2

THE BRAIN AND HUMAN BEHAVIOR AT WORK (AND EVERYWHERE ELSE)

This is by far the longest chapter in the entire Guide. There are several reasons for that:

1. The **"human element" in organizational change is typically the major impediment** to unqualified success and it's definitely the component of change that is least understood by the people who are responsible for implementing major change initiatives (Fugate, Kinicki & Prussia, 2008; Jorgensen, Owen & Neus, 2008; Savolainen, 2013; Seo et al., 2012).
2. To be effective as a Change Leader or change management consultant, **you have to be very good at persuasion**, i.e., getting other people to do what should or needs to be done, despite any initial or continuing opposition on their part. And, **it's virtually impossible to be a great persuader unless you have a thorough understanding of why people behave the way that they do at work**.
3. **Human behavior is extremely complex. At the same time, it is highly predictable** *if you have an appropriate (and relatively easily learned) lens through which to view it*. (I'll get back to this lens-concept in a later section.)

In this chapter, I'm going to present some behavior basics, the understanding of which I believe to be critical to successful change management, much less true Change Leadership. **I'm going to approach the neural (brain-controlled) basis of human behavior from three primary (psychological, physiological and evolutional) perspectives.** At present, there are no contradictions or incompatibilities among the three approaches. However, in the last decade, the mainstream psychological perspective has had to make some self-corrections to

account for a number of recent findings in SCN research (i.e., the knowledge well-spring of the physiological perspective).

Internal and External Influences on Behavior

Kurt Lewin, about whom much information follows in later sections, came up with a formula that is considered the most basic building block in understanding human behavior:

$B = f(P, E)$ **[Behavior is a function of both the person and the environment.]**

That is, there are internal and external causes of behavior. If you want to influence behavior, you can attempt to change the person or change the environment (or both) (Shoda, 2004).

Q. Of the two, person or environment, which one is easier to change?
A. The environment.

Q. Of the two, person or environment, which one do most managers concentrate on when they are attempting to change someone else's behavior?
A. The person.

Q. Is that smart?
A. No.

Consider this: I have a 9″ × 9″ solid wooden beam in a 15-foot length. I place the beam on the floor in the lobby of the building where you work. I then ask you and nine of your physically unhampered colleagues to come to the lobby and, forming a single line, walk on the beam from one end to the other. This would likely be a very simple thing for each of you to do. Some may wonder why they were asked to do it. But, it's likely that none would refuse.

Now consider this: I place two, 10-foot, sturdy stepladders approximately 13 feet apart and securely bolt each of them to the floor of the lobby. I then take the same 9″ × 9″ × 15′ beam and secure it atop the ladders. (For visualization: This would result in a structure somewhat akin to a tall, very solidly built saw-horse. Imagine that there is no chance that it will fall or even sway the tiniest bit.) This time, the task I ask the ten of you to accomplish is to climb a ladder, stand on the beam, walk across the beam to its other end and then climb down the second ladder.

What would happen this time? In all likelihood:

- some people would refuse to even try;
- those who attempt to complete the task would suffer some amount of anxiety or fear, whether a little or a lot;
- one or more of you might fall from the beam and seriously hurt yourselves.

Hah! I know what you are thinking. You're thinking that, yeah, well, of course the task of walking across the beam would be tougher in the second "environment" than in the first. But, it's a preposterous example. Work environments don't inhibit performance . . .

But, they do. Every day. Every single day. In every large organization.

The truth is that most work environments don't lend themselves very well to . . . Well, they don't lend themselves very well to work! Brain and behavior expert, John Medina (2008, p. 5) says that:

> If you wanted to create an education environment that was directly opposed to what the brain was good at doing, you probably would design something like a classroom. If you wanted to create a business environment that was directly opposed to what the brain was good at doing, you probably would design something like a cubicle. And if you wanted to change things, you might have to tear down both and start over.

How common are *environmental* problems such as these? (**Very**; I've seen all of them myself):

- Gail's computer has a 17-inch screen and at any one time, she can see a maximum of 50 percent of the spreadsheets with which she must work.
- Bill can't complete his daily work because he is continually interrupted by others who need his help.
- Jean and Phil are supposed to keep each other informed of all developments in their respective departments. But, their departments aren't located in the same building and they almost never see each other by chance.
- The training manuals for the new software system provide generic instruction. The materials haven't been tailored to the version of the software as customized for Joann's company.
- Janet's cube is near the copier and vending machines where everyone hangs out to chat.
- The monthly reports that Sam obtains don't include the kind of metrics he needs to improve any of the production processes in his shop.
- Gary is the CFO of a company that has recently been acquired by a German firm that uses a completely different kind of enterprise-wide software/information/accounting system.

Bottom line: If you want to change (improve) performance, look FIRST at what you might helpfully change (fix) in the environment (E) before you start trying to change the people (P) involved. And, it's so easy to remember:

Before you go to P, think about E! (small joke)

EXPERTS' INSIGHTS: A "GOOD" WORK ENVIRONMENT IS NOT INTUITIVELY OBVIOUS

Effective Change Leaders and consultants know that environmental problems are not always as obvious as those in the bulleted list shown previously. **In many cases, you can't simply look at the work environment and decide whether it (or any part thereof) is "good" or "bad."** In fact, what really works for the best is often counter-intuitive. Police patrol units are a good example.

What do you think is safer for police officers who are assigned to neighborhood patrols: One officer per car or two officers? Which do you think is safer for criminals and non-criminal citizens: One officer or two per car?

Well, if you said two per car, you'd certainly be in agreement with patrol officers themselves. When given the option, patrol officers overwhelmingly choose to work in pairs. Partner officers provide conversation that makes time on uneventful patrols pass more quickly, they provide second opinions when there is time to consider options and any officer will say that their partner "has my back."

Nonetheless, evidence supports the opposite. That is, one-person patrols have lower incidences of injury to both officers and citizens (criminal or non-) than do two-person patrols. Why? Well, it's pretty complicated. But, at the simplest level, the answer is that officers working together take more chances because they "feel safer" in pairs. Officers working alone are less confrontational and more cautious, at least in part because they feel more vulnerable when they must operate without a partner (Boystun, Sherry & Moelter, 1977; Scoville, 2011). Go figure, huh?

So how do you tell what works? Ideally, you'd do just what police departments all around the country have done, **try different variations, in different kinds of situations, and carefully record performance on as many objective measures as is practical. Then, let the data speak.**

A Psychological Perspective on Behavior

Please read the following list carefully!

- Maslow's Hierarchy of Needs
- Herzberg's Motivator-Hygiene Theory
- Attribution Theory
- Expectancy Theory
- Equity Theory
- (Need for) Achievement Theory
- Behavior Modification
- Theory X and Theory Y
- The Theory of Cognitive Dissonance
- Goal-Setting Theory.

Now, and this is very important, **forget everything you've ever heard about these things**. (Yes, I am totally serious.)

Why? Pick up any textbook on work motivation and you'll likely find that this is the format:[1]

I. Theory 1

   a. Explanation of the theory
   b. Example of a study or two where the theory seemed to "work" (i.e., accurately predict the behavior of some of the participants)
   c. Example of more than one or two studies where the theory didn't seem to work
   d. Possible explanation for why the theory doesn't work in many circumstances.

II. Theory 2

   a. Explanation of the theory
   b. Example of a study or two where the theory seemed to "work" (i.e., accurately predict the behavior of some of the participants)
   c. Example of more than one or two studies where the theory didn't seem to work
   d. Possible explanation for why the theory doesn't work in many circumstances.

III. Theory 3…

Get the idea? Well, even if you do, this is a dead horse that I'm going to continue to beat. But, first . . .

BRAIN CONNECTION! METAPHORS AND STORIES

It's said that we *learn through metaphors* (Lakoff, 2008) **and we *remember through stories*** (Gottschall, 2013). That is, **our brains store all information in the form of stories**. So, here's a story. (**Remember it!**)[2]

Once upon a time . . .

. . . at Harvard, there was a famous professor by the name of David McClelland. He was hired by some insurance companies to help them do a better job of selecting sales people. McClelland predicted that people who have a high need for achievement (i.e., those who preferred to work toward and accomplish challenging

goals) would make better sales people than those who have this need to a lesser extent or not at all.

The insurance companies started using the "test" of need for achievement that McClelland proposed. In the test, candidates for sales jobs were asked to make up a story about each of several pictures. One picture showed a man sitting at a drawing table on which there were architectural and design tools. The man was looking out of the window next to the table and he was smiling.

Stories that applicants told about this particular picture, at the extremes, tended to fall into two categories:

1. The man is thinking about a (building, bridge, whatever) that he is designing and he knows that it's going to be the best (building, bridge, what-have-you) ever designed. That's why he's smiling.
2. The man is thinking about the vacation he is going to take next week with his family. He can picture himself having fun doing (whatever) and that's why he's smiling.

As you might guess, the job applicants who told a story more like number 1 than number 2 were thought to have higher needs for achievement and were awarded higher test scores. The insurance companies then began hiring only those applicants with the best scores. And, guess what? McClelland's theory worked! That is, people hired on the basis of their need for achievement scores sold more insurance on average than did people who had been hired on the basis of other criteria. But . . .

Q. Did everyone who obtained a high test score have above average sales?
A. No.

Q. Was an individual's sales revenue on average proportional to the size of that person's need for achievement score?
A. No.

Yet, on average, overall sales increased when applicants who had the highest need for achievement scores were hired. Given this bottom-line success, the theory and the need for achievement test were applied elsewhere.

Eventually, this selection method was tried in a Japanese company. Did it work there? Nope. Japanese were found to be extremely likely to meet their need for "achievement" by collaborating with others, not by competing with or beating them (as American sales people might) (Colon, 2011; Holloway, 1988). Thus, they uniformly scored very poorly on McClelland's test. In fact, there was so little variance (variation) in the scores that it would have been impossible to use them to separate out prospective employees into likely to succeed vs. unlikely to succeed categories.

So . . . Like almost all the other theories of human motivation, Need for Achievement Theory **can predict—with marginal accuracy—the behavior of some people in some circumstances**. But, when you are trying to get hundreds or thousands of people to change from Behavior A to Behavior B across a wide variety of situations (as you must in an enterprise-wide change project), **none of these theories taken individually is going to help you much**. And, trying to keep them all in your head and figure out which one applies best in one situation vs. another would certainly be an impossible task.

As alluded earlier, many psychologists and other motivational theorists believe that there is one need (or "motive") that is trans-personal, trans-situational and trans-cultural. Meaning that this need is applicable to almost every person, in almost every circumstance, in almost every part of the world. This is the need to either enhance (whenever possible), or at least to protect or maintain, one's self-image (i.e., how positively or negatively one views one's self).

Today, most psychologists believe that people in every culture around the world have this fundamental drive to think favorably of themselves (rather than unfavorably) and that positive self-images are strongly and consistently associated with both psychological well-being and effective performance (both job performance and "life" performance). In contrast, threats to self-images often result in direct and powerful negative effects on general psychological well-being and on everyday behavior (Snyder & Williams, 1982). (In fact, many psychologists believe that when people commit suicide, it's because those people can think of no other way to stop the downward spiral of their self-images (Baumeister, 1990).)

