

PIECING TOGETHER THE PTSD PUZZLE

How deconstructing trauma could help doctors come up with more targeted treatments

There is a lot we don't understand about trauma. Two people work side by side to pull bodies out from piles of concrete, steel and dust. One can head home, hug their loved ones and go back to their routine. The other will find themselves, months later, shaking and crying as their mind keeps replaying the horrific images.

We don't have a clear roadmap for treating post-traumatic stress disorder (PTSD), either. Exposure therapy, in which people recount traumatic events in a calm state of mind, might work. But it might not. The same holds for cognitive behavioural therapy, meditation and other interventions.

Then there's the trauma of childhood abuse, which people may not even realize they're carrying until decades later. How can you treat something that you can't even identify?

Shilat Haim-Nachum, a postdoctoral fellow in Columbia University's Department of Psychiatry, knows the mysterious, frustrating impacts of trauma first-hand. When her mother died of cancer when she was 16 years old, Haim-Nachum and her four siblings experienced "five different trajectories of trauma," she says. Since then, she's been driven to help people figure out the unique ways in which trauma affects their lives and how they can heal.

"PTSD is like this big puzzle that I keep trying to add pieces to," says Haim-Nachum, who is currently helping lead three studies to fill in this picture at Columbia's PTSD Research and Treatment Program. Her work builds on research she did as an Azrieli Graduate Studies Fellow, from 2018 to 2022, during her doctorate at Bar-Ilan University in Ramat Gan, Israel.

In her PhD studies, supervised by Einat Levy-Gigi, Haim-Nachum explored how "cognitive flexibility" could partly explain why some people develop PTSD and others don't. She ran studies involving firefighters and trauma-exposed students, in which participants played video games. In one game, they would open a box with an image of a car on it and discover a bomb. Later, they would see the same box, but with an image of a hat on it. Some people reacted differently to the box based on the new illustration; those who were able to adjust their thinking about the outcome of the box based on this change were defined as more cognitively flexible.



By Wendy Glauser
Photographs by Chris Taggart



Shilat Haim-Nachum, a postdoctoral fellow in Columbia University's Department of Psychiatry and a former Azrieli Graduate Studies Fellow at Bar-Ilan University, is doing research to help develop novel treatment options for PTSD and other forms of trauma. Looking at the brain scans (opposite page) of patients could one day help determine the degree of trauma people are experiencing and help improve treatments.

Overall, in her experiments, people who had symptoms of PTSD were much less cognitively flexible than those who didn't have symptoms. "People experiencing PTSD were less likely to open the box that was originally associated with a negative outcome," she says, "even if it was different from the original box."

The importance of cognitive flexibility hit home for Haim-Nachum when she spent time with firefighters in Israel as part of a volunteer activity. On the job, they would talk about sports and make jokes immediately after rescuing people, sometimes from gruesome scenes.

"Distraction was the best and most efficient way for them to cope at the time," she says. "But if they were distracting themselves to avoid connecting emotionally with their families, that wouldn't be adaptive. Flexibility is about the ability to change your behaviour according to that specific situation."

Yuval Neria, a clinical medical psychology professor at Columbia and Haim-Nachum's mentor, says that her combination of "motivation and talent" is rare and that her ability to measure cognitive flexibility in people exposed to trauma could guide novel treatment options.

"The idea that cognitive capacities in the brain can be amenable to intervention is compelling," says Neria. "We typically employ our interventions toward emotional capacities." In other words, part of effective PTSD treatments might lie in changing how people think, not just how they feel.

Still, cognitive flexibility is just one aspect of PTSD, says Neria, and while it may play a large role in some cases, it could have a smaller bearing on others. "There are numerous ways in which one

meets criteria for PTSD, which makes the patient population very heterogeneous," he says. As Neria explains, research being done by Haim-Nachum and others he's mentoring could move the field closer toward identifying different types of PTSD and tailoring treatments to them.

Although there are myriad causes of PTSD, childhood abuse is quite a common cause, according to Haim-Nachum. Many people who carry trauma from childhood don't seek treatment until years later. Some don't seek treatment at all. Guilt and shame, at least partly, explain why.

"There's so much shame when it comes to being hurt by the people who are supposed to take care of and protect you," says Haim-Nachum, "and it kind of twists the way they perceive themselves and others and the world."

This explanation is affirmed by the Toronto-based Centre for Addiction and Mental Health, which says, "Many people don't know that abuse can affect their lives many years later, and do not connect the common effects of trauma to experiences of childhood abuse." The U.S. federal government's Center for Substance Abuse Treatment, meanwhile, notes that people "often don't recognize the significant effects of trauma in their lives; either they don't draw connections between their trauma histories and their presenting problems, or they avoid the topic altogether."

