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The Science of Suffering

Kids are inheriting their parents' trauma. Can science stop it?

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Photo: Maciek Jasik

Lowell, Massachusetts, a former mill town of the red-brick-and-waterfall variety 25 miles north of Boston, has proportionally more Cambodians and Cambodian-Americans than nearly any other city in the country: as many as 30,000, out of a population of slightly more than 100,000. These are largely refugees and the families of refugees from the Khmer Rouge, the Maoist extremists who, from 1975 to 1979, destroyed Cambodia's economy; shot, tortured, or starved to death nearly two million of its people; and forced millions more into a slave network of unimaginably harsh labor camps. Lowell's Cambodian neighborhood is lined with dilapidated rowhouses and stores that sell liquor behind bullet-proof glass, although the town's leaders are trying to rebrand it as a tourist destination: "Little Cambodia."

At Arbour Counseling Services, a clinic on a run-down corner of central Lowell, 95 percent of the Cambodians who come in for help are diagnosed with Post Traumatic Stress

Disorder, or PTSD. (In Cambodia itself, an estimated 14.2 percent of people who were at least three years old during the Pol Pot period have the disorder.) Their suffering is palpable. When I visited Arbour, I met a distraught woman in her forties whom I'll call Sandy. She was seven when she was forced into the jungle and 14 when she came to the United States, during which time she lived in a children's camp, nearly starved to death, watched as her father was executed, and was struck in the ear by a soldier's gun. She interspersed her high-pitched, almost rehearsed-sounding recitation of horrors past with complaints about the present. She couldn't concentrate, sleep at night, or stop ruminating on the past. She "thinks too much," a phrase that is common when Cambodians talk about PTSD. After she tried to kill herself while pregnant, her mother took Sandy's two daughters and raised them herself. But they have not turned out well, in Sandy's opinion. They are hostile and difficult, she says. They fight their grandmother and each other, so bitterly that the police have been called. They both finished college and one is a pharmacist and the other a clerk in an electronics store. But, she says, they speak to her only to curse her. (The daughters declined to talk to me.)

On the whole, the children of Cambodian survivors have not enjoyed the upward mobility of children of immigrants from other Asian countries. More than 40 percent of all Cambodian-Americans lack a high school diploma. Only slightly more than 10 percent have a bachelor's degree. The story of Tom Sun, a soft-spoken, pop-star-dapper thirtysomething (he doesn't know his exact age) is emblematic, except, perhaps, in how well he's doing now. His mother was pregnant with him during the Khmer Rouge years. His father died before the Vietnamese invaded Cambodia and drove the Khmer Rouge back into the jungle. When he was very young, he, his mother, and a little brother made their way from a Thai refugee camp to the United States and eventually settled in Lowell. The two boys and two other brothers, born after they arrived in the United States, were left to raise themselves. Illiterate and shattered, their mother gambled, cried, and yelled at her sons. "My mother, she's loud," Sun told me. "She's got a very mean tone. I still hear it in my head." His stepfather, a mechanic, also a survivor and also illiterate, beat them until welts striped their bodies. By the time Sun should have entered seventh grade, he had joined the Tiny Rascals, perhaps the largest Asian American street gang in the United States. "It was comforting," he says. "We weren't into drugs or alcohol." They were into being a substitute

family. They were also into guns. Sun was involved in a shooting that led to a stint in prison, which led to a GED, some college credits, and some serious reflection on his future. He left the gang in his mid-twenties. His brothers were not so lucky. Two of them are serving life sentences for murder.

The children of the traumatized have always carried their parents' suffering under their skin. "For years it lay in an iron box buried so deep inside me that I was never sure just what it was," is how Helen Epstein, the American daughter of survivors of Auschwitz and Theresienstadt, began her book *Children of the Holocaust*, which launched something of a children-of-survivors movement when it came out in 1979. "I knew I carried slippery, combustible things more secret than sex and more dangerous than any shadow or ghost." But how did she come by these things? By what means do the experiences of one generation insinuate themselves into the next?