Saying this in another, simpler way, **people's brains are powerfully attracted to situations in which they believe they will "look good" . . . and, they avoid situations—sometimes even at great personal cost—where they expect that they will "look bad"** (or even "not good"—as seen through their own eyes).

Now, as you read the previous sentence, you might have been thinking that the point being made could be nominated for a prize at the International Championship of the Obvious. But, the implications of the point are not obvious as all.

Here's how it all gets applied to work performance: Don't view poorly performing employees (or colleagues or bosses) as unmotivated or un-influenced by their managers. Instead, **focus on the fact that humans are always motivated to maintain or enhance their self-images** (i.e., the personal view of ourselves that is our mental image or self-portrait; it's a collective representation of our assets and liabilities as we see them).

The difference between high-performing employees and low performers is not in the levels of their motivation. All workers are fully motivated at all times. However, high performers perceive good performance as a means of maintaining or enhancing their self-images,

whereas low performers see poor performance (or not trying hard to perform well) as providing this fundamental function (Snyder & Williams, 1982).

A common example of the latter is the person who is recently promoted to first-line management and who fails to train subordinates to do certain parts of their jobs or who fails to delegate appropriate levels of authority to subordinates. These behaviors might not be effective in the eyes of the organization, but they might be highly effective in allowing this new manager to retain personally desired levels of power or control (i.e., part of a positive self-image, as defined by this particular employee) (Snyder, 1998a, 1998b).

Okay, now let's apply these concepts to major change initiatives. Your role as a Change Leader or change management consultant is to get people to adopt the newly expected/required behaviors as quickly and as willingly as possible. **Your ability to succeed at this challenging role will be significantly enhanced if you keep reminding yourself to operate within a self-image maintenance or enhancement framework.** That is, focusing on how you can help people feel better about themselves if they work hard to implement and adopt the new system. **On the other hand, if people don't move in the direction in which you're trying to "herd" them, try to identify the possible threats to their self-images that might be involved and do whatever you can to reduce or eliminate those threats** (Snyder & Williams, 1982). A lot more on this is forthcoming.

EXPERTS' INSIGHTS: MAKING PEOPLE FEEL GOOD ABOUT THEIR PERFORMANCES

A big part of aligning self-image enhancement and high performance involves the judicious use of feedback. Here are some things to keep in mind as you provide feedback to colleagues or customers—whether a high-level executive or the lowest-paid person in the organization. (It's just a "teaser," there's lots more on feedback to come.)

1. **One old maxim certainly holds true: "Praise in public, criticize in private."** For most people, few things are more threatening to one's self-image than being criticized in front of co-workers—or worse still—in front of the "boss." In addition to looking for a private way of providing corrective feedback, you have to be sure that you can provide it calmly. Sometimes, this might even mean waiting until the next day to address an issue. Although, when your emotions aren't involved, feedback (whether positive or negative) should be as close in time to the actual performance as possible.

When you must provide corrective feedback, make sure that it is specific (e.g., ". . . when these kinds of invoices arrive in your system, the very first thing that needs doing is . . .") and focused entirely on performance, not the person.

2. **If you want your praise to have the intended impact, watch out for "blanket recognition."** Example: Ann, Mark and Courtney work on delineating

each of the steps in a complicated manual process that will soon be automated. Their report turns out to be excellent. However, you are aware that Mark and Courtney did almost all of the work and Ann, if anything, was more of an obstacle than an asset. In these circumstances, you should try to avoid situations in which you need to praise the group for its work. If you were to do that, it's likely that it would greatly decrease the impact of the praise on Mark and Courtney and it sends a clear message to other change-project team members that you don't have to contribute to a sub-project to get by (with flying colors, even). So what do you do?

In public you can focus on the quality of the work product and use phrases like, "this was a really outstanding job," without specifically mentioning any of the individuals. It's usually best to follow up a situation like this by telling Mark and Courtney individually how much you appreciate their fine work. (Guidelines for dealing with Ann will come later.)

3. **Another old saying that applies well to effective feedback: "Don't kill the messenger."** To be successful at leading change, you have to find ways to encourage people to voluntarily inform you of things that aren't going as planned. Likewise, you have to be prepared to handle bad news in a positive way. Be aware that even "off-hand" comments can be misperceived. For example, if you respond to bad news with a negative exclamation (e.g., "Oh, crap!!!"), this might seem to you to be simply and entirely a result of your frustration—or perhaps even a self-condemnation (e.g., "Why didn't I see that coming?"). However, to the people who provide the news, it will often "feel" as a criticism of **their** behavior.

4. **Praise given at the completion of a major project task should be an "automatic."** However, task completion is sometimes a reward in itself. With difficult tasks, it is often the case that people more dearly need praise and encouragement while the effort is still underway. So, don't wait until end-points to "make people feel good about their performance."[3]

5. From expert-on-human-behavior, Maya Angelou: "I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel."

A Physiological Perspective on Behavior

And, now, for something entirely different . . .

The "psychological" perspective on human behavior that I covered in the preceding section has been around for a long time. Much more recently, an entirely different (but, totally compatible) view of behavior has evolved, primarily through the work of neuroscientists. It focuses on "brain wiring," i.e., the electro-chemically based circuitry in the brain.[4]

Through the use of a variety of brain activity recording devices, it has now been established beyond all doubt that **every time you learn something, the circuitry in your brain undergoes a measurable, physiological change**.

That is, the circuitry reprograms itself in much the same way that a computer can be reprogrammed.[5]

Consider this example: You see a story in your daily newspaper entitled, "World's Most Widely Recognized American." You read the story and find out that it is Muhammad Ali who holds this distinction. Instantly, in a way similar to how electrons flow across computer circuitry, your brain now sends an electrochemical impulse from the neuron that has just stored the concept "World's Most Widely Recognized American" along a neural pathway to the neuron(s) in which your knowledge of "Muhammad Ali" has been stored. That is, a new (yet relatively weak) circuit is hard-wired within your brain's (neural) network.

To continue with the same example: Six months later, a friend of yours wonders aloud who the most globally well-known American might be. If you think immediately of Ali, it is a result of the previously created circuit (connecting "Muhammad Ali" and "World's Most Widely Recognized American") being reactivated. However, the brain tends to "**prune**" connections (circuits) that aren't used frequently—especially if the circuit hasn't been used many times in total. So, if this same question arises five years later (yet did not arise in the interim), you might not think of Ali as a possibly correct answer. That once-active connection is no longer retrievable (i.e., it is forgotten).

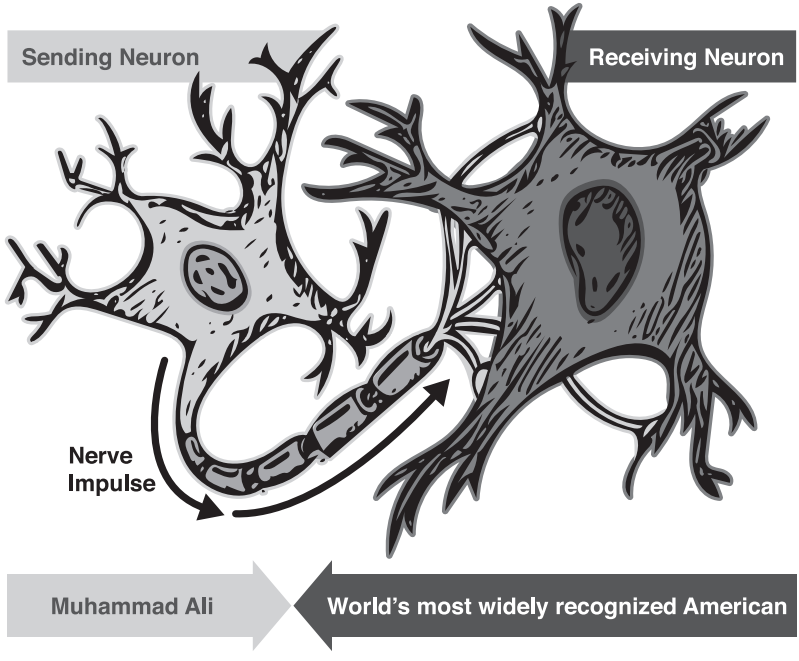

FIGURE 2.1 One Concept (M. Ali) Connecting with Another Concept (World's Most Widely Recognized American) Electro-Chemically in the Brain

BRAIN CONNECTION!

Why are there some things that you don't ever forget (e.g., your SSN, your middle name)? Later, I'll provide a fuller explanation. But, for now, I'd like you to know that REPETITION plays a huge role. With this "Ali" example, suppose you obtained a job as a guide for the Muhammad Ali Museum in Louisville, KY. If you told 6–8 groups of visitors each day (possibly for years on end) that Ali is the world's most widely recognized American, it would be very unlikely that that link would ever be pruned by your brain (i.e., you'll likely remember it until the day you die).

The format of this Guide takes advantage of the power of repetition: Any given important concept or consulting tactic will appear in more than one section and will be expressed in more than one way (e.g., a different example of the same phenomenon).

Let's look at another example of a simple, neuron-to-neuron, physiological connection being created: Jen, your friend whom for years you have called frequently, changes her phone number to 545.9718. She calls you while you're driving to work (your phone is in your briefcase just out of reach, but you can talk with Jen through the dashboard speaker) and reports the change. If you say the new number aloud several times, you have a better chance of remembering it than if you listened only. When you hear the new number, your brain creates a circuit between "Jennifer" and "545.9718." However, when you repeat the number three times, that circuit gets used again, then again, then a fourth time. So, it has become a stronger, faster (ever so slightly more durable) circuit.

A few days later, (using your land line at home which lacks a call directory) you decide to call Jen. You "automatically" punch in her old number. Why? Because the "Jen to old number" circuit has been reactivated hundreds of times and so it is much stronger (and faster to activate) than the newer one for Jen's current number (Duhigg, 2012).[6]

Now, here's an example of a really, really strong circuit: Back in the day, most Americans had a cigarette and coffee after dinner. Do this most days for ten years and you have a circuit that has been reactivated over 3,500 times. As a result, people who are attempting to quit smoking often find that sticking to their pledge is hardest right after dinner. Behavior associated with very strong circuits such as these can be extremely difficult to change. For example . . .

In work organizations, managers often assume that if they explain clearly and compellingly the need for change, then the behavior of reasonable people will fall in line. Clear and compelling communication is undoubtedly an important part of any behavior change campaign. However, a single communication is the equivalent of your friend, Jen, telling you her new phone number. **The communication creates**

a circuit, but it's likely to be weak in comparison with competing circuits—especially when ultra-strong, often-used brain circuits are already in play, as they typically are in "routinized" work behavior patterns.

BRAIN CONNECTION! THE BRAIN IS A CONSERVATIONIST

For reasons detailed later in the section "An Evolutional (that is, Evolution-Based) Perspective on Behavior," the human brain is designed to conserve its energy. After many repetitions of a specific behavior in a specific circumstance, the brain no longer has to "work" to decide what to do in that circumstance—it simply initiates the behavior that is wired to it. As a result, in the everyday course of events, you don't have to think about how to open your car door or how to tie your shoes. When *complex patterns* of behavior are repeated often enough, those patterns (switching from speaking one language to another) can also become "automatic."

