second, providing you with ongoing nonconscious intuition of what is meaningful to you in every situation of your daily life (Gordon et al. Journal of integrative Neuroscience, sept 2008). such studies show that the approach-avoid response drives attention at a fundamental level – nonconsciously, automatically and quickly. it is a reflexive activity.

it is easy to see that the ability to recognize primary rewards and threats, such as good versus poisonous food, would be important to survival and thus a part of the brain. social neuroscience shows us that the brain uses similar circuitry for interacting with the social world. Lieberman and eisenberger explore this finding in detail in a paper in this journal entitled ‘The Pains and Pleasures of social Life’ (Lieberman & eisenberger, 2008).

***The effects of approaching versus avoiding***

The significance of the approach-avoid response becomes clearer when one discovers the dramatic effect that these states can have on perception and problem solving, and the implications of this effect on decision-making, stress- management, collaboration and motivation.

in one study, two groups of people completed a paper maze that featured a mouse in the middle trying to reach a picture on the outside. one group had a picture of cheese on the outside, the other a predator – an owl. After completing the maze both groups were given creativity tests. The group heading towards the cheese solved significantly more creative problems than those heading to the owl (Friedman and Foster, 2001). This study, supported by several other similar studies, shows that even subtle effects of this approach-avoid response can have a big impact on cognitive performance.

Translating this effect to the social world, someone feeling threatened by a boss who is undermining their credibility is less likely to be able to solve complex problems and more likely to make mistakes. This reduced cognitive performance is

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|  |  |  |  |
| --- | --- | --- | --- |
| **response** | **synonyms in literature** | **Which traditional primary factors activate the response** | **What social factors/situations activate the response** |
| **approach** | Advance, attack, reward, resource, expand, solution, strength, construct, engage. | Rewards in form of money, food, water, sex, shelter, physical assets for survival. | Happy, attractive faces. Rewards in the form of increasing status, certainty, autonomy, relatedness, fairness. |
| **avoid** | Withdraw, retreat, danger, threat, contract, problem, weakness, deconstruct. | Punishment in the form of removal of money or other resources or threats like a large hungry predator or a gun. | Fearful, unattractive, unfamiliar faces. Threats in the form of decreasing status, certainty, autonomy, relatedness, fairness. |

2

driven by several factors. Firstly, when a human being senses a threat, resources available for overall executive functions in the prefrontal cortex decrease. There is a strong negative correlation between the amount of threat activation, and the resources available for the prefrontal cortex (Arnsten, 1998). The result is literally less oxygen and glucose available for the brain functions involved in working memory, which impacts linear, conscious processing. When feeling threatened by one’s boss, it is harder to find smart answers because of diminished cognitive resources. secondly, when threatened, the increased overall activation in the brain inhibits people from perceiving the more subtle signals required for solving non-linear problems, involved in the insight or ‘aha!” experience (subramaniam et al, 2007). Thirdly, with the amygdala activated, the tendency is to generalize more, which increases the likelihood of accidental connections. There is a tendency to err on the safe side, shrinking from opportunities, as they are perceived to be more dangerous. People become more likely to react defensively to stimuli. small stressors become more likely to be perceived as large stressors (Phelps, 2006). When the boss appears threatening, perhaps they just do not smile that day, suddenly a whole meeting can appear threatening and the tendency can be to avoid taking risks.

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Clearly the threat or avoid response is not an ideal state for collaborating with and influencing others. However, this response is the default situation that often occurs in teams. Due to the overly vigilant amygdala, more tuned to threats than rewards, the threat response is often just below the surface and easily triggered. Just speaking to one’s supervisor, or someone of higher status is likely to activate this response. Thus it is much easier to cause aggravation (activate an avoid response) than it is to help others think rationally and creatively (the approach response). Many psychological and brain studies now support this idea, showing that the avoid response generates far more arousal in the limbic system, more quickly and with longer lasting effects than an approach response (Beaumeister, 2001). This discovery, that our brain is inherently attuned to threatening stimuli, helps explain many disquieting parts of life, from why the media focuses on bad news to why people are self-critical. it also points to the need to understand the social nature of the brain and proactively minimize common social threats.

on the other hand, an approach response is synonymous with the idea of engagement. engagement is a state of being willing to do difficult things, to take risks, to think deeply about issues and develop new solutions. An approach state is also closely linked to positive emotions. interest, happiness, joy and desire are approach emotions. This state is one of increased dopamine levels, important for interest and learning. There is a large and growing body of research which indicates that people experiencing positive emotions perceive more options when trying to solve problems (Frederickson, 2001), solve more non-linear problems that

require insight (Jung-Beeman, 2007), collaborate better and generally perform better overall.

in summary, the sCARF model is an easy way to remember and act upon the social triggers that can generate both the approach and avoid responses. The goal of this model is to help minimize the easily activated threat responses, and maximize positive engaged states of mind during attempts to collaborate with and influence others.

**The scarF model**

While the five domains of the sCARF model appear to be interlinked in many ways, there is also value in separating out and understanding each domain individually. Let’s look now at some of the supporting research for each domain then explore how threats and rewards might be managed in each.

***status***

in researcher Michael Marmot’s book **The status syndrome:** How social standing Affects our Health and Longevity, Marmot makes the case that status is the most significant determinant of human longevity and health, even when controlling for education and income. This finding is supported by sapolski’s work with primates (sapolski, 2002). sapolski found that in primate communities, status equals survival: higher status monkeys have lower baseline cortisol levels, live longer and are healthier.

status is about relative importance, ‘pecking order’ and seniority. Humans hold a representation of status in relation to others when in conversations, and this affects mental processes in many ways (Zink, 2008). The brain thinks about status using similar circuits for processing numbers (Chaio, 2003). one’s sense of status goes up when one feels ‘better than’ another person. in this instance the primary reward circuitry is activated, in particular the striatum, which increases dopamine levels. one study showed that an increase in status was similar in strength to a financial windfall (izuma et al, 2008). Winning a swimming race, a card game or an argument probably feels good because of the perception of increased status and the resulting reward circuitry being activated.

The perception of a potential or real reduction in status can generate a strong threat response. eisenberger and colleagues showed that a reduction in status resulting from being left out of an activity lit up the same regions of the brain as physical pain (eisenberger et al., 2003). While this study explores social rejection, it is closely connected to the experience of a drop in status.

**reducing status threat**

it can be surprisingly easy to accidentally threaten someone’s sense of status. A status threat can occur through giving advice or instructions, or simply suggesting someone is

3

slightly ineffective at a task. Many everyday conversations devolve into arguments driven by a status threat, a desire to not be perceived as less than another. When threatened, people may defend a position that doesn’t make sense, to avoid the perceived pain of a drop in status.

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in most people, the question ‘can i offer you some feedback’ generates a similar response to hearing fast footsteps behind you at night. Performance reviews often generate status threats, explaining why they are often ineffective at stimulating behavioral change. if leaders want to change others’ behavior, more attention must be paid to reducing status threats when giving feedback. one way to do this is by allowing people to give themselves feedback on their own performance.

**Increasing status reward**

organizations know all about using status as a reward and many managers feel compelled to reward employees primarily via a promotion. This may have the unfortunate side effect of promoting people to the point of their incompetence. The research suggests that status can be increased in more sustainable ways. For example, people feel a status increase when they feel they are learning and improving and when attention is paid to this improvement. This probably occurs because individuals think about themselves using the same brain networks they use for thinking about others (Mitchell, 2006). For example, when beating one’s own best time at a task or sporting activity, the reward circuitry from a sense of being ‘better than’ is activated, but in this case, the person one is ‘better than’ is oneself in the past.

### Many everyday conversations devolve into arguments driven by a status threat, a desire to not be perceived as less than another.

status can go up when people are given positive feedback, especially public acknowledgment. one study showed activation of the reward circuitry in children being as strong as money as when told ‘that’s correct’ by a repetitive computer voice. (scott, Dapretto, et al., 2008, under review). Leaders can be afraid of praising their people for fear of the

4

request for promotion. However, given the deeply rewarding nature of status, giving positive feedback may reduce the need for constant promotions, not increase it.