Traditionally, psychiatrists have cited family dynamics to explain the vicarious traumatization of the second generation. Children may absorb parents' psychic burdens as much by osmosis as from stories. They infer unspeakable abuse and losses from parental anxiety or harshness of tone or clinginess—parents whose own families have been destroyed may be unwilling to let their children grow up and leave them. Parents may tell children that their problems amount to nothing compared with what *they* went through, which has a certain truth to it, but is crushing nonetheless. "Transgenerational transmission is when an older person unconsciously externalizes his traumatized self onto a developing child's personality," in the words of psychiatrist and psychohistorian Vamik Volkan. "A child then becomes a reservoir for the unwanted, troublesome parts of an older generation." This, for decades, was the classic psychoanalytic formulation of the child-of-survivors syndrome.

But researchers are increasingly painting a picture of a psychopathology so fundamental, so well, *biological*, that efforts to talk it away can seem like trying to shoot guns into a continent, in Joseph Conrad's unforgettable image from *Heart of Darkness*. By far the most remarkable recent finding about this transmogrification of the body is that some proportion of it can be reproduced in the next generation. The children of survivors—a

surprising number of them, anyway—may be born less able to metabolize stress. They may be born more susceptible to PTSD, a vulnerability expressed in their molecules, neurons, cells, and genes.

After a century of brutalization and slaughter of millions, the corporeal dimension of trauma gives a startling twist to the maxim that history repeats itself. Yael Danieli, the author of an influential reference work on the multigenerational dimensions of trauma, refers to the physical transmission of the horrors of the past as “embodied history.” Of course, biological legacy doesn’t predetermine the personality or health of any one child. To say that would be to grossly oversimplify the socioeconomic and geographic and irreducibly *personal* forces that shape a life. At the same time, it would be hard to overstate the political import of these new findings. People who have been subject to repeated, centuries-long violence, such as African Americans and Native Americans, may by now have disadvantage baked into their very molecules. The sociologist Robert Merton spoke of the “Matthew Effect,” named after verse 25:29 of the Book of Matthew: “For unto every one that hath shall be given ... but from him that hath not shall be taken.” Billie Holiday put it even better: “Them that’s got shall have; them that’s not shall lose.”

But daunting as this research is to contemplate, it is also exciting. It could help solve one of the enduring mysteries of human inheritance: Why do some falter and others thrive? Why do some children reap the whirlwind, while other children don’t? If the intergenerational transmission of trauma can help scientists understand the mechanics of risk and resilience, they may be able to offer hope not just for individuals but also for entire communities as they struggle to cast off the shadow of the past.



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Chhorm Sao (front, middle) survived the astonishing brutality of Cambodia's Khmer Rouge regime. She, her daughter Soeuth Sao (right), grandson Deevin Sao (left), and Soeuth's boyfriend Vorn Vith (behind Deevin) all live in Lowell, Massachusetts.

Rachel Yehuda, a psychologist at the Veterans Affairs Hospital in the Bronx and a professor of psychiatry and neuroscience at Mount Sinai Hospital, has well-coiffed blonde hair, a slew of impressive post-doctoral students, and an air of rock-solid confidence. She is the go-to person on the molecular biology of intergenerational trauma, although she may never have pursued this line of research were it not for the persistence of the children of trauma victims themselves.

In the late '80s, when Yehuda was a postdoctoral fellow in psychology at Yale, she was analyzing the results of an interview with a shell-shocked Vietnam veteran. At one point, she told her mentor, "I just can't understand whether trauma does this, or whether this is just who this person is." He said, "Rachel, that is a testable hypothesis." So she tested it. Yehuda had grown up in Cleveland Heights outside Cleveland, Ohio, in a Jewish neighborhood full of Holocaust survivors. She returned home and used a university archive to identify survivors from among her neighbors. In her initial experiments, Yehuda found that Holocaust survivors with PTSD had a similar hormonal profile to the one she was seeing in veterans. In particular, they had less cortisol, an important steroid hormone that helps regulate the nervous and immune systems' responses to extreme stress. Some of

the participants have objected strongly to the comparison: “They had guns! We were hunted,” they’d tell her. “But that doesn’t mean they both don’t experience nightmares,” she says.

