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Xun Wang

julia.x.wang323@gmail.com

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The Impact of Climate Change on the Mental Health of Native American Youth:

A Qualitative Study Protocol

Xun Wang

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Yale School of Public Health

Department of Environmental Health Sciences

Committee Chair: Dr. Sarah Lowe

Committee Member: Dr. Laelia Benoit

**Abstract:**

Climate change can induce a significant mental health burden on youth, especially for those in Indigenous communities. Despite their vulnerability, little is known about the impact of climate change on the mental wellbeing of Native American children and adolescents. This qualitative study seeks to address this gap by exploring Native American youths' perceptions and emotional and behavioral responses to climate change. The study is grounded in Indigenous methodologies, which prioritize Indigenous worldviews, values, and ways of interaction. We will utilize relational capital on campus to identify the collaborating tribe and ensure a respectful and reciprocal relationship is built before proceeding with research logistics. Tribal Elders and the Indigenous Research Advisory Board are integral to the design and implementation of all phases of the study. Upon their permission, we will employ qualitative methods including in-depth interviews, art interpretation, and photovoice to learn about the youths' perceptions and lived experiences of climate change, with a hope to incubate potential for social change. Data analysis will be done iteratively and collaboratively with participants to accurately represent their voices. Although doing Indigenous methodologies takes time, resources, and commitment, it is critical for research with Indigenous populations to be done ethically in a way that avoids exploitation, emphasizes self-determination, and promotes capacity building in the community.

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## ***Introduction***

Climate change is a public health emergency (Frumkin et al., 2008; Keim, 2008; McMichael, 1993; Roubain, 2022; Solomon & LaRocque, 2019). With abnormal temperatures, the spread of insect-borne disease, and more frequent hurricanes, floods and droughts, human's physical as well as mental wellbeing face severe challenges (Frumkin et al., 2008; Keim, 2008; McMichael, 1993; Solomon & LaRocque, 2019; WHO, 2021). While the direct impact of climate change on mental health (e.g., through acute extreme weather events) is salient and fairly well-studied (Kokai et al., 2004; Morrissey & Reser, 2007), the indirect impacts due to a slowly degrading natural environment that foresees unpredictable futures are likely to be more latent and long-lasting, and are beginning to receive more attention (Berry et al., 2010; Chalupka et al., 2020; Fritze et al., 2008).

A variety of terminologies that address the negative emotions associated with deteriorating natural habitats have been introduced by researchers (Albrecht, 2011; Albrecht et al., 2007; Cianconi et al., 2020; Cunsolo & Ellis, 2018). *Solastalgia* refers to the distress due to changes in people's home environment; *ecological grief* is the mourning for physical ecological losses and identity loss associated with them; and *ecoanxiety* portrays the frustration and powerlessness facing environmental uncertainties (Albrecht, 2011; Albrecht et al., 2007; Cunsolo & Ellis, 2018). Though not yet recognized as clinical conditions, these negative effects are still important to study since they could be associated with distress and dysfunction, as well as predictive of pro-environmental behaviors (Collier, 2022; Kirmayer et al., 1996; Stevenson & Peterson, 2016).

Recent research suggests that children and adolescents are vulnerable to climate change induced mental health impacts. For example, in a survey study of young adolescents aged 12-13 years old in Austrian and Australian cities, the majority agreed that climate change is something to worry about, climate change is anthropogenic in nature, and climate change is happening now (Harker-Schuch et al., 2021). The trends did not differ by country nor gender (Harker-Schuch et al., 2021). Another recent study that surveyed youth aged 16-25 years old from a mix of Global North and South countries reported that the majority felt at least moderately worried about climate change, accompanied by varying degrees of negative affect including anxiety and fear towards climate change and the future (Hickman et al., 2021). Physiologically underdeveloped, youth are exposed to environmental changes through unique pathways that could result in interruptions of neurological development (Chalupka et al., 2020; Sheth et al., 2017). The exposure to climate change information can become a “stressor,” resulting in sustained frustration, worry, and fear among children (Chalupka et al., 2020; Sheth et al., 2017; Strife, 2012). Their limited power and adaptive capacity further restrain their ability to cope with climate change stress, underscoring the importance of studying children and adolescents' emotional and behavioral response to climate change and providing appropriate support (Chalupka et al., 2020).