Conservation of the brain's energy is critical for survival. So, the brain "protects" its strong circuits—the ones that result in automatic behaviors—by releasing noxious neurochemicals if we try to substitute a different behavior. Thus, people who are prevented from performing their routine work behaviors due to a prescribed organizational change can easily suffer as much (often much, much more) psychological *and* physiological discomfort as those who are trying not to have a cigarette after dinner.

*The Infrastructure of Brain Circuitry (***Greatly** *Oversimplified and* **Metaphor***-Based)*[7]

Our senses are continuously bombarded with stimuli (things we see, hear, touch, etc.). Before making their way to the brain, these stimuli must pass through the equivalent of a spam filter. This enables the brain to put aside the vast majority of (apparently useless) stimuli and keep itself from being overloaded**.** (**In any given *second*, the sensory system sends the brain about *11 million bits of information but it can actively process less than 50 of them*** (Mlodinow, 2012).)

Most of the remaining stimuli are encoded to the brain's largest storage area called long-term memory. This is where the brain maintains hard-wired (i.e., strong, fast and durable) circuits. That is, all the things we know—but which we are not actively considering or thinking about. Long-term memory has a colossal capacity and requires very little energy to do its job of being a storage facility. (For someone living in a cold-weather state, it would be analogous to keeping an extra case of sodas in the garage during the winter. You don't need those sodas right now; yet, you know that you can go and get them if you do—and they will be cold. Yet, it doesn't require any additional energy to store the sodas in an already

chilly garage like it would in a refrigerator.) This is a very important advantage of long-term memory because, as indicated above, **the brain overall is biologically programmed to be as energy efficient as possible**.

Recent SCN research has demonstrated conclusively that the brain hardwires every connection that it can. To conserve energy, the brain sends stimuli to the apparently appropriate "folder" in long-term memory as soon as it detects an absolute minimum level of similarity to an established set of connections/circuits. Of course, this results in many **erroneous connections being stored together**. These include **mistaken beliefs** (e.g., all dogs shed), **misunderstandings** (e.g., thinking that an appointment was set for 4 p.m., when 3 p.m. was actually the appointed time), **misperceptions** (e.g., "hearing" someone say one thing when another thing was actually said) and so on. Furthermore, information stored in long-term memory is consistently undergoing de-fragmentation as apparently related data are compressed and compacted—**making it more difficult for the brain to identify bits of data that do not belong in a particular set of connections** (i.e., in that folder).

Stimuli that are not filtered out as spam or sent to long-term memory are sent to an area of the brain called **working memory** (very roughly the equivalent of system memory in a computer). Here, in temporary residence, are the stimuli that the brain wants to actively consider; those that are perceived as new or relevant or important for decision-making or problem-solving or other types of **connection-making**. Again, classification mistakes can be made and, as a result, (irrelevant or incorrect) information can be held in short-term memory that only interferes with accurate connection-making or decision-making.

In terms of fuel (energy) consumption, working memory is a 1957 Cadillac hearse and long-term memory is a brand-new Vespa motor scooter. So to reduce its energy usage, working memory tends to "jump to conclusions" (i.e., make decisions very quickly; **it strongly favors speed over accuracy**). (The evolutionary basis of this speed-over-accuracy function is explained later in the section "An Evolutional (that is, Evolution-Based) Perspective on Behavior.")

Brain circuits become faster, stronger and more durable the more times they are activated.

Attention and action activate the brain's circuits. That is, you can activate a circuit by thinking about the connection it represents or by acting out the connection. For example, most people learned multiplication by focusing on "multiplication tables" or flash cards and by saying "multiplication facts" aloud (over and over; **attention**) and solving multiplication problems (**action**). Each time, we saw "$3 \times 4 = 12$" or recited that equality or filled in the number 12 next to "$3 \times 4 =$," we reactivated the circuit between this specific pair of factors and their product. As these individual circuits are reactivated repeatedly, a myelin sheath (a white, fatty substance generated by the brain) grows over the connection increasing the speed with which it is activated. The effect is much like what happens when a CAT-5 cable is replaced with a CAT-6.[8]

In the same way, the more often you repeat a relatively complex behavior pattern, the stronger the associated brain circuits become and the less you have to think about them in order to successfully re-manifest the behaviors involved. The lower need for focused thinking occurs with strong circuits because you do not need to search in long-term memory for connections, retrieve them to working memory, check their relevance and decide how to apply them. It's all "automatic." Hundreds, sometimes thousands, of our behaviors are controlled directly by strong circuits in long-term memory every day. We tend to only "notice" this happening when circuits in long-term memory control behaviors that we assume must be governed by conscious thinking, such as driving a car. For example, you drive from home to work or vice versa and when you turn off the ignition, you have an experience similar to waking up. You suddenly realize where you are. But, you "don't know how you got there." You actually do know how, but not at a conscious level because the focus of your attention was diverted (Mlodinow, 2012). Again, the more you repeat a complex behavior pattern (and reactivate the associated brain circuits), the more easily you can re-manifest that pattern of behaviors because the circuitry in your brain has created a "program" to direct it. This strengthen-by-reactivation programming function is so cumulative, in fact, that the level of measurable brain activity of long-time assembly workers while on the job is similar to that of people who are unconscious (Rock, 2006). It seems that the phrase, "operating on automatic pilot," applies as fittingly to many people in their daily work routines as it does to guidance systems for airplanes.

BRAIN CONNECTION! PHONES—THE REAL "WEAPONS OF MASS DESTRUCTION"

Do you think that the "don't know how you got there" experience could simply be a case of multi-tasking? Well, stop thinking like that! Despite common beliefs, your brain cannot multi-task because it can only focus on one thing at a time. Imagine a teenager "studying" while listening to high volume Death Metal. He's not studying&listening simultaneously. In nanoseconds, his brain is doing this: Read-listen-read-listen-read-listen over and over. If the goal is learning, to the brain the music is a distraction; the only possible value of which is that it might keep the kid from being distracted by one or more OTHER things.

Okay. Now, feature yourself driving and talking on your phone. Again, it's not multi-tasking. In this case, it's drive-talk-talk-drive-talk-talk-talk-drive-on-autopilot-talk-talk-talk, etc. As the conversation develops, your brain falls back on a driving "program" and devotes more focus to the conversation. No wonder research shows that using a phone while driving is the equivalent of

driving while "under the influence" in most states. Of course, texting causes much greater performance degradation (Medina, 2008)!

So, WMD really DO exist. We just never thought to look for them in our cars!

"Programmed driving" is an example of how a practiced pattern of brain connections can control perceptions and behavior in a specific incidence or domain. However, our complete brain circuitry houses hundreds of thousands of massive, dynamic (i.e., changeable) and extremely complex sets of interconnections that collectively control all of our thoughts, memories, skills and more. Scientists refer to these sets of interconnections as cognitive maps (or schemas or mental models). Any given cognitive map can be labyrinthine (e.g., a mathematician's understanding of quadratics), but is nonetheless comprised by the same kinds of circuits that structure much less complex ideas. There are simply many more and more intricately interwoven connections.

"Belief system" is the lay term for *each one* of these sets of interconnections of concepts, assumptions, values and knowledge (i.e., each cognitive map or schema). Our belief systems can be shared (i.e., with other people) partially or in full. For example, McCandless and Posavec (2009) have illustrated that members of the "political left" (broadly defined) share many beliefs throughout the western world and their resulting belief systems can be contrasted with those typical of the "political right." Table 2.1 shows an adapted excerpt.

Once a belief system is established (repeatedly activated, compressed and compacted), **it is self-validating and very difficult to change**. Contributing factors include:

Confirmation bias. When confronted with information that contradicts an existing belief system, the brain could struggle to resolve the inconsistency, a major energy drain. Or it could: a) ignore the inconsistent information and/or b) seek out other information that fits with established beliefs. The brain has a strong tendency to take the latter, energy-saving course (Tavris & Aronson, 2007) while "enjoying" the additional benefit of keeping individual beliefs fitting together compatibly. In fact, that's why they are called belief *systems*.

In the book *The Political Brain* (2007), neuroscientist Drew Westen reported studies that demonstrated another determinant of confirmation bias: Euphoria.

Much like Reid's (2012) study reported earlier, Westen and his colleagues had participants read essays with purposely inserted contradictions. Few contradictions were noticed when an essay was attributed to a representative of their own political party. But when statements were said to be made by a member of the opposition, many more contradictions (in the same content) were identified. The kicker: **When participants ignored same-party contradictions *and* when they identified other-party contradictions, their brain activity was equivalent**

TABLE 2.1 Common Political Belief Systems in the Western World

Political left believes . . .	*Focal construct*	*Political right believes . . .*
Based on ethics	**Community**	Based on morals
Equality	**Equality or Freedom**	Freedom
Scientific, non-organized, unconventional	**Religion**	Theistic, organized, traditional
Others must observe	**Rights**	Others must not interfere
Social and economic victims	**Criminals**	Choose to be criminals
Downtrodden, lack opportunities, victims of the system	**Homeless**	No work ethic, no values, no shame
One for all and all for one	**Society**	Each to their own
Utopianism, things can be better, bring in the new	**World view**	Preservation, protect of the good things around the world
Multicultural, inclusive, evolving	**National view**	Nationalistic, exclusive, established

to the experience of elation (Westen, 2007; Westen, Blagov, Harenski, Kilts & Hamann, 2006). That is, during the enactment of confirmation bias (below the level of conscious awareness), **strong neurochemicals are secreted in the brain that make the performance of *bias* highly satisfying**.

Maintenance of self-image. Under the "psychological basis of behavior," I argued that people, in every culture around the world, have a *very strong need* to maintain (or enhance) their views of themselves, i.e., their self-images. In fact, our self-image is our most complex and elaborate belief system. **Our brains are particularly sensitive to situations or experiences in which our self-image is threatened.**

For example, most people have a strong belief that their mothers love them. Any new information that is consistent with that belief will be fired immediately to the neurons in long-term memory that house the set of connections relating to your "mother" and "loves me." **Information *inconsistent* with the belief that your mother loves you would be handled quite differently for three reasons.**

1. Anything pointing to the fact that your mother doesn't love you is, for most people, incompatible with their fundamental need to maintain or enhance their self-images. (What kind of person must I be if even my mother doesn't love me?)
2. There is no strong, established circuit on which this information can travel electro-chemically.

3. As with confirmation bias, ignoring discrepant information conserves the brain's energy.

Thus, people are able to continue to believe that their mothers love them, sometimes even when a mammoth amount of evidence (e.g., harmful and hurtful belief-contradicting behaviors manifested by their mothers, counter-intuitive insights provided by siblings, friends and perhaps therapists or counselors, and so on) strongly suggests otherwise. (People who endure domestic violence (DV) over the long term is a current worrisome example—although there are certainly additional factors (e.g., safety of children, etc.) involved in DV.)

Confirmation bias and maintenance or enhancement of the self-image are processes in which the physiological basis of behavior becomes intertwined with the psychological basis, resulting in what are sometimes referred to as the "neuro-emotional" causes of behavior. Here, "neuro" refers to the physiological part of the equation, while "emotional" reflects the psychological dimension at play. **These dual forces (neuro and emotional responses) assure that strong beliefs will be repeatedly re-validated and maintained.**

One of the most common frustrations I've heard expressed by managers over the years is their inability to "get through to" poor performers. They conclude that "she just doesn't get it," "he's completely unmotivated," "Chris is thick as a brick!" Yet, **the behaviors that lead to these condemnations are simply the result of these poor performers' neural spam filters working properly**. Again, telling people that their performance is poor is one of the best ways of influencing poor performers to resist change, thereby maintaining their current performance levels!

