Retraining the Brain: Harnessing our Neuralplasticity

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By Janina Fisher and Pat Ogden

Carrie, 67—a mother and grandmother—came into therapy because of increasing difficulties in her marriage of 40-odd years to her childhood sweetheart, a Vietnam vet. Ever since Vietnam, he'd been moody and easily irritated, but in the past year or so, she reported, he'd developed health problems, and his moods had gotten worse.

"Out of nowhere, he starts screaming at me or putting me down--ridiculing me for being useless and inadequate," she said. "When he does that, I just freeze; it feels as if I'm rooted to the floor and can't move. He'll scream at me to 'say something!' but I can't; no words come. Then I try to think how to make him happy: what does he need? When I can talk, I ask him what I can do. Does he need to know I love him? I try to say something nice, but that just makes him madder."

Carrie vividly remembered growing up with parents who'd been moody, unpredictable, and quick to anger. Alcohol had fueled their hair-trigger reactivity, making them even more volatile and frightening. When she heard certain tones in their voices or saw particular facial expressions, her young body would freeze and become quiet and still--her eyes tracking their movements and expressions intently. She'd then automatically shift into a calmer, compliant state in which she'd try to soothe them and minimize the abuse. Sometimes, she'd try to placate them by giving each a hug, smiling brightly, and telling them how much she loved them and how pretty her mother looked. These were a child's adaptive responses to alcoholic parents, designed to diffuse their rage. Frequently, her next response would be shame and submission: her shoulders

slumped, her head came down, her chest collapsed, and her body shrank in and away. Over time, these reactions became automatic, thanks to what's called procedural learning--our memory system for learning habits and habitual functions. Carrie's young brain was organizing itself for survival in an alcoholic family environment, and her body was developing patterns of response that became as automatic as the ability to ride a bike.

The same childhood-survival strategy was being activated whenever her husband lashed out at her. The problem, of course, was that the pattern of freezing and placating--meant for another time and place--was no longer adaptive. Thanks to years of therapy, Carrie understood this, but her insight was having no effect on her automatic reactions.

Why hadn't years of talk therapy worked? Could it be because these patterns were so encoded in her body and brain that insight and emotional expression alone couldn't change them? Until the end of the 20th century, neuroscientists believed that the brain's structure was largely unchanging and unchangeable after certain "critical periods" in infancy and childhood. They'd have assumed that the survival skills that Carrie learned as a child couldn't be unlearned in adulthood: those neural pathways were fixed for life. The only likely major changes in the brain would be negative--neural degradation or destruction caused by injury, disease, or old age.

Understanding Brain Function

Since the "neuroscience revolution" beginning in the 1970s (including radical advances in scanning technology that allowed researchers to study living brains at work), we now know that all areas of the brain are "plastic," capable of reorganizing themselves, growing new cells and neural networks, and making other areas obsolete in response to

experience. Neuroplasticity has two sides, which psychiatrist and researcher Norman Doidge, author of "The Brain That Changes Itself," calls the "plastic paradox." Experience and environment produce changes in the brain, for the better and for the worse, promoting stubborn, frustrating patterns of behavior that result in many of the symptoms our clients bring into therapy. Because of Carrie's neuroplasticity as a youngster, her brain had wired itself in ways that had become rigid, fixed, and, despite her best intentions as an adult, resistant to change. She needed to develop new patterns of response, which could become as automatic and comfortable as the patterns she'd developed in childhood.

Despite the growing interest in neuroplasticity generated by leaders in the field like Doidge, Daniel Siegel, and Jeffrey Schwartz, we still have no sure way of knowing which therapeutic interventions may be able to change the brain, but knowledge of the principles of neuroplasticity is a promising avenue for therapists eager to help clients who can't benefit fully from traditional talking cures. Even before the advent of neuroscience research and brainscan technology, Sensorimotor Psychotherapy, a body-centered talk therapy developed by Pat Ogden, had started using techniques that dovetail with what we now know about the qualities of neuroplasticity.

