Research Methodology and Community Participation:
A Decade of Indigenous Social Science Research in Canada

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Abstract

Those engaged in community-based participatory research (CBPR) often comment on tensions between social scientific and community values, yet little systematic evidence exists about the relationship between social science research methodologies and community participation. We analyze nearly 500 peer-reviewed articles published between 2005 and 2015 on Indigenous issues in Canada, where policies encourage participatory research methods with disempowered groups. We find that research that includes Indigenous participation is more likely to include Indigenous epistemologies and participatory evidence sources and analysis methods. We also find that peer-reviewed research involving Indigenous participants often fails to go beyond minimum levels of consultation required by policies.

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INTRODUCTION

Community-based participatory research (CBPR), is defined by Israel et al. (1998) as a

partnership between the researcher and community members where expertise is mutually shared

in order to develop a more enhanced understanding of the research topic, and to integrate

knowledge and action the community's benefit. CBPR is not only a tool for research oversight

but also community capacity building (Banks et al. 2013, 264). This is particularly true for

research conducted with disempowered communities, where researchers often have more power

than research participants due to differences in education, financial resources, and structural

positions of privilege (Banks et al. 2013, 265; Bastida et al. 2010, 18). Recognizing these

advantages of CBPR, research policies, including those around ethical practices for research with

human participants, increasingly require at least minimal levels of community engagement and

research approval when research involves structurally disadvantaged communities.

Meanwhile, academic social science research uses a range of qualitative and quantitative

methodologies based on social scientific values or principles that may not coincide with

perspectives of researched communities. When worldviews collide, differences in power,

resources, and authority will tend to privilege the approaches of Western researchers.

Community-based research can shift this power imbalance so that research responds to and

reflects the values of researched communities. We might also assume that more technical or

opaque academic research methodologies are less conducive to meaningful community-based

research participation due to their complexity or the limited human capital or education in some

researched communities. However, in practice we have little systematic information about the

extent to which different social science research methodologies are used in conjunction with

meaningful community consultation and participation or in community-based research.

We fill this gap by systematically and critically examining a decade of peer-reviewed social

science research on Indigenous issues in Canada to answer the question: In what ways are

research policies, research methodology, and community participation related in practice? The

case of social science research on Indigenous issues in Canada is ideal for answering this

question for several reasons. First, Indigenous Peoples remain economically and socially

marginalized in Canada, including ongoing acts of colonialism and history of systemic research

abuses (Mosby 2013; Mosby and Galloway 2017). Second, Canada is home to Indigenous

Nations and communities with varied worldviews that often differ from those of its colonial

government and Western academic research, creating tensions over epistemology and

methodology. Third, ethical research practices have been a key point of debate and discussion in

Canada (Ball and Janyst 2008, 33), and since the late 1990s, all national government-funded

research in Canada is governed by a common policy of the three national funding agencies in

health, science and engineering, and social sciences and humanities (CIHR et al., 2014).

Universities and related research organizations develop their policies and procedures to ensure

research within their organization complies with "Tri-Council" policy (TCPS), providing

continuity of formal institutions and norms across Canada. Consequently, Indigenous research in

Canada represents a "most likely" case for participatory research methods, making it ideal for

answering our research question and highlighting the limitations of research policy mandates and inherent tensions between Indigenous and social science approaches to knowledge production.

SOCIAL SCIENCE RESEARCH ETHICS, METHODOLOGIES, AND COMMUNITY PARTICIPATION

In general, CBPR encourages a variety of values and public goods: including access, equality, and capacity building for communities and community organizations (Chino and DeBruyn 2006; Banks et al. 2013, 265). This is because CBPR requires active participation, oversight, and power sharing by researched communities, where community can be defined by common geography or identity (Banks et al., 2013, p. 264). Others emphasize that "CBPR is not a research method…[but] a process by which decision-making power and ownerships is shared…" (Castleden, Morgan, and Lamb 2012, 162). CBPR is also a response to "parachute" research in which outside researchers, usually academics, parachute into a community to collect data without developing sustained relationships with communities or returning to share their research findings with community members (Bastida et al. 2010, 16; Burhansstipanov, Christopher, and Schumacher 2005, 71). The expectation is that when communities actively participate in research, it will reflect community values and understandings. However, there remain several tensions around community-campus (or governmental agency) partnerships and ethics, rights, ownership, power, and research boundaries (Banks et al. 2013, 267–68; Holkup et al. 2004; Minkler 2004, 2005; Muhammad et al. 2015). In addition, academic researchers engaged in CBPR report institutional and organizational barriers and disincentives for their work (Díaz Ríos, Dion, and Leonard 2018; Goodman, Bird, and Gabel 2017; Harding et al. 2012; Kowal 2008; Tolich and Smith 2014).