To encourage people to recognize how childhood trauma is affecting their lives and help them feel safe enough to seek help, Haim-Nachum is leading a study with Neria and Doron Amsalem, another Columbia psychiatrist, using a brief video intervention aiming at reducing the stigma around childhood trauma. The video features an actor who describes how childhood abuse affected her. "It took me a while to understand what I went through was truly wrong," says the actor, sitting on a staircase and looking at the camera. "There were even times where I felt, 'There must have been something wrong with me.'" She explains why she sought help and how insights from therapy helped her build the life she has today, with a fully supportive partner and the awareness that she's part of a "community of people" who have overcome similar adversity. (For study participants who identify as male, another version of the video features a male actor.)

Participants — all of whom self-identify as having experienced childhood trauma — will be randomly assigned into two groups to determine whether the video has an effect on their self-stigma levels. One group will watch the intervention video; the control group will watch a "day in my life" video in which the same actor describes their life in general, without talking about overcoming trauma. Haim-Nachum is using questionnaires and scales, filled out by each participant, to measure the levels of guilt, judgment and shame people feel about their personal traumas before and after watching the video, as well as 30 days later. She'll also be asking participants about their willingness to seek treatment — and providing referrals for those who request help — to determine whether the video has a positive impact. (An informed consent process explains that the video may involve an actor talking about how trauma has affected them. All participants are given phone numbers they can call if they experience emotional distress.)

While other research found that videos can reduce stigma among people with various conditions, such as depression, this is the first study Haim-Nachum is aware of that applies the technique to self-stigma stemming from childhood trauma. Given that so many children around the world experience abuse, Haim-Nachum's study could have a significant impact. If the intervention proves successful, short videos to reduce internalized stigma could be introduced in doctors' offices, campus orientations and other settings.

Determined to look at as many different approaches to treatment as possible, Haim-Nachum is collaborating with Tel Aviv University psychology professor Amit Lazarov and Neria on another study that, as she puts it, "has a long and fancy name — gaze-contingent music reward therapy — but it's really about helping people with PTSD shift their attention from negative cues to neutral ones."

Participants with PTSD will look at 16 faces, half with threatened expressions and half with neutral expressions. For one of the intervention groups, music that the participants have identified as pleasurable will stop playing when the eye-tracking technology detects they are fixating on the threatened expressions. For the other intervention group, music will play when the study participants fixate on the threatened faces. The idea here is that pairing music with positive and negative stimuli can somehow change how the brain responds to the latter.

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"We know that people with PTSD have this overgeneralization of fear and negative emotions and thoughts, so they tend to focus on negative cues," Haim-Nachum explains. While the project is "a bit ambitious," she says, it's aiming to examine whether training the brain to focus away from negative stimuli could be linked with reduced PTSD symptoms.

These projects allow Haim-Nachum to take a clinical look at the consequences of trauma. But she also interviews people with PTSD as part of her research at Columbia, and their stories are intense. The veterans, first responders and survivors of childhood abuse require exhaustive treatment, with varying degrees of effectiveness.

Yet Haim-Nachum remains hopeful. "In my intake interviews, I'm sometimes meeting with people in their 70s and they share with us that they've been through so many different treatments, and it sucks, right? Because clearly, something isn't working for so many people," she says. "But it's also hopeful to see that, even after so many years, people don't give up on themselves. They keep that desire to not only survive, but to have a meaningful, hopeful life. Humans are really resilient." ▲●■

CAN BRAIN SCANS REVEAL PTSD PATTERNS?

One way that Shilat Haim-Nachum is working to better understand different presentations of PTSD is through brain scans. She and neurobiology researcher Xi Zhu at Columbia are analyzing the MRIs of people who have been exposed to various types of trauma — by force of nature, by accident, or by the hands of others, and at different ages, from childhood to later in life. She will look at patterns in connections between the amygdala (the fear centre of the brain), the hippocampus (a vital brain region for learning and memory) and the medial prefrontal cortex, which is involved in processing threats in a more cognitive or high-level way than the amygdala. (More activity in the medial prefrontal cortex has been associated in research with fewer PTSD symptoms.) She will also test brain networks related to reward processing, especially the nucleus accumbens, because people with PTSD are generally less reactive to positive rewards, possibly due to so-called "numbing" defence mechanisms.

This type of research could one day help doctors use brain scans to determine the degree of trauma people experience, which is helpful given that survivors of traumatizing events, especially children, may not have the language to identify and seek help for PTSD symptoms. Brain scans could also help practitioners improve treatments, says Yuval Neria, because they'll be able to see how the brain patterns of patients change, or don't change, after various treatments. ▲●■