Finally, status is about one’s relative position in a community of importance such as a professional group or social club based on what is valued. While society, especially advertising and the media, would have people spend money in order to be ‘better than others’, it doesn’t have to be a zero-sum game. status can be increased without cost to others or an effect on relatedness. As well as playing against oneself, one can also change the community one focuses on, as when a low level mailroom clerk becomes the coach of a junior baseball team. or, one can change what is important, for example deciding that the quality of one’s work is more important than the quantity of one’s work.

***certainty***

The brain is a pattern-recognition machine that is constantly trying to predict the near future. For example, the motor network is useless without the sensory system. To pick up a cup of coffee, the sensory system, sensing the position of the fingers at each moment, interacts dynamically with the motor cortex to determine where to move your fingers next. Your fingers don’t draw on fresh data each time; the brain draws on the memory of what a cup is supposed to feel like in the hand, based on expectations drawn from previous experiences. if it feels different, perhaps slippery, you immediately pay attention (Hawkins, 2004). The brain likes to know the pattern occurring moment to moment, it craves certainty, so that prediction is possible. Without prediction, the brain must use dramatically more resources, involving the more energy-intensive prefrontal cortex, to process moment-to-moment experience.

even a small amount of uncertainty generates an ‘error’ response in the orbital frontal cortex (oFC). This takes attention away from one’s goals, forcing attention to the error (Hedden, Garbrielli, 2006). if someone is not telling you the whole truth, or acting incongruously, the resulting uncertainty can fire up errors in the oFC. This is like having a flashing printer icon on your desktop when paper is jammed – the flashing cannot be ignored, and until it is resolved it is difficult to focus on other things. Larger uncertainties, like not knowing your boss’ expectations or if your job is secure, can be highly debilitating.

The act of creating a sense of certainty is rewarding. examples are everywhere in daily life: music that has simple repeating patterns is rewarding because of the ability to predict the flow of information. Meeting expectations generates an increase in dopamine levels in the brain, a reward response (schultz, 1999). Going back to a well- known place feels good because the mental maps of the environment can be easily recalled.

**reducing the threat from uncertainty**

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Any kind of significant change generates uncertainty. Yet uncertainty can be decreased in many simple ways. This is a big part of the job of managers, consultants and leaders. As people build business plans, strategies, or map out an organization’s structure, they feel increasing levels of clarity about how an organization might better function in the future. even though it is unlikely things ever go as planned, people feel better because certainty has increased. Breaking a complex project down into small steps does the same. Another key tool involves establishing clear expectations of what might happen in any situation, as well as expectations of desirable outcomes.

**Increasing the reward from certainty**

some examples of how to increase certainty include making implicit concepts more explicit, such as agreeing verbally how long a meeting will run, or stating clear objectives at the start of any discussion. in learning situations, the old adage is ‘tell people what you are going to tell them, tell them, then tell them what you told them’, all of which increases certainty.

The perception of certainty can be increased even during deeply uncertain times. For example, when going through an organizational restructure, providing a specific date when people will know more information about a change may be enough to increase a sense of certainty. Much of the field of change management is devoted to increasing a sense of certainty where little certainty exists.

***autonomy***

Autonomy is the perception of exerting control over one’s environment; a sensation of having choices. Mieka (1985) showed that the degree of control organisms can exert over a stress factor determines whether or not the stressor alters the organism’s functioning. inescapable or uncontrollable stress can be highly destructive, whereas the same stress interpreted as escapable is significantly less destructive. (Donny et al, 2006). The difference in some rodent studies was life and death (Dworkin et al, 1995).

An increase in the perception of autonomy feels rewarding. several studies in the retirement industry find strong correlations between a sense of control and health outcomes (Rodin, 1986). People leave corporate life, often for far less income, because they desire greater autonomy.

A reduction in autonomy, for example when being micro managed, can generate a strong threat response. When one senses a lack of control, the experience is of a lack of agency, or an inability to influence outcomes.

**reducing autonomy threat**

Working in a team necessitates a reduction in autonomy. in healthy cultures, this potential threat tends to be counteracted

with an increase in status, certainty and relatedness. With an autonomy threat just below the surface, it can be helpful to pay attention to this driver. The statement ‘Here’s two options that could work, which would you prefer?’ will tend to elicit a better response than ‘Here’s what you have to do now’.

**Increasing rewards from autonomy**

Providing significant autonomy in an organization can be difficult. Yet even a subtle perception of autonomy can help, for example by having self-directed learning portals, where employees get to design their learning curriculum, and self- driven human resource systems.

Allowing people to set up their own desks, organize their workflow, even manage their working hours, can all be beneficial if done within agreed parameters. sound policy establishes the boundaries within which individuals can exercise their creativity and autonomy. sound policy should enable individual point-of-need decision-making without consultation with, or intervention by, leaders. in this regard, sound policy hard-wires autonomy into the processes of an organization.

***relatedness***

Relatedness involves deciding whether others are ‘in’ or ‘out’ of a social group. Whether someone is friend, or foe. Relatedness is a driver of behavior in many types of teams, from sports teams to organizational silos: people naturally like to form ‘tribes’ where they experience a sense of belonging. The concept of being inside or outside the group is probably a by-product of living in small communities for millions of years, where strangers were likely to be trouble and should be avoided.

### in the absence of safe social interactions the body generates a threat response…

The decision that someone is friend or foe happens quickly and impacts brain functioning (Carter & Pelphrey, 2008). For example, information from people perceived as ‘like us’ is processed using similar circuits for thinking one’s own thoughts. When someone is perceived as a foe, different circuits are used (Mitchell, 2006). Also, when treating someone as a competitor, the capacity to empathise drops significantly (singer et al, 2006).

5

Neuroscientist John Cacioppo talks about the need for safe human contact being a primary driver, like the need for food (Cacioppo, 2008). in the absence of safe social interactions the body generates a threat response, also known as feeling lonely. However, meeting someone unknown tends to generate an automatic threat response. This explains why one feels better at a party knowing three people rather than one. Alcohol helps to reduce this automatic social threat response, enabling strangers to communicate more easily, hence its use as a social lubricant the world over. in the absence of alcohol, getting from foe to friend can be helped by an oxytocin response, an experience of connecting with the other person. oxytocin is a hormone produced naturally in the brain, and higher levels of this substance are associated with greater affiliative behavior (Domes et al, 2007). studies have shown far greater collaboration when people are given a shot of oxytocin, through a nasal spray. (Kosfield, 2005). A handshake, swapping names and discussing something in common, be it just the weather, may increase feeling of closeness by causing the release of oxytocin (Zak et al, 2005). The concept of relatedness is closely linked to trust. one trusts those who appear to be in your group, who one has connected with, generating approach emotions. And when someone does something untrustworthy, the usual response is to withdraw. The greater that people trust one another, the stronger the collaboration and the more information that is shared.

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**reducing threats from lack of relatedness**

increasing globalization highlights the importance of managing relatedness threats. Collaboration between people from different cultures, who are unlikely to meet in person, can be especially hard work. The automatic foe response does not get diminished by social time together. This response can be mitigated by dedicating social time in other forms. For example, using video to have an informal meeting, or ensuring that people forming teams share personal aspects of themselves via stories, photos or even social-networking sites. in any workplace it appears to pay off well to encourage social connections. A Gallup report showed that organizations that encourage ‘water cooler’ conversations increased productivity (Gallup, November 2008).

**Increasing the rewards from relatedness**

Positive social connections are a primary need; however, the automatic response to new social connections involves a threat. To increase the reward response from relatedness, the key is to find ways to increase safe connections between people. some examples include setting up clearly defined buddy systems, mentoring or coaching programs, or small action learning groups. small groups appear to be safer than large groups. The Gallup organizations research on workplace engagement showed that the statement ‘i have a best friend at work’ was central to engagement in their ‘Q12’ assessment

6

(Gallup organization). Perhaps even having one trusting relationship can have a significant impact on relatedness.