In Canada, Indigenous "community-campus partnership research" is understood to have transformative potential, and funding agencies have developed strategies to promote more participatory, collaborative, or community-based research strategies (Ball and Janyst 2008, 33; Koster, Baccar, and Lemelin 2012, 196–97). Indigenous communities also value developing research capacity in their communities and more Indigenous researchers overall, and research partnerships can be a means toward these ends (Ball and Janyst 2008, 41; Castleden, Morgan, and Lamb 2012, 169–70). Indigenous communities also advocate for research to value Indigenous knowledge and favor partnerships where blended knowledge mobilization is fully conceived and prioritized (Evering 2012; Lambe 2011).

Nevertheless, an ongoing debate remains about on how to do this research "in a good way" (Wingert and White 2017, 1). In general, scholars acknowledge that CBPR principles are consistent with many of the key principles common to many Indigenous research methodologies, such as the 4 R's: respect, relevance, reciprocity, and responsibility (Kirkness and Barnhardt 1991; Wilson 2001; Louis 2007, 133; Koster, Baccar, and Lemelin 2012, 198–99; Tobias, Richmond, and Luginaah 2013; Evans et al. 2014, 185).[1] Among advocates of CBPR, some scholars suggest that CBPR with Indigenous people does not require specific evidence sources or methods of analysis because Indigenous methodologies often involve similar evidence sources and analysis methods to those of Western-oriented research (Evans et al. 2014, 185; Walter and Andersen 2013). Others stress that CBPR and meaningful community participation go beyond

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[1] Some scholars also argue that with appropriate practices, non-CBPR can also be compatible with the four R's of Indigenous research (Alcantara, Lalonde, and Wilson 2017).

having community members administer surveys or approve research protocols, but also design the study, analyze evidence, and determine how to best disseminate findings (Burhansstipanov, Christopher, and Schumacher 2005, 72; Rainie et al. 2017). But others go further and demand that CBPR approaches for Indigenous research should also decolonize, rebalance power, and provide healing (Drawson, Toombs, and Mushquash 2017, 12; e.g., Simonds and Christopher 2013, 2186).

These scholars often regard particular Western epistemological approaches, like positivism, as incompatible with Indigenous perspectives (Evans et al. 2014, 185; see Gobo 2011 for a similar critique of surveys) and restrict the range of appropriate evidence and methods (e.g., Nicholls 2009, 118–19; Smithers Graeme and Mandawe 2017). In general, "conversational and story-telling approaches," which are more consistent with the relational worldview that undergirds many Indigenous epistemologies, tend to be preferred (Ball and Janyst 2008, 43; Christensen 2012; Drawson, Toombs, and Mushquash 2017). By contrast, some social science methods of analysis, such as analyzing survey data, may be more difficult to implement if analysis requires formal training of research participants (e.g., Grover 2008). Indigenous communities may also have local norms or ethical principles that clash with Western social science principles and constrain sharing of Indigenous knowledge or stories (Simonds & Christopher, 2013, 2188–2189).

CBPR practices are also regulated by policies and practices of academic organizations, including national funding agencies and universities. Such organizations develop research policies and ethical regulations based on "abstract principles" meant to cover a wide range of research

activities, and consequently they often "pay little attention to participatory research" (Banks et al., 2013, 266, 274). By extension, academic approaches to research ethics that privilege impartiality and objectivity are perceived to privilege positivism and Western research approaches and undervalue Indigenous and other critical or post-colonial worldviews (Chalmers 2017, 101–3). By contrast, ethical frameworks guiding research with Indigenous Peoples offer general principles that encourage the four R's (Moore et al. 2017), but do not provide enough practical instruction on how to conduct ethical research in accordance with Indigenous community customs and practices (Riddell et al. 2017). Even when research is guided by appropriate principles, researchers will need to actively reflect on these principles and continually adapt their research to the context as the research proceeds (Bastida et al., 2010, 20). That is, ethical research practices are contextually constructed, constantly negotiated, and based on "qualities of character…and the ethics of care" (Banks et al., 2013, 266.).