Trauma is generally defined as an event that induces intense fear, helplessness, or horror. PTSD occurs when the dysregulation induced by that trauma becomes a body’s default state. Provoke a person with PTSD, and her heart pounds faster, her startle reflex is exaggerated, she sweats, her mind races. The amygdala, which detects threats and releases the emotions associated with memories, whirs in overdrive. Meanwhile, hormones and neurotransmitters don’t always flow as they should, leaving the immune system underregulated. The result can be the kind of over-inflammation associated with chronic disease, including arthritis, diabetes, and cardiovascular disease. Moreover, agitated nervous systems release adrenaline and catecholamines, both involved in the fight or flight response, unleashing a cascade of events that reinforces the effects of traumatic memories on the brain. This may partially explain the intrusive memories and flashbacks that plague people with PTSD. Extreme stress and PTSD also appear to shorten telomeres—the DNA caps at the end of a chromosome that govern the pace of aging.

In the early ’90s, Yehuda opened a clinic to treat and study Holocaust refugees. She often got calls from the children of survivors. “At first, I would just politely explain that this is not a program for offspring,” she says. But then she happened to read *Maus*, Art Spiegelman’s now-classic graphic novel about a paranoid Auschwitz survivor and his puzzled, repelled son, who observes that his father “bleeds history.” Shortly thereafter, yet another survivor’s child called her and said, “If you understood the issues better, I think you would see that we need a program also.” “Come on by and educate me,” Yehuda replied. The man was an Ivy League graduate and a successful professional “whom you would not think was the casualty of anything,” she says. She listened to him talk about his unhappy childhood for several hours, and then stopped him. How could he square his impressive accomplishments with the notion that he was damaged? “He said: ‘Well, there are a lot of ways to be damaged. I wouldn’t want to be the person involved in an intimate relationship with me. I wouldn’t trust myself to be a good father.’” That is when Yehuda decided to research therapies for the children of survivors, too.

She knew some of them were troubled, but she didn't know why. Was the damage a function of the way they were being raised? Or was it transmitted by some other means?

In early papers Yehuda produced on Holocaust offspring, she discovered that the children of PTSD-stricken mothers were diagnosed with PTSD three times as often as members of control groups; children of fathers or mothers with PTSD suffered three to four times as much depression and anxiety, and engaged more in substance abuse. She would go on to discover that children of mothers of survivors had less cortisol than control subjects and that the same was true of infants whose mothers had been pregnant and near the Twin Towers on 9/11.

In the early '90s, whenever Yehuda presented her findings, fellow scientists scoffed at them. The prevailing wisdom then held that the fearful body manufactures too *much* cortisol, not too little, and moreover that effects of stress on the body are fleeting. Yehuda was asserting that PTSD is correlated with lower, not higher, cortisol levels and that this trait—and vulnerability to PTSD—could be passed from parent to child. “My colleagues did not believe me,” she says.

They also accused her of espousing Lamarckian genetics. The eighteenth-century thinker Jean-Baptiste Lamarck held that traits acquired over the course of a lifetime could be bequeathed to offspring. Evolutionary thinkers had been ridiculing his views for well over a century. The Darwinian orthodoxy was that, while biology may be destiny, the vicissitudes of individual fate don't alter the underlying sequences of genes. Yehuda told her critics: “Listen, I don't know what's right or wrong. I'm telling you what it is.”