The first principle of neuroplasticity that's helpful in a therapeutic context, articulated by Schwartz and Sharon Begley in their 2002 book, <I>The Mind and the Brain,<I> is that neuroplasticity is "induced by <I>changes<I> [emphasis added] in the amount [and kind] of sensory stimulation reaching the brain." This means, simply and obviously, that repetition of old, habitual thoughts, feelings, body sensations, and movements won't change the brain, but will only reinforce established neural networks

and behaviors. To change the brain, something new has to happen: we must interrupt and inhibit rigid patterns, and experiment with new kinds and amounts of sensory stimulation.

The second principle is that neuroplasticity requires focused attention and direction. As the pioneering French psychologist Pierre Janet pointed out a century ago, the sensory information available to us at any given moment far exceeds our capacity for conscious awareness. Much of the information that reaches our sensory organs doesn't register in our minds. What's registered automatically, without conscious intention, is determined by the intensity and repetition of a signal, its novelty or familiarity, our own internal state at the moment, and our histories. Without conscious awareness, we typically engage well-established neural pathways just by our routine focus of attention.

Carrie's procedurally-learned focus was to "signs of danger" evidenced in her husband's body language, tone of voice, or level of tension. Watching him through the narrow lens of this childhood telescope deprived her of other information that might have been reassuring: his old friends rolling their eyes in amusement at the outrageousness of his behavior, how hard he tried to control his irritability, the look of discouragement after an outburst. His acts of apology (gifts or a helping hand with some chore) never registered on her radar screen.

When we consciously select the object(s) of our attention, it's believed that we can stimulate neuronal firing in the areas we wish to restructure. We help the brain retain the new learning by heightening awareness of and sustaining attention to the new stimulus. According to Richard Davidson, director of the Laboratory for Affective Neuroscience at the University of Wisconsin, Madison, "In some ways, attentional training can be thought of as the gateway to neuroplasticity." In other words, we can take

advantage of attention's role in neuroplasticity by teaching our clients how to focus on new stimuli they normally might not notice, and consciously keep their attention there.

Third and perhaps most important, neuroplastic change requires the conscious inhibition of old responses, coupled with intentional repetition of new, more adaptive responses. Carrie's instinct was to use therapy sessions to tell story after story about her husband's rages and their effect on her. At times, she was angry at him; at times, ashamed of herself for being so affected and desperate to find a way to make him stop. These were understandable but "old" responses, which didn't offer her any new options; they reflected her brain's past neuroplasticity, yet failed to capitalize on her brain's present capacities. However, our clients can, with our help, become conscious, intentional participants in changing their own brains.

Applying Neuroplasticity Principles

How does this work in practice? In Sensorimotor Psychotherapy, as we notice habitual emotional or somatic responses, we ask clients to pause during recitations of past events and current difficulties, and then notice what's happening in their bodies. In this way, old responses are spontaneously interrupted as the client directs attention in a mindful way to the experience of the present moment.

When Carrie was asked to see what was happening "inside" as she recounted her husband's latest outburst, she first noticed a feeling of fear and the sensation that her heart was racing, and then she tightened up and stopped breathing for a moment. Her body felt rigid. Encouraged to keep observing what was happening, she noticed that her shoulders and chest suddenly felt heavy and sunken, and feelings of sadness welled up, to

which she attached the word “hopeless.” She felt paralyzed, unable to speak or act. Her body couldn’t shift its longstanding childhood “script.” She felt little, scared, sad, and helpless.

Because neuroplastic change requires mindful attention to inhibiting habitual responses and the repetition of something new, Carrie’s therapist asked her to focus just on these deflated sensations and then notice what happened inside if she lengthened her spine slightly. “I can breathe,” she said with surprise. Her gaze could now take in the room, and she and her therapist noticed that her body was no longer collapsed. Gone, too, was the hopeless feeling. Instead, she was laughing: “The weirdest thing is the doctors say I have emphysema, but right now I’m breathing without effort.”