***Fairness***

studies by Golnaz Tabibnia and Matthew Lieberman at uCLA showed that 50 cents generated more of a reward in the brain than $10.00, when it was 50 cents out of a dollar, and the $10 was out of $50 (Tabibnia & Lieberman, 2007). This study and a number of others illustrate that fair exchanges are intrinsically rewarding, independent of other factors. The need for fairness may be part of the explanation as to why people experience internal rewards for doing volunteer work to improve their community; it is a sense of decreasing the unfairness in the world.

unfair exchanges generate a strong threat response (Tabibnia & Lieberman, 2007). This sometimes includes activation of the insular, a part of the brain involved in intense emotions such as disgust. unfair situations may drive people to die to right perceived injustices, such as in political struggles. People who perceive others as unfair don’t feel empathy for their pain, and in some instances, will feel rewarded when unfair others are punished (singer et al, 2006).

**reducing the threat from unfairness and increasing the reward from fairness**

A threat response from a sense of unfairness can be triggered easily. The following statements are examples of what employees might say in reaction to a threat to fairness:

* ‘He has a different set of rules for Mike and sally than for the rest of us.’
* ‘Management tell us that we need to lose headcount, but our sales are carrying the other division and they don’t have to cut anyone.’
* ‘They do all this talk about ‘values’ but it’s business as usual at the top.’

The threat from perceived unfairness can be decreased by increasing transparency, and increasing the level of communication and involvement about business issues. For example, organizations that allow employees to know details about financial processes may have an advantage here.

establishing clear expectations in all situations – from a one- hour meeting to a five-year contract – can also help ensure fair exchanges occur. A sense of unfairness can result from a lack of clear ground rules, expectations or objectives. Allowing teams to identify their own rules can also help. in an educational context, a classroom that creates the rules of what is accepted behavior is likely to experience less conflict. examples of the success of self-directed teams in manufacturing abound (semler, 1993). Much of what these self-driven teams do is ensure fairness in grass-roots decisions, such as how workloads are shared and who can do which tasks.

The issue of pay discrepancies in large organizations is a challenging one, and many employees are deeply unhappy to see another person working similar hours earning 100 times their salary. interestingly, it is the perception of fairness that is key, so even a slight reduction in senior executive salaries during a difficult time may go a long way to reducing a sense of unfairness.

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**The wider implications of the scarF model**

***Managing oneself***

The sCARF model helps individuals both minimize threats and maximize rewards inherent in everyday experience. For minimizing threats, knowing about the domains of sCARF helps one to label and reappraise experiences that might otherwise reduce performance. Labelling (Lieberman et al, 2007) and reappraisal (ochsner & Gross, 2005) are cognitive tools that have been verified in brain studies to be effective techniques for reducing the threat response. These techniques have been shown to be more effective at reducing the threat response than the act of trying to suppress an emotion (Goldin et al, 2007). Knowing about the elements of sCARF helps one understand issues such as why you can’t think clearly when someone has attacked your status, instead of just trying to push the feeling aside.

Knowing the domains of sCARF also allows an individual to design ways to motivate themselves more effectively. An example might be focusing attention on increasing one’s sense of autonomy during a time of uncertainty, such as focusing on the thrill of doing whatever you like when suddenly out of work.

***education and training***

successful educators, trainers and facilitators intuitively use the sCARF model. They know that people learn best when they are interested in something. interest is an approach state. Teaching children who feel threatened, disconnected, socially rejected or treated unfairly is an uphill battle. For example, educators can create a nurturing learning environment by pointing out specifically how people are improving, which increases a sense of status. This is particularly important when learning anything new, which can create a threat response. educators can also create certainty by presenting clear outlines of what is being learned, and provide a perception of some autonomy by introducing choice into the classroom. The key here is for educators, trainers and coaches to value the approach state as the necessary state for learning, and to put effort and attention into maintaining this toward state.

***coaching***

Personal and executive coaching can increase all five sCARF domains. status can be increased through regular positive feedback, attention to incremental improvements, and the achievement of large goals. Certainty can be increased

by identifying central goals, and subsequently reducing the uncertainty inherent in maintaining multiple focuses. Breaking down large goals into smaller steps increases certainty about how a goal can be reached. Finding ways to take action when challenges appear insurmountable can increase autonomy. Relatedness can be increased through the relationship with the coach. Fairness can be reduced through seeing situations from other perspectives. The sCARF model helps explain why coaching can be so effective at facilitating change, and points to ways of improving its delivery.

### The sCARF model points to more creative ways of motivating that may not just be cheaper, but also stronger and more sustainable.

***leadership development***

The sCARF model provides a robust scientific framework for building self-awareness and awareness of others amongst leaders. Many new leaders may negatively impact the domains of sCARF by accident. They may know how things should be done, and subsequently provide too much direction and not enough positive feedback, thereby affecting people’s status. They often don’t provide clear expectations, impacting certainty. They micro manage, impacting autonomy. They want to maintain a professional distance, impacting relatedness. And, they may impact fairness by not being transparent enough. When the opposite happens and you meet someone who makes you feel better about yourself, provides clear expectations, lets you make decisions, trusts you and is fair, you will probably work harder for them as you feel intrinsically rewarded by the relationship itself. spending time around a leader like this activates an approach response and opens up people’s thinking, allowing others to see information they wouldn’t see in an avoid state.

***organizational systems***

sCARF has many implications for how organizations are structured, including reward systems, communications systems, decision processes, information flow and

7

remuneration structures. in the space available in this article we will explore just one of these – reward systems. Techniques for motivating and rewarding staff are largely based on the carrot and stick principle, with the carrot mostly involving money or a promotion. The sCARF model points to more creative ways of motivating that may not just be cheaper, but also stronger and more sustainable. For example, success could be rewarded by increasing people’s autonomy by allowing them to have greater flexibility in their work hours. or, rewards could be provided via increasing the opportunity for learning new skills, which can increase a sense of status. or, people could be rewarded through increasing relatedness through allowing more time to network with peers during work hours.

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**summary**

The five domains of sCARF reflect core brain networks of greatest significance when it comes to collaborating with and influencing others. understanding these drivers can help individuals and organizations to function more effectively, reducing conflicts that occur so easily amongst people, and increasing the amount of time people spend in the approach state, a concept synonymous with good performance.

understanding the domains in the sCARF model and finding personalized strategies to effectively use these brain insights, can help people become better leaders, managers, facilitators, coaches, teachers and even parents.

in the early 2000s, the philosopher Theodore Zeldin said, ‘When will we make the same breakthroughs in the way we treat each other as we have made in technology?’ These findings about the deeply social nature of the brain, and the deep relevance of the domains of sCARF in everyday life, may provide some small steps in the right direction.

**suggestions for future research**

An abbreviated list of potential research issues includes the following questions:

* Which of the domains of sCARF generate the strongest threats or rewards?
* Which domains have the longest-term impact?
* What are the links between the domains?
* How can studies be designed to identify individual domains?
* What are the best techniques for minimizing threat and maximizing reward in each of the domains?
* Do people vary in the importance of the 5 domains, and if so are there patterns across men and women, age groups or cultures?
* is there value in assessing these domains in individuals or culturally in organizations?
* What are the organizational implications of this model for how systems are set up?
* Testing what aspects of the model are most effective to which individual leaders?

8

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9

Part One

Recent Discoveries About the Brain That Change Everything

***Today’s revolutionary advances in neuroscience will rival the discoveries of Copernicus, Galileo and Darwin.***

Paul Churchland (1996)

Ten years ago I became fascinated by the sealed magic box that is the seat of our thinking, our choices, and our selves. I’ve now de- voured dozens of books and hundreds of articles about how the brain works, from fields including evolutionary psychology, sys- tems theory, genetics, linguistics, and neurophysiology. In 2003 I began to introduce a few concepts about brain functioning into my coaching programs and started to notice strong links between what scientists were finding out about the brain, and how I had been training leaders to be better coaches. I began to see that cen- tral to leadership was the ability to improve people’s thinking. Therefore leaders might benefit from knowing more about the thing that does the thinking.

Over several years of including a study of the brain in my var- ious classes, a set of core discoveries about the brain emerged. I began to see the central ideas that anyone wanting to understand how to change human behavior should know. These insights trace their origins to brain research by a wide range of neuro- scientists including Gerald Edelman, John Ratey, Jeffrey Schwartz, Joseph LeDoux, Michael Merzenich, Edward Taub, Jeff Hawkins, Thomas B. Czerner, and many others. These in- sights, when fully appreciated, have the power to fundamentally rewrite the rules for nearly every human endeavor involving thinking and learning, including how we educate our children, how we hire and manage staff, how we train people in the work- place, and how we develop leaders.