Since then, further research offers support for Yehuda's thesis. Studies of twins have showed that a propensity for PTSD after trauma is about 30 to 35 percent heritable—which means that genetic factors account for about a third of the variation between those who get PTSD and others. More biologists are unpacking the epigenetic effects of PTSD—how it may change the way genes express themselves and how these changes may then reprogram the development of offspring. For instance, the kind of PTSD to which a child may succumb differs according to whether it was a mother or a father who passed on the risk. Maternal PTSD heightens the chance that a child will incur the kind of hormonal

profile that makes it harder to calm down. Paternal PTSD exacerbates the possibility that the child's PTSD, if she gets it, will be the more serious kind that involves feeling dissociated from her memories. A mother's PTSD can affect her children in so many ways—through the hormonal bath she provides in the womb, through her behavior toward an infant—that it can be hard to winnow out her genetic contribution. But, Yehuda argues, paternal transmission is more clear-cut. She believes that her findings on fathers suggest that PTSD may leave its mark through epigenetic changes to sperm.

About a decade ago, Michael Meaney, a professor of psychiatry at McGill University in Montreal, founded the field of behavioral epigenetics when he proved, by experimenting with rat mothers and their pups, that early experiences modify gene expression and that those modifications can be passed from one generation to another. David Spiegel, a professor of psychiatry at Stanford University and a former president of the American College of Psychiatrists, told me that Meaney had revealed the epigenetic transmission of vulnerability in rats, and Yehuda is now showing it in humans. Yehuda is, he wrote in an e-mail, “ahead of her time.”

What Yehuda hopes to do is nothing less than untangle the web of relationships among biology, culture, and history. Do social forces transform our biology? Or does biology “permeate the social and cultural fiber”? How do you even begin to tease these things apart?



CREDIT: Maciek Jasik

Garretson Sherman, 30, his son Rich, 5 months, and his mother, Caroline M. Bryant, 51, in Staten Island, New York. Weary of the chaos following Liberia's long civil war, Garretson left the country in 2007. His mother, who is visiting, still lives there.

In the early '80s, a Lakota professor of social work named Maria Yellow Horse Brave Heart coined the phrase “historical trauma.” What she meant was “the cumulative emotional and psychological wounding over the lifespan and across generations.” Another phrase she used was “soul wound.” The wounding of the Native American soul, of course, went on for more than 500 years by way of massacres, land theft, displacement, enslavement, then—well into the twentieth century—the removal of Native American children from their families to what were known as Indian residential schools. These were grim, Dickensian places where some children died in tuberculosis epidemics and others were shackled to beds, beaten, and raped.

Brave Heart did her most important research near the Pine Ridge Reservation in South Dakota, the home of Oglala Lakota and the site of some of the most notorious events in Native American martyrology. In 1890, the most famous of the Ghost Dances that swept the Great Plains took place in Pine Ridge. We might call the Ghost Dances a millenarian movement; its prophet claimed that, if the Indians danced, God would sweep away their present woes and unite the living and the dead. The Bureau of Indian Affairs, however, took the dances at Pine Ridge as acts of aggression and brought in troops who killed the chief, Sitting Bull, and chased the fleeing Lakota to the banks of Wounded Knee Creek, where they slaughtered hundreds and threw their bodies in mass graves. (Wounded Knee also gave its name to the protest of 1973 that brought national attention to the American Indian Movement.) Afterward, survivors couldn't mourn their dead because the federal government had outlawed Indian religious ceremonies. The whites thought they were civilizing the savages.

Today, the Pine Ridge Reservation is one of the poorest spots in the United States. According to census data, annual income per capita in the largest county on the

reservation hovers around \$9,000. Almost a quarter of all adults there who are classified as being in the labor force are unemployed. (Bureau of Indian Affairs figures are darker; they estimate that only 37 percent of all local Native American adults are employed.) According to a health data research center at the University of Washington, life expectancy for men in the county ranks in the lowest 10 percent of all American counties; for women, it's in the bottom quartile. In a now classic 1946 study of Lakota children from Pine Ridge, the anthropologist Gordon Macgregor identified some predominant features of their personalities: numbness, sadness, inhibition, anxiety, hypervigilance, a not-unreasonable sense that the outside world was implacably hostile. They ruminated on death and dead relatives. Decades later, Mary Crow Dog, a Lakota woman, wrote a memoir in which she cited nightmares of slaughters past that sound almost like forms of collective memory: "In my dream I had been going back into another life," she wrote. "I saw tipis and Indians camping ... and then, suddenly, I saw white soldiers riding into camp, killing women and children, raping, cutting throats. It was so real ... sights I did not want to see, but had to see against my will; the screaming of children that I did not want to hear. ... And the only thing I could do was cry. ... For a long time after that dream, I felt depressed, as if all life had been drained from me."