A DECADE OF INDIGENOUS SOCIAL SCIENCE RESEARCH IN CANADA

In Canada, initial public discussions and articulation of principles for ethical research among Indigenous peoples developed in the North in 1982 by the Association of Canadian Universities for Northern Studies (Castleden, Morgan, and Lamb 2012, 163–64). By 1998, the three primary national government funding agencies adopted its first TCPS, which acknowledged past research misconduct, incorporated Indigenous perspectives, and outlined recommended research practices (CIHR, NSERC, and SSHRC 1998; see also Castleden, Morgan, and Lamb 2012, 164–166). Around the time of the first TCPS and accelerating through the mid-2000s, various Indigenous organizations, federal research agencies, and academic researchers outlined ethical principles or guidelines for research on Indigenous issues (Ball and Janyst 2008, 34; Castleden et al. 2012,

165–166). These included revisions to the TCPS (TCPS2) (CIHR, NSERC, and SSHRC 2010, 2014) and documents by Indigenous organizations outlining guidance for ethical research in and with their communities (Inuit Tapiriit Kanatami 1998, 2005; Métis Centre 2010; First Nations Information Governance Centre 2014). These guidelines encourage reflections about research engagement with Indigenous Peoples (see Riddell et al. 2017; Rainie et al. 2017), but serious incongruences remain between the demands of ethical research in Indigenous communities and the policies and practices of research funding agencies, university financial administration, and Research Ethics Boards (Moore et al. 2017; Riddell et al. 2017, 9).

As we explain above, universities (and other research organizations) that receive government funding enforce TCPS2 and often adopt internal policies and practices that align with TCPS2. Consequently, nearly all scholarly research that is published in peer-reviewed academic outlets about Indigenous issues in Canada is also regulated directly or indirectly by TCPS, whether funded or not. Compared to countries without a unified national policy for ethics (Grant 2016; Tolich and Smith 2014), this makes Canada a "best" case where we would expect more uniformly inclusive consultations for nearly all peer-reviewed, social science research.[2]

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[2] We acknowledge that not all social science research on Indigenous issues in Canada is conducted within universities nor is it all peer-reviewed. Studies carried out by colonial and Indigenous governments are often not available to the public, unlike research published in peer-reviewed academic journals. Most peer-reviewed research is conducted by researchers or teams with some university affiliation such that most peer-reviewed publications are thus directly or indirectly regulated by Tri-Council policies. Exceptions would be studies in Canada carried out by non-Canadian researchers, though we expect these to be rare and hard to exclude from our sample.

First, we searched academic databases[3] and specific portals or websites to identify relevant social science articles. The search strategy included combinations of keywords related to Indigenous Peoples (e.g., First Nation, specific Nation names) and Canada (e.g., Canada, provinces) to identify relevant articles published between 2005 and 2015 in peer-reviewed publications (see Dion et al. 2019 for a detailed research protocol). We terminate our sample at the end of 2015 for multiple reasons. At the time we collected and coded our data, 2015 was the most recent year in which most journals had completed their publication of all 2015 issues, which ensures that our sample was complete through the end of an entire publication year. We return to this issue in the conclusion in light of recent developments. By starting our data collection in 2005, our sample is sufficiently long to be deemed representative of practices since the first TCPS in 1998. The search included filters for social science disciplines, including anthropology, development planning, economics, interdisciplinary social science, political science, social work and sociology.[4] Two reviewers screened the title and abstract of 1,503 journal articles to determine whether they met our inclusion criteria, and a third reviewer resolved differences. After eliminating duplicates and reviewing the full-text, 537 articles remained relevant for our study.

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[3] These were the Web of Science Core Collection and the Bibliography of Native North Americans and America: History and Life in EBSCOhost.

[4] Studies from related disciplines, such as law, education, health, history, linguistics, and geography, were included if they explicitly focused on social conditions of Indigenous peoples (e.g. studies from human geography, sociology of education, comparative education, sociolinguistics, and social aspects and effects of law). We excluded psychology and health (except when related to policy) because those disciplines are normally funded by a different federal agency, use different methodologies given their professional and clinical orientations, and are consequently governed by different research ethics boards in most universities.