To me, these insights help explain why therapy often doesn’t deliver real change, why trying to give advice is usually futile, why managers are not meeting the needs of workers today, and much, much more. But enough of what *my* brains thinks about all this— let’s get into it.

■

■

THE BRAIN IS A CONNECTION MACHINE

***Your brain craves patterns and searches for them endlessly.***

Thomas B. Czerner (2001)

Scientists have discovered that our brain is a connection machine. Or to be more specific, the underlying functionality of our brain is one of finding associations, connections, and links between bits of informa- tion.1 Our thoughts, memories, skills, and attributes are vast sets of connections or “maps” 2 joined together via complex chemical and physical pathways. I will call these connections maps from here on as it’s a short, memorable word; however you can replace this word with *circuits, wiring,* or *neural pathway* if you prefer.

To give you a sense of the complexity of these maps, imagine a topographic map of one square mile of forest, on a sheet of paper one foot square. Add in the specific details of all the animals living there, from the microbes to major mammals, and the complete specifica- tions of every plant, fungus, and bacteria. Include in the details of each object its size, shape, color, smell, texture, and a history of its in- teractions with every other object, and then include a snapshot of this information for every moment in time going back forty years. That should give you a sense of how rich these maps are. As it turns out, our brains are made up of maps, and maps of maps, and maps of maps of . . . you get my drift. These sets of maps are created through a

process of the brain making over a million new connections every second between different points. Quite something.

So every thought, skill, and attribute we have is a complex map of connections between pieces of information stored in many parts of the brain. For example, the idea of a “car” is a complex, ever changing map of connections between our cognitive or high-level thinking center, our deeper motor skills center where our hardwired activities are held, and many other regions in the brain. The map for car for you might include links to the name and shape of every car you remem- ber, the memory of your driving test including the look of panic on your instructor’s face when you nearly sideswiped that truck, the sound of your car when it is running smoothly, your understanding of how an engine works, the history of cars, and even remembering where you left your keys.

Consider what happens when we are trying to think. When we process any new idea we create a map of that idea in our mind, and then compare it subconsciously in a fraction of a second to our existing maps. If we can find solid enough links between the new idea and our current maps, if we can find the connections, we create a new map that becomes a part of the layout of our brain; this new map literally be- comes part of who we are.

Our brains like to create order out of the chaos of data coming into them, to make links between information so that our lives make more sense. We feel more comfortable surrounded by order, we feel better inside symmetry, where we can see how everything is con- nected. Thus we are constantly making links between maps to form new metamaps. A field called *Gestalt psychology* 3 has done significant research on how we look at situations and make meaning out of them.

One respected theory for why our brain likes to make everything fit together is that our maps help us predict the outcome of situations more easily. In *On Intelligence,*4 Jeff Hawkins, founder of Palm Com- puting, puts forward that our predictive abilities are the attributes that differentiate us most from the rest of the animal kingdom. The first time we use a new computer we’re confused as to where the shortcut buttons are: after a few days we have a mental map for how

Recent Insights About the Brain That Change Everything 5

to hit them, and could do so with our eyes closed. The more hard- wired our maps are for repetitive tasks, the more we’ve freed up our working memory for higher-level tasks.

Let’s get back to what happens when we create new mental maps. You can tell when you are going through this process yourself be- cause you will probably stop speaking and start picturing concepts in your own mind. You can tell when other people are going through this process: their eyes become glazed, they reflect, and they often look up or away into the distance. When we are processing complex ideas we tap into our visual center: we see ideas as flashes in our mind’s eye.

We’ve all had the feeling of that sudden “aha” moment. It’s a mo- ment when various ideas that were not linked before come together to form a new idea. It feels like we’ve seen something new. This is the moment of creation of a new map. There is a big release of energy when this new map forms, even though energy was required up front to connect the dots. There’s a tale told about Archimedes, who after an insight about how to solve a scientific challenge, leaped out of the bath and ran through the streets naked shouting “Eureka!” 5 Such is the impact that insights can have on us.

When we create a new map we feel motivated to do something, and our face and voice change. When you watch for it, you can see that the act of creating a new map is a specific event. It’s possible to pinpoint the exact moment it occurs. This is the moment of break- through, a moment when we see an answer to a challenge or prob- lem. We’ll explore the anatomy of these aha moments further in the chapter called Dance Toward Insight, where we’ll go into exactly what happens in the brain during the few seconds before, while, and after we generate a new idea.

Consider what happens when we want to think a new thought, process a set of ideas, make a decision, or unravel any kind of issue. For example, as a manager you might want to increase the sales in your division but are not sure you have the right people on board. Or as an executive you need to decide whether or not to confront a manager about their poor performance. In each instance we need to create a new map in our brain. We literally have to “think things through for

ourselves.” It is important to realize this is still the case even when we are told what we “should” do; unless that “should” fits exactly with our existing wiring (which as you will see in the next insight is extremely unlikely), we still need to expend the energy to create our own maps.

Creating a new map chews up resources. Our brain needs to do a lot of comparing, associating, and matching any new idea with our exist- ing maps. However, the creation of the new map releases substantial energy along with various neurotransmitters, and even changes the brain waves occurring. There is a sudden, strong motivation for action. So let’s stop for a moment and reflect on the ideas I have put for-

ward so far, and see what they might add up to.

1. To take any kind of committed action, people need to think things through for themselves;
2. People experience a degree of inertia around thinking for themselves due to the energy required;
3. The act of having an aha moment gives off the kind of energy needed for people to become motivated and willing to take ac- tion

It becomes clear why our job as leaders should be to help people make their own connections. Instead of this, much of our energy goes into trying to do the thinking *for* people, and then seeing if our ideas stick. As you will see in the next insight, this is usually a big waste of human resources. (And I mean that in every sense of the word.)

There is a new world to explore here. If we are trying to help other people think, we might develop a whole new set of skills—such as the ability to create the physical and mental space for people to want to think, the ability to help others simplify their thinking, the ability to notice certain qualities in people’s thinking, the ability to help others make their own connections. These are some of the most im- portant skills that leaders must master today, and central to being a Quiet Leader.

■

UP CLOSE, NO TWO BRAINS ARE ALIKE

***There are more possible ways to connect the brain’s neurons than there are atoms in the universe.***

John Ratey (2001)

As scientists have begun to understand the mechanics of the brain they have discovered a world of almost unimaginable complexity.6 The brain has around 100 billion neurons. Each neuron may have up to 100,000 dendrites (think of dendrites as roots—they gather infor- mation for the neuron) and one axon (think of the axon as a tree trunk, passing on information). The connections between our neurons, con- nected by the dendrites, are the maps that guide our thoughts, behav- iors, and action.

If you want to determine how many possible ways the neurons in a brain could be connected, simply multiply the number of neurons by their roots and branches, and then by the number of chemical messengers they can use to communicate. As it turns out, this is a rather ridiculous number. Let’s keep it simple and just say that it’s a larger number than there are atoms in the known universe, as Dr. Ratey says.7 Some people think this means we have unlimited mind power; however, that’s somewhat of a misunderstanding. Yes, the brain has extraordinary capacity to develop connections: just lis- ten to a jazz musician in full flight to see what a well-trained brain can do.

Here is a more accurate insight from the fact that we each have more than 300 trillion constantly changing connections: There are unlimited different ways that brains can store information, unlimited options for how experience, learning, and information might be en- coded in the brain.8

Have you noticed how different people look at the same situation from quite different perspectives? Perhaps you played telephone as a child; there is a similar game played in leadership development pro- grams. Person one explains a new job description to person two. Per- son two then passes on the job description to person three. Person three then explains the job description back to person one, who is then baffled at how different the job has become after just a couple of handovers. People hear even the simplest things very differently. And the reason for this is that our brains are substantially more different than we acknowledge.

I mentioned earlier that our minds process complex ideas fastest when we use our visual resources. So let me tell you a story to illus- trate how different our brains are. (Note that the phrase “process complex ideas” means that we’re making our own mental maps and comparing them to our existing maps. By hearing my story you can “see” my point for yourself.)