Youth of certain demographics are disproportionately prone to the adverse impacts of climate change (Berberian et al., 2022). In particular, Indigenous populations around the world bear a substantial mental health burden as climate change induces instability to their traditional livelihoods, cultural practices, and interpersonal relationships that are highly sensitive to fluctuations of the natural environment (Petrasek MacDonald et al., 2015; W. J. Smith et al.,

2014). Recognized by the United Nations, the term *Indigenous people* will be used throughout the protocol to refer to pre-settler communities that possess strong links to territories and strive to maintain their ancestral environments and systems (*Who Are Indigenous Peoples?*, n.d.). Compounded with younger age, the mental health toll for Indigenous children and adolescents can be overwhelming. For example, research with Inuit youth in Nunatsiavut, Labrador showed that, as rapid climate change disrupts outdoor activities that sustain the connection between Inuit people and their land, youth reported experiencing significant worry and a host of negative emotions, including boredom, anger, fear, frustration, and anxiety (Petrasek MacDonald et al., 2015). Kowalczewski and Klein (2018) similarly found that Sami youth who engaged in traditional reindeer herding experienced more anxiety due to climate change, as it threatened their cultural continuity. Furthermore, health seeking behaviors (e.g., visiting medical professionals) were discouraged due to the unfamiliar colonial health systems, and traditional medical practices were sometimes refused due to fear of being perceived as weak (Kowalczewski & Klein, 2018). Dependency on the natural environment, coupled with historic trauma and persistent socioeconomic disparities, make Indigenous communities especially vulnerable to adverse mental outcomes under climate change and worthy of a long-deserved attention from the academia and political institutions (Cianconi et al., 2019).

Despite the high risk of climate change distress, Indigenous populations have also demonstrated protective factors against climate-induced mental health impacts and built resiliency in a changing environment. Importantly, access to land and cultural traditions serve as crucial coping strategies and cornerstones to maintaining psychological wellbeing (Petrasek MacDonald et al., 2015). Family and community connections are immense sources of strength, and engaging in

climate governance fosters confidence and leadership while offsetting the anxieties related to climate change (MacKay et al., 2020). Arctic youth who attended the 2018 Conference of the Parties on Climate Change, for example, shared their cultural traditions and personal experience of climate change with other like-minded Indigenous delegates, building emotional bonds and social capital that promoted self-efficacy and climate action (MacKay et al., 2020).

Understanding Indigenous youth's perspectives and encouraging their participation in climate activism not only voices a historically marginalized group, but also offers an opportunity to engage with ancient wisdom that, in collaboration with modern technologies, has the potential to inspire a greener path to the future (MacKay et al., 2020).

While there have been a few studies on Indigenous children and adolescents' perception of climate change, they have been largely limited to populations in the Arctic and Australia (Cunsolo & Ellis, 2018; Ford, 2012). Little is known about the emotional and behavioral responses of Indigenous youth on continental United States, also known as Native Americans – which is the term I will henceforth use to describe this group (*Native American and Indigenous Peoples FAQs*, n.d.). Considering the alarmingly high prevalence of mental illness among Native American youth (“Mental Health Statistics in Native Americans,” 2019), the proposed study will aim to identify the role climate change might play in this phenomenon. In addition, despite the common impression of Indigenous communities favoring sustainable lifestyles and stewarding the land, we aim to learn about the actual lived experience of Native American communities under climate change and offer an opportunity for them to speak for themselves (Adeney & Arroyo, 2021).



The current study protocol offers a model to explore the impact of climate change on Native American youth's mental health, their emotional and behavioral reactions, and responses that emerge from their unique cultural background. Our work serves as a first step towards understanding Indigenous perspectives, supporting Indigenous wellbeing, voicing a marginalized community, and promoting a more diverse and inclusive climate activism landscape.