Coding research methodology

Of these, research assistants coded indicators of research methodology and Indigenous

participation in 497 articles (92.6%).[5] Our classification protocol combined our understanding of

Western social science and Indigenous research approaches. One the one hand, we identified

three broad, interdependent dimensions of social science research. First, social science research

encompasses a range of different epistemological perspectives that each represents different

assumptions about the nature of knowledge. Second, different epistemological perspectives (or

paradigms) suggest or require different research methodologies, or processes for pursuing

knowledge. Third, methods, particularly when thought of as a "tool" of data collection, may

often be used as part of different methodologies with different epistemological perspectives

(Evans et al. 2014; Drawson, Toombs, and Mushquash 2017; Lincoln, Lynham, and Guba 2011).

For example, one-on-one interviews can be used with either interpretive or positivist

methodologies, but the types of questions and dynamics will vary by methodological perspective.

We assume that some methods of data collection and analysis are flexible enough to use with

different methodological or epistemological perspectives and that all social science methods of

analysis inherit and should be shaped by the study's epistemological perspective.

On the other hand, our classification was also informed by our understanding of Indigenous

epistemologies and methodologies. While there is not one Indigenous methodology, but many

(Kovach 2010; Drawson, Toombs, and Mushquash 2017), Indigenous methodologies often share

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[5] Forty articles were not coded due to difficulties acquiring the full-text. The first two authors
trained two research assistants, and then, each article was coded by one assistant, who also
indicated whether the article was easy or difficult to code. Those marked difficult were then
coded by the other assistant and differences were resolved by one of the first two authors.

an epistemological understanding of knowledge as relational, as between peoples or between

people and the natural world (Wilson 2001, 2009; Koster, Baccar, and Lemelin 2012, 198).

Furthermore, like mainstream social science, the use of Indigenous methodologies requires an

alignment between a method as tool and the study's epistemological perspective or worldview.

For us, this meant that some research methods used as part of an Indigenous methodology may

share some basic characteristics with mainstream social science methods, but when informed by

an Indigenous epistemology, the use of those methods will differ in meaningful ways from the

ways in which they may be used with other social science epistemologies. See Table 1 for an

overview.

[TABLE 1 HERE]

Overall, we used the classification to compare research projects while always acknowledging

that in practice methods are shaped by a study's epistemology. This means that we sometimes

grouped together studies by evidence source (e.g., one-on-one interaction between researcher and

study participant) that varied dramatically in their epistemological perspective. Likewise, our

classification system helped identify the range of evidence sources used within one

epistemology. Thus, we focused on the combination of different dimensions of research

methodology to code articles' epistemological approaches, evidence sources, and methods of

analysis, allowing the possibility that an article could combine approaches, sources, or methods.

Epistemology, or knowledge worldview, categories included: positivist/post-positivist,

constructivist, critical, constructionist/post-modern, or Indigenous. Evidence sources included

experiments, surveys, one-on-one dialogue, experience, group dialogue, primary sources,

secondary sources, reflexive sources, and other evidence sources. Methods of analysis included

quantitative description, quantitative inferences, interpretive ethnography, qualitative content

analysis, discourse analysis, qualitative comparative case studies, inductive analysis, participatory methods, simulations or other methods.

Coding Indigenous participation in research

Our approach to measuring participation drew upon existing work on Indigenous research (CIHR, NSERC, and SSHRC 2014; Kovach 2010; Smith 1999; Wilson 2009) and community-based, participatory methods (Burhansstipanov, Christopher, and Schumacher 2005; Banks et al. 2013, 265). Further, CBPR may include a range of levels of community participation (Banks et al., 2013 265). We developed an ordinal indicator of Indigenous participation that included six levels:

1. no Indigenous participation involved (theoretical and/or conceptual studies, research based on existing sources, or involving only non-Indigenous participants),

2. omitted participation (omits the involvement of Indigenous individuals and the review and approval from Indigenous communities),

3. acknowledge (limit the participation of Indigenous communities to the approval of ethics protocol),

4. engage (minimal involvement of Indigenous communities in the project focused primarily on sharing information either as research informants or audiences for knowledge mobilization),

5. collaborate (partner with Indigenous participants in each aspect of the research process, including the development of research questions, research design, and analysis of findings), and

6. empower (very strong, entrenched involvement that empowers participants or Indigenous research partners to leverage the knowledge to have an impact in their environment and continue to carry on research that benefits them by imparting new skills, knowledge and/or resources, often initiated by Indigenous organizations or arising from a pre-existing research relationship).