How about this example of attempted-but-failed behavioral change that scientists have only recently begun to understand. People who have very serious heart attacks and yet survive are typically prescribed both physical (exercise) therapy and a form of mental therapy. The mental therapy is designed to help them to understand that they can dramatically reduce the likelihood of a second heart attack simply by changing their eating habits. (For simplicity's sake, I'll focus on eating habits here. But, of course, other lifestyle factors such as exercising frequently and cessation of smoking are relevant as well.) This mental therapy was assumed to be effective because patients who complete it and then take a test on the relationships between diet and heart healthiness generally score very well. Yet, all that these high test scores really tell us is that the patients who undergo mental therapy know intellectually (at one point in time) that there is a strong relationship between poor eating habits and the reoccurrence of heart attacks. This **passively learned** brain circuit is simply no match for the stronger and faster circuits between eating or overeating pizza/candy/ice cream and immediate physiological feelings of satisfaction. In fact, only 11 percent of the participants in this type of therapy actually change their eating habits—despite the fact that, as a result, they are putting their lives at much higher risk. (More on this kind of "irrational" behavior shortly.) The stronger, more frequently

activated circuitry simply wins the competition to control behavior. It is important to note that, in this example, the majority of patients did not change their behaviors even though: 1) they are likely to believe what they are told by cardio-therapists and that the therapists have their best interests at heart, 2) making the change is clearly to their immediate, personal advantage, 3) they have the skills needed to make the change, and 4) they are not in a heightened emotional state at the time the information is provided—**highly favorable conditions for altering behavior that are far from typical in most large-scale organizational changes**.

Why do people refuse to change their behavior when most of the conditions and circumstances (including self-interest) favor making a prescribed change? Four of the primary person-centered (i.e., non-organizationally specific) reasons are:

1. **People didn't draw their own conclusions.** When people in cardio-therapy are only *told* what they should (not) do, **rather than being allowed to make their own new connections**, they simply continue to follow established patterns, habits, etc. (the old, strong circuitry). Looked at another way, the patients have not created new strong circuitry (perhaps involving preparing, eating, enjoying, sharing healthy foods) to replace the old circuitry (Pulakos, Hanson, Arad & Moye, Forthcoming; Rock, 2006).[9] So, the old circuitry continues to control their behavior.

Note that the failed change strategy for cardio patients is repeated frequently in the pre-execution stage of major organizational changes. We tell employees that it's not good for the organization to continue to do X (whatever represents the organizational equivalent of eating artery-clogging foods) or something bad is going to happen (the organization will have a financial heart attack). Instead, people need to do Y (e.g., collaboratively implement a major reorganization). **We've made all the connections and drawn all the conclusions for people. They just need to change (and suffer the neuro-emotional consequences)!**

2. **People aren't always rational.** As much as we'd like to believe that we behave rationally (in our own best interests) virtually all the time, well, we just don't. Much of our behavior is controlled by secretions and counter-secretions of neuro-chemicals that do their "work" below the level of our conscious awareness. For example, do you know that when heavy fog rolls into an area, **the average speed of the traffic on interstate highways increases** which greatly amplifies the danger of deadly, many-vehicles-involved crashes (Culham, 2012; Pretto, Bresciani, Rainer & Bülthoff, 2012; Rogers, *n.d.*)? What could cause such irrationality?

In heavy fog, our brains recognize that the situation is dangerous. And, because of that perception of danger, our brains release neurochemicals designed to help us survive that we experience as primitive instincts: Flee, fight and/or freeze. The subconscious flee response tells us that we need to get through the fog as quickly as possible. The subconscious fight response causes us to focus on the source of the danger (the fog) and ignore seemingly non-dangerous elements of our environment (like the speedometer). The subconscious freeze response (in this case, the easiest one of the three to ignore) sends us a conflicting signal that we need to

stay right where we are until we can figure out the exact nature of this particular danger. Unfortunately, a very small percentage of drivers do, in fact, stop in the midst of the fog virtually guaranteeing that they will be hit from behind.

Mathematical *physicist* turned expert on the unconscious, Leonard Mlodinow (2012, p. 5) exhorts:

> To gain a true understanding of human experience, we must understand both our conscious and our unconscious selves, and how they interact. Our [unconscious self] is invisible to us, yet it influences our conscious experience of the world in the most fundamental of ways: how we view ourselves and others, the meanings we attach to the everyday events of our lives, our ability to make the quick judgment calls and decisions that can sometimes mean the difference between life and death, and the actions we engage in as a result of all these instinctual experiences.[10]

3. **Their current emotional state overloads their brain circuitry.** The brains of employees must deal with incoming stimuli from many sources, not just from the workplace. Prior to the pre-execution stage of an organizational change, many employees have already run out of processing space in their working memories. Perhaps they are facing foreclosure on their houses or they have sickly parents for whom to care. **Unfortunately, none of these people has a unique working memory that can be dedicated to work-related issues only.** When they arrive at the workplace each day, the brains of these employees are literally "tired" from overwork. They are tired in the sense that: 1) their spam filters are over-reaching—casting aside useful stimuli in an attempt to conserve the brain's energy, i.e., reduce the load on working memory, 2) with shorter processing time, greater numbers of stimuli are being misclassified to and within long-term memory, again in the service of workload reduction (i.e., speed-over-accuracy) and 3) electro-chemical impulses from working memory are sending out warning signals that way too much energy is being expended.

Change implementers (especially senior managers) often completely overlook, or grossly underestimate, the size of this brain-weary subset of employees. How sizable is this group? One inkling: Large national studies (Attridge, Cahill, Granberry & Herlihy, 2013; Mahieu & Taranowski, 2013; Taranowski and Mahieu, 2013) have found that the average combined services utilization rate for Employee Assistance Programs is in the range of 6–13 percent. Actuarial evidence suggests that there are 3–4 employees who should use these programs for every one that does; utilization rates of minorities are especially low (Albrecht, 2014; APA Practice Research and Policy Staff and Communications Staff, 2007; Bouvard, 2012; Fleming, Lee & Dworkin, 2014). If we do the math, those findings suggest **conservatively that 20–30 percent of the employees who will be asked to undergo a major organizational change might have extremely limited neural ability to effectively do so**. Yet, in Change Leadership programs that I've facilitated over the past 25+ years, **nine out of ten**

managers who are asked to estimate the percentage of people in their organizations who might be dealing with at least partially debilitating emotional issues at the present moment give answers in the range of 2–9 percent—most often at the low end of that range.

Yet, it's not only people's current emotional states that can hamper the implementation of organizational change, **the emotional histories that people bring with them to the workplace are often equally or more important**. That's why Kaiser and Kaplan's work on "overcoming sensitivities" is absolutely "MUST READING" for Change Leaders and consultants.

A brief summary of their work is presented in the box at the end of this section. But for now, let's stick a bit longer to the focal question: Why do people refuse to change their behavior when most of the conditions and circumstances (including self-interest) favor making a prescribed change? So far, I've covered three of the primary reasons:

1. **People didn't draw their own conclusions.**
2. **People aren't always rational.**
3. **Their current emotional state overloads their brain circuitry.**

And, here's No. 4 . . .

4. Strong, pre-wired emotions (such as "inequity aversion") are driving behavior. I've proposed a couple of times now that people in every culture have a fundamental need (or "motive" or "drive") to maintain or enhance their self-images. Perceptions of fairness or equity seem to be imbedded (hard-wired) in the maintenance or enhancement function. That is, if we believe we are being treated unfairly, it is very difficult to maintain (much less enhance) our self-images. Could this fundamental concern with fairness be "pre-wired"? It certainly looks that way.

Anyone who has spent any time at all around young siblings knows that perceptions of fairness are either pre-wired into our brains or they evolve at a very early age. Kids seem to have acute mental calipers that can detect microscopic

Grapes of Wrath

In a clever experiment at Emory University, Sarah Brosnan (Brosnan & de Waal, 2003) was able to demonstrate that even young, lower primates (in this case, Capuchin monkeys) manifest severe forms of "inequity aversion." In her study, Brosnan trained monkeys to complete a task in order to obtain a reward—a slice of cucumber handed by the experimenter to each appropriately performing monkey. At this point, there was every reason to conclude that the monkeys were more than happy to "work" for cucumber "pay." Then, however, Brosnan began to reward some monkeys with a grape rather than a cucumber slice. Well, if you don't know much about monkey cuisine, I need to tell you that grapes are MUCH preferred over cucumbers.

When the monkeys who were receiving the cucumber slices saw other monkeys receiving grapes, they reacted in different ways—but all of those ways reduced their "work performance." Some worked more slowly, some stopped working completely. Many monkeys began to screech at the experimenter; a few threw their cucumber slices at the experimenter while doing so.

(perceptual) differences in the sizes of two pieces of cake or two bowls of ice cream. And, whether it's kids in the home or employees at work, people who think that they received the "short end of the stick" often suffer severe distress that, as with cases of social rejection to be covered in the section below, "An Evolutional (that is, Evolution-Based) Perspective on Behavior," some psychologists have likened to a punch in the stomach.

We now know that when we believe we are being treated unfairly, brain regions that register pain are highly activated. I'm going to write that again. **When we believe that we are being treated unfairly, brain regions that register *physical* pain light up like the proverbial Christmas tree.** Yet, the real neuro-emotional kicker here is that brain regions that register pleasure (via secretions of dopamine) are highly activated if we see bad things happen to someone whom we perceive to have been advantaged by the inequity we experienced. **The badder, the better, in terms of the amount of dopamine secreted** (Cikara & Fiske, 2013). In all likelihood, these types of automatic pain and pleasure responses came about as a physical, evolutionary defense mechanism (e.g., the need to make sure that you get your fair share of the Wooly Mammoth you helped kill). Yet, psychologists believe that this particular, pre-wired circuitry has not only lost its bright side, it might well be a fundamental cause of violence in the world today. (Think school shootings, etc.)

EXPERTS' INSIGHTS: UNCOVERING PERCEIVED INEQUITIES

In several places throughout this Guide, I recommend that if you want to understand performance, you have to talk to the performers (i.e., the people who actually do the work) because they're the best source of information about what is contributing to and/or prohibiting desired work outcomes. There are some times, however, when the performers are going to be less than open about what is really going on and you can usually count on perceptions of inequity/unfairness to be one of those areas.

One of the everyday-language names for perceptions of inequity is "envy." And, if we were to rank order the negative emotions (e.g., anger, sadness, disgust, fear, etc.) on how "shameful" they are, envy would be right up there vying for the top spot. Due to the shamefulness of envy, we find it difficult to recognize it in ourselves and, even when we do, we don't like to own up to it. People can admit to being angry, or even fearful, more easily than they can admit to being envious. **Self-perceptions of enviousness seem to strike at the core of the maintenance or enhancement function.** Bottom line: If you ask Mary directly why she doesn't get along with Paul (and even if she recognizes at some level that envy is at the root of the interpersonal problem), she is likely to attribute the problem to a more self-image-friendly cause.

This means that you often have to uncover perceptions of inequity **indirectly**. One way to do that is to **focus on others rather than the employee at hand**.