### ***Theoretical Framework: Indigenous Methodologies***

Native Americans have suffered a long history of persecution from Western colonizers. Besides committing genocide, the colonizers has also committed “epistemicide,” a term coined by Santos (2014) that refers to the destruction of other ways of knowing (Rowell & Hong, 2017; Santos, 2014). The power of producing knowledge was solely granted to positivist scientists trained in Western paradigms, resulting in a knowledge monopoly across the colonized Global South (Rowell & Hong, 2017). In practice, Indigenous people were deemed as mere objects of research, examined and studied through a patronizing Western gaze (Rowell & Hong, 2017; L. T. Smith, 2012). Indigenous communities have largely been traumatized by dehumanization, exploitation, and inaccurate representation (Thambinathan & Kinsella, 2021). In the current study, we would like to employ a decolonizing methodology that centers the worldviews of non-Western individuals, emphasizes self-determination, and engages in actions to heal, to reconstruct, and to empower (Kovach, 2017; Thambinathan & Kinsella, 2021). Among the various approaches to conduct decolonizing research, the current study will draw its theoretical foundation from Indigenous methodologies proposed by Kovach (2017), approaching the topic from four aspects—Indigenous epistemology, Indigenous theory-principles, relational actions, and interpretations and representations (Kovach, 2017). Each aspect's implication on the current study will be discussed in the following paragraphs.

Indigenous epistemology is the foundation where other aspects are built upon. Summarized by Kovach (2017), the tenets of Indigenous epistemology include:

- Knowledge is holistic and implies empirical, experiential, sensory, and metaphysical possibilities.
- Knowledge arises from interconnectivity and interdependency.
- Knowledge is animate and fluid.
- Knowledge arises from a multiplicity of sources, including nonhuman sources (p. 389-390).

These general tenets are manifested in a body of literature delineating specific tribal knowledges, which can help researchers to conceptualize a non-Western way of making sense of the world (Deloria, 2016; Kovach, 2017; Little Bear, 2004; Ortiz, 1969). Of course, epistemologies of each tribe will differ from one another, especially considering Indigenous community's strong link to the local landscape (Kovach, 2017; *Who Are Indigenous Peoples?*, n.d.). If literature is available, all researchers should also familiarize themselves with the specific worldviews of the collaborating tribe (Kovach, 2017). Tribal knowledges are serious matters (Kovach, 2017). In order to break the global North knowledge monopoly, we ought to pay respect to the Indigenous knowledge producers during every phase of the research process (Rowell & Hong, 2017).

Indigenous theory-principles, or Indigenous teachings, serve as a series of values that guide the research processes of the current study (Kovach, 2017). Specifically, we turn to the series of values coined by Michael Hart (2010), including "respect for community and individuals, reciprocity and responsibility, connection between mind and heart, self-awareness, and

subjectivity” (Hart, 2010, cited in Kovach, 2017, p. 395). While it could be difficult for researchers to be critical of the Cartesian dualism they were trained in, Indigenous methodologies require constant self-reflection and an intention to embrace the alternative perspective as much as their informants do.

While Indigenous epistemologies and teachings exist on a relatively abstract level, relational actions are how these values manifest in actual research practices (Kovach, 2017). Doing Indigenous theory is building trust and mutual relationships with the community (Kovach, 2017). As it might be challenging for outsiders to start the conversation, we aim to identify relational capital within the Yale network as the first step of the study. The research team will begin by reaching out to Indigenous-affiliated researchers on campus who are interested in the mental health impacts of climate change on Indigenous youth. We will offer sufficient details regarding the design and the significance of the study and see if they know any potential candidates in their relational networks with tribes or reservations. Upon initial agreement with the community, we will establish an Indigenous Research Advisory Board (IRAB) featuring Elders and community representatives to advise our approaches (Kovach, 2017). We will refine the topic and co-construct the research framework to ensure it is of interest to the community and is explored through ways that respect the community’s values and lifestyles. In line with the experiential emphasis of Indigenous methodologies, the research team will initiate multiples visits to the tribe to learn more about the geographic, social and cultural context of our collaborators, and participate in face-to-face conversations and activities that build trust and credibility with both the IRAB members and our participants (Kovach, 2017).