A year ago, my wife, Lisa, bought two identical computers for each of us to use. Lisa and I have been together for nearly ten years and we know just about everything about each other. Yet after only one year of using our computers I can’t make any sense of hers. It takes me a lot longer to do a basic task on her laptop than it does on mine. I don’t know how she files information; I can’t picture the way she’s arranged her digital world.

Our environment literally shapes the physical nature of our brains; therefore our brains were already quite different to each other’s at birth. Since then, the circuitry of our brain has been molded by every sound, thought, feelings, idea, and experience, for our whole lives. So while your brain looks similar to mine at a dis- tance, the way we store, organize, manage, and retrieve information is as different between you and me as two laptops would be after forty years of use.

Recent Insights About the Brain That Change Everything 9

All this is quite logical; however, we are a long way from living like this is the truth. When we are trying to help a colleague think anything through, we make the unconscious assumption that the other person’s brain works the same as ours. So we input their prob- lem into our brain, see the connections our brain would make to solve this problem, and spit out the solution that would work for us. We then tell people what *we* would do and are convinced it’s what *they* should do.

I have watched this happen hundreds of times in my workshops and in day-to-day life. Highly successful, intelligent people are blind to the fact that they are trying to make connections *for* people, as- suming their brains are similar enough for this to work. Even those people you would consider emotionally intelligent naturally want to do the thinking for others. It is a rare person indeed who doesn’t try to help another human being on the assumption that their brains are basically the same.

Doing the thinking for other people is not just a waste of our own energy; it also gets in the way of other people working out the right answers. Consider for a moment how much advice you get each week from others. Putting aside information we couldn’t find for ourselves, like a password, how often is the advice people give you truly useful?

Our mental maps are so remarkably different, yet we live as if this is not the case. To me, the implications of this insight are almost as significant as seeing the Earth is actually round. If the world truly ac- cepted this insight we might see the foundations of education, train- ing, and development shaken up, which I’m not alone in thinking could be a positive thing. To you, of course, this insight may bring to mind implications I couldn’t possibly predict.

■ ■ ■ ■ ■ ■ ■ **EXERCISE STATION FOR** ■ ■ ■ ■ ■ ■ ■

**Up Close, No Two Brains Are Alike**

If you’d like to take this insight further, here is an exercise that you might like (or, of course, you might come up with a much better one). For one whole week keep a tally of the number of times people give you advice, and the number of times it is useful. At the end of the week do the math to see the percentage that advice was useful to you. See what happens in how you approach others around you after that.

■

THE BRAIN HARDWIRES EVERYTHING IT CAN

***The brain is constantly trying to automate processes, thereby dispelling them from consciousness; in this way, its work will be completed faster, more effectively and at a lower metabolic level. Consciousness, on the other hand, is slow, subject to error and “expensive.”***

Gerhard Roth (2004)

I discovered something about my own wiring while watching my one-year-old daughter, Trinity, learning to walk. At that time I was living in an apartment that was up two flights of stairs. Though they were carpeted, the stairs were steep enough to cause harm if Trinity toppled over. Early on during the process of learning to walk that’s exactly what she did, and the resulting scream, the intense fatherly guilt of causing her pain, and the fear of causing long-term harm led the incident to be firmly wired into my brain.9 Every time I went out with Trinity after this event I purposefully took her by the hand down the stairs, and she hasn’t fallen since. I can’t be sure if there was any change in Trinity’s brain, but I know that in my brain, the wiring was quite different from that point on. And so far, nine months later, my brain is still different. I had learned something.

Recent findings from neuroscience are showing that when we learn, the universe changes too. The connections between our neu- rons reconfigure, and the world is a tiny bit different as a result.

When I saw Trinity fall down the stairs, the impact of this experi- ence was strong enough to create what is termed *hard wiring* in my brain. A specific thought pops up each time I take the stairs with her, and that thought is now a part of my life, a new habit that I live by. This thought is now an automatic function, and in several years’ time, when Trinity is quite adept at taking the stairs, I will probably still feel the urge to take her hand.

This habit is not being held in my working memory; it’s hard- wired somewhere deeper. We have a limited amount of working memory, which anyone who has tried to juggle too many projects at once has discovered. Joseph LeDoux, a renowned neuroscientist working at New York University, believes that the brain can hold just seven concepts in working memory at any time.10 Therefore the brain likes to take any action or thought that is repeated, or tagged as im- portant in any way (which seems to be linked to the amount of emo- tional charge in an event), and in a sense “hard code” them. The brain pushes the map down into the part of itself that holds long-term memories and processes, called the subcortex, which has far more ca- pacity than working memory.

An analogy for hard wiring is the way water flows across the sur- face of the Earth. The water finds a course through the land, and over time this course deepens and it becomes less and less likely that water will flow another way. The Grand Canyon was created like this. In the same way, we develop chemical and physical links between our neurons, which over time become more ingrained, to the point that eventually we would only be able to forge a new pathway with quite some effort. It’s like treading a well-worn path through thick jungle versus having to cut a new route—the well-trodden path is so much easier.

When you learn to play a new sport, for example tennis, your skills improve quite quickly. That’s because your brain hardwires some of your movements as you go along. This allows you to forget about, say, how to hold your racquet, and now focus on your stance. Brain scans of elite athletes have shown that they use significantly less of their brain while playing their sport, compared to nonelite

athletes.11 You would think intuitively it would be the other way around, but what’s happening is that the bulk of the athlete’s cogni- tive brain is no longer required for their movements, and can be used just for high-level decision making as needed. They have trained their brain as much as their body. It seems our hard wiring is more dependable, more able to deliver results, than our everyday con- sciousness.

So the way we talk, walk, interact, read emails, and manage our staff is, for the most part, deeply hardwired and therefore habitual. Our habits are literally unconscious to us; we don’t “have in mind” what we are doing. You might take this further and say that once peo- ple have done a job for some time, they are unconscious much of their workday.

In summary, given how deeply hardwired we all are, if we want to help others change any type of habit, it’s going to take more effort than we are currently applying, and possibly a whole new approach.

■

OUR HARD WIRING DRIVES AUTOMATIC PERCEPTION

***Prediction is not just one of the things your brain does. It is the primary function of the neocortex, and the foundation of intelligence.***

Jeff Hawkins (2004)

This next insight is a radical one, and it’s one that’s taken many neu- roscientists by surprise. However, it’s something that writers, phi- losophers, and poets have been pondering for a few thousand years. It wasn’t hard for an ancient Greek scholar to notice that doctors al- ways saw diseases, that children saw opportunities for mayhem, and that mathematicians saw logic in everything. In the last thirty years as the New Age movement took on the role of global philosopher, the mantra of “you create your own reality” has been repeated in seemingly infinite forms. From Napoleon Hill to Dr. Phil, from Deepak Chopra to Oprah, millions of books and workshops have churned out the message, put so eloquently by Anaïs Nin, that we see the world as *we* are, not as the world is.12

Let’s look at how this happens in the brain. Any piece of infor- mation that comes along, whether it’s a new face, a new way of think- ing about ourselves, or a new business idea, gets broadly the same treatment when it enters the brain. It doesn’t matter whether the data is in the form of a force, a sound, a smell, a taste, an image, or a tex- ture,13 the process is that the new data is compared to our existing

mental maps, to see where the connections are. We then try to fit the data into our existing frameworks. If any data doesn’t quite fit, we try harder to make the connections, we literally try to make the connec- tions fit. Perhaps you have noticed that when we are for an idea we are more likely to allow tenuous links to become fact, and when we are against an idea we see even strong evidence as irrelevant. Even whole societies do that collectively at times.

While our brain likes to fit every piece of new information into an existing map, it’s dealing with a massive volume of information. Mil- lions of pieces of data pour in through our senses each second, at the same time as complex internal data processing takes place. The way we can process such massive volumes of data is by doing a lot of *ap- proximating.* For example, once we have learned to read, we read by glancing over the first letter or two of a word and guessing the rest, in the context of the whole sentence and the word after it.

What does the phrase below, from a famous Disney movie, say to you?