Statements and questions like the following can often be used to open the trail to deeper emotions:

> "In most organizations, there are people who are under-rewarded in comparison with their contributions and others who are over-rewarded. Would you say that that is true here?" If the respondent agrees . . . "Would you mind giving me an example or two of how that works here?"
>
> OR—"When you think about the people with whom you work on a day to day basis, who do you admire the most? Why?"

There's another possible trail that involves getting the focal performer to talk about himself without directly asking any questions about envy or related feelings:

> "All things considered (not just pay—but recognition, opportunities for advancement and learning and so on), do you think that you are fairly rewarded for all that you contribute to this organization?"
>
> OR—"When you feel that you have a particularly good day here, what might be the kinds of things that would make you to feel that way?" Followed by: "When you have a day that's not so good . . ."

It's a crap shoot. But, relationship and equity issues often come to the fore in answer to questions like these.

BRAIN CONNECTION! "HOT BUTTONS" AS IMPEDIMENTS TO ORGANIZATION CHANGE (AND TO PSYCHOLOGICAL SAFETY AT WORK)

. . . Rob Kaiser and Bob Kaplan, of the consulting firm Kaplan DeVries, have authored a large and important body of work (e.g., Kaiser & Kaplan, 2006) that examines how psychological wounds that we suffer as children can sensitize us as adults to be anxious about getting hurt again and that anxiety is often what underlies emotional outbursts in the workplace. **What in office jargon might be called "hot buttons" or "issues" that cause people to "fly off the handle" without apparent justification, Kaiser and Kaplan refer to as "deep sensitivities."**

They define a "deep sensitivity" as "a set of emotionally charged beliefs and expectations generalized from experience *[but operating below the level of awareness]* that serve to protect the individual from repeating a painful

psychological or physiological injury from the past" (Kaiser & Kaplan, 2006, p. 466). **That is, people who have had extremely hurtful experiences, most likely occurring in childhood, are unconsciously ever-alert, at less than a conscious level, for the possibility of the same kind of thing happening again.** This causes people to react *intensely* to any situational cues—not noticed by others—that might signal a forthcoming reoccurrence of the previous hurt, regardless of how objectively dissimilar the present and past circumstances may be. Common sensitivities include being perceived as intellectually inadequate, being extremely dependent upon a person who will "let you down," or being seen as weak and unable to stand up to authority.

When such a sensitivity is activated via exposure to a proposed change in the psychological comfort or safety of the organizational status quo, there is likely a two-phase response. At first, the focal person will overestimate the demands of the change or underestimate his ability to deal with it or both. Unless something occurs that disarms the brewing emotions, the attack of anxiety that results leads to highly emotional behaviors designed to stop the change from occurring (i.e., fight) or getting away from/out of the situation entirely (i.e., flight). **The person who manifests this type of behavior may recognize that it is inappropriate, perhaps afterward even sincerely apologizing for the outburst. But, recognition of the occurrence without an understanding of the underlying dynamics makes the behavior no less likely to reoccur.**

Kaiser and Kaplan have developed sophisticated "desensitization" programs that have proven highly effective in eliminating these behavioral explosions. Unfortunately, the programs require that the offending person voluntarily participate and actively work to eliminate the sensitivity. What is more likely, however, is that the offender will not learn the true extent of the problem because the organization will ignore, excuse or decide to "work around" the issue, particularly if the focal employee is an otherwise solid contributor. **In fact, sensitivity-based outbursts by executives are often considered to be not only acceptable, but normal!**

An Evolutional (that is, Evolution-Based) Perspective on Behavior

Why Deal with Evolution in a Book on Leading Large-Scale Organizational Change in the 21st Century?

For quite some time, I've been helping clients employ SCN research findings to increase the likelihood that: 1) their large-scale organizational change projects would be more successful and 2) their organizations would become more effective overall. As indicated earlier, some of this research has demonstrated that much of what we thought to be true about the causes of human behavior was both wrong *and* counter-intuitive to accepted (and deeply ingrained) management practices. In many cases, especially in the early going, helping managers come to their own conclusions that a new, very different and strikingly better way to manage people is available to them has been a very demanding task. **Over time and by trial and error, I have found that the means by which people most quickly "see the light" and gain the deepest understanding of the true reasons why people behave the way they do is by describing a simple relationship that explains a whole lot:** The exceedingly ***strong*** and ***constant*** impact on current work behavior that results directly from the way in which the human brain evolved over hundreds of thousands of years. If that statement is hard for you to believe at the moment, that's good. It means you have a lot to gain by giving consideration to this fresh, potent and rich evolutional perspective.

Please take a moment and try to imagine what the brain of our ancestor (Figure 2.2) was like. Then think about the ways that your brain is likely to be different.

Perhaps you're thinking that there must be so many and such extreme differences that the two types of brains can't be truly or meaningfully compared. But, in fact, from a structure and function standpoint, there is only one major difference: The outer-most layer of your brain is thicker than those of our friend in Figure 2.2.

In the western world today, most non-scientists have what could be called a vaguely "morphological" view of how the human brain evolved. For example,

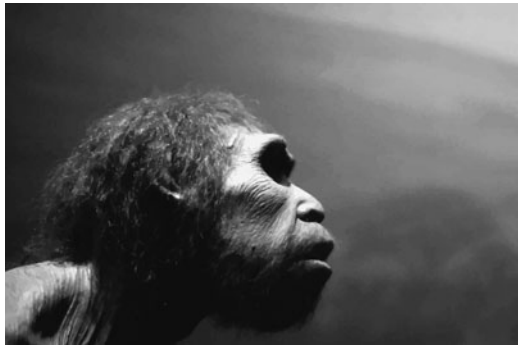

FIGURE 2.2 How, and In What Ways, were the Brains of Our Primitive Ancestors Different from Ours?

their visual metaphor for the change might be the transformation of a caterpillar into a butterfly, the result of the transformation being something completely different from the original. Metaphors such as this one aren't even close to being accurate.

A more fitting metaphor I use to help people understand the evolution of the human brain is a motorcycle that has been customized with external metal cladding, an extended seat with a back brace, a sound system and a side car. **The now largely hidden (original) motorcycle can barely be seen but it's still there and it still performs the same elemental functions.**

A second metaphor, one that is more faithful to the true evolutionary process, is "animal adaptation." That is, the process by which animals increased the likelihood of their survival by adapting to their environments. For example, ducks developed webbed feet, rams developed horns and hedgehogs developed external spines. The ducks remained ducks but they developed new functionality. Same for the rams and hedgehogs. Likewise, **the human brain adapted/evolved by adding functionalities to its most primitive form while that primitive form *remained intact during all later phases of evolution***.

It's often said the modern humans have three brains. It's more accurate to say that the human brain has three parts[11] but those parts operate **independently as well as interactively**.

Brain 1

The oldest part of the brain is commonly called the primitive or reptilian brain; let's call it "Brain 1." **Brain 1 evolved in a highly precarious environment with life-threatening forces lurking in abundance and survival in the balance.** Survival over time in the reptilian era was determined by how quickly each animal was able to detect sources of danger (such as a predator) or reward (such as food) and how quickly that animal could respond to what had been detected. In this environment, the consequence of failing to detect danger was, more often than not, fatal. So, speed of decision-making in detection was paramount. **As a result, Brain 1 favors speed over accuracy. It would rather be wrong than a predator's breakfast.** (Ultra-fast decision-making also serves the brain's biologically programmed need to conserve energy by, for example, not using further effort to evaluate more information.)

Let me break down this detection/decision-making process a bit further. While it's an oversimplification to say, Brain 1's job has two primary parts. One is to constantly monitor the environment, essentially "asking itself" five questions simultaneously and repeatedly about anything encountered in its environment:

- Can I eat it? (aka "**fight**," should I try to kill it?)
- Will it eat me? (aka "**flight**," should I run from it?)
- Should I "**freeze**" (until I figure out if I'm in danger)?

- Can I ignore it? (the brain's "spam filter," described previously)
- Can I procreate with it?[12]

The second part of Brain 1's job is to provide a warning (for danger) or an alert (for an available reward) and initiate the appropriate response, such as kicking in specific neurochemicals to provide the energy and focus needed to escape from a predator. A key to understanding much of human behavior is to know this: **Brain 1, that ancient reptilian organ, remains intact and largely unchanged in humans today and it continues to perform those same primitive, survival functions as it has for hundreds of thousands of years.** Brain 1 can still be a life-saver today, as when it provides a blast of adrenaline that enables a mother's strength to be increased to extraordinary levels when it is needed to save a child. The problem is that (for most people) the environment in which they live is no longer so precarious nor as frequently life-threatening. Yet, Brain 1 remains alert for just such a problem anywhere and everywhere. **Essentially, it presses a panic button much more frequently than is appropriate (resulting in such behaviors, as you will recall, like speeding up when dense fog covers interstate highways).**

When I first started covering the evolutional perspective in management training programs, I found that several people would express disbelief about the (current) existence of Brain 1 and the discussion would devolve into arguments for and against. So, I developed another tactic. I now have a number of 10–20-second videos that present different versions of essentially the same content (some pleasant or relaxing scene that is unexpectedly and loudly interrupted by, for example, the noise from an unseen explosion or the sudden appearance of a horrible-looking monster unleashing a frightening scream). At the point of surprise in the video, inevitably almost all of the trainees exhibit a strong, visible startle response usually accompanied by shrieks of various sorts (from both men and women). Immediately thereafter, trainees start looking at others around them and chatting rapidly (if only to themselves)—seemingly seeking assurance that everything is okay (a further automatic response to this type of situation which serves the purpose of returning their heart rates to normal and re-establishing composure). Since I started using these videos, I have never once had a trainee argue that Brain 1 isn't alive and well—and inarguably operative.

Brain 2

With the evolution of mammals, several things changed. Three of the most important changes were that a) newly born offspring needed extended periods of nourishment, general care and protection[13] (Broad, Curley & Keverne, 2006), b) neural mechanisms had to evolve that would assure that those offspring would seek this care and protection and that the relevant parent (or both parents) would provide it (Power & Schulkin, 2013) and c) the probability of the survival of a

species became greatly enhanced by within-species cooperation, the hunting behavior of wolves being one example (Bailey, Myatt & Wilson, 2012). Thus evolved Brain 2—the "mammalian" or "social" brain[14]—whose job it is to flood the nervous system with chemical secretions (neurotransmitters) that guarantee a strong, systemic, self-defensive response to any possible threat to the hard-wired emotions that this part of the brain monitors including "fear" of social rejection/loss of affiliation.

Naiomi Eisenberger (2012a, 2012b, 2012c; Eisenberger & Cole, 2012; Eisenberger & Lieberman, 2004), an inventive and prolific SCN researcher at UCLA, has done a long series of neuroimaging studies that **demonstrate very well how primal and strong Brain 2's social affiliation/fear of social rejection drive is**.[15] One of the common methods that Eisenberger has used is as follows:

Each subject was equipped with a brain activity recording device and was led to believe that two other (unseen) subjects were participating simultaneously in the study. Subjects were shown a screen in which appeared two cartoon characters supposedly representing each of the other subjects that were part of the three-some. A drawing of a hand represented the focal subject herself (see Figure 2.3).

Subjects were told that they should participate in a ball-tossing game with the other two subjects. In reality, there were no other subjects and the cartoon characters representing the mythical subjects were controlled by a computer program.

