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Advancing Transparency and Impact of Research: Initiating Crosstalk between Indigenous Research and Mainstream “Open Science”

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Cover Page Footnote

Lui led the study idea conception, data curation, provision of funding and supervision. Lui and Skewes contributed equally to the conceptualization and writing of the manuscript. Gobrial conducted data analysis and contributed to manuscript writing. Rollock supported design of methods and data curation, and contributed to manuscript writing.

Advancing Transparency and Impact of Research:

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Scientific research is one of several ways of seeing and knowing about the world. Psychological science is a systematic and precise way of observing and measuring psychologically relevant phenomena; its goal is to answer questions about people’s lives. To reach this goal, research needs to yield consistent (reliable) and accurate (valid) results. For scientific findings to provide credible information about human psychology, the findings should be reproducible if different investigators study them in a new sample from the same population (Gone, 2011). Along with other approaches to seeing and knowing—local wisdom, traditions, and teachings that are passed down across generations—one aim that can be achieved by psychological research is to reflect and understand Native peoples’ experiences, ways of being, and behavioral, mental, relational, and spiritual processes.

Philosophies of Research

Psychological knowledge can be informed by both Indigenous-focused approaches and mainstream “Western” scientific approaches. The primary goal of Indigenous research is to *understand* people’s experiences. The researchers’ role is to *advocate* for the well-being of Native people, families, and communities to inform their practices, and to promote strengths and resilience. Hence, Indigenous researchers tend to use a collaborative, participatory approach to engage their community members throughout the scientific process—including the steps in confirming the accuracy of results and sharing findings with the community. This transparency aligns with the goals of open science, but it extends those goals by using research to advocate for communities and promote social justice. The goals of Indigenous research also are consistent with a constructivist worldview, in which different lived realities are represented, and meaning

and theories are induced from participants' stories and narratives. Because interpretations are shaped by their own biases and perspectives, researchers actively discuss the role of their personal identities and values as part of the scientific process. Given these two guiding principles, investigators in Indigenous research traditions strive to share broadly the meanings and understandings generated by their efforts, and to seek ways to disseminate them usefully.

By contrast, the goals of mainstream research are to *describe* psychological phenomena, *predict* and *explain* human behaviors, emotions, and thoughts, and to *modify* maladaptive experiences. These goals generally are consistent with a postpositivist worldview, in which a singular reality is assumed and tested using deductive and quantitative methods. Relatedly, a postpositivist approach assumes that identification of researcher biases is possible, and that once accomplished, optimal and objective science is achievable.¹ Postpositivism in part can explain the persistent dominance of samples from Western, educated, industrialized, rich, and democratic (WEIRD) societies in psychological research (Arnett, 2008; Henrich et al., 2010; Thalmayer et al., 2021).

Replication Crisis and the Mainstream Open Science Movement

In recent years, mainstream psychology has discovered that many research findings—particularly studies with laboratory experimentation—do not replicate when examined by different scientists in new and larger samples (Open Science Collaboration, 2012, 2015). This “replication crisis” has shaken the field to its core. The crisis raised concerns not only about the validity of findings that were widely accepted as true, but psychological science itself. Threats to reproducible science include: designing quantitative studies with small samples and limited

¹ Readers interested in in-depth discussions of the different research paradigms and philosophical worldviews may consult Creswell & Clark (2011) and Guba & Lincoln (1994, 2005).

statistical power, and analyzing data in ways that maximize positive findings—and in turn inflate false discoveries (Munafò et al., 2017). Importantly, key culprits may be the current incentive structure and “normalized” process in mainstream research. Researchers are rewarded with tenure, promotion, and grant funding for publishing novel findings that support the hypothesis; null results often are buried in file drawers. Hence, there are strong motivations to ensure that data yield positive results supporting the research questions and hypotheses, and to ignore contradictory findings. Because of the beliefs in the objectivity of researchers and their methods, it naturally raises alarm when findings cannot be reproduced.

Is “Open Science” Limited?

Touted as a means to address the replication crisis, the “open science movement” encourages researchers to increase rigor and transparency of findings. The language of mainstream open science highlights that, “predictions, analysis plans, data, and supplemental material[s] are made available to the broad scientific community” (Shrout & Rodgers, 2018, p. 488). In particular, preregistering the study plan prevents investigators from radically changing their methods or analyses after having observed data patterns to achieve the result they anticipated. Sharing all study materials with other researchers also promotes transparency. Although open science is considered a radical shift in the ways that mainstream researchers produce knowledge, many of these open science practices are congruent with the transparent and collaborative approaches used in Indigenous research. Yet, the language of open science is uncommon in Indigenous research and other domains of ethnic minority psychology/cultural diversity research. Thus, it would be useful to understand whether open science practices and Indigenous research can be mutually informative.