*When you wish upon a a star . . .*

We expect the sentence to say “when you wish upon a star” be- cause we’ve heard this phrase before, yet most people won’t see that there are two *a’*s in the sentence. We see the sentence according to our expectations, not based on what is in front of us. As a conse- quence, we get a lot of things wrong.

Here’s a story I won’t forget in a hurry about how my own brain once got things wrong. A few years ago while in another country I wanted to get a local phone chip for my cell phone, a SIM card as they’re called, so that I could have a local phone number and avoid international phone bills. Lisa kindly offered to handle this for me. A few days later she handed me my phone as I headed off to a confer- ence, saying, “It’s done.” Or at least that’s what I thought she said; in fact, she’d said something quite different. So off I went, making many more calls than I would have otherwise. At one point I called a

colleague to give him my new number. “That’s weird,” he said. “Your old number is showing up on my screen.” “Oh, that must be just a weird type of phone memory,” I responded. I can actually remember pushing aside the flicker of a thought that came through my mind with another thought, which went “Naah, that’s not possible.” My reality was firmly set in place, and I had defense mechanisms to en- sure the world stayed the way I expected it to be.

Several days later while chatting with Lisa on my cell I thanked her for organizing the new chip. “How did you manage to get the battery off ?” she asked. “What are you talking about?” I responded, my wiring starting to overload. She told me to look in the coin sec- tion of my wallet and there, to my horror, was the new chip. And boy, did I feel silly, not to mention poor when the bill came in a month later.

In the story above, my brain was seeing the world through my wiring, even when strong evidence to the contrary was showing up. It’s like when you close a big deal one week and nothing seems hard. Then you discover the deal’s fallen apart, and the same projects seem like wading through mud. It is our interpretations of the facts, the decisions our brains make of inputs around us, that determine how we perceive reality. There is literally no reality “out there,” only the re- ality we are deciding to see. Our automatic perceptions are driven by our hardwiring.14 Some of this wiring is only short term, held in our working memory such as a bad mood that passes after a day. How- ever, some of our wiring is very long term indeed. Many of our habits are driven by decisions we made in the past that are now literally a part of us. Finding ways to shift these hardwired habits is often the central challenge for leaders as they try to bring out the best in their people.

Let’s reflect on all this a little. Our brain tries to make whatever we are sensing or thinking fit into our existing mental models. It does so through guesswork that’s based on past experience, which has been hardwired in our brain. If we think the world is a dangerous place, we look around for evidence of this and find it. If we think peo- ple are talking about us, we find evidence for this too. Whatever fil-

ter we hold in mind, the brain will look for evidence to confirm this filter, and it does this extremely efficiently, second to second, without our conscious mind being aware of what we are doing.

I’m not saying this is all a bad thing, in fact perceiving the world through hardwiring is very useful: Without it we couldn’t cope with the volume of information hitting our senses every moment, nor could we speak, read, write, or do business. And now comes the good news: If our world is defined by the mental frames we hold in mind, it means it’s possible to tangibly improve people’s performance sim- ply by helping them shift their thinking.

The link between hard wiring and perception explains many busi- ness performance trends, from visualization to the power of setting goals to the impact of positive feedback on others. As a leader who wants to improve other people’s performance, it’s going to be useful to be able to influence the way people perceive the world. This is a new art for most leaders, one that requires the development of new muscles.

So there are big upsides to the fact that we perceive the world ac- cording to our wiring. Now let’s explore the downsides.

1. Changing the way people think is one of the tougher chal- lenges of leadership, as people tend to fight hard to hold on to their view of the world. They feel that if they change their thinking the whole world might collapse, and in a sense this is true, given that we perceive the world through our mental maps. Confronting people head-on can make them dig their heels in further. A more subtle approach may be needed here.
2. When external realities change, people’s internal realities often don’t change as quickly. When experiencing a big change at work, employees literally need time to rewire their minds. And they have to make their own connections, according to their own wiring. We can make the space for this to happen, and en- courage it, but then we need to take a step back and allow the process to unfold.
3. Given that our wiring is all so different, any group of people

will see the same situation from substantially different perspec- tives. Rather than fighting this fact, the best leaders harness this reality by bringing together a balanced team of people who think in different ways. When two people think too much alike they get in each other’s way.

1. Some people’s maps could be out of date. Someone may per- ceive others at work as a threat, as a result of difficulties in a previous job. Helping people identify and then let go of mental frames that are holding them back from performing at their peak is another important skill for leaders to develop.

The implications of the fact that our hard wiring drives percep- tions are far reaching, and of course will be different for each reader. Yet although people have been discussing this idea for decades now, in the corporate world this insight is a long way from being at the forefront. The brain truly sees the world according to its own wiring. In fact, the majority of the time it’s even worse than that—our brains will go to great pains to vehemently defend our existing mental mod- els even to the point, at times, of death.15

■

IT’S PRACTICALLY IMPOSSIBLE TO DECONSTRUCT OUR WIRING

***Connections that are used become stronger, even permanent elements of the neural circuitry.***

Jeffrey M. Schwartz and Sharon Begley (2002)

We’ve explored how our habits, thoughts, aptitudes, and skills are based on unimaginably complex sets of connections that can’t be ac- curately predicted. Many of these connections are firmly embedded into our subconscious. These connections then define how we see the world, the choices we make, and therefore the results we produce, without our knowledge that this is happening. So if we want to im- prove a person’s performance, the obvious next question is how do we change their connections? The answer, it turns out, is that unfortu- nately we can’t. It’s almost impossible to change any hard wiring that’s been embedded in the brain.

Now, I am not saying that the brain has no ability to change— clearly with a million new connections being created each second there is an awful lot of change going on. However, the *way* we go about trying to change our habits most of the time is fundamentally flawed.16 Our default mode for trying to change our habits is to try to “unwire” what is already there, to deconstruct it somehow.17 How- ever, it’s like trying to get rid of the Grand Canyon—it’s not such an

easy task. Far easier to leave it where it is, cut a small new path in the side of the wall and allow the water to do its work over time.

Let’s take a deeper look at the mechanics of what happens when we try to change our wiring. Our automatic approach is to decon- struct the habit, meaning to try to understand where it comes from. We are a reductionist society: Our tendency is to assume that know- ing the source of an issue will resolve it. So when we want to change something about ourselves, we first look down into our memory and search for the roots of our habits. We look for the links. We literally try to make connections from the habit back into our past; in the process we deepen the connections between the idea that we want to replace and other parts of our brain. Can you see where I am going with this?

Given how interconnected the brain is, we can probably find links just about anywhere we look. It’s easy to be lured into the fascinating world of links, connections, and reasons, and continue down the rab- bit hole for a long time, even our whole lives. Not confident speaking in public? Think about it hard enough and you’ll find lots of reasons why. Maybe it’s your confidence, which is poor because of a lack of positive feedback when you were young. Maybe it’s a fear of being open. Maybe it’s something that happened when you were at school. While these connections might be interesting to talk about, how use- ful is this process of finding the reasons and links? Will seeing these links, even if they are true, help us change the habit? Also, remember that with the brain’s tendency to find what it’s looking for, we may create links that were not even there in the first place.

Now, just to be clear, I am talking about what we do once we have basic awareness of a habit we want to change. I am not saying we shouldn’t reflect and learn about ourselves—far from it. Becoming more conscious of the way we move through the world is a critical first step to fulfilling our potential in any domain. However, it’s what we do once we’ve seen something we want to change that makes all the difference. Looking for the source of a habit literally creates more connections between this habit and other parts of our brain. The more we focus on a problem we have, the more ingrained we make it.

So what about just telling ourselves to “stop it”? Unfortunately, hard wiring is quite firmly implanted. What usually happens is we fail to stop the habit, and then become upset with ourselves for fail- ing. This provides further links and energy to the original wiring we wanted to get rid of, further embedding the habit.

There is another way: We can leave the problem wiring where it is, and focus wholly and completely on the creation of new wir- ing. This is just what happens in the brain when we are solutions- focused. Yet for many people, the act of focusing solely on creating new wiring requires the creation of new wiring in itself.