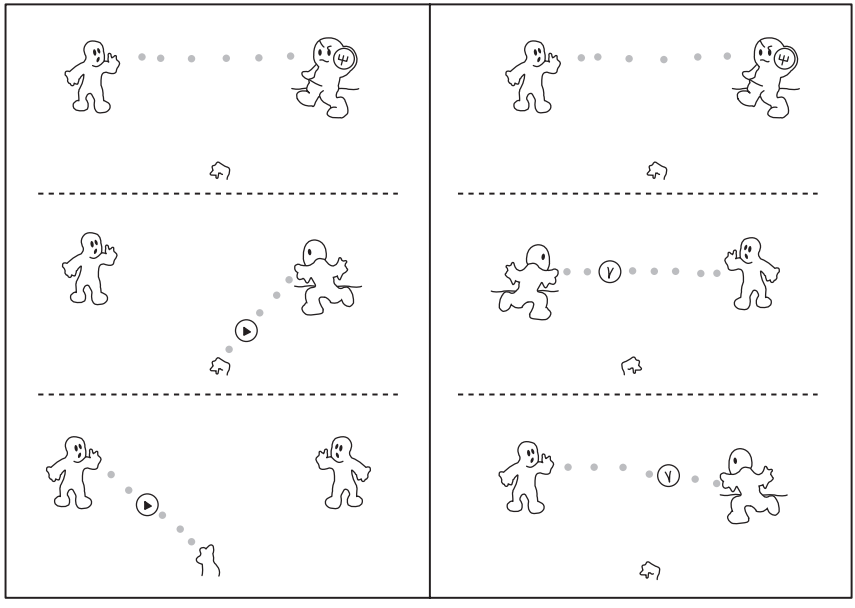

FIGURE 2.3 Subject Inclusion (Left) and Exclusion (Right) Conditions

Source: Eisenberger & Lieberman, 2004

In different conditions, the true subjects were a) able to fully participate in ball-tossing throughout many trials (social inclusion condition) or b) had their ability to participate gradually reduced until the two mythical subjects tossed the ball back and forth only between themselves (social exclusion condition).

The brains of subjects in the social inclusion condition responded as though they were in a reward state (i.e., their brains were registering a mild "fun" effect). The activity of the brains of subjects in the social exclusion condition manifested a firing pattern equivalent to physical pain.

After the neuroimaging part of the study was completed, subjects in the social exclusion condition also self-reported experiencing various kinds of physical discomfort. These same results have been obtained in a variety of related experimental, neuroimaging studies (e.g., use of still photographs of humans bearing expressions of "disapproval" for which no cause was provided—instead of the cartoon characters) (Kross, Egner, Ochsner, Hirsch & Downey, 2007).

The now accepted conclusion drawn from this (quite large and varied) collection of studies is that the reaction to social rejection (broadly defined), as well as to many other emotion-based, negative experiences (e.g., perceived inequity or unfairness) "piggy-backs" on the brain's circuitry for physical pain and causes the same experience (i.e., emotional pain felt physically) (Eisenberger & Lieberman, 2004).[16] (Yes, even when the subjects are "rejected" by cartoon characters or photographs of unknown people, it *still hurts*. You might want to keep this in mind the next time you ask some, but not all of the people within earshot, to go to lunch, etc.)

Conversely, social acceptance has been found to relate positively to self-esteem, ability to regulate stress and self-perceived well-being/quality of life (while social rejection has been associated with depression, susceptibility to PTSD, wounding and inflammation dynamics) (Eisenberger, 2013; Eisenberger & Cole, 2012).

BRAIN CONNECTION!

Lieberman (2010) suggests that the link between social rejection and physical pain evolved for mammals because being rejected by their caretakers was usually fatal. This link remains functional today. Recent SCN research consistently replicates this rejection/pain relationship thereby leading to the label of the brain as "a social organ" (Rock, 2008). In fact, even when the brain is at rest, most of the unconscious processes that continue to operate are related to "thinking" about yourself and your relationships with other people (Rock, 2009).

Brain 2 houses all of the evolutionarily pre-hard-wired emotions (i.e., ones that are built into the brain prior to learning taking place).[17] There are five of

these "built-in" emotions that are particularly relevant to Change Leadership/employee behavior in the workplace. In addition to a) the need for social acceptance or attachment (just covered), I've previously introduced two of the others: b) the drive or need[18] to maintain or enhance one's self-image and c) the drive or need to receive equitable or fair treatment. The remaining two are **d) the drive or need for certainty/elimination of ambiguity and e) the drive or need to have a sense of control or be free from constraints**. (These two drives or needs (d, e) are interactive/reciprocal in that, for example, dealing with ambiguity can reduce one's sense of control in or over the situation. And, for both (d) and (e), Brain 2 gets a lot of "enforcement" help from Brain 1.)

The Drive or Need for Certainty/Elimination of Ambiguity

You've already learned that Brain 1 is decision-driven. It would rather be wrong than not come to a quick conclusion—in the primitive service of not making a fatal mistake as well as to conserve energy by limiting the amount of processing that is being done by working memory. When Brain 1 deals with very familiar events, it can "relax" by going into its automatic mode, such as the aforementioned driving-while-not-consciously-thinking-about-driving example. Were something unusual/unexpected to happen while your Brain 1 is in that automatic (driving) mode—let's say that you hear a siren and realize that a police officer is ordering you to pull off the road—Brain 1 will instantly adapt by going into an *anticipation of danger mode*. When the same unexpected stimulus (siren, police car) is received by Brain 2, it is recorded in a small part of Brain 2's emotional system called the ACC[19] that is responsible for emotional and cognitive processing (in this case, figuring out what the heck is going on and how bad it is going to be) and as a result, it creates a tension or uneasiness in the brain that can only be eased by achieving certainty/eliminating ambiguity. Lieberman (2010) *metaphorically* compares the ACC to a smoke alarm. A smoke alarm has to be able to *detect* when a dangerous level of smoke particles is present—and, if it is—the alarm sounds a *warning* and the warning continues (unless turned off) until the smoke level has dissipated below a programmed threshold, i.e., when there is no longer any danger. Of course, not all uncertainty is dangerous. The point is that your brain (Brains 1 and 2 working in concert) are ever on alert for problems that can be caused by uncertainty, with a hair-trigger connection to a possible declaration of danger and a quick response. In Chapter 6, you'll see that uncertainty—on many levels—is rampant in organizations today and a major suppressor of performance (Ash, 2013; Damon, Harackiewicz, Butera & Quiamzade, 2007). **Of course, <u>additional</u> high levels of uncertainty/ambiguity are typically inherent in large-scale organizational changes and are close correlates of resistance to change.**

The Drive or Need to Have a Sense of Control or be Free from Constraints

This drive or need works in exactly the same way as (d), the drive or need for certainty/eliminate ambiguity and most likely evolved for the same reason: Being constrained (e.g., not being able to flee from a dangerous predator) in prehistoric times was usually paramount to death (Leotti, Iyengar & Ochsner, 2010). There is certainly evidence that this drive is every bit as strong in animals, including humans, today. You're probably aware that both wild and domesticated animals have been known to chew off their own limbs to escape from a trap. There have been many documented cases of the same phenomena with humans, though a cutting tool is usually involved rather than teeth. The 2013 movie, "127 hours," tells the story of just such a case.

There is an entire storehouse of research documenting the relationship between employee autonomy (usually defined by being free to make choices/employees have input on decisions that affect them) and engagement (Trinchero, Brunetto & Borgonovi, 2013), job performance and self-regulation (Legualt & Inzlicht, 2013), self-efficacy and customer service (Sousa, Coelho & Guillamon-Saorin, 2012), work satisfaction and organizational commitment (Graves & Luciano, 2013), organizational citizenship (Peng, Hwang & Wong, 2010), innovation (Lu, Lin, Leung, 2012), relatedness (Van den Broeck, Vansteenkiste, De Witte, Soenes & Lens, 2010), favorable perception of procedural justice (Gillet, Colombat, Michinov, Provost & Fouquereau, 2013), psychological health and satisfaction (Moreau & Mageau, 2012), initiative (van der Kaap-Deeder et al., 2014) and **(negatively) to resistance to change** (Thomas, Walker & Musselwhite, 2014). Such findings seem relatively free of cultural moderators (Wichmann, 2011).

Brain 3

The last major part of the brain to evolve is its thick, outer layer called the neocortex. This is the most distinctively "human" part of the brain and is usually what people are thinking of when they use the term "brain" in everyday language. It's also almost all of what can be seen in a picture of the brain's exterior. **It's the part of the brain that is responsible for higher-level thought (e.g., language acquisition, conception of past and future, planning and goal-setting, self-reflection, etc.). A second important function of Brain 3 is to accept or reject (usually the latter) electro-chemical impulses (communications) from Brains 1 and 2.** The accept/reject function of Brain 3 will be explained shortly.

It's often said that Brain 3 is the most complex organism in the universe. Unfortunately, that complexity is inversely related to how much is known with certainty about it, even though Brain 3 evolved some 25 million years ago (Rakic, 2009).

One thing we can be sure of is that much of what is said and written about Brain 3 is pure hyperbole, often without any scientific basis. Famously, science-popularizer, Carl Sagan, was quoted many times in saying that the human neocortex is more complicated than an entire galaxy, quite a claim for an astronomer-astrophysicist-cosmologist to make. How did he measure THAT? Well, he didn't. Dr. Sagan was speaking metaphorically, with purpose—as you will see in Chapter 5, using metaphors in this way helps complex ideas "stick" in people's minds. It's like an icon on the desktop of your brain's filing system.

Some of the hyperbole is beginning to be tested. For example, the most common estimate of the number of neurons in the brain is 100 billion (a number you'll see confirmed on the very highly regarded MIT McGovern Institute for Brain Research's web site). However, Suzana Herculano-Houzel, a neuroscientist at the Federal University of Rio De Janeiro, says she has looked at the relevant literature long and hard and can find no evidence on which the 100 billion number could be based. Hard to believe, but she and her students came up with a way to actually count the neurons in the brains of four deceased men and found the average number of neurons to be 87 billion (Herculano-Houzel, 2009). So, it might be best to take many of the super-complexity-claims about the brain with a couple of billion micrograms of salt.

Michael Shermer (2011, p. 113), the respected physicist and middle-of-the-roader on such estimates, offers his view of the brain's complexity:

> [It] consists of about a hundred billion neurons of several hundred types, each of which contains a cell, a[n] . . . axon cable, and numerous dendrites and axon terminals branching out to other neurons in approximately a thousand trillion . . . connections between those hundred billion neurons. . . . The number of connections in the brain is equivalent to the number of seconds in 30 million years.

Remember the graphic from earlier in this chapter (see Figure 2.4)? **It represents just ONE of those thousand trillion connections in the typical human brain.** Those connections collectively represent all of the pieces of data/ideas/concepts that have been connected together, that is, shared between neurons—from a simple idea to a complex belief system.

