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Exploring indigenous perspectives of an environmental disaster: Culture and place as interrelated resources for remembrance of the 1960 mega-earthquake in Chile

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ABSTRACT

On May 22, 1960, the most powerful earthquake recorded in history shook the coast of southern Chile: the 'Valdivia Earthquake'. The areas around the Budi Lake, eighty kilometers from the epicenter, are lands of the *Lafkenche-Mapuche* indigenous group. The present study explored the role of culture and place in the remembrance and meaning-making processes of the earthquake in *Lafkenche-Mapuche* community members. Semi-structured qualitative interviews with eighteen participants (N = 18) were completed. Through the use of decolonial narrative analysis, findings were organized around two themes describing how cultural and spatial elements in Mapuche communities can afford systems of meaning to remember and make sense of an extreme environmental event like a devastating earthquake. Results provide insight into how indigenous communities recollect sacred oral histories, tap into reserves of traditional ecological knowledge and adapt to shifting landscapes, which together surfaced as critical dimensions of remembrance, meaning-making and response to environmental hazards and their aftermath.

1. Introduction

On May 22, 1960, the most powerful earthquake ever recorded in human history shook the southern coast of Chile: the 'Valdivia' earthquake (9.5 Mw). The Budi Lake, located approximately eighty kilometers from the epicenter, is a tidal brackish lake whose origin is associated to earthquakes and floods. For more than 500 years, the areas around the Budi have been inhabited by *Lafkenche* communities—a subgroup of the largest indigenous group in Chile: the *Mapuche*.

In the face of traumatic events, such as earthquakes, research shows that survivors may engage in meaning-making processes embedded in core beliefs systems related to the sacred and the mundane [54]. These processes have been characterized as highly dependent on a collective memory that reconstructs the events through narratives grounded in the culture of the groups that remember and in the places and environments of their everyday lives [35,48,51]. Moreover, the relations between reconstructive remembrance, culture and place have been addressed in indigenous psychologies and social psychiatry through the study of trauma related to indigenous communities' journeys facing histories of colonization and ongoing structural oppression (e.g. [32,39]).

Mapuche cultural processes related to earthquakes and natural disasters, however, have been primarily studied and documented in the social sciences in the past within Eurocentric worldviews and knowledge systems. In previous studies by researchers in Chile (e.g. [29]), strong relations between *Mapuche* cultural elements (such as ancestral knowledge, beliefs and religiosity) and geographical elements and places (such as volcanoes, mountains and the sea) are highlighted. For example, in 1912, Rodolfo Lenz compiled a series of tales, vocabulary and poetry that reflected the traditions of *Mapuche* regarding earthquakes, floods, tsunamis and volcanic eruptions [44]. More recent research (e.g. [15]) explored *Mapuche* religious practices, stories, poems and songs related to indigenous spiritualities and belief systems linked to ecological and geographical spaces and events, stressing the

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salience of interconnections between *Mapuche* culture and ecological environments.

Taking into account these previous studies and strong ecocultural dimensions characterizing *Mapuche* worldviews, there is relatively little contemporary systematic research from indigenous perspectives regarding the ways in which *Mapuche* community members of the Budi Lake remember and interpret the Valdivia earthquake. Therefore, the current study aimed to contribute to understandings of the interplay between culture and place in the remembrance of *Mapuche* participants when processing and making sense of the potentially traumatic events from this 1960 environmental disaster, yet from a transdisciplinary conceptualization and with a qualitative method specifically grounded in perspectives of indigenous community members themselves.

1.1. Conceptual background: culture, place, and memory of disasters in indigenous communities

Collective memory is a reconstruction of the past guided and constrained by cultural tools deployed in the everyday interaction with people and environment [31]. In this sense, reconstruction processes involve narratives, songs, tales, pictures and monuments, which are deployed in the interactions of individuals in their social and ecological contexts [6]. In his classic work on memory in psychology, Bartlett [11] showed how cultural conventions become knowledge structures or schemas that organize the reconstruction of narratives and tales. For example, changes in the re-telling of a Native American folk-tale made by a group of English participants were related to aspects of the tale that don't fit into the cultural environment of this group and the canonical elements and form of Western Eurocentric stories. Also, the cultural determination of memory serves a group in generating and maintaining its identity and sense of unity, for example, when memory devices take the form of rituals and in the transmission of relevant knowledge to subsequent generations [6]. In summary, the conceptualization of collective memory as social reconstruction brings into the foreground the complex dynamics between memory and culture.

The memory of collectives is also situated in the places where the group inhabits. In order to commemorate, some societies build places for memory: concrete physical spaces that are nothing but the materialization of the past. Some of these memorials are built to serve as places for commemoration ceremonies: statues, monuments and even museums [51]. Others are set in the same places where events that groups want to be remembered took place, as when buildings that were used for torture or imprisonment are slightly adapted as museums [35]. But also collective memory can be unintentionally registered in the environment in a subtler way but more permanently at the same time. In fact, ancestors transform space as a result of the way they lived, which in turn constitutes a *landscape* that reflects their forms of living [36]. This situatedness of collective memory underscores the salience of relationships between people and place.