We also coded a separate indicator for studies in which Indigenous Peoples and communities initiated and had leadership of the research process and in which they had greater power than non-Indigenous researchers or organizations. These studies also went beyond research conducted by individual Indigenous researchers in educational or non-educational institutions. In addition, we coded several characteristics of the first five authors of all the articles, including whether they self-identified (in the text or author notes) as Indigenous or as affiliated with an educational, governmental, or non-profit organization. Authorship is important because sharing co-authorship with Indigenous community leaders or research participants is a recognized, yet potentially under-utilized, means of recognizing community participation in academic research (Castleden, Morgan, and Neimanis 2010). This classification of Indigenous research participation, combined with the articles' epistemology, evidence sources, and analysis methods, allowed us to describe the distribution of approaches and authors who published research on Indigenous issues in Canada over the last decade as well as explore the coincidence of certain article or author characteristics.

Results: Research methodologies and community participation

Table 2 includes the frequencies of articles by epistemological approach and Indigenous community participation. Of articles published 2005-2015, about half (235 of 497) included no Indigenous research participants because they were theoretical or conceptual studies, literature reviews, or studies that rely solely on existing (e.g., primary and secondary) sources. Of these, only 22 studies included an Indigenous worldview, and most of those (18) included an additional social science perspective. A critical perspective was most common (128) among the articles without Indigenous participants, and 75 of those included another perspective as well. The articles coded as not having Indigenous research participants used a wide range of analytical methods, including primary (186) and secondary (159) sources, discourse analysis (90 articles), comparative case studies (56), descriptive statistics (54), other methods (39), content analysis (28), inferential statistics (31), and inductive methods (23).

[TABLE 2 HERE.]

Among articles that include interactions with Indigenous research participants, a small number (22) of studies included interactions with Indigenous research participants but provide no indication that Indigenous communities approved research protocols as required by TCPS2. Eight of those studies were also coded as positivist and used mostly survey data, primary and secondary sources. Twelve articles in this category with omitted participation of Indigenous communities used one-on-one interviews as evidence sources with some combination of Indigenous, positivist, constructivist, critical or post-modern approaches. In some of these cases, the interview participants were settlers, such as policy-makers or politicians. In other instances, it is possible that this information was merely omitted from the publication but that appropriate Tri-Council and local Indigenous policies and practices were followed. The articles were silent

on this aspect of the research, which is problematic because research transparency is important to ensure that research follows policies designed to protect the rights of disempowered populations. Even those studies that reported higher levels of Indigenous participation (acknowledge through empower) often neglected to detail the process of consultation and approval with the community in which the research took place. In the interest of transparency and to ensure compliance with relevant research ethics policies, all research should include at a minimum the information necessary to confirm compliance (e.g., reporting of protocol numbers, contact information of ethics boards, First Nation resolutions authorizing research).

Focusing instead on studies with some evidence of Indigenous research participants and meeting the minimum requirements of TCPS2 for community acknowledgement, studies that include Indigenous epistemologies (alone or alongside other social science approaches) tend to have deeper Indigenous community participation in comparison to studies that exclude Indigenous epistemologies (see Table 2). Studies that exclude Indigenous perspectives tend to minimize or have lower levels of Indigenous community participation (e.g., acknowledge or engage). We cannot speak to whether including deeper Indigenous participation leads to greater incorporation of Indigenous perspectives or whether an embrace of Indigenous epistemologies prompts researchers to more deeply engage Indigenous communities in their research, but an association exists. Nevertheless, the evidence suggests that there is room for significant improvement in the amount of meaningful participation by Indigenous communities across all research approaches or epistemologies, but particularly by studies that rely exclusively on one or more Western epistemology.

Figure 1 depicts the number of studies that use an evidence source and their level of Indigenous community participation. For most sources, acknowledge, or the lowest level of participation, is the most common type of participation (e.g., survey, one-on-one, experience, primary and secondary sources). However, studies with higher levels of participation (collaborate and empower) more often include reflexive, group, and experiential sources. Figure 2 illustrates the relationship between Indigenous participation and methods of analysis. For many methods of analysis (e.g., content analysis, comparative case study, discourse analysis, and ethnographies), the most common level of community participation is minimal (acknowledge), or that meeting minimum research ethics policy requirements. Inductive and participatory methods deviate from this pattern somewhat, with "engage" as the most common type of participation in inductive studies and "collaborate" most common in studies with participatory analysis methods. Together, these patterns suggest an association between higher or more meaningful levels of Indigenous community participation and specific evidence sources (group, reflexive, experience) or methods of analysis (inductive and participatory). This is consistent with another recent review that found that qualitative methods of data collection or analysis were most common in studies using an Indigenous research approach (Drawson, Toombs, and Mushquash 2017, 14).