Brave Heart's subjects were mainly Lakota social-service providers and community leaders, all of them high-functioning and employed. The vast majority had lived on the reservation at some point in their lives, and evinced symptoms of what she called unmourned loss. Eighty-one percent had drinking problems. Survivor guilt was widespread. In a study of a similar population, many spoke about early deaths in the family from heart disease and high rates of asthma. Some of her subjects had hypertension. They harbored thoughts of suicide and identified intensely with the dead. Brave Heart quoted a Vietnam vet, who said: "I went there prepared to die, looking to die, so being in combat, war, and shooting guns and being shot at was not traumatic to me. That was my purpose and my reason for being there."

American Indians suffer shockingly worse health than other Americans. Native Americans and native Alaskans die in greater proportions than other racial or ethnic groups in the country, from homicide, suicide, accidents, cirrhosis of the liver, pneumonia, and

tuberculosis. Public health officials point to a slew of socioeconomic factors to explain these disparities: poverty, unemployment, lack of health insurance, cultural barriers, discrimination, living far from decent grocery stores. Sociologists cite the disintegration of families, the culture of poverty, perpetual conflict with mainstream culture, and, of course, alcoholism. The research on multigenerational trauma, however, offers a new set of possible causes.

At the frontier of this research lies a very delicate question: whether some people, and some populations, are simply more susceptible to damage than others. We think of resilience to adversity as a function of character or culture. But as researchers unravel the biology of trauma, the more it seems that some people are likelier to be broken by calamity while others are likelier to endure it.

For instance, studies comparing twins in which one twin developed PTSD after trauma, and the other never had the bad experience and therefore never received the diagnosis, have uncovered shared brain structures that predispose them to traumatization. These architectural anomalies include smaller hippocampuses—which reduce the brain’s ability to manage the neurological and hormonal components of fear—and an abnormal cavity holding apart two leaves of a membrane in the center of the brain, an aberration that has been linked to schizophrenia, among other disorders. Researchers have further identified genetic variations that seem to magnify the impact of trauma. One study on the mutations of a certain gene found that a particular variation had more of an “orchid” effect on African Americans than on Americans of European descent. The African Americans were more susceptible than the European Americans to PTSD if abused as children and less susceptible if not.

Another theory, even more uncomfortable to consider, holds that a particular parental dowry may drive a person to put herself in situations in which she is more likely to be hurt. Neuropsychologists have identified heritable traits that push people toward risk: attention deficits, a difficulty articulating one’s memories, low executive function or self-control. The “high-risk hypothesis,” as it is known, sounds a lot like blaming the victim. But it isn’t all that different from saying that people have different personalities and interact with the

world in different ways. As Yehuda puts it, “Biology may help us understand things in a way that we’re afraid to say or that we can’t say.”

In the past few years, Yehuda has helped design and has co-authored studies with Cindy Ehlers, a neuroscientist at La Jolla’s Scripps Research Institute, along with others, who advanced the high-risk hypothesis for Native Americans. A host of studies have shown that significantly more American Indians endure at least one traumatic incident—assault, an accident, a rape—than other Americans (among the subjects in this particular study, the rate was 94 percent); that the risk of being assaulted and contracting PTSD seem heritable to about the same degree (30 to 50 percent); and that trauma, substance abuse, and PTSD mostly seem to happen in early adulthood. “What is being inherited in these studies is not known,” writes Ehlers. But the fact that all these bad things emerge at the same point in the kids’ development argues for some degree of genetic or epigenetic influence. Another way of saying it is that maybe these young adults are finding themselves at the center of a particularly cruel collision of genes and history.



