

Redefining indigenous brain health: de-centering Western science, colonialism, and normative ethics

Introduction

Over centuries, colonialism devastated the relationship between Indigenous peoples and their environment. Now more than ever, continued human influence on global ecosystems has caused environmental destruction in forms of “global climate change, deforestation, and increased health risks from exposure to radiation, toxicants, and stress” (Cabrera et al., 2016). New technologies such as chemical fertilizers and pesticides, cash-crop cultivation, and mining activities have forced the resettlement of Indigenous communities (Hoover et al., 2012).

Recently, more studies have explored the effects of environmental changes on brain and mental health, especially with the shift in understanding neuro health as “complex interactions” between the individual, their preferences and behaviors, social and economic surroundings, and the environment, as opposed to simply observing empirical changes in neurological functions (Cabrera et al., 2016). Researchers have identified climate change as a key stressor in undermining the mental health of Indigenous peoples in Canada, affecting “emotional wellness, anxiety, depression, chronic stress, mood disorders, and the ability to cope with other forms of mental illness” (Blas et al., 2011).

As neurological and mental health risks for Indigenous peoples increase, many scholars claim that “[bridging] knowledge between First Nations and Western institutions of environmental and medical science” grows even more important (Tesluk et al., 2017). However, unethical research practices and scientific colonialism have already jeopardized Western and Indigenous engagement in health, especially with “ontological and epistemological” differences in knowledge systems (Tesluk et al., 2017). Discussions surrounding Indigenous brain health and the environment become even more difficult when considering the magnitude of Western environmental destruction on Indigenous lands.

To address these problems in environmental neuroscience, I argue that we must reject normative ethics and Western science as exclusive pillars for understanding the effects of the environment on Indigenous brain health. Instead, drawing on social constructionist thought, I argue that accepting Indigenous and Western knowledge systems as different perceptions of human-nature interactions brings about a process of decolonization from settler-society frameworks, ultimately bridging dialogue through Indigenous realities.

Indigenous Brain Health & Environmental Changes

Increasing evidence has demonstrated the role of environmental change in neurological and mental illnesses: air pollution associated with neuroinflammation, water pollution linked to neurodevelopmental deficits, and infectious diseases (borne from drastic climate change) related to the epidemiology of vector-borne zoonotic diseases (Block & Calderón-Garcidueñas, 2009; Mills, Gage & Khan, 2010; Silbergeld 2016). For Indigenous populations with habitation in regions of rapid industrialization and extensive reliance on natural resources, the negative consequences of environmental changes are often exacerbated (Ford, 2012).

Apart from neurological deficits and diseases, mental health in relationship to the environment emerges as a pressing concern as well. Recent studies have reported that climate change plays a role in “undermining the mental health and coping capacity of” Indigenous peoples in all regions of Canada (Macdonald et al., 2013). Climate change negatively impacts the traditional community-based lifestyles of some Indigenous peoples by interrupting seasonal practices such as hunting and gathering (Bourque & Willox, 2014). Furthermore, in those Indigenous communities that especially value nature and human interactions, the impact of climate change may be “tied to changes in cognition and thinking,” going beyond influencing “affective states” (Tesluk et al., 2017).

Western Science, Normative Ethics, and Colonialism

Historically, medical research engaging Indigenous populations has grounded the foundation for scientific colonialism. Western scientific communities have imposed Western normative judgements on Indigenous belief systems and exploited Indigenous participation in research through unethical practices. For example, the Family Planning Services and Population Research Act of 1970 authorized physicians to sterilize 25% of Native American women, with evidence that women were coerced into such procedures without informed consent (Lawrence, 2000). Another study conducted in western Canada involved a genetic researcher that used blood samples from Nuu-chah-nulth people to study HIV, which was not the intended purpose of the study that had originally obtained consent. The same researcher later used the genetic materials to publish research about human migration that contradicted the Nuu-Chah-Nulth’s historical accounts, insulting the community and introducing theories that undermined their historical claims to their lands (Tesluk et al., 2017; Wiwchar 2004).

Some research studies have also criticized Indigenous communities for their lifestyles and genetic makeup, often “attaching essentialist judgements” and encouraging negative perceptions of Indigenous health (Tesluk et al., 2017). The *thrifty gene hypothesis*, founded by James V. Neel in 1962, argued that Indigenous peoples were “genetically predisposed to Type 2 diabetes due to the foodways of their ancestors” (Hay, 2018). Similarly, the *warrior gene hypothesis* argued that Indigenous communities were “more aggressive and violent and more likely to get involved in

risk-taking behavior like gambling” (Barker, 1990). Both hypotheses failed to address the overwhelming effects of colonization on Indigenous peoples, exposing colonialist approaches in understanding Indigenous health. The practices persist even today, with Indigenous communities facing stigma from health comparisons to the general population (Allan & Symlie, 2015).

As more studies are conducted to analyze Indigenous brain health, it is paramount that Indigenous peoples and their neurological well-being are not treated as objects of study defined primarily by “their flaws and vulnerabilities” (Tesluk et al., 2017). Oftentimes, the Western social and health sciences disciplines have inherited the reasoning that when they “control and mediate” interactions with Indigenous communities, their disciplines constitute the “gold standard” (Nemutandani, Hendrick & Mulaudzi, 2020). Such forms of colonialism represent unethical “authority” and “superiority” over Indigenous self-understandings (Stoner, 1986). Since mental health and neuroscience are topics closely tied to stigmatization and prejudice to begin with, it is imperative that these problems are better addressed moving forward.

