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*Psychotherapy*  
*and the* **Brain**

Are we entering  
a new era of  
practice?





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WHAT WE CLINICIANS HAVE LEARNED in recent years about the intricacies of the brain's implicit memory systems has certainly helped us better recognize the linkage between distressing or traumatic experiences and many of the previously puzzling symptoms clients bring to our offices. But now brain science is beginning to offer more specific and powerful guidance about clinical methods that can help free clients from the emotional distress and problematic behaviors triggered by disturbing implicit memories. ■ These days, more and more therapists have moved from simply talking about emotional issues and the past to using experiential approaches based on the recognition that implicit memory is *living* memory. But once a client has achieved direct access to the raw living memory

**TRANSLATING CUTTING-  
EDGE NEUROSCIENCE  
INTO PRACTICE**

# *The* **Brain's** *Rules for Change*

*by*  
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of difficult or traumatic experiences, how do we know what to do next to resolve those memories? And what does “resolving” such memories actually mean? Most clinicians are all too aware that implicit memory often maintains an emotional chokehold, even after it’s become conscious. Yet sometimes we do see our clients experience a deep, liberating, lasting shift, after which their behavior changes and their mood vastly improves. The only problem is that we often don’t know why or how this shift happened.

In the late 1980s, my clinical collaborator, Laurel Hulley, and I began a close study of cases in which clients experienced such deep emotional breakthroughs. Over time, we noticed consistent patterns in these cases and eventually developed clinical guidelines for how to help clients dissolve implicit memories more reliably. But then we decided to go the next step to see how the methods we’d crafted corresponded to the rules and processes neuroscientists had identified regarding change in the synapses and circuits of implicit memory. I immersed myself in neuroscience journals such as *Neuron* and *Learning and Memory*, and began searching through dozens of highly technical research articles to see what clues neuroscience might offer about unwiring a specific, long-standing, implicit memory.

Until quite recently, a century of research on learning and memory had established that, while all newly formed memories are unstable and relatively easily disrupted, experiences accompanied by intense emotion set down implicit memory circuits in the limbic system that last a lifetime, once the complex *consolidation* of these memory traces is complete. Such consolidated circuits are locked in by specially formed, extraordinarily durable synapses. Even the process of extinction at best suppresses, but never erases, an implicit memory in the subcortical limbic system (and likewise for cognitive regulation approaches such as CBT). Neuroscientists, like their professional brethren in the mental health field, have long been aware of the devilish tenacity of emotional memory.

Yet, decades ago, there’d been a few hints to the contrary in the neuro-

science literature. Electroshock procedures that had been completely ineffective for dispelling an implicit memory became dramatically successful in some animal and human studies when the implicit memory was reactivated just prior to the shock. In these studies, not only did the emotional and behavioral responses driven by the implicit memory cease, but they couldn’t be reevoked, distinguishing the process fundamentally from extinction and other suppressive methods. However, these few articles received scant attention from brain scientists and even less from clinicians, and the immutability of consolidated memory traces remained dogma in brain science.

Then, at the end of the 1990s, a major turnaround in that viewpoint began. Researchers in three different labs had resumed studying the effects of reactivating an implicit memory. Thanks to sophisticated new techniques combined with the field’s advanced knowledge of exactly where in the brain certain memories form, these neuroscientists were able to determine that what makes a reactivated memory briefly dissolvable is an actual, if temporary, unlocking of synapses. In one study, researchers first trained mice to respond with fear to an auditory tone by pairing the tone with an unpleasant stimulus. Then they waited one day, enough time for full consolidation of the fear memory circuit. After reactivating the fear memory by playing the tone, the memory-bearing part of each mouse’s amygdala was doused promptly with anisomycin, a chemical that precisely blocks the production of proteins necessary for consolidation of a memory circuit. When the tone was subsequently played, the mice no longer responded with fear. The implicit memory was gone. But if anisomycin was applied without first replaying the tone to reactivate the memory, the memory was left intact, and the fear response continued. The fact that a consolidation-blocking chemical could erase an already consolidated, reactivated implicit memory meant that reactivation had caused the memory to deconsolidate. This in turn implied that a reactivated deconsolidated memory undergoes a natural process of *reconsol-*

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idation, which soon relocks the synapses and returns the memory to long-term durability.