[FIGURES 1 & 2 HERE]

Research methodologies in Indigenous community-led research

Very few articles (24 of 497, or 4.8%) met our definition of "Indigenous community-led research," in which the Indigenous community initiated and defined the research project. These articles were all published between 2007 and 2015, with about 2-3 per year meeting these criteria. This finding is consistent with previous research that suggests most often university-based researchers initiate research relationships and projects with Indigenous communities in

Canada (Castleden, Morgan, and Lamb 2012, 167–80). While this finding might suggest that Indigenous communities are not actively leading and developing research, it could also just reflect that such research does not result in publications in academic journals, instead perhaps resulting in white papers or other research output. Of these 24 articles, six employed an Indigenous epistemological approach, another seven combined Indigenous and critical approaches, and the remaining 11 articles were distributed relatively evenly across the following epistemological approaches: constructivist, critical, critical and constructivist, Indigenous and constructivist, positivist, post-modern, and post-modern and critical. Indigenous community-led research is highly participatory, with 12 studies coded as empower and 9 as collaborate. Two did not include Indigenous participants, and one did not explain community involvement.

Indigenous community-led research included a range of evidence, often using more than one evidence source, including: one-on-one interactions (18), experience (14), reflexive sources (10), group interactions (9), surveys (5), primary sources (3), and secondary sources (2). Likewise, Indigenous community-led research often used more than one method of analysis, including participatory methods (15), interpretive ethnography (8), content analysis (7), comparative case studies (4), discourse analysis (4), inductive analysis (4), descriptive statistics (2), simulations (1), or other (1). Together these patterns suggest that studies led by Indigenous communities are more likely to use Indigenous perspectives and more participatory sources of evidence and analysis. At the same time, some Indigenous community-led research may also use sources (e.g., surveys) and methods (e.g., content analysis) often associated with Western social science.

Research methodologies and Indigenous researchers

In addition to coding participation, we also coded the probable gender based on given (first) name, self-identification as Indigenous as indicated in author notes or text, and type of organizational affiliation for the first five authors of each article.[6] The distribution of these characteristics by author position is presented in Table 3. Following others (Teele and Thelen 2017; Sumner 2018), we used the genderize.io API (http://api.genderize.io/) and genderizeR R package (Wais, VanHoudnos, and Ramey 2016) to estimate the probability that a given (or first) name of an author belongs to someone who identifies as female.[7] The genderize.io API uses information about given (or first) names and gender expression (i.e., self-identification) in social media databases to estimate the probability that a given (or first) name is associated with someone who identifies as male or female. Using these criteria, we estimate that about 481 (including duplicates, or 50.2%) are female and 415 (or 43.3%) are male, while 6.5% of author names were not coded.[8]

[TABLE 3 HERE]

To code Indigenous self-identification, we relied on the author biographical notes, acknowledgments, text, or notes. However, a majority of authors (773) had no indication of their

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[6] Of the 497 coded articles, only 17 (or 3.4%) have more than 5 authors, and 11 of those 17 have 6 or 7 authors.

[7] We recognize that gender is not binary and instead includes a range of gender identities. See also Leigh (2009).

[8] Some given names, if uncommon in the genderize.io database, fail to yield a gender prediction. For example, Indigenous authors with Indigenous given names may also be underrepresented and/or misgendered in the genderize.io database. In a previous study of article author genders, researchers hand-coded or verified the gender predictions of the genderize.io API for more than 1000 articles and found that only 2% of predictions were incorrect, with a tendency to over predict that a given name was female (Teele & Thelen, 2017). To minimize potential errors, we have only coded a given name as belonging to a female author if the genderize.io API returns a probability greater than 0.7 that a name is female, and it is only coded male if the probability that the given name is female is less than 0.3

Indigenous or non-Indigenous identity. These omissions are likely due to journal practices that prohibit or discourage authors from articulating their identity. Of 161 authors that explicitly claimed an Indigenous or non-Indigenous (e.g., settler), 80 (or 8.4% of all authors) identified as Indigenous and 81 as non-Indigenous. In many social sciences, the order of author names often is used to signal the relative contributions of authors to the article. Alphabetical order signals equal responsibility, and otherwise, order usually reflects relative share or contribution. On average, for those authors for whom we have information, non-Indigenous authors were more common than Indigenous authors in the first two author roles, and Indigenous authors were more common in third through fifth author positions. We do not code whether an Indigenous author is a member of the community researched in the article, but this pattern is consistent with research led by academic, non-Indigenous researchers in which Indigenous community members are included as co-authors to recognize their contributions to the project (Castleden, Morgan, and Neimanis 2010).