CREDIT: Maciek Jasik

Holocaust survivors Terry Herskovits, 89 (front, red jacket) and Maria Kaslow, 90 (in wheelchair); and their descendants.

On the stormy afternoon in July when I visited Tom Sun's apartment, lightning had just blown out a transformer drum down his block and the lights were out. The sky was just bright enough to illuminate a domestic idyll: A two-year-old boy bounced happily on and off Sun's lap. A ten-year-old girl whisked the toddler into the kitchen as soon as her father asked her to. The living room was sparsely but pleasantly furnished. The air of calm was no accident. Now in his late thirties, Sun is a counselor to teenagers in trouble, including gang members, and has arranged his schedule so that he can come home early every day and give his children the care he was denied. (Sun's wife works late.) In addition to cultivating serenity, he teaches them self-reliance. He wants them, he tells me, to be prepared for whatever reversals of fortune they may encounter. He has taught them to cook for themselves, "just in case something should happen to Mommy and Daddy"; he has taken them for 15-mile walks to a mall over the border in New Hampshire so they know they can walk that far if they need to. It's hard to imagine many other Americans doing this and hard for me not to interpret Sun's precautions as echoes of his mother's experience. But it is his way of mastering the past.

Ever since humans have been inflicting violence on other humans, they have been devising techniques to deal with its aftereffects. The French phenomenologist Maurice Merleau-Ponty writes of "the lived body"—the body as a receptacle of past experiences, of a knowing that bypasses knowledge. Think of a culture as a collective lived body, the scars of its experiences accumulated over generations and fixed into rituals and mores. A less elegant way of putting this is in the language of therapy: culture as coping mechanism.

The Jewish mode of trauma management is commemoration. An old joke has it that all Jewish holidays amount to the same thing: "They tried to kill us. They failed. Let's eat!" When Jews retell the tales of Egyptian slavery—hunger, humiliation, murder—they're performing acts of catharsis in the company of others whose forebears also outlasted their tormentors. If refugees from the Nazis and their offspring have thrived relative to other victims of massive historical trauma, surely that has to do with the quantity of cultural and human capital that washed up with the survivors on the shores of America and Israel. But their flourishing may also be a therapeutic benefit of ritualized communal mourning. It is

no accident that the Holocaust now has its own holy day: Yom Ha-Shoah, the Day of the Holocaust.

Cambodians don't privilege commemoration in the same way, although they certainly have rituals for mourning the dead. Dwelling upon the atrocities of the Khmer Rouge, I was told repeatedly, is not the Cambodian way. During my time in Lowell, I visited a *wat*, a Buddhist temple, and met a monk who explained, through a translator, that he advises people who come to him for help to accept what cannot be changed, focus on the future, and trust that all injustices will come out right in the end.

Looking insistently forward, rather than backward, may strike some Westerners as a form of denial. That reliving the past and telling tales about it offer the best cures for mental suffering must qualify as the most entrenched belief in Western psychology, with deep roots in the Christian imperative to confess and the Jewish injunction to remember. Delve into the literature on collective trauma, and you will read about the devastating and long-lasting suffering occasioned by "the conspiracy of silence," the failure to speak openly about the horrors of recent history.

This ingrained faith in memory has surely influenced the most common treatment for PTSD: cognitive behavioral therapy, or CBT. The dominant CBT protocol for PTSD is prolonged exposure—the vivid reexperiencing or reimagining, and in some cases writing down, of distressing memories, until they have been crafted into narrative and lost their sting. By creating new associations and contexts for the intrusive thoughts, the therapy is said to decouple memory and fear, along with all the physiological reactions that fear provokes.