Note the "connecting electro-chemically" in the box. I didn't explain this concept earlier; I wanted to develop other ideas about how the brain works before I did that. I did, however, provide this example in the Prologue:

> [Lieberman's work has demonstrated] that talking aloud to one's self (by labeling one's emotions) can cause a nearly instantaneous reduction in anxiety. Lieberman didn't have subjects talk aloud and then ask them if they felt less anxious. Rather, he: 1) measured subjects' Time 1 levels of the stress-producing neurochemical cortisol, 2) asked them to talk about their anxiety

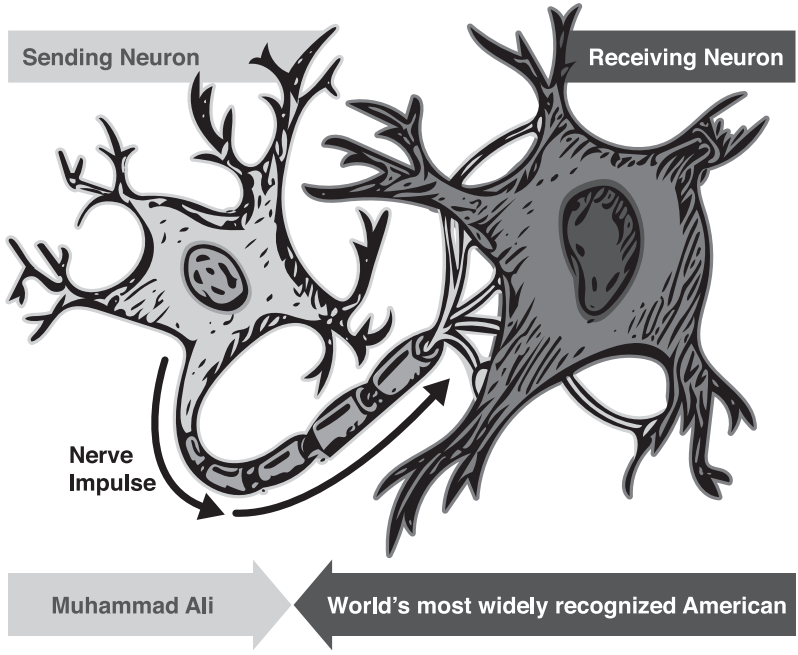

FIGURE 2.4 One Concept (M. Ali) Connecting with Another Concept (World's Most Widely Recognized American) Electro-Chemically in the Brain

levels according to an established emotion-labeling protocol, 3) demonstrated that when subjects were doing so there was increased activity in the right ventromedial prefrontal cortex that had previously been shown to be a source of secretions of DHEA, a cortisol-neutralizing hormone (Tor, Christian, Lindquist, Fredrickson, Noll & Taylor, 2006) and, finally, 4) measured subsequent (Time 2) levels of cortisol and found them to be lower.

Neurochemicals in the brain (like cortisol and DHEA in this example) are called *neurotransmitters* because they communicate (i.e., transmit) information between and among neurons. The brain doesn't "experience" life directly; rather it does so via these neurotransmitters. For example, we touch a pot on the stove that we didn't know was very hot. The heat from the pot is detected by sensors (nerve endings) in the skin on our hand and those sensors send out a signal that travels along a peripheral nerve in the arm to the spinal cord. Once in the spinal cord, the signal is converted a couple of times, resulting in the activation of neurotransmitters that carry the converted signal to the pain receptors in the brain. The brain translates that information and sends a "move your hand" command back to the hand along a similar pathway.

This response to a hot pot is multi-faceted and quite complex. Yet, for the neurons involved, it is just one of perhaps hundreds of signals sent by each neuron every second. Please recall from earlier in this chapter that **the sensory system alone sends the brain about 11 million bits of information but it can actively process less than 50 of them** (Mlodinow, 2012). And, filtering out the 10,999,950 bits of information that it's not going to consider is an active process. No wonder the brain needs to conserve its energy![20]

The Three Brains Often Work at Cross-Purposes

Okay, now you know that the brain is crazy-busy having to process millions of bits of information, communicated by neurotransmitters, every second. The perception-decide-act process is actually even more complicated than that **because much of the information the brain receives is contradictory**.

In Chapter 1, you learned about mirror neurons, those brain cells that help us understand the experiences of others. (Recall the example of seeing someone embarrass themselves often causes us to "feel" embarrassed.) Those mirror neurons also work in reverse. That is, they help us use other people's actions to make our choice of how to act (or respond) (Jarrett, 2012). Earlier in this chapter, you also learned that when we feel we have been treated unfairly (inequitably), that experience often creates a desire to see that the other person "will get what's coming to him" and that typically means something worse than the unfair

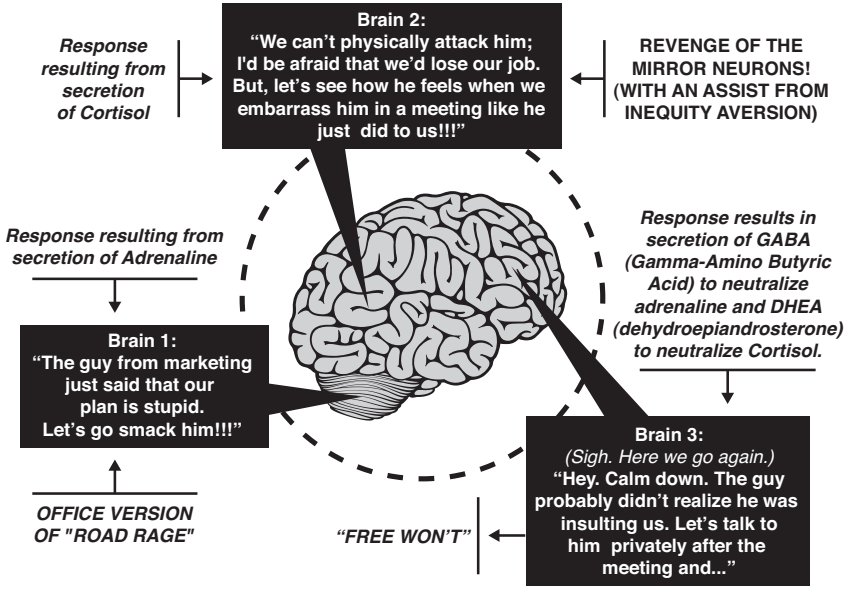

FIGURE 2.5 Human Behavior Results from Constant "Battles" Among Neurotransmitters

treatment we experienced. **This is a case where two (albeit similar and closely related brain functions) coproduce an amplified reaction** (cf., Brain 1 and 2 co-conspiring in Figure 2.5).

Chapter 2 Wrap-Up: Making All This Complicated Brain-and-Human-Behavior Stuff *Simple*

To my knowledge, there is only one holistic theory of human behavior that has been both broadly and specifically applied to the workplace and is based 100 percent on neuroscientific findings: David Rock's (2008) theory/model that he calls SCARF (explanation of the acronym forthcoming). Rock acquired his knowledge of these findings initially by interviewing prominent neuroscientists from, literally, around the world.

These are some of the theory's basic premises:

- the primal, primary and "overarching" organizing principle of the brain is "minimize danger and maximize reward"—in that order;
- the brain, operating below the level of conscious awareness, immediately identifies each new person, circumstance or situation (PCorS) it encounters as potentially dangerous/bad or potentially rewarding/good;
- the brain is repelled by danger and attracted to reward;[21]
- the traditional inducements (money, promotion, perks, etc.) used to get employees to be attracted to a PCorS or a way of performing are usually ineffective and frequently counterproductive;
- the traditional inducements (e.g., punishment, threats, etc.) used to get employees away from a PCorS or a way of underperforming are usually ineffective and frequently counterproductive;
- contrary to traditional business practice, the best way to induce desired performance is to provide rewards that affect an employee's drive or need for **S**tatus, **C**ertainty, **A**utonomy, **R**elatedness and **F**airness (thus, SCARF) and avoid any possible threats to those same drives or needs.

So, once you have this SCARF thing, what do you do with it? The most effective leaders constantly self-monitor their behaviors to make sure that they do as little as possible that would elicit "threat" responses in the people who report to them. At the same time they must do as much as possible to elicit "reward" responses during their interactions with those reports (Rock, 2008). I think of this as "managing by SCARF."

Table 2.2 presents a number of possible managerial behaviors that can, and usually do, lead to reward expectations or threat expectations for each of the elements of SCARF. Here are a few things to note about the table:

1. I chose unique examples of behaviors that lead to reward-expectations vs. threat-expectations. However, the opposite of behaviors that lead to reward-

expectations are also likely to elicit threat-expectations (e.g., being truthful vs. being dishonest);

2. Some behaviors can activate the brain's response to more than one element of SCARF. For example, being truthful can influence others' sense of certainty and sense of fairness—though I haven't represented that in the table; and

3. **Some behaviors can activate the brain's response to all of the elements of SCARF.** These multi-impact behaviors are so important that I devoted two of the rows in the table to examples of them. If you look at the last two rows under possible rewards, you'll see that "Building plans with someone; allowing someone to choose among options" and "Delegating an important task or responsibility" are likely to impact status, certainty, autonomy, relatedness *and* fairness perceptions. Think about delegation for example. If your boss selects you (rather than others) to do something important, that's going to affect your self-perceived status in relation to co-workers. You'd get an increase in certainty and autonomy perceptions because you get to decide how some things are going to be done. Being chosen for the task and spending more time with your boss might lead to a sense of being closer to her (relatedness). And, people almost never think it is unfair to be chosen among others for something desirable (though those not chosen might). Of course, things that should have positive impacts can lead to the opposite effects. If by "delegating" a task, you really just dump a bunch of extra work on someone, react emotionally to any mistakes made, micro-manage the work, abdicate your own responsibility for the work, etc., you'll be creating highly compounded threat-expectations.

In my view, SCARF is irrefutably supported by every related neuroscience study with which I'm familiar. So, why did I devote so much (previous) space to the critical importance of the maintenance or enhancement of the self-image drive or need? Here's the short-hand version: First, I believe that (Rock's) status and (my concept of) self-image are similar enough so that they can be considered the same concept.

Second, I believe that when Rock talks about a threat state and I talk about the need to protect one's self-image or when Rock talks about a reward state and I talk about an opportunity to enhance one's self-image, we're talking about precisely the same things.