Indigenous Knowledge Systems & Brain Health Research

Indigenous knowledge systems and Western scientific methods hold major differences. Many (though not all) Indigenous communities focus on ideas of “respect, balance, interconnectedness, sustainability, reciprocity, community, and self-determination” in traditional environmental and health issues (Browne, 1995; Wilson, 2003; Tesluk et al., 2017). In contrast, Western scientific methodologies focus on empirical, objective, and quantitative approaches. These alternative views deepen when discussing the impact of the environment on brain health. By emphasizing the experiences of thought and cognition within the “interconnectedness of the body with the environment,” many Indigenous communities carry different epistemological foundations (Tesluk et al., 2017). It is also important to note that these knowledge systems vary across different Indigenous groups, as they are based on “oral histories, traditional practices, and ceremonies” (Battiste, 2002; Tesluk et al., 2017). Furthermore, in many Indigenous communities, biological samples may be spiritually and traditionally significant, as these samples are considered “the essence of a person” (Arbour & Cook, 2004). Conducting Indigenous brain research in a completely different value system, then, would mean that these differences need to be reconciled.

Previous scholars have pointed out the importance of “bridging” and “understanding” the differences in the foundations of knowledge systems for the purpose of discussing ethical issues related to the environmental impacts on brain health in a “space of common language and practice” (Tesluk et al., 2017). However, past attempts of such engagement have rarely resulted in collaborative and effective research of Indigenous health—primarily, I would argue, because they are still based on Western scientific methodologies, inflicting normative judgements upon Indigenous health through unethical research practices.

The first step to decolonizing Indigenous brain research is to understand and accept the great variety of Indigenous knowledge systems on the very terms that the living keepers of these

knowledge systems understand them, which would lay a foundation of partnership and respect upon which a mosaic of knowledge can be built. Drawing from social constructionist frameworks, once we accept that perceptions of the world, including the environment, are “influenced by the underlying culture, values, and local knowledge”, we realize that Indigenous and Western perceptions of the environment and health are different interpretations of the same reality. By doing so, we can understand the “meaning and order of [different] world(s) and shape [the] shared reality” without imposing or controlling Indigenous forms of thought, taking steps to deconstruct and decolonize Western paradigms in Indigenous brain health research (Cabrera et al., 2016).

A few examples of recent studies have begun, in some part, the rejection of Western science as overriding principles of medical research, moving towards the acceptance of Indigenous knowledge systems. A study based in Edmonton, Alberta, researched First Nation practices that “support healthy brains in their study of the Cree First Nations’ traditional child-rearing practices and their impacts on neurological development” (Pazderka et al., 2014; Tesluk et al., 2017). The community-based research methodology of this study is especially notable, as the researchers translated child rearing and attachment teachings from Cree to English without applying normative standards or judgements (Pazderka et al., 2014). The study “examined the cross-cultural applicability of [Cree] practices”, meaning they were observing how traditional ways-of-knowing may bring further insight to “current neurobiological and epigenetic scientific understanding” (Pazderka et al., 2014).

Another important aspect of conducting Indigenous neuroscientific research in the environmental context is to move beyond the physiology of the brain, focusing on “representations of the brain according to its role in social and cultural processes” (D’Abbs & MacLean, 2000). A study in Australia conducted psychological and psychiatric research through Indigenous knowledge systems, analyzing “different levels of [Indigenous] cultural engagement focusing on stories, family, country and body” by corresponding these dimensions to “functional cognition, [such as] memory, socialization, identity, and motor function” (Cohen & Stemmer, 2011). These studies start to comprehend Indigenous brain health through Indigenous realities, making space for decolonization from settler-society frameworks and values.

Future Directions

As greater environmental changes cause health deficits that require systemic and immediate action, the study of environmental neuroethics in relation to Indigenous communities needs further attention. Moving forward, as (predominantly settler) researchers work with Indigenous peoples to better understand the impacts of the environment on Indigenous brain health, we must move away from conducting research through Western normative frames of reference. Rather, we need to acknowledge that studies engaging Indigenous communities about environmental impacts on the brain entail “co-creation of knowledge” that applies to both Western and Indigenous societies (Tesluk et al., 2017).

A Yidinji community leader in Australia who was interviewed in the study *Indigenous Environmental Values as Human Values* (2016) says the following about the environment:

Once you start taking water, which is the life giving, it affects everything in this Country, your trees, your grass, your animals, they need that water just like we do, so if you start taking that thing away you are going to start to see that these things deteriorate, your trees and your grass and all those things they start to die back, and the River starts to wither and they'll start to fall away too, you know. I have seen that happening before, and it's not good. (TO7)

The impacts of climate change on Indigenous brain health must be explored with respect to such connections, allowing for a deeper and nuanced understanding of Indigenous forms of thought.

As Western science moves towards this new-emerging field of environmental neuroethics, we must remain cognizant of the history of colonialism as well as the differences of values in our societies. Most importantly, accepting Indigenous and Western knowledge systems as different perceptions of human-nature interactions begins a process of decolonization that, ultimately, will help foster self-determination of Indigenous communities in the long term. Individual autonomy over the communities' mental and neurological health will help shape healthier internal decisions and processes that better serve these communities.

Many questions remain unanswered as to how we can better understand and accept Indigenous knowledge systems in the context of brain health. How can we measure the impact of climate change on Indigenous mental health through the values of these communities? How do we shift away from imposing normative values and judgements that are ingrained into Western research methodologies, but accept the impacts that the history of colonialism has brought forth to Indigenous peoples? In order answer these questions, we must engage Indigenous knowledge as valid and important forms of thought-- paving the way for self-determination among these communities.

Word Count: 1963

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