In addition, formalized protocols will be used to document the consensus on ethics of the study (Kovach, 2017). In the research protocol, the study team will delineate their respect for Indigenous knowledge, truthfully outline the common research goals and study design, disclose on the risk and benefits towards the tribal community, and demonstrate evidence of Indigenous ownership of the data (Kovach, 2017). The tone of the protocol will be sincere and honest, with an emphasis on securing Indigenous voices, reciprocity, and capacity building for the community (Kovach, 2017). The protocol will document the agreement on co-authorship, plans to provide consistent research updates and share findings with the community, and the intention to offer the tribe with resources that fulfill their needs (Kovach, 2017). As the funding permits, we could provide resources, including but not limited to materials and equipment for local schools, opportunities to attend junior mental health programs, or visits to the Yale campus. Working with youth, we would strive to contribute to their educational and social capital to support their future studies and careers. After collaboratively drafting the protocol with representatives of the IRAB, the protocol will be sent to the tribal Institutional Review Board (IRB) for review. In the absence of a tribal IRB, we will obtain a letter of support from the Elders and the IRAB. The protocol and supporting materials will also be sent to the Yale IRB for review and approval.

Finally, the deliverable of the research, a retelling of stories from the perspective of the researchers, must be produced responsibly (Kovach, 2017). With the supervision of the IRAB, the researchers ought to take deep care of the data they gathered and avoid misrepresenting the tribal community, which could result in dire consequences regarding the community's image, reputation, and accessibility to resources (Thambinathan & Kinsella, 2021). Representation of

the participants integrates all the previously mentioned aspects of Indigenous methodologies, as Kovach (2017) suggests:

(R)e-storying (representation) involves the following: has respect for the tenets of Indigenous epistemology of how knowledge arises from an Indigenous perspective; is grounded in Indigenous theory-principles (teachings) such as those pertaining to relationality, ethics, protocols, reciprocity, and respect; is highly contextualized within the experiences of the Indigenous communities of which the research is involving itself (i.e., socioeconomic, political, cultural, religious, kinship, etc.); arises from embodied experience and story; acknowledges the conditions of Indigenous societies, including colonialism, neocolonialism, and resistance; and is accessible to the people and community it seeks to represent (p. 403- 404).

## ***Methods***

### Recruitment and Sampling Procedure

The research team will include Yale researchers who identify as Native Americans, and they will have important roles in the study leadership, data collection, analysis, and writing (i.e., co-PI, interviewer, analysis, and interpretation of data). As discussed in the previous section, the selection of tribes will be a direct result of the relational capital of the Yale researchers, and the research topic and framework will be co-constructed with the tribe, only if their interest align with topic as well. Thus, the recruitment and sampling procedure will be highly contextualized to the selected tribe. Recruitment will not happen until we formed bonds with the community, and all decisions will undergo confirmation with the IRAB. The study population is youth from 10 to 18 years old. Ideally, we would like to have a representative sample of all youth in the tribe, including those who attend English speaking schools and those who attend traditional forms of

education. We are very likely to collaborate with the local division of the Boys & Girls Clubs of America (BGCA), since BGCA has nearly 250 native clubs around the country, representing 150 tribes (*BGCA Native Services*, n.d.). A great advantage of BGCA is the convenient access to youth of various ages. In the absence of a BGCA, we will reach out to the youth through community gatherings, or with the help of schools that volunteer to participate. We will closely collaborate with a translator from the tribe to communicate with non-English speaking youth.

After identifying pathways to recruit participants, our Indigenous representatives will send out appropriate messages, providing any assistance they need to ensure an accurate description of the study process (Sherman et al., 2012). Trusted insiders understand the appropriate content, format, and timeline to obtain consent, which could lead to higher rates of participation (Sherman et al., 2012). Interested participants will be given study consent forms, or a media deemed appropriate for the tribe, that outlines the study procedure, the risks and benefits of participation, data security and ownership, and contact information of the research team. Initial informed consent shall be obtained from participants, and as consent is an iterative process, participants can withdraw from the study at any time while being fully compensated (Sherman et al., 2012). The rather complex information will be thoroughly explained to minors, whom will also need to obtain informed consent from their guardian. We will offer each participant a \$15 stipend for their time and contribution to each phase of the study. We aim to recruit a minimum of 30 participants in the first phase of the study to ensure data saturation. However, a case study approach could also be considered when appropriate.