But repeated reexperiencing does not work in all cases. For some people, rather than healing, it may retraumatize. Anthropologist and psychiatrist Devon Hinton, who works at Arbour Counseling, talks about his patients' "catastrophic cognitions"—extreme attacks of anger, say, triggered by experiences that set off memories, which then kickstart fits of anxiety, and so on. These triggers often have deep cultural and historical associations. They may be children behaving in a manner deemed disobedient or ungrateful; they may be, as Lemar Huot, a young therapist at Arbour (she treats Sandy, among others) explained

to me, women refusing to act as they would have in the old country. Being disrespected, Hinton told me, reawakens the sensation of being coldly demeaned by the Khmer Rouge. Symptoms such as neck pains and shortness of breath may reenact suffering endured during the years of slavery, when Cambodians were sometimes forced to carry heavy loads on their heads and shoulders or were tortured by near-drowning or having bags placed over their heads. Huot recounted the tale of a beloved grandmother who began to behave in a way that left no room for ambiguity. “We’d come home from school,” said Huot. “We lived across the street from a baseball field, and she’d be in it. She’d hidden a bag of rice in her clothes and told us it was time to run. Or she’d start seeing bugs in her food.”

Hinton is part of a group that has catalogued more enigmatic sources of distress; they have even succeeded in having them included in the DSM-V. The manual includes nine culturally specific presentations of mental disorders; one is Cambodian, others are Latino, Japanese, and Chinese. The Cambodian one is the “khyal attack.” Khyal is thought to be a sort of malevolent wind that can wreak havoc in the body, blinding and even killing. Outbreaks occur when the flow of khyal is trapped in the body; this may lead to cold limbs, dizziness, heart palpitations, tinnitus, and blurry vision, among other things. The fear that one is suffering a khyal attack is another “catastrophic cognition,” a terror born of terror that keeps cycling back on itself.

Another source of what feels like near-fatal anxiety is sleep paralysis, idiomatically known to Cambodians as “the ghost pushes you down.” This is when a person wakes but is unable to move and senses the presence in the room of a menacing figure. You might call sleep paralysis a haunting. Visitations often begin during periods of everyday stress—money troubles or fights with children or spouses. The guests are understood to be the angry spirits of people of whose gruesome deaths the dreamer may, say, have witnessed: fellow villagers whose skulls were smashed, a child killed by being swung against a tree, a friend who starved to death. Apparitions of the unburied and unmourned can dislodge a soul from its body and enslave the visitant to the ghost. The only way to allay its fiendish malignity is to make gifts and offer incense in the name of the dead.

Hinton argues that treatments should focus as much, if not more, on techniques for

calming oneself down than on awakening demons and that these should be rooted in the patient's own traditions. For his clients, he uses meditation, mindfulness, stretching, the visualization of images that promote self-forgiveness and loving-kindness. For instance, Buddhism prizes a quality called *upekkha* (the word comes from Pali, an ancient Indian language): equanimity. This entails distancing oneself from emotions and disturbing thoughts; a Buddhist metaphor is to think of them as clouds in the sky, and let them scud away, and so that is something practitioners of culturally adapted CBT might have people do. "We have Southeast Asian patients imagine love spreading outward in all directions like water," writes Hinton. "This is because in Buddhism water and coolness are associated with values of love, kindness, nurturing, and 'merit-making,'" that is, doing good deeds such as giving to the poor or to the temple.

I do not mean to imply that a traumatized nation should forgo a strict accounting of the crimes of the past. One source of deep anger for many Cambodians is that the Khmer Rouge regime ended inconclusively. Only this autumn, nearly 40 years after the fall of the Khmer Rouge, did a United Nations-backed tribunal open hearings on whether its top officials committed genocide; before that, only a handful of officials had been tried and sentenced on the lesser charge of crimes against humanity. The director of the most notorious torture center, Kaing Guek Eav, better known as "Duch," was only given a lifetime sentence after Cambodians protested his lighter penalty of 35 years. Cambodia's current prime minister, Hun Sen, was at one point a Khmer Rouge commander, though he left the group when Pol Pot began killing his own followers. Sen is now a capitalist rather than an agrarian communist, but his government is authoritarian and certainly does not give the reassuring sense that the past is safely past.