Research Procedures and Results

We administered survey and open-ended questions to psychological researchers who identified as Native American/Hawaiian or Indigenous Peoples. The present data were collected as part of a larger study on researcher practices in the ethnic minority psychology/cultural diversity field. Indigenous doctoral and master's-level researchers came from diverse psychology-related disciplines, including clinical and counseling psychology. This group of researchers on average published 11 peer-reviewed articles as a primary author and 15 articles as a co-author. Researchers were asked to indicate their opinions about open science practices. For example, individuals rated their understanding of the “replication crisis” and “open science movement.” Researchers also indicated their beliefs about scientific rigor, transparency, and reproducibility of their work.

We found that Indigenous researchers were “somewhat familiar” with the replication crisis and “moderately familiar” with the open science movement. Individuals were “somewhat concerned” about the research reproducibility problem in not only psychological science generally, but ethnic minority psychology/cultural diversity specifically. Indigenous researchers believed rigor and transparency to be very important in their research; they placed relatively less value on the reproducibility of their findings. This may reflect the slight difference between the goals of mainstream psychological science and Indigenous research discussed above (i.e., to create generalizable knowledge vs. to advocate for social change for Native people). Among the 10 individuals who had engaged in open science practices, it was most common for researchers to post an open-access pre-print/post-print of their research reports, register their research projects, and openly share their data with the scientific community (see Figure 1).

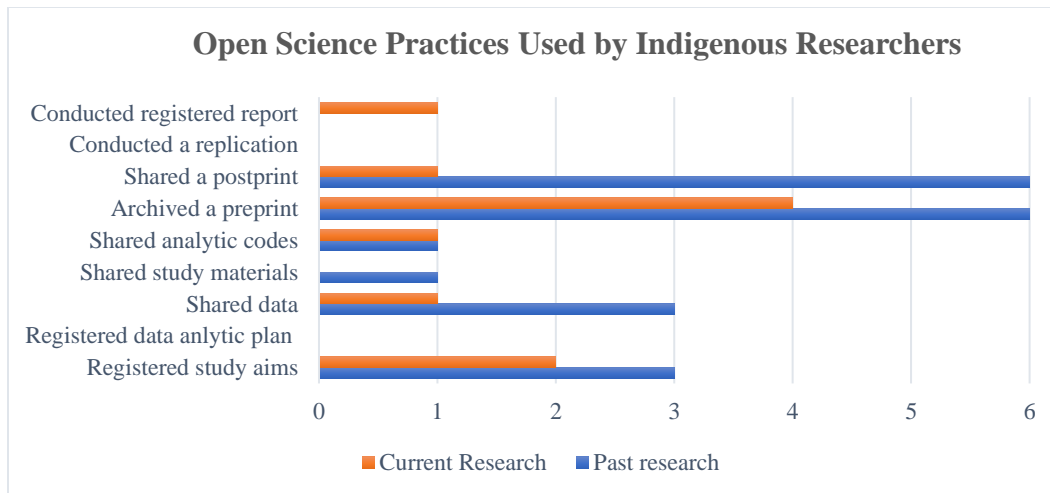


Figure 1. Use of open science practices reported by Indigenous researchers

As shown in Figure 2, common motivations for engaging in these practices included being able to share their findings with research participants in the community and ensuring transparency in their research procedures. Sharing findings is not unique to practices promoted in the mainstream open science movement. Sharing findings also is key to community-based participatory research (CBPR), an approach that is preferred—or required—in many Native communities (e.g., Wallerstein et al., 2018). A main difference, however, is that the mainstream open science movement prioritizes sharing findings with the scientific community, whereas CBPR prioritizes sharing findings with research participants and their communities.