When we freeze like the proverbial “deer in the headlights,” all movement, including the breath, is inhibited. As Carrie lengthened her spine, she “unfroze” and counteracted the submission responses in her chest and shoulders, a signal to the body to breathe again. To this day, she experiences an increased ability to breathe normally whenever she remembers to lengthen her spine.

In this first session, we repeatedly used the image of her husband’s most recent angry outburst to stimulate the old responses. As she envisioned his belligerent expression and menacing tone, her body would respond in its habitual way, and then she’d practice the simple intervention of lengthening her spine until, after six to eight trials, it became easier and more automatic. The therapy session had become more like a gym session with a personal trainer: the same physical movements rehearsed again and again. In this way, Carrie was learning to redirect her attention from her old, automatic

freezing response to a new physical posture, which immediately made her feel less afraid and hopeless, more solid and confident.

That night, when her husband's irritability threatened to trigger the old freeze-and-collapse reaction and reduce her to tears, she remembered to lengthen her spine and focus on that physical movement, rather than her habitual feelings. Much to her surprise, after a few seconds, he didn't seem so frightening, and she didn't feel as compelled to soothe him. She did feel more empathy toward him, noticing how hard it was for him to tolerate his increasing physical frailty. But for the first time, she began to consider that this really was his problem, not hers.

At the next session, thoughts of her husband's impending return from a business trip activated Carrie's fears of an angry tirade induced by the strain of travel. How would he act? How would she respond? At this session, after a brief discussion of her anxiety, she was asked to inhibit the oft-told narrative about his behavior to focus on her body and then to notice what happened if she raised both arms and hands to make a "Stop" gesture. At first, she experienced positive feelings of solidity and strength, but as she continued to focus attention on these movements, sadness came up, accompanied by a sense of heaviness around her heart. "After all these years, I have to shut him out to feel safe. It's so lonely. I miss him," she said, her chest caving a little as if she were carrying the weight of the loss.

Sensorimotor Psychotherapy assumes that since the body's answers don't come in the form of words, we must discover the "right" answer through a process of mindful trials of new movements, postures, words, and attentional focus. In that spirit, Carrie was asked if she'd be willing to try something else: "Notice what happens if you make the

same Stop movement with one hand and reach out with the other hand." With this action, she observed a feeling connected to the raised hand of being centered and solid, but also a sense of tenderness connected to the reaching-out hand. I asked her to practice these movements over and over, while keeping in mind an image of meeting her husband at the airport. Excited, she began to entertain the possibility that she could have both her boundary and her connection with him. "I can hardly wait for him to get here so I can try this out!" She was encouraged to keep practicing the movement during the next 24 hours before his arrival, and to make it again several times at the airport.

At the next session, she proudly reported the results of her efforts at brain change: "I saw him waiting for me outside--he never waits inside because he feels trapped--pacing impatiently, and I could feel a little anxiety come up. But then I made my movement a few times while I was waiting for his bags, and when I turned to go to him, I felt better about seeing him and calmer inside. I wasn't so afraid anymore, even though he was impatient. And I think he treats me better when I'm not afraid!"

Over the next few months, attentively practicing just these new patterns of lengthening the spine and the "Stop and Reach Out" gesture, both at home and in session, helped Carrie begin to renegotiate her relationship with her husband. Instead of feeling frightened, frozen, and hopeless, she increasingly felt stronger and calmer, at times a little annoyed by his behavior, and at times wanting to roll her eyes and laugh at his outbursts as his friends typically did. Instead of being inflamed by her old procedurally-learned patterns, he recovered faster from his outbursts. He responded to her nurturing in a more relaxed manner--gruff instead of angry and defensive. And when he did blow up, she found it easier to give him time and space to recover on his own, rather than to rush in

with her procedurally-learned anxious caretaking. His trauma symptoms continue to be activated; he still isn't very good at expressing his feelings; she still longs for more closeness. What's changed is that she's no longer afraid and hopeless, no longer trapped by the neuroplastic patterns that were adaptive for her childhood, but are maladaptive in her marriage.