## *Qualitative Measurements and Rationale*

### Phase One: Oral and Visual Storytelling

The first phase of the research will include a one-on-one, semi-structured interview followed by a drawing activity, during which the youths can tell the story of their lived experience in their own terms (Kovach, 2017; Thomas, 2005). In a setting that is familiar and comfortable for the participants, the researchers – including at least one interviewer who identifies as Native American – will start by introducing the research topic and acknowledging their intention to learn from the participants without any judgment. The youth will be asked to share their experiences interacting with the natural environment, including all of the creatures in it. Then, the researcher will follow up with questions including: Have you ever noticed any changes in the natural environment around you? How do you feel about these changes? Do they make you feel positive or negative and why? How do these changes affect your relationship to the environment? How do they impact your peers/ family/ tribe's relationship to the environment? What are some of your guesses regarding the cause of these changes? Do you think these changes are local or global? Why so? If the participant ever mentions climate change or global warming in their response, the researcher will ask them to explain climate change in their terms and follow up with questions, such as: Where did you first hear about climate change? How often does this term appear in your daily conversations? The researchers will then delve in on the youth's perception, emotional and behavioral responses through the questions mentioned above, but only focusing on climate change. If the youth described a phenomenon related to climate change, but did not specifically use the term, the researcher will ask clarifying questions and actively guide the conversation towards the concept. If climate change or global warming never come up during the first half of the conversation, the researchers will bring up the topic of

climate change, in addition to a transitional question about whether they perceive any correlations between climate change and the environmental changes they described previously. Only the audio of the interview session will be recorded on the researcher's recording device.

These questions set the stage for the following activity, during which the researchers will hand out a piece of blank paper and drawing utensils, asking the youth to draw three versions of their environment, including the environment 100 years ago, the environment they live in now, and the environment they imagine in 100 years. This activity is inspired by Strife's study, in which researchers assessed the children's fear of environmental problems from their artworks representing their imaginary future world (Strife, 2012). Demonstrated by Strife's results, the process of visualization could elicit information that complements the children's verbal responses (Strife, 2012). During the drawing process, participants will be encouraged to share their understandings, emotions, and thought process as the researchers demonstrate genuine curiosity in their work. At the end of the session, the participant will be asked whether they prefer to share their artwork with their peers. Those who are willing to share will be gathered to engage in an unstructured discussion about the environment, climate change, and their artwork. Only the audio of the art and discussion sessions will be recorded.

It is important to note that although the previous paragraphs outlined a few themes of inquiry, the actual interview questions will be highly contextualized to the selected tribe. The previously mentioned themes only serve as general topics of interest regarding Indigenous youths' perceptions and feelings toward climate change. Since each tribal community differs from the other in their geography, history, socioeconomic background, and worldviews, the appropriate



vocabulary to use and questions to ask will be co-generated with Elders and Indigenous representatives on the IRAB. We want to ask questions that are truly of interest and significance to the community, and the importance of collaborating with Indigenous insiders should not be understated.

Storytelling has long been the optimal medium to convey Indigenous epistemology and theory-principals (Kovach, 2017). While storytelling can take a variety of forms, the first phase of the study explores the oral and visual pathways. As the participants disclose the understanding and thought process behind their creative art work, they will be granted full power to make sense of the world in their own expressions and experiences (Kovach, 2017; Thomas, 2005). Storytelling also aligns with core Indigenous values such as relation, respect, and reciprocity (Kovach, 2017). The research session will only be carried out after the researchers has established trust and a mutual relationship with the youths. Suggested by Cahill, the researchers should not posit themselves as aloft, sober observers (Cahill, 2007). Instead, the researcher is thought to be integral to the conversation, listening with “not only open eyes and open ears but also open hearts and minds”(Delpit, 2011, p. 297; Kovach, 2017). To demonstrate respect and reciprocity, the researchers will be honest about the why they are here and how this conversation influenced their personal perceptions, feelings, and relationship to the community (Kovach, 2017). Listening to the stories shared, the researchers bear the responsibility of a witness to remember and retell the story (Lincoln & Denzin, 2005, cited in Kovach, 2017, p. 401).