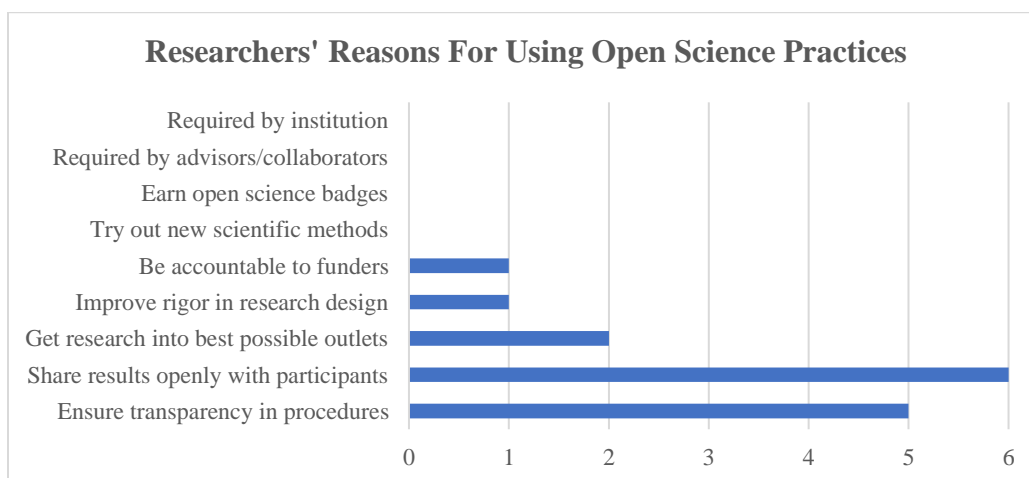


Figure 2. Reasons for using open science practices among Indigenous researchers

As shown in Figure 3, Indigenous researchers who never used open science practices indicated concerns about being “scooped” in their work. Researchers also stated that open science practices were uncommon and unincentivized in their subfields/institutions.

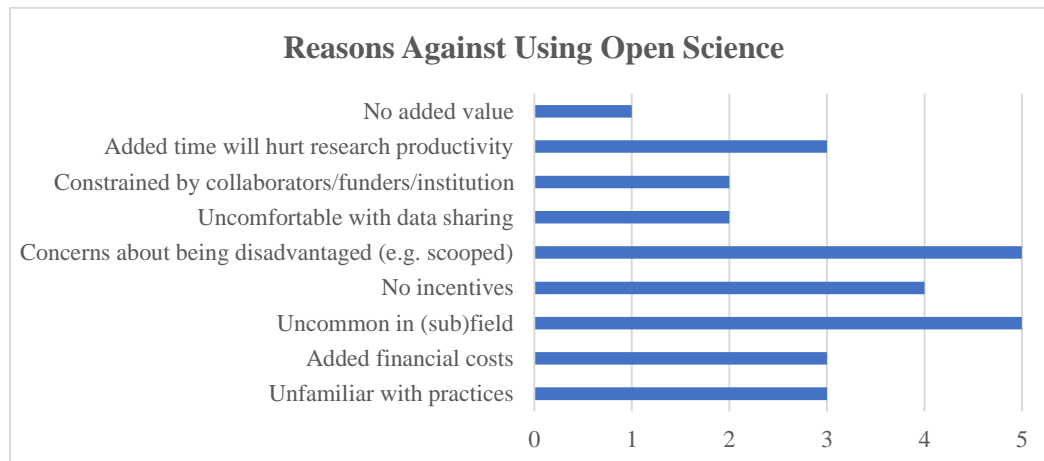


Figure 3. Reasons against open science by Indigenous researchers who have no experiences with open science practices

Two themes emerged from the written responses and suggested Indigenous researchers’ concerns about “open science.” As illustrated in the excerpt below, researchers believed that the mainstream open science movement had not embraced CBPR frameworks and qualitative methods. Researchers also cautioned about misinterpreting contextualized experiences in the Indigenous communities.

“The language of open science movement is still based on Euro-western scientific framework and concepts of validity. Indigenous validity is met through validation of Indigenous methodology from the communities engaged in the process or encircling or some methodology for ensuring the community recognizes the work as valid.”

On the one hand, Indigenous researchers in our sample appeared to believe that “open science” applied only to researcher-initiated studies that used quantitative methods. On the other hand, when materials and data were shared openly with other scientists, Indigenous researchers were worried that research processes and findings would be misrepresented and misinterpreted by outsiders. Namely, research results and conclusions might be invalid without meaningful

community participation.

Enhancing Crosstalk between CBPR and Mainstream Open Science

Our participants' responses support the notion that research with Native people emphasizes community participants' narratives and stories, and values transparent and equitable collaborations with community partners. Indigenous researchers view empirical inquiry to be a way of understanding the population, through which applications can advocate for the needs of Native communities. Although mainstream "open science" rarely is discussed in Indigenous research and Indigenous research is rarely discussed among those promoting open science, we believe that this separation unnecessarily reflects differing worldviews to scientific inquiry. Mainstream open science practitioners and Indigenous researchers have much to learn from one another, given their shared goals of transparency and accountability (see Table 1). Rather than an exhaustive prescription, we hope that this article opens a constructive crosstalk between Indigenous research and mainstream open science practices.

Some open science practices may be useful for Indigenous researchers and will allow Indigenous research to have a broader impact within the mainstream scientific community. For example, allowing public access to research conception and planned methods, study materials, and relevant data can facilitate independent observation of psychological phenomena. In our own experience with study preregistrations, there is value in investing in the significance of the research questions and planning process by consulting with both research collaborators and community advisory boards prior to knowing the patterns in the observed data. Registration of research plans and analyses can apply to various research methods—including qualitative, quantitative, and mixed methods approaches. Additionally, by making data (and when appropriate, analytic syntax) and researchers' reflexivity and interpretations available to the

scientific community, we can gain greater appreciation for making our records and process accessible by independent researchers.