The interrelation between culture, place and memory has been addressed directly when studying remembrance of potentially traumatic events for individuals and social groups, such as natural disasters, political violence, oppression and displacement. Related to memorials, Simpson and De Alwis [60] compared constructions for the 2001 Guajarat earthquake in India and for the 2004 tsunami in Sri-Lanka. Marked differences are attributed to cultures, religions and political processes—for example, in Guajarat memorials were mainly built by people´s initiative, whereas in Sri Lanka most of them were built by the government. The memory of political repression is also kept in places such as Robben Island in South Africa, which is currently a museum, yet before served as a place of repression and captive exile for anti-apartheid anti-colonial activists and leaders like Nelson Mandela [35].

Regarding indigenous communities, research from psychology and psychiatry contributes to understandings about issues linking memory, place and culture in colonized groups facing loss of culture and land as a result of histories of genocide, ethnocide and forced displacement [32]. Memory has been shown to be a critical resource embedded within indigenous resilience processes, providing a pathway for "cultural continuity" in the face of ongoing cultural repression [40]. For example, in a quantitative study by Chandler and Lalonde [17] with indigenous communities in Canada, the authors found that collective remembrance of indigenous culture and the perseverance and promotion of traditional practices and languages were associated with lower suicide rates and school dropout rates. Moreover, Abu Lughod and Sa'di [1] studied the protective role of collective memory and village narratives in indigenous Palestinian communities. Likewise, Atallah [7] found that the reconstructive process of memory emerged as a resilience strategy for indigenous Palestinian families who emphasized the importance of re-gaining ecological capital through direct engagement in native lands and the re-gathering of oral histories and memories of their indigenous villages. In the same vein, Pilgrim et al. [55] identified several pathways for engaging memory, culture and place in community projects in indigenous groups, including *Diet* (increasing consumption of traditional foods), *Education* (transferring traditional knowledge to younger generations through culturally-sensitive curricula) and *Culture* (strengthening ceremonial traditions and reviving key threatened cultural ways of life), among others.

Lastly, it is important to note that the incorporation of indigenous culture, knowledge and practices into research and planning is now acknowledged in the disaster risk reduction literature (e.g. [33,61,64,8]; for a review on this topic see Bohensky and Maru [14]). For example, indigenous architecture in Kashmir is adapted to reduce seismic risk [2] and traditional knowledge provides the ground for resilience in relation to floods in Chadereka and Dambakurima communities in Zimbabwe [46]. Furthermore, indigenous and scientific knowledge can be systematically integrated to reduce risk to natural disasters [34]. In fact, in a recent article by Kwok et al. [41], the authors argued that an essential task for disaster risk reduction remains to increase understandings of structural and cognitive attributes of community resilience (including honing in on exploring local communities' skills, abilities and knowledge; unique qualities of a community; and the relevant community perceptions and processes).

1.2. Contextual background: The 1960 Valdivia earthquake, the Budi Lake and the Lafkenche-Mapuche indigenous community

The 1960 Valdivia earthquake is the biggest one recorded in human history. Its epicenter was in the Pacific Ocean, 80 km from the coast of south-central Chile, with a rupture zone of 1000 km from north to south (see Fig. 1a and b). Its duration was 10 min. An hour after, a tsunami battered the zone, with waves that reached 20 m high. Similar waves also lashed the coasts of Hawaii and Japan [18]. Two days later, the Puyehue volcano erupted at 200 km from the epicenter (see Fig. 1b). For weeks, strong aftershocks were felt reaching up to 7.9 Mw [16]. As a consequence of these events, it is estimated that about 5700 people died, 3000 disappeared and much more were wounded. Many cities were destroyed as a result of the shaking of the earth and the waves of the tsunami.

The Budi Lake is located at 80 km northeast from the epicenter. It is a brackish water lake whose origin is linked to earthquakes: it might have formed after one of the branches of the Imperial River was cut off by an earthquake 2000 years ago (Fig. 1b). The changes of the sea level resulting from the deglaciations of the last glacial cycle also contributed. Indeed, the 1960 Valdivia earthquake played a role in its current configuration: the coastal level fell about two meters, which resulted in the permanent flooding of lands due to the rising water level and created a permanent connection to the sea through a drainage channel, contributing to its further salinization [16]. Picture 1 shows the landscape of Budi Lake from ground level.

The native people of this land are the *Lafkenche*: a subgroup of the *Mapuche*, the most populous indigenous group in Chile. In *Mapudungun* (the language of the *Mapuche*) *Lafkenche* can be translated as 'people of