This time, the neuroscience field took notice. The number of articles and conference presentations on reconsolidation and its memory-dissolving disruption has grown exponentially since then.

Further research has established that in order for synapses to unlock, the brain requires not just the experience of reactivation of the memory—it's also necessary for a second, critical experience to promptly take place while the memory reactivation experience is still occurring. That second experience consists of perceptions that sharply contradict and disconfirm the implicit expectations of the reactivated memory.

For example, suppose an animal has been trained to respond to a blue light with a fearful expectation of a harsh sound soon to follow. Subsequently, reactivating this memory by turning on the blue light will not, by itself, cause synapses to unlock. Only when the blue light is soon turned off, *without* any sound having occurred, do the synapses unlock, because the turning off of the light without the expected sound contradicts the implicit memory while the memory is reactivated. This need for a sharp contradiction has proven to be a key for translating these findings to psychotherapy.

These studies and others by neuroscientists at many different labs have established that the unwiring of implicit memory occurs through a type of neuroplasticity that's "experience-driven," and they've articulated the procedural, experiential steps that the brain requires for an implicit memory to be unwired:

(1) Fully reactivate the target implicit memory so that the emotional experience is occurring.

(2) While the target memory is fully reactivated and the emotional experience is occurring, promptly create an additional, concurrent experience that sharply mismatches (contradicts and disconfirms) the expectations and predictions arising from the implicit memory.

These two steps confirmed the pattern we'd clinically observed and documented. To see how this process might

apply in a clinical situation, consider my client James, a mild-mannered fellow in his late thirties, who came for therapy because of intense self-doubt and anxiety at work, despite his many successes and consistently positive evaluations from supervisors and coworkers. In the first two sessions of focused, experiential retrieval work, James got more and more in touch with the implicit material underlying his difficulties on the job. We worked on putting it into words that felt emotionally accurate for him: "If I say anything with confidence that it's right, I'll be just like Dad—a know-it-all lording it over everyone. And then people will hate me for that, just the way I hate him for it. So I'd better keep myself quiet by thinking, 'What do I know?' even though that makes me feel so insecure that I don't express what I do know."

After the second session, I wrote those words on an index card and handed it to James for daily rereading. He said he was deeply relieved to find that what had seemed so irrational actually made so much sense. The coherence of implicit memory—the fact that the symptom exists because it's in some way part of an emotionally adaptive response—is what we utilize to zero in on the relatively tiny patch of symptom-producing material in the client's vast implicit universe.

At this point, James suddenly felt a further connection between this newly conscious emotional truth and his lack of self-assertion in other contexts, especially his personal relationships. He was struck by a new realization of how pervasive and costly this way of being was for him. After a silence in which he was reflecting on this realization, he uttered, "It's really sort of crippling." James had now retrieved a cluster of personal constructs including memories of Dad, certain emotional meanings, and his own self-protective tactics. All of that symptom-requiring implicit material was now conscious and explicit, so the search for a strongly contradictory experience for step two could proceed.

The contradictory material can be found either in the client's already-existing life experience and knowledge, or in new experiences. A client who's

become mindfully aware of his own implicit theme is the best detector of disconfirmations of that material, so I simply asked James to go through day-to-day life with as much awareness as possible of what he'd retrieved. To maximize his new mindfulness I said to him softly, "I'm struck by how clear you are that *any* degree of self-assertion from you, no matter how small, is utterly potent because it turns you into a tyrant like Dad. For you it's like plutonium: just the tiniest speck of self-assertion is disaster, so absolutely none of it can be allowed. You seem very clear about that." James was silent for a few seconds, and then replied simply, "It *is* like that." I ended the session by saying, "So you can use the card we prepared together, and when you read it every day, just let it keep you in touch with that, and see how it is to go through the day knowing that."