#### Phase One: Data Analysis and Presentation

The research team will utilize interpretative phenomenological analysis (IPA) to analyze the interview and group discussion transcripts (Smith & Osborn, 2007). This method attempts to

understand the complexity of meanings behind participants' words, peeking into their psychological world (Smith & Osborn, 2007). In IPA, researchers are urged to keep in mind the dual process of interpretation, which includes the participant trying to make sense of the world and the researcher interpreting the participant's attempt to make sense of the world (Smith & Osborn, 2007). Although this approach is rooted in Western qualitative research paradigms, the researchers will closely collaborate with the Elders and representatives on the IRAB to identify codes and themes, connect the themes, and compare themes across stories (Smith & Osborn, 2007). Multiple researchers will code the transcripts independently before combining the codes and verifying the coder's interpretations with study participants. Photos of the participants' artwork will provide additional support for the analysis. Participants and the IRAB will oversee and contribute to the analysis process to exert their ownership on the data and avoid misrepresentation (Kovach, 2017). The same collaborative relationship will continue into manuscript writing and any other formats of data representation.

Depending on the findings and the will of the participants, the final deliverable could be presented in non-traditional ways that are more accessible to and embraced by the community. Past examples of creative scholarship of Indigenous methodologies include poems, short stories, or scientific text framed as a metaphor or allegory (Cole, 2000; Diversi, cited in Kovach, 2017, p. 404; Kovach, 2017). The ultimate goal is to make the research and its significance easily understood by one's aunt or uncle at a holiday family gathering (Kovach, 2017).

### Phase Two: PAR through Photovoice

Whether the research will proceed into the second phase will depend on the analysis of the previous phase. If the Indigenous youths believe that their life has been heavily impacted by climate change, the researchers will offer the second phase of the study, utilizing the photovoice method to facilitate Participatory Action Research (PAR). PAR seeks a critical reflection on the lived reality, with an emphasis to use these understandings to improve the world (Baum et al., 2006). The intention to empower informants and make changes happen is imperative to PAR (Baum et al., 2006). Wang and Burris (1994, 1997) were pioneers in deploying photovoice to achieve PAR, as they enabled rural Chinese women to document their health and work realities through photography and appealed to policymakers to enhance women's health (C. Wang & Burris, 1994, 1997; C. C. Wang, 1999). In the current study, researchers will first explain PAR, photovoice, and their significance to Elders and the IRAB and consult with representatives the appropriateness of this method. Varying from tribe to tribe, privacy concerns could be a challenge since sacred land and traditions might be disgraced upon photographic documentation. Adhering to the principals of PAR, the community should fully take initiative and have control over their data as well as the improvements they foresee (Baum et al., 2006; C. Wang & Burris, 1997).

If consensus is reached upon the implementation of photovoice, researchers will start to recruit youths between 15 and 18 years old. Only older adolescent participants will be considered because they have greater probability of producing high-quality photos, relative to early adolescents and children. The researchers will inform all eligible participants through a session during which PAR and photovoice basics are explained. Interested participants will be given a

camera and a full set of technical instructions. The youth photographers will be asked to capture sights and moments at which they recognize the impact of climate change on their life and their environment, as well as their own or their peer's reaction towards these phenomena, if granted permission. There will be ample time in the training session for the youth to raise issues of concern about the photovoice approach and camera usage. The researcher will be accessible for instruction clarification and technical assistance throughout the study period.

Every week, the participants will take photos on their own and meet with the researchers in a workshop session. The workshop sessions will be held at a convenient time for participants, and the setting will integrate Indigenous elements to create a safe and comfortable environment. For example, in their workshop sessions with rural Mayan women, Lykes and Crosby (2015) set up the room with candles and flowers, and started the session with a discussion of the meaning of the day according to the Mayan calendar (Lykes & Crosby, 2015; Lykes & Scheib, 2015).

Similar to Lykes and Crosby's (2015) workshop agenda, the researchers of the current study will use this time to learn about the adolescent's ideas regarding PAR and provide corresponding guidance, discuss the photos taken during the previous week and articulate the stories behind them, and identify emergent themes that are worth further exploration in the following week (Lykes & Crosby, 2015; Lykes & Scheib, 2015). The workshop sessions are anticipated to last about 6 to 8 weeks, depending on seasonality and the tribal calendar.