In summary, science is showing that we *can* change the way we think, and that it’s not as hard as we’ve been assuming. Changing a habit, now that’s hard, but leaving it where it is and creating a whole new habit—that turns out to be far more achievable. There are many implications to all this, and this insight and the next one combined are ideas we draw on heavily for the rest of this book. To start with, in a workplace context this insight means that if you’re trying to im- prove people’s performance, then working out what’s wrong with their thinking is not going to be very productive. Again, we need a whole new approach.

■

IT’S EASY TO CREATE NEW WIRING

***Whenever you read a book or have a conversation, the experience causes physical changes in your brain.***

George Johnson (1991)

Until just twenty years ago scientists thought our brain was all wired up by early childhood, and then slowly declined in complexity, with neurons dying away over time and our links becoming weaker as we aged. The theory was that we couldn’t regrow or make new connec- tions between our neurons. This seemed logical given that children went through a phase of easy learning which slowed down at a cer- tain point, and that we seemed to become more forgetful as we got older. All this has changed with an exciting new domain within neu- roscience called neuroplasticity.

Neuroplasticity grew out of studies of stroke patients and those with other degenerative brain diseases.18 Scientists found that the brain had a remarkable ability to rewire itself when things went wrong. If the part of the brain responsible for speech was affected by disease, other parts of the brain could be called into action and would start to perform this function. The brain diverted traffic along new highways it quickly laid down around the accident site, allowing largely normal functioning to occur.

As the study of the plasticity of the brain evolved, scientists no- ticed that the brain was capable of creating new connections on a

massive scale, at any stage of life, and did this in response to anything new that was learned, such as learning to play an instrument. Edward Taub initiated much of the breakthrough work in this realm in the 1980s, at the time as the chief scientist at the Institute for Behavioral Research in Silver Spring, Maryland. As did Michael Merzenich of the University of California in San Francisco.19 However, for years mainstream neuroscience strongly resisted Taub’s and Merzenich’s results. Finally, by the mid- and particularly late 1990s, through ad- vances in imaging technology together with results reported from stroke patients, it became widely accepted that the brain could rewire itself as a result of physical therapy.20

It is now widely believed that our brain doesn’t just get rewired when life-changing events occur; it happens second by second, day and night, in response to everything going on around us. Every day we create enormous sets of new maps that change the chemical and physical connections in our brain. Drive to a suburb you’ve never vis- ited before and you will feel a sense of not being able to picture where you’re going and feel mild anxiety. By visiting the area just once, even for a few minutes, you automatically create a mental map of the sub- urb. Go back five years later and you will, quite literally, still have that map in mind: as a result you feel less anxious than if you’d never been there before. Your brain’s wiring was changed by your visit.

Everything we think and do influences the layout and connec- tions of our brain. Every thought, word, new idea, what we eat, what we do for exercise, how we define ourselves—all of this and more is fine-tuning the pathways inside our head. The upside to this finding is that we have an incredible ability to change, an immense capacity for new connections. Our brain is very comfortable making new maps, perhaps you could even say it’s the brain’s favorite activity.

You have created hundreds of millions of new connections from reading this book so far. However, most of these won’t be hardwired into long-term memory. Right now you can probably remember the major points you’ve read, but if you didn’t do anything else with these ideas it’s unlikely you’d remember this book in detail in two years’ time. So there is clearly a difference between a thought (a map held

in our working memory), and a habit (a map that’s hardwired in the deeper parts of our brain).

Science is showing it’s not that difficult to bridge the gap between a thought and a habit. If we want to hardwire a new behavior we just need to give our new mental map enough attention, over enough time, to ensure it becomes embedded in our brain. We do this by making links to different parts of the brain so that the web of links thickens and spreads out. Instead of just thinking about an idea, we also write it down, and speak about it, and take action. These events provide links across many parts of the brain, such that our new map has more depth, more density, and is thus held in place more firmly. If we literally put enough energy into the insight or idea, it will be- come a part of who we are. It’s an attention economy in our brains, at a million connections per second.

Lots of research has been done on this fascinating gap—the gap between a thought and a habit—by fields as diverse as neuroscience, sports psychology, education, adult learning theory, behavioral sci- ence, and cognitive behavioral therapy. Here are some of the findings that are most relevant here.

1. ***New habits take time, but not that much:*** For a long time it’s been commonly believed that it takes several months before we create a new habit—in other words, hardwire a new behavior into our thinking. However, science is showing that we create both chemical and physical changes in our brain remarkably quickly. Studies show 21 that physical new branches, called den- drites, were emerging after just an hour of stimulation. Try opening your car door with your other hand for one day and watch what happens. It doesn’t take long to create new habits. What’s hard is trying to *uncreate* them.
2. ***Positive feedback is essential:*** This quote from *What Makes You Tick* by Thomas Czerner says it so well: “The brain needs to see a happy face and to hear occasional laughter to cement its neu- ral circuitry. The encouraging sounds of ‘ Yes! Good! That’s it!’ help to mark a synapse for preservation rather than pruning.”

We’ll go further into the importance of positive feedback at several other points later in the book. Suffice to say for now that neurons literally need positive feedback in some form to create long-term connections.22 If we want to help people improve their performance at work, we need to become much more pro- ficient at giving positive feedback.

1. ***Too many thoughts, too little time:*** One of the difficulties inher- ent in developing new wiring is simply *remembering* to do what we know we *should* do. We need to remember to remember, something that’s quite a challenge in a week overloaded with priorities and deadlines. This is why it can make such a differ- ence having another person help us change. The reminder, the attention, the energy of knowing someone is thinking about our new habit, helps create more links to the insight we are attempting to hold in mind. Put another way, we can make a tremendous difference to other people’s thinking by helping them clearly identify the insights they would like to hardwire, and over time reminding them about these insights.23

You might be wondering what happens to our old wiring when we create new maps. Wouldn’t there be a conflict between the old and new? A new field of neuroscience called neural Darwinism24 is studying how the brain constantly prunes and removes unused links. Just as your ability to do complex mathematical multipli- cations in your head quickly in your youth largely disappears if not used for years, any pathways you don’t use for a while slowly become less connected. So if you want to change your habits, just give less energy to the habits you don’t like. Like pesky neighbors whom you’d rather not deal with, don’t bother them and they won’t bother you. Meanwhile clearly define the new connections you’d like to foster and get to work at turning these into long- term habits.

In summary, if we want to improve people’s performance, our job is to help them find new ways to approach situations that leaves their existing wiring where it is, and allows for the development and ulti-

mately the hard wiring of new habits. A less technical way of saying this is we need to help people focus on solutions instead of problems. We need to give up our desire to find behaviors to fix, and become fascinated with identifying and growing people’s strengths, an en- tirely other discipline.

■

SUMMARIZING THE RECENT

**DISCOVERIES ABOUT THE BRAIN**

***The brain was constructed to change.***

Michael Merzenich (1992)

Our standard practices for improving performance involve tech- niques that are largely ineffective at helping others: giving advice, solving problems, or trying to work out how people need to think. To maximize our effectiveness as leaders, it’s time to give up second guessing what peoples’ brains need, and become masters of helping others think for themselves. The best way to do that is by defining so- lutions rather than problems, and helping people identify for them- selves new habits they could develop to bring those solutions closer. Pivotal to all this is the art of enabling other people to have their own insights.

Once people have had new insights for themselves, our job as quiet leaders is to provide the encouragement, ongoing support and belief in people, over time, to ensure they develop the new habits that are possible. Then we will be truly bringing out the best in others. As it turns out, this new approach saves a tremendous amount of time and energy for everyone involved.

If you’re still wondering exactly how you’re going to do all this, you’re in just the right place as that’s precisely what the rest of this book is about.

■ ■ ■ ■ ■ ■ ■ **EXERCISE STATION FOR** ■ ■ ■ ■ ■ ■ ■

**All the Recent Discoveries About the Brain that Change Everything**

If you’ve had some useful insights from reading this book so far, now could be a great time to deepen them by writing your ideas down. The act of taking time to crystallize high-level thoughts, images, and con- nections into concrete words, and then writing them down is, as you know by now, one of the ways to cajole our delicate new wiring into hard wiring: to ensure an insight becomes not just a good idea but a part of who we are.

