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From Generation to Generation: Rethinking "Soul Wounds" and Historical Trauma

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> If Elizabeth Warren, often referred to by me as Pocahontas, did this commercial from Bighorn or Wounded Knee instead of her kitchen, with her husband dressed in full Indian garb, it would have been a smash!
>
> —Donald Trump (1)

Each year, members of the Lakota tribe and their allies gather in Bridger, South Dakota, and travel more than 300 kilometers on horseback in the dead of winter. The conditions are harsh: wind and snow burn their faces and make it difficult to breathe.

They travel to commemorate the journey of their ancestors. After the killing of Chief Sitting Bull by the U.S. Cavalry, Chief Big Foot led approximately 350 Lakota, mostly women and children, on what he hoped would be a journey to the safety of the Pine Ridge Reservation. Instead, they were intercepted by the U.S. Army. Their group submitted peacefully and made camp along Wounded Knee Creek.

On the morning of December 29th, 1890 a shot rang out and chaos ensued. Those who tried to flee were pursued and executed by U.S. soldiers. Children who hid were coaxed to come out and were then killed (2). All told, more than 250 Lakota were massacred.

Although this tragedy took place more than 100 years ago, its impact remains. The ongoing pain—from the genocide of the Lakota and numerous other acts against Native American communities—has been described as a "soul wound" (3). It is what drives the Lakota horse riders in their search for both personal and communal healing. The past weaves intricately through modern life, and in some ways, communities are still trying to recover.

Their experiences challenge us as clinicians: how can we understand the persistent impact of trauma—not just on the individuals affected but on the children of survivors and even on additional generations?

This question first gained traction in the research community in the aftermath of the Holocaust. Many concentration camp survivors were transformed by their experiences and suffered with symptoms that would now be described as posttraumatic stress disorder. Surprisingly, in the years that followed, accounts circulated of children of survivors who

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were also severely affected. As one psychiatrist wrote at the time: “It would almost be easier to believe that they, rather than their parents, had suffered the corrupting, searing hell” (4).

At the time, psychological models dominated the field of psychiatry. It is perhaps not surprising that the children’s symptoms were thought to be the “result of having traumatized parents who may have been symptomatic, neglectful, or otherwise impaired in parenting” (5).

In the ensuing decades, as scientists gained access to a range of new research tools, our understanding of psychiatric illness became increasingly rooted in brain science. Some of the earliest successes of the biological psychiatry movement came with seminal studies of posttraumatic stress disorder: first, demonstrating dysregulation of the hypothalamic-pituitary-adrenal axis, and later revealing alterations in the epigenetic regulation of key genes in the stress response system (5).

When researchers began studying Holocaust survivors using modern tools, they found many biological signs associated with trauma. Interestingly, their children showed the same biological and epigenetic markers. On one hand, this demonstrated that the syndrome seen in the children was not merely behavioral—it was biologically mediated in the same way as their parents’. But it also raised a more profound question: did the children acquire these changes by virtue of their own traumatic experiences (conceivably including the stress of being raised by an “ill” parent)? Or was it possible that there might be some other process at play?

The question struck at foundational principles of biology. More than 100 years earlier, around the same time that the Lakota were forcibly removed from their traditional lands, the world’s leading scientists in Europe were hotly debating man’s place in nature. In contrast to the opinions of contemporary intellectuals, Jean-Baptiste Lamarck had been one of the first scientists to assert that species evolved over time (a theologically provocative suggestion). He postulated that individuals in one generation might, through their own experience, acquire a characteristic that could be passed directly to their offspring. Charles Darwin and Alfred Russel Wallace later offered the contrasting theory of natural selection to explain how species evolve. The work of Mendel—and generations of subsequent scientists—supported the latter model and seemed to put Lamarck’s idea to rest.

But the Yehuda team’s finding—that offspring of Holocaust survivors seemed to be affected in the same way as the Holocaust victims themselves—seemed to contradict scientific dogma: is it possible that an acquired condition might be passed to the next generation through an epigenetic mechanism?

While the data were strongly suggestive, it would be impossible to rigorously and prospectively study such a question in humans. A team led by Brian Dias and Kerry Ressler developed an animal model that allowed them to tightly control all relevant parameters (6). First, they fear-conditioned mice to a specific olfactory stimulus (acetophenone). As expected, the mice showed an enhanced fear response to the stimulus smell. They further showed that the observed behavioral change was mediated by epigenetic upregulation of the acetophenone receptor. This was all consistent with previously published literature.

What they found next was truly stunning. The team extracted sperm from the fear-conditioned mice, performed in vitro fertilization, and then raised the offspring separately from the biological fathers. Extraordinarily, these offspring—and another generation beyond them—demonstrated increased fear responses to acetophenone. Moreover, their sensitivity stemmed from the same increased expression of the olfactory receptor, owing to epigenetic changes. These findings offered potential mechanistic proof that a learned behavior could be passed from one generation to the next via an epigenetic mechanism. In addition, they demonstrated the plausibility of Yehuda's suggestion that biological symptoms of posttraumatic stress disorder could be passed directly from one generation to the next.

This research raises a wide range of additional questions: How is it that epigenetic signatures of trauma can be encoded and transmitted via sperm? How persistent and pervasive are these changes? Can such changes be reversed with conventional treatments or do they require more targeted interventions?

One especially important question is how this work might be relevant to communities that have experienced historical trauma. Yehuda's work with Holocaust survivors provides a foundation for greater consideration of intergenerational trauma, such as those experienced by African Americans and Native Americans within the United States. The Wounded Knee Massacre is only one of many atrocities perpetrated against Native American communities. Similar to what was seen in offspring of Holocaust survivors, these genocides seem to reverberate across generations.

Only recently has the academic community begun to seriously study this topic under the lens of "historical trauma." The initial definition of historical trauma was the "cumulative emotional and psychological wounding" across multiple generations (7). Studies have found that as many as one third of Native American adults think about historical loss at least daily (8). Moreover, the trauma is compounded by the continuous cycling of macroaggressions and microaggressions, discrimination, and disparities that many Native Americans continue to experience.

The callous reference to Wounded Knee by Donald Trump is base political theater. He not only flaunts his use of racist slurs toward an individual—he belittles the history and suffering of a community. While in many ways Native American populations have been resilient to survive so many attempts of genocide, deep harm persists. The significance of Wounded Knee should not be eroded by bigotry but should instead be met with solemn reverence. Perhaps this is best captured by the reflections of Black Elk, a Native Leader and Lakota Medicine Man (9):

> I did not know then how much was ended. When I look back now from this high hill of my old age, I can still see the butchered women and children lying heaped and scattered all along the crooked gulch as plain as when I saw them with eyes still young. And I can see that something else died there in the bloody mud and was buried in the blizzard. A people's dream died there. It was a beautiful dream.

Numerous anthropologic and now genetic studies have shown that these "soul wounds" are more than a poetic phrase. Emerging evidence suggests that these traumatic events may

become encoded not only within the epigenome of survivors but also their descendants. This means that pain from trauma does not cease with death but may rather be woven into the (epi-)genetic architecture of generations that follow.

There is also reason for hope: follow-up data from the mouse studies discussed above has shown that exposure therapy before mating appears to reverse the next generation's inheritance of the behavioral and neurobiological marks of the previous trauma (10). Perhaps there are ways in humans to heal (or at least prevent further transmission of) such "soul wounds."

As clinicians we must acknowledge and appreciate the biological implications of historical trauma. Furthermore, we need to increase our understanding of those who suffer from their ancestors' traumatic experiences. This insight is critical for developing treatment strategies and methods to better target the current impact of past generational harm.

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