Table 1. Comparisons and Contrasts between Principles of Community-Based Participatory Research (CBPR) and Mainstream Open Science (OS) Practices

CBPR Principles	Common Mainstream OS Goals and Practices
Enhances understanding by communicating with the research participant community Builds on strengths and resources within the Indigenous community	Minimizes biases by communicating with the scientific community Collaborates among research teams and shares resources within the scientific community <ul style="list-style-type: none"> • Communicates research ideas and process through preregistrations and registered reports, open materials, and open data sharing
Facilitates a collaborative, equitable partnership in all phases of the research with the community	Builds team science to minimize individual biases and establishes partnerships for broader reach of the population <ul style="list-style-type: none"> • Multisite collaborations • Transparency with data and analyses to democratize incentives/rewards and knowledge production
Fosters co-learning and capacity building among all partners Balances knowledge and action for the mutual benefit of all partners Addresses locally relevant health problems and considers multiple determinants of health and disease	Basic and continuing education for investigators Disclosure of investigator interests and their conflicts Uncovers universal laws and facts, and enumerates possible modifiers across groups and settings/conditions
Occurs in a cyclical and incremental process that includes ongoing evaluation of successes and obstacles	Self-corrections of scientific methods and applications <ul style="list-style-type: none"> • Replication studies (including resampling methods, cross-validation) to demonstrate reproducibility of results and to reinforce viability of findings • Explicit differentiations of confirmatory and exploratory analyses
Disseminates findings and knowledge to all partners	Disseminates findings and knowledge widely <ul style="list-style-type: none"> • Preprints that are free and widely accessible • Use of open social media platforms for sharing and discussion
Involves a long-term process and commitment to sustainability	Involves sustained accountability to the scientific community and cumulative knowledge production <ul style="list-style-type: none"> • Share primary data, relevant research materials, and data analysis syntax • Incentives/rewards for upholding principles, including digital open science badges • Team science for data pooling • Longitudinal research with extensive data collection and intensive analyses

Other open science practices may be inappropriate when working with Native populations and when conducting CBPR. For example, mainstream researchers suggest that larger sample sizes and higher statistical power can enhance scientists' confidence in

(quantitative) studies (Button et al., 2013; Fraley & Vazire, 2014). This prescription does not account for the small population in different tribes of Native Americans—who often have unique lived experiences and sociocultural contexts. Additionally, although our research team has benefited from multisite collaborations—endeavors that facilitate participant recruitment of some segments of the population—coordinating such collaborations with tribal advisory boards may be challenging.

Importantly, we believe that mainstream open science movement can help researchers broaden their conception of accountability and transparency. Rather than be accountable only to other researchers who examine study materials and data to ensure that they were handled responsibly from a scientific viewpoint, mainstream science would benefit from increased transparency and accountability to individual participants and their communities. Indigenous researchers view science as a sacred endeavor that aims to not only understand people but also help them and change the systems in which they live (Salois et al., 2006). How are researchers to know if their work is beneficial without a relationship to the community it intends to help? Making transparent the methods, study materials, analyses, and interpretations of the data would equip other scientists, practitioners, and policymakers to make good decisions and propel the field forward in a way that serves Native people and communities.

Nevertheless, to assess whether research is achieving its intended impact, evaluation methods must be grounded in true understanding of the communities and cultural contexts. From the perspective of CBPR, the community owns the data, and it is up to the tribe to decide whether and how to share them with interested outsiders. Researchers with limited experience with Native cultures and communities may easily and inadvertently misinterpret findings without the proper guidance from community members. Innovative solutions are needed to bridge this

and other gaps between Indigenous research and open science. Perhaps, formalized practices of vetting researchers and data sharing agreements can contribute to a new *Indigenous open science* approach that helps address the replication crisis while also protecting and empowering Native communities and researchers.

Final Thoughts

The goals of increasing transparency of research and improving reproducibility are important for increasing validity of study findings. Practices promoted by proponents of the mainstream open science movement can help reduce instances of data manipulation but may not eliminate them. As long as the incentive structure rewards scientists only for finding positive results and emphasizes major, groundbreaking discoveries, individuals will be motivated to manipulate open science or any other research practices. We see the mainstream open science movement as a good starting point toward improving the quality of scientific inquiry. We also believe that the movement would benefit from an expanded view of accountability held by Indigenous researchers. Dialogue to find connections between open science and Indigenous science are likely to benefit all who use research to create useful understanding that empowers people—and the communities it is intended to help.

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