So it is important to remember. But tone also matters. What made Yehuda the saddest while cataloguing the stories of survivors' children, she told me, were the descriptions of childhood homes that felt like graveyards and the children's sense that laughter desecrated the memory of the dead. Death, she says, must not quash life: "Living and laughing and being joyous and almost disrespectful to those who suffered—it's what they'd want you to do, without forgetting them," she says.

When entire countries or communities are ravaged by the effects of massive collective trauma, often the response is to call for truth commissions and reparations. Although these deliver necessary justice and restore moral balance to the world, they don't suffice to heal the damage. Studies of the South African Truth and Reconciliation Commission, for instance, indicate that, though it imparted a greater knowledge of history among South Africans, it had little impact on their well-being.

The emerging research on trauma makes it increasingly clear that in order to interrupt the cycle of dysfunction for families, we'll have to address the biological aftershocks of trauma. There are hopes for quick fixes—drugs and other rapid treatments to prevent the traumatized from developing PTSD. Early research on mice into a non-addictive drug called SR-8993, for instance, appears promising: It activates opioid receptors in the amygdala, which may prevent the consolidation of fearful memories. This suggests that perhaps there's a way to keep the traumatized from becoming fixed inside their terrors.

As for those who already have PTSD, some scientists swear by beta-blockers. They are said to interfere with the storage of memories—to blunt the emotional edge of horrific memories and to help the brain extinguish fear by making its circuits a little more flexible and associations less fixed. However, beta-blockers haven't done any better than placebos in recent tests. "Fear extinction is a lovely theory, and if it were really about fear, it would be nice to extinguish it," says Yehuda. But "in people fear is just one of many things that happens when you're traumatized." Yehuda puts more stock in hydrocortisone, which inhibits the abnormal cortisol secretion that permanently damages the body's ability to quell anxiety.

None of this tells us specifically what to do for the next generation. Perhaps one of the most popular approaches emerges from social work and public health: It is to help mothers with PTSD deal with their infants so that they don't reproduce their angst in their young children. I can no longer count how many psychologists I talked to who are launching or already working on programs that try to do this, sometimes starting during pregnancy. Another idea is to run genetic tests on the recently traumatized, so as to

identify who among them is more likely to develop PTSD (and thus, presumably, to pass it on). Trauma victims in an emergency room in Atlanta who tested positive for genes associated with a risk of PTSD got an hour of psychotherapy, with follow-up over the next two weeks. They developed fewer symptoms than victims with a similar profile who did not get the therapy.

Yehuda, for her part, aims to locate the exact spots on genes where molecular changes occur in response to trauma. Such knowledge could elevate interventions to an even higher level of precision than genetic screening. To be effective, she says, “we have to understand what are the reversible and the non-reversible targets,” by which she means, what can be restored to normal and what can’t be. This research, however, is not easy, because among other dangers you risk trying to reverse something that actually helps a body adapt—of mistaking resilience for pathology, as she puts it. Nor are these investigations cheap.

It seems a small moment of grace when you hear a tale of how the past can come to heal rather than bedevil. Lemar Huot is grateful that her parents and grandmother, who were able to carry on and to shield her from their experiences until her grandmother became sick, never inculcated in her any fear of the dead. On the contrary, “it was almost reassuring to have them visit,” she says. “There was this idea that your loved ones are never far away.” But the collective wounds of the Cambodian community have a way to go before they close up, and at some level, of course, they never will. Huot discerns a lingering anomie among her patients and their children. Children learn from their parents’ ongoing torment that the past is unpalatable and the present a flimsy gauze that can easily be torn to expose the festering underneath.

There is biological PTSD, and familial PTSD, and cultural PTSD. Each wreaks damage in its own way. There are medicines and psychotherapies and the consolations of religion and literature, but the traumatized will never stop bequeathing anguish until groups stop waging war on other groups and leaving members of their own to rot in the kind of poverty and absence of care that fosters savagery. All that, of course, is improbable. The more we know about trauma, though, the more tragic that improbability becomes.

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