#### Phase Two: Data Analysis and Presentation

Data analysis exists extensively throughout the photovoice workshop sessions, during which participants will tell stories and engage in critical reflection on their understandings of the scenes as well as their emotional and behavioral response to the scenes (Lykes & Scheib, 2015). With

the guidance of the Elders or representatives on the IRAB, the youth will be encouraged to reconstruct the photo narratives using both Indigenous epistemologies, drawing on the relational production of knowledge, or possibly Western epistemologies, which they might have been taught in school. Through the iterative process of elaborating stories, commenting on each other's lived experience, and strengthening their understanding of climate justice, the participants will collectively identify issues and brainstorm ways to make change happen. The photos and photo texts will be presented in ways that promote the social changes envisioned. Exhibitions, books, policy briefs and even social media posts each has their unique potential to reach certain target populations (M. Lykes & Scheib, 2015; C. Wang & Burris, 1997). Sustaining a relationship with the participants beyond the initial presentation and ensuring the community's ownership over the data is of utmost importance (Kovach, 2017; M. Lykes & Scheib, 2015).

### ***Discussion***

Climate change, with its acute and long-term impact, can take a severe toll on the mental health of vulnerable populations including Indigenous youth. The current study aims to learn more about Native American children and adolescents' experience with climate change, with a particular focus on their cognitive, emotional, and behavioral responses. Rooted in Indigenous epistemologies and teachings, this study prioritizes building a respectful, reciprocal, and sustained relationship with the collaborating community. Researchers will employ qualitative methods such as interview, art, and photovoice to capture the lived experience of Native American youth, empower Indigenous voices and encourage capacity building. The methods used in this research protocol closely align with Indigenous methodologies to ensure an accurate representation of Indigenous perspectives. As a community-centered, participant-driven

approach, the study ensures that the community has full control over the data collection process, the actual data, and the afterlife of data collected. Providing the community with resources to promote social change, the researchers strive to avoid exploitative behaviors while supporting self-determination (Thambinathan & Kinsella, 2021).

However, this approach does present some challenges and limitations. One such limitation might be the size and heterogeneity of the sample. Even if qualitative methods do not require large samples ( $n = 15$  or  $20$  could be sufficient), we will have to ensure that the qualitative data is rich and sufficient to provide a complete qualitative analysis. If the recruitment involves different tribes, a challenge will be to make sense of the different world views and beliefs without overgeneralizing beliefs that might be different across tribes, nor to reify concepts as specific to one tribe when they are in fact representative of one of their members only. The participation of the members of each tribe at every stage of the research is crucial to navigate these challenges. Whether information saturation is obtained will be contingent on the opinions of the Yale researchers, the tribal Elders, and the IRAB. If either party believes that there are missing elements, the Research Advisory Board will collectively decide on whether the study is extended within the same tribe, across different tribes, and if the next steps consist of repeated interviews with the same participants or if more participants should be recruited. The research team will always prioritize Indigenous teachings and values to build sustained, trusting relationships and obtain high-quality, in-depth data.

The other challenge is building and maintaining a relationship with a Native American community. The physical distance between the community and the Yale campus poses a huge

barrier, and researchers bounded by the academic calendar might find it difficult to visit the community and participate in local events at the appropriate time. Thus, visits will require significant planning in advance. Prior to and after the in-person study implementation period, at least one other researcher besides the Indigenous affiliated researcher will be designated as the communications manager, who will be responsible for providing research updates to the IRAB on a biweekly basis. Any ideas or logistical concerns from the IRAB will also be passed to the research team through the communications manager, and a virtual board meeting will be arranged if necessary. If the community's will ever conflicts with the research goals, the researchers will prioritize community voices and see how the study can be altered to fit the community's ideologies. Importantly, both researchers and funders of the study must be committed to a serious, long-term investment that may not result in immediate, quantifiable, or publishable outcomes. Doing decolonizing research correctly takes patience and respect, and it is essential that all researchers and funders recognize this before embarking on the challenge.

In conclusion, this research protocol envisions a qualitative study focusing on Native American youth's cognitive, emotional, and behavioral responses to climate change. In order to avoid exploitative research and make the academia allies of Indigenous empowerment, we strictly adhere to the Indigenous methodologies proposed by Kovach (2017), accompanied by change-oriented aspirations that underlie PAR. Researchers will approach the community with genuine curiosity and support in a way that participants are not considered as subjects, but colleagues. Although we foresee challenges to this approach, it is worthwhile for the researchers to conduct research in an ethical manner, to respect a community that has shown remarkable resiliency, and to support the community as it heals and builds.

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