**Capacity, Motivation, Bias Overview**

Research from neuroscience, psychology, and human development establishes three main areas that contribute to our overall effectiveness: our capacity to attend to, retain, and manipulate information; the strength and type of motivation that drives our thinking and behavior; and the cognitive biases that shape what information we pay attention to, and that impact our ability to reason, make accurate decisions, and develop successful strategies. Simply put, the science of capacity, motivation, and bias underlies almost all mental processes related to managing oneself and others. As such, they underlie all leadership behaviors and, by extension, influence all HR processes.

The neuroscience of capacity, motivation, and bias encompasses NLI’s primary areas of research. These science-based principles synthesize all the fundamental characteristics of leadership, more effectively enabling organizations to approach talent management through the lens of neuroscience.

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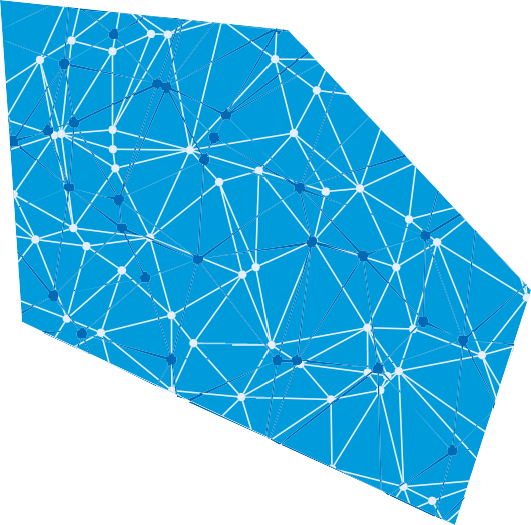
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## THE FACT MODEL™:

### A framework for managing cognitive capacity

by Robyn Catagnus Michaela Simpson Heidi Grant

and David Rock

VOLUME NINE | JANUARY 2020

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In today’s digital age, organizations are facing an attentional crisis, with information overload having adverse effects on both employees and consumers. Part of the issue is that humans can only process a small amount of new information at any one time. These limits occur within a small range across most people, are largely unchangeable, and are generally either misunderstood or just outright ignored. However, understanding these limits and working within them can lead to more successful problem-solving, optimal learning, and more effective communication overall. The FACT Model™ describes four critically important factors for improving human information processing: maximize the fluency of information, minimize the amount of information employees must process at any given moment, increase the coherence of incoming information, and increase the time that employees have to process the information. By focusing on these four elements, The FACT Model™ helps leaders and everyone promote better information processing for better performance on all kinds of work tasks.

THE FACT MODEL™:

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#### A framework for managing cognitive capacity

**by Robyn Catagnus Michaela Simpson Heidi Grant**

**and David Rock**

**Key takeaways:**

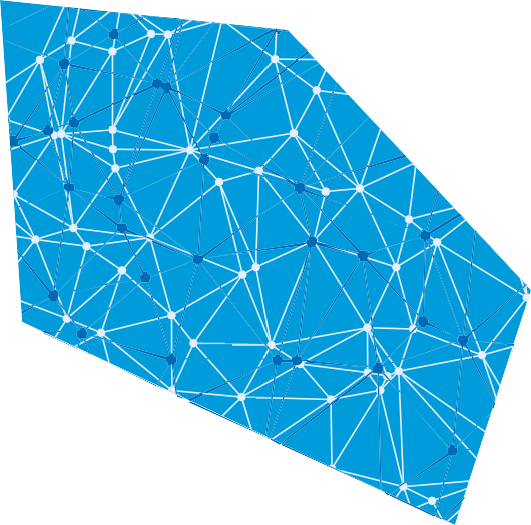
1. In the digital age, we face daunting challenges related to attention and cognitive capacity.
2. We have unlimited choices of detailed, exhaustive, and exciting information, but the brain is an organism with biological limits that affect processing.
3. Science suggests that people work best when they have essential, memorable, and coherent information.
4. To stay competitive, leaders and organizations must understand and manage the ways

**f**luency, the **a**mount of information to process, **c**oherence, and **t**ime (**FACT**) affect thinking.

1. The FACT Model™ offers realistic and straightforward strategies to enhance learning, communication, and understanding in the workplace.
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4

NeuroLeadership**JOURNAL**



## PERSPECTIVE TAKING:

### The neuroscience of better workplace relationships

by Robyn M. Catagnus David Rock

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The practice known as “perspective taking”—seeking out and thinking about others’ points of view and feelings—offers numerous benefits for individuals and organizations. It allows you to see new possibilities with clients, colleagues, and even competitors. Perspective taking can improve social interactions, relatedness, teamwork, performance, and more.

But organizations and leaders often fail to take advantage of this practice. Thinking about the experience and emotions of someone else does not come naturally to many people. It often requires time and motivation, uses a lot of cognitive resources, and can be challenging to do effectively—depending on whose perspective we seek to understand.

In this paper, we explain why organizations should offer leaders and employees more support for perspective taking. Three steps can help develop the right habits: 1) Remind people of the value of others’ point of view; 2) talk openly about the differences among people’s attitudes and beliefs; and

3) seek the necessary information to better understand others’ perspectives. Organizations can help individuals, leaders, and organizations consciously improve this important skill.

PERSPECTIVE TAKING:

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#### The neuroscience of better workplace relationships

When you actively pay attention to thinking that’s different from your own, your working relationships improve, and the organization grows more competitive.

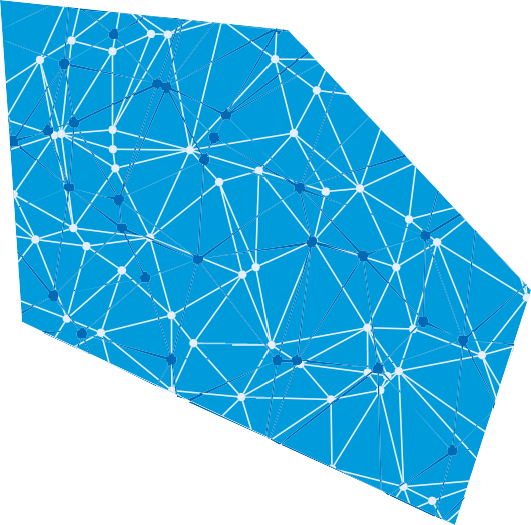
**by Robyn M. Catagnus and David Rock**

**Key takeaways:**

1. Perspective taking is a cognitive process enabling you to understand others in a less egocentric way—appreciating and accepting that their thoughts and feelings are likely to be very different from your own.
2. Effectively taking the perspective of others is important and offers numerous benefits for individuals and organizations.
3. Taking another’s perspective is easy to overlook, cognitively taxing to perform, and requires accurate information to be effective.
4. Individuals and organizations can implement practices to improve perspective taking, including planning ahead, managing capacity, and seeking accurate information.

4

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## HOW POWER AFFECTS BEHAVIOR AND DECISION-MAKING

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Being in a position of relative power (or simply feeling powerful) has reliable effects on our cognition and behavior. The cognitive effects come with a distinct set of advantages and challenges. Research has shown that experiencing power increases activity in the brain’s Behavioral Approach System, which is engaged when we pursue goals related to rewards. This often results in an increased sensitivity to goals, increased optimism, and big-picture thinking. Although there are clear benefits to experiencing power, it can come at a cost: the neglect of people, lowered sensitivity toward risk, and the neglect of concrete, detail-level thinking. In this paper, we describe the cognitive effects of power, including its advantages and drawbacks, and suggest strategies to help the powerful achieve more balance in their interactions and decision-making.

How Power Affects Behavior and Decision-Making

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##### Key takeaways:

1. Being in a position of relative power (or simply feeling powerful) has reliable effects on the human brain. Specifically, it increases activity in the behavioral approach system (BAS)

— the reward-seeking system.

1. BAS activation leads to cognitive and motivational changes in how powerful people process information.
2. Power leads us to focus more on goals that are important to us, sometimes at the expense of focusing on other people.
3. Power modulates sensitivity to risk-taking and can result in unwarranted optimism.
4. Power enhances psychological distance, often resulting in more abstract vision-level thinking and the neglect of concrete, detail-level thinking.
5. Research suggests that using specific strategies (e.g., incorporating expectations around perspective taking in goal setting, elevating managers’ accountability and responsibility to their teams, or paying attention to details) can help those in positions of power to adopt a more balanced approach.

4