At the same time, there are some differences between the two perspectives: Rock views the five variables (S-C-A-R-F) as *roughly equivalent in impact*. I see self-image (or Rock's notion of "status") as more fundamental. Why? **One reason is that I can't come up with a situation in which the brain sees the self-image as irrelevant. But, I can imagine many theoretical situations in which one or more of the other variables are less than central, if operative at all.** For example, if certainty (C) is as powerful as self-image, why would anyone ever go sky-diving or volunteer for hazardous warfare or want to become an astronaut? On the other hand, learning how to sky-dive and surviving several jumps, serving your country in ways that most other people wouldn't dare,

TABLE 2.2 Setting Reward-Expectations Rather Than Threat-Expectations with SCARF

	Status	*Certainty*	*Autonomy*	*Relatedness*	*Fairness*
POSSIBLE REWARDS	Providing any form of public or private recognition for good work, good decisions, special effort, etc.	Providing real-time, honest, open communication and information especially about the future	Where possible, allowing people to set their own priorities, to organize their own work and schedules	ALWAYS treat every person in the workplace with respect, civility and cordiality; CARE about people as individuals	Aligning rewards, recognition and desirable opportunities with performance levels
	Selecting someone for a job, a desired promotion, training or enjoyable tasks	Being authentic, transparent and truthful; remaining calm in the face of crises and unexpected events	Organizing your meetings and communication to show respect for the value of others' time; don't distract them unnecessarily	Keep reminding people how what they do fits into the "big picture" (i.e., organizational or work unit strategy)	Basing your decision-making on the best available hard evidence; avoid knee-jerks
	Asking someone for an opinion, particularly if it's based on knowledge or skills	When some major outcome is unknown, giving someone information about when it will be known	Where possible encourage/allow people to evaluate their own performances	Recognize/reward collaboration; tell stories about teamwork and supporting others	Giving credit for the work of others; owning up to your own mistakes
	Building plans with someone; allowing someone to choose among options	Building plans with someone; allowing someone to choose among options	Building plans with someone; allowing someone to choose among options	Building plans with someone; allowing someone to choose among options	Building plans with someone; allowing someone to choose among options
	Delegating an important task or responsibility	Delegating an important task or responsibility	Delegating an important task or responsibility	Delegating an important task or responsibility	Delegating an important task or responsibility

POSSIBLE THREATS	Pitting employees or groups against one another	Behaving inconsistently, unpredictably, moodily or out of line with goals or organizational values	Micro-managing; telling someone exactly how things must be done; over-checking work	Not including someone in planning, discussions or even lunch invitations if extended to others	Failing to address performance problems, ethical violations or undesirable behaviors
	Responding emotionally to bad news or to the discovery of mistakes	Frequently changing goals, priorities, practices without apparent cause	Countermanding someone's decisions or authority to make them	Creating work spaces for some that elicit a sense of isolation	Failing to explain the reasons or logic behind decisions
	Ignoring someone's opinions, concerns or preferences	Providing inadequate training or preparation for new tasks, technologies or responsibilities	Ignoring or failing to act on feedback about your own performance or behavior	Criticizing some employees in the presence of other employees	Establishing uneven workloads; asking top performers to do more than their share

and being picked as one of 50 applicants for the "job" of astronaut most assuredly would affect one's self-image. Likewise, if autonomy (A) is always crucial, why would anyone have six children or become a Buddhist Monk or even endure football training camp?

So, is SCARF at odds with the primacy-of-self-image view? No. As depicted in Figure 2.6, **I see our self-image as a *LENS* through which we view all of our experiences, our own behavior and other peoples' reactions to our behavior**. For example, if we don't get to choose how we do something or if we are micro-managed, that hurts not because it's a threat to our need for autonomy (A) per se. **It hurts because of how that threat affects our self-image.** Most people in work organizations today simply can't feel good about themselves if they have zero impact on decisions that are being made about how the work is to be done and have the level of oversight usually extended to kindergarteners.

Likewise, if we don't feel that we are being rewarded in line with our contributions (F—fairness) that hurts not because it's a threat to our need for fairness/equity in itself. When people say, "It's not fair!" what they really mean is that "I am **(i.e., my self-image is)** hurting because I don't feel like an equal in this situation" (in Rock's parlance—one's **status** is being threatened!).

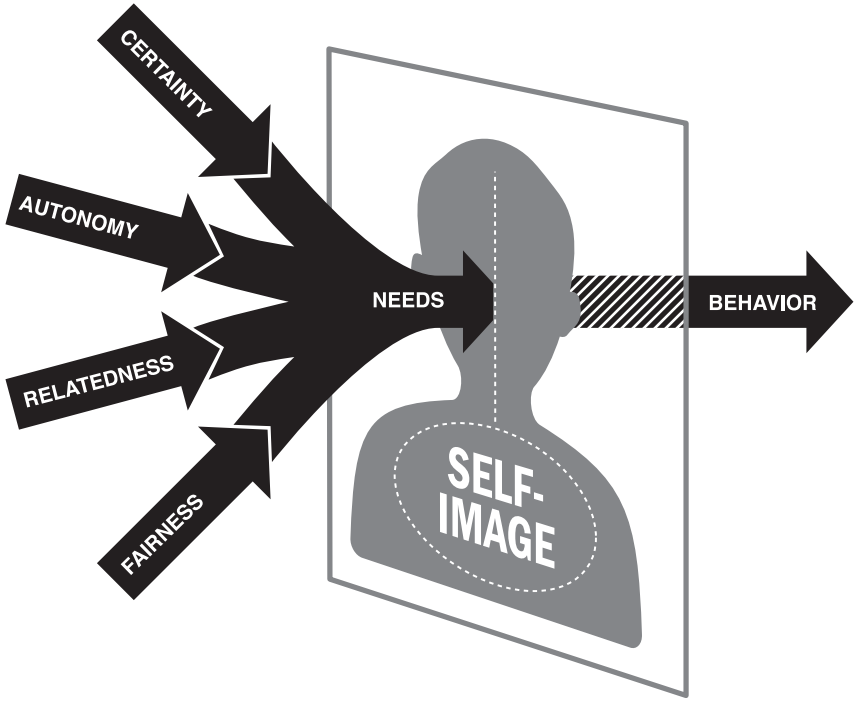

FIGURE 2.6 Self-Image as a "Lens" Through Which Needs/Fears Are Filtered and Processed Into Behavior

For all of these reasons, I recommend that Change Leaders take the simpler route:

Focus on the lens: How all experiences affect employees' self-images!

Okay. If you're presently telling yourself that there doesn't seem to be much difference between Rock's theory and my approach, you're right. In the end, Change Leaders who follow my recommended course of action—and Change Leaders who follow Rock's—do pretty much the same thing day-to-day. The difference is primarily in the focus.

Of course, it **IS** easier to **FOCUS** with a **LENS**!

Notes

1 Readers interested in what a college textbook would be like if it were designed around SCN learning principles can find out here: Snyder (2014).

2 Milligan (2014) provides an interesting interview with Jonathan Atwood who explains how Unilever uses stories to build brands and promote sustainability issues.

Melcrum Communications (*n.d.*) has a model for collecting and refining organizational stories to support change projects.

3 Bob Nelson has written several books about using a wide variety of recognition tactics as rewards. You can find an overview of his work in Nelson (*n.d.*).

4 McGill University (*n.d.*) maintains an excellent primer on brain circuitry and neural networks.

5 In many ways, the TED talk by Sebastian Seung (2010), a computational neuroscientist at MIT, is out of date. It was made *way back in 2010*—which is a long time ago by SCN standards. However, the graphics he created for that talk are the best I've seen in terms of giving a lay person insight into the wondrous nature of the process by which the brain reprograms (i.e., physiologically changes) itself.

6 Duhigg (2012) describes the *power* that these circuits have over the decisions we make and the ways that we behave in life and in business. It's a fascinating book; one that has woken up many people to the possibility of the fact that they are behaving automatically (i.e., without thinking) in circumstances where thought/consideration would make an important difference.

7 What I mean by metaphor-based should be obvious (you'll see spam filter, garage, system memory, folder, 1957 Cadillac hearse, etc. used in this section). "Oversimplified" isn't as transparent, so I'll provide an example. For the sake of understanding and retention, I've made it sound as though data from our senses are being processed in a linear fashion by stand-alone entities: Spam filter > working memory > long-term memory. This description of the process would make a neuroscientist cringe; the process is far from linear and several parts of the brain are usually doing their *jobs* (yet another metaphor) simultaneously and reciprocally. In fact, it is now believed that data are processed by neural networks that are widely distributed throughout the brain. For a more technically accurate description of the process, you might want to take a look at Cikara and Van Bavel (2014).

8 Knowledge of the nature and function of myelin sheaths has come full circle (something that only rarely occurs in neuroscience). Earlier on, myelinization was believed to function like insulation that kept signal quality from decaying during transmittal. At other times, sheaths were likened to amplifiers, then later to "repeaters" in the sense of how radio frequency transmissions can be made to go faster via intermediate placement of devices that essentially resend the same signal.

Most recently, the insulation view is back in vogue—albeit with a much more complex understanding of how the sheaths function. A sound technical explanation can be found at Bechler and ffrench-Constant (2014).

9 If you aren't familiar with the training programs developed by Gordon Graham, you should be. That is, I think that everyone can benefit from the insights on human behavior that he developed (long before the very same ideas were being validated by SCN). Graham was a (very) hardened criminal who served 19 years in prison, including 12 months of "bread and water only" in a tiny, isolated cell in Walla Walla Federal Prison. (That sounds medieval, but it occurred during the 1960s.) Graham was able to turn his thinking and his life around and he became a management trainer with many Fortune 500 firms as clients.

Videos of many of his programs are still available on YouTube. The one that provided the most valuable insight for me is called "Effective Feedback" (Graham, *n.d.*). Today, it would likely be called "Performance Management."

The means by which Graham was able to change his life is described in this six-minute, low-budget shoot. More importantly, Graham explains that if you want to change someone's behavior, never tell them what you don't want them to do—because of how the brain records and replays that directive over and over and that interferes with acceptance of the new, desired behavior. Likewise, Graham emphasizes that people only change when *they decide* to change and *they decide how* to change. So if, for example, one of your reports doesn't make her sales quota, you could ask, "Why didn't you make your quota this month?" That only leads to defensive excuse making. Rather, he suggests: "What would have to be different so that you could make your quota every month?" and then let the report "paint the picture" of how to change.

10 It wasn't SCN research and the study could be considered "cute" rather than impactful. But, Melissa Bateson and her colleagues (Bateson, Nettle & Roberts, 2006) randomly rotated a picture of flowers or a picture of human eyes on a sign above the "kitty" for an honor coffee stand. All other possible variables were the same throughout the study. When the eyes, rather than the flowers, were present, revenues were 2.76 times as great. Of course, people would be more honest when they were being "watched!"—apparently, even if they were being watched by a picture.

11 Some experts talk about a fourth part of the brain with No. 4 being the pre-frontal cortex (PFC). I believe that, for my purposes here, it's fine to include the PFC in the neocortex because: a) it is a part thereof and b) inclusion is the more common practice. When the three-part approach is taken, the term "Triune Brain" applies.

12 First, procreation is essential to the survival of the species, not the individual animal; second, in one way, ancient reptiles were smarter than contemporary humans. Reptiles never procreated with any creature from which they should flee.

13 The ability of offspring to quickly learn to recognize their primary care-giver has survived the millennia. There's evidence (Medina, 2008) that human babies can recognize their mother's face within four to five hours after birth if, that is, the biological mother is the predominant person to provide care.

14 Brain 2 is called the Limbic System in the neuroscience literature.

15 Among social animals, there is protection in numbers. Aged, sickly or injured members of a herd, for example, struggle mightily to keep up with the herd's movement because they know instinctively that otherwise they will die.

16 Eisenberger and Lieberman (2004, p. 295) also report:

> Perhaps most surprising, though, is that even when participants are told they are playing with a computer program and that the computerized players are going to stop throwing the ball to them, participants still report lower self-esteem following the game.

17 I'm oversimplifying here for ease of presentation. Emotion-related neural activity occurs throughout the entire brain, not just in Brain 2.

18 I'm using both of these words so as to include two divergent scientific perspectives. It's

beyond the scope (and intent) of this section to explain the arguments for and against each of these labels.

19 This is the anterior cingulate cortex.

20 The human brain averages about 2 percent of the body's weight but consumes about 20 percent of the energy used each day.

21 Personally, I would add a qualification to this premise: "So long as other factors don't interfere."

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