At his next session two weeks later, James told me, "Something unusual happened. I was in a meeting at work and I thought of a good solution to a problem being discussed. But I went into 'What do I know?' and kept quiet. A moment later, somebody else piped up and suggested the same solution, and he said it pretty confidently. That jolted me. I immediately looked around the room and saw that everybody seemed glad to get this useful solution from this other guy. It was weird, how differently it went from how I was assuming it would go if I'd said it."

My clinical experience has taught me that it's usually a mistake to assume that a disconfirming experience automatically transforms a client's implicit material. Change becomes much more reliable when we take the additional step of creating a *juxtaposition* experience: guiding the client to attend to both the retrieved material and the disconfirming experience all at once. After all, step two requires concurrent experiences, and that rule of the brain has to be fulfilled thoroughly. In a juxtaposition experience, the client is emotionally in touch with the retrieved material and with a sharply contradictory experience simultaneously. Both feel real, yet both can't possibly be true. It's an experiential form of cognitive dissonance

*Continued on page 60*



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**ECKER** from page 45

with a unique, peculiar feeling. Both sides need to be emotionally rich and real, not just cognitive insights or talk.

So I invited James to close his eyes and revisit the office scene in imagination and I said, "The moment to revisit is that point right after the jolt: you've already squelched your own good idea to keep from being hated like Dad, and you're looking around the room and it feels weird that folks are fine with hearing the same good idea confidently put forward by the other guy."

That simple "establishing shot" began to focus him on both realities in juxtaposition with each other. Then I again prompted him to feel both at once by simply saying softly, "In your life, you've been convinced that if you say something confidently, you'll always come across like your Dad—like an obnoxious know-it-all whom people will hate. At the same time, here you're seeing that saying something confidently isn't always received that way. And it's quite a surprise to know that."

I allowed some silence, then again expressed empathy for both sides, ushering his attention to both by saying, "All along, it seemed to you that saying something confidently could be done only in your Dad's dominating way, and now suddenly you're seeing that saying something confidently can be done very differently, and it feels fine to people."

James was absorbed in experiencing the juxtaposition. In soft tones I delivered other variations twice more. I then asked him how it *felt* to be in touch with both sides. Through a sudden burst of giddy laughter he said, "It's kind of funny! Like, how could I think *that*?" When dissolution is successful, clients often express exactly that kind of gleeful laugh and view the old, tormented reaction as amusing or absurd.

At our next session one week later, James reported, "Something has really changed. I feel really different at work, but it's not how I always thought I'd feel if I could stop feeling so shaky. I always thought I'd feel superconfident, like some kind of genius, but I don't. The change is just that I don't feel uncertain any more, or insecure. That's a big relief, but there are no bells and whistles. It's kind of ordinary, actually.

When I have something to say or contribute, I just say it, and it's no big deal."

We continued meeting for two more sessions to see if the change would hold, and it did. The effortlessness of remaining free of the original emotional and behavioral symptoms is another marker that's regularly apparent and suggestive of actual unwiring. I asked James to consider whether it was time to discontinue our sessions or focus next on other possible emotional impacts of life with his father or other family experiences. He thought about it and was clear he'd return if needed, but felt no need to go beyond the change he'd achieved.

The brain's power to restore a person's distressed emotional world to well-being is far greater than we once knew, and we're learning more about that capacity all the time. I have no doubt that the most significant development in the evolution of our clinical methods depends on the continuing synthesis of clinical and neurodynamic knowledge. Regularly and predictably helping clients have breakthrough moments like those James experienced will become increasingly likely as we learn more and more about how to cooperate knowingly with the rules of change inherent in the brain. ■

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