In our practice, we've found that focused attention to in-the-moment responses can activate the neural circuits driving established patterns, while mindful trials of new responses can help encode new neural circuits that override the old. It appears that applying the principles of neuroplasicity to psychotherapy through this and other interventions can create structural alterations in the brain, which, as Daniel Siegel writes in "The Mindful Brain," are likely to stimulate changes in brain function, emotional experience, stress response, and even immune function.

Perhaps more important, Carrie would tell us about the positive effects on her marriage and well-being of the changes she's experienced, and how grateful she is to feel closer to her husband again--compassionate and warm, yet with boundaries and a feeling of safety. Are all her challenges behind her? No, but she's facing them with more equanimity. She's still vulnerable to old "scripts" and behavior patterns being reactivated. Changing our brains takes focus and repetition. Carrie has just begun to explore what it means to harness her innate neuroplasticity. What she takes from these sessions is a new feeling of mastery--"I can do it"--and greater hope for the future.

Case Commentary

By Susan Aposhyan

"Neurons that fire together wire together," neuropsychology founder Donald Hebb's fundamental axiom, stated in 1949, remains central to our understanding of neurological patterning and change. Carrie's case, as presented here by Sensorimotor psychotherapists Pat Ogden and Janina Fisher, illustrates this tenet simply and clearly.

Since childhood, Carrie was neurologically habituated to freeze in the face of her parents' rage and then attempt to placate them--a pattern stored in her procedural memory. In the course of her treatment, she becomes aware of the somatic components of her behavior through focused attention. After many repetitions of new movements and behaviors, she's able to change longstanding emotional and relational patterns.

I appreciate the care with which Fisher and Ogden delineate the stages of this process. However, as a Body-Mind psychotherapist who works through similar stages of treatment, I'd like to point out an important component of Carrie's therapy that wasn't explicitly articulated. As she began to focus on experiencing the old pattern of paralysis and collapse somatically, a neurological loading process occurred in which she consciously recognized her problematic behavior patterns and the discomfort she felt when carrying them out. As this came to conscious awareness, a healthy nervous system would naturally search for options that might alleviate the discomfort. We're told that Carrie "felt paralyzed, unable to speak or act. Her body couldn't shift its longstanding childhood 'script'--she felt little, scared, sad, and helpless." It was then that her therapist

suggested that she lengthen her spine. This pacing--allowing the client's nervous system to exhaust its known resources--is essential for this simple, somatic change process to be effective.

I generally encourage my trainees to add an additional step here: permission to change. This step increases the possibility that clients will utilize their own resources a bit more, allowing a tad more self-determination. It's an addition to the process of exhausting accessible options before directing the client toward change. As Carrie was mindfully aware of her sensations and emotions, her therapist might have said, "Give yourself permission to shift your body as you feel all this."

The authors describe three simple suggestions made by the therapist--lengthening the spine, putting both hands out in a "stop" gesture, and finally the "stop and reach out" gesture. By accessing these simple behavioral resources, Carrie was able to move through a lifelong developmental and relational impasse.

In essence, the kind of somatic interventions described in this case might be seen as the new behavioral therapy. They allow us to "chunk down" a new behavior so we can master it. Perhaps by breaking down new behaviors into simple movement components or micro-behaviors, we're harnessing the neurological bedrock of behavior and facilitating the learning process of macro-behaviors--in Carrie's case, self-regulation and relational equality.

Fisher and Ogden have portrayed how easy and direct this sort of somatic awareness and change can be. Try this at home, or in your office! If you're intrigued, seek out ways to cultivate your own embodied awareness, which will enhance your comfort with this approach.

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