In contrast to Indigenous self-identification, most authors (893, or over 93%) included organizational affiliation information. A significant majority of authors (787 or 82.3%) were affiliated with educational organizations (e.g., colleges, universities, etc.), which is to be expected given that our sample comes from academic, peer-reviewed journals. The next most common types of organizational affiliations were non-governmental organizations (e.g., think tanks, advocacy organizations, 59 or 6.2%), colonial (e.g., provincial, national, etc.) governments (29, or 3.0%), and Indigenous governments (18, or 1.9%).

We were only able to completely code the intersection of self-identification and organizational affiliations for 144 authors, who may not be representative of all authors. Nevertheless, Indigenous authors appear more likely to be affiliated with non-governmental or Indigenous government organizations than non-Indigenous authors, who are more likely to be affiliated with educational organizations (Pearson's chi-square = 68.553, df = 8, p-value = 0.000).[9] Given the limitations of our data and coding, we suggest that this is an area that requires additional research.

Of the 61 articles coded as having at least one author who self-identified as Indigenous, the most common epistemological approaches were critical (16 articles), Indigenous (11), or a combination of critical and Indigenous (12). A handful of articles with at least one Indigenous author used either constructivist (5), Indigenous and post-modern (2), Indigenous combined with post-modern and critical (4), or positivist/post-positivist (3) approaches. Articles with a self-identified Indigenous author appeared more likely to use Indigenous and/or critical perspectives compared to the general pattern in the full sample. Articles with at least one Indigenous author were also more likely than the overall sample to include Indigenous research participants and more community participation. Only 23 (37.7%) of the 61 articles did not include participation, 15 (25.0%) included low (acknowledge or engage) and 22 (36.1%) included high (collaborate or empower) levels of community participation.[10] This pattern also suggests that research that

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[9] This is based on calculating the expected number of authors in each cell based on the total number of authors that self-identify as Indigenous/non-Indigenous and total number of authors that are affiliated with educational organizations.

[10] One article did not provide sufficient information to evaluate the degree of Indigenous community participation.

includes at least one Indigenous author was more likely to include higher levels of Indigenous community participation than studies overall.

Research with Indigenous authors tended to use different sources and methods than the full sample, including sources that facilitate greater participation or contributions from participants. In terms of evidence, articles with an Indigenous author often used personal experience (34) or one-on-one interactions (30) for evidence, ahead of primary (18) and secondary (20) sources, which were most common in the overall sample. These studies also often included reflexive sources (11) and group interactions (10). Articles with an Indigenous author also were more likely to use participatory (17), inductive (16), and interpretive ethnographic (15) methods of analysis, compared to the full sample. The use of qualitative content analysis (13), discourse analysis (11), and comparative case studies (11) were similar to those in the full sample.

DISCUSSION AND CONCLUSIONS

We find that there is a correlation between Indigenous participation, measured as level of community participation, community-led research, and self-identified Indigenous authors, and incorporation of Indigenous epistemologies and more participatory types of evidence sources and analysis methods in peer-reviewed social science research articles. Our results provide concrete evidence to support impressions based on experience shared among many Indigenous communities or researchers, such as that most research in their communities is led by non-Indigenous researchers (e.g., Ball and Janyst 2008, 34) and that Indigenous researchers tend to prefer emancipatory and participatory research methods (Rigney 1999; Ball and Janyst 2008, 43). Our findings also indicate the limits of research policies prompting a turn towards CBPR in

research with Indigenous peoples (Alcantara, Lalonde, and Wilson 2017) and rather show that most peer-reviewed social science research articles involving Indigenous research participants fail to go beyond the minimum levels of consultation and participation required by policy and contrary to several articles (3, 18, 19, 23, and 31) of the United Nations Declaration on the Rights of Indigenous Peoples (United Nations General Assembly 2007).

Our analysis also suggests that there is significant room for improvement in the ways in which Indigenous Peoples participate in social science research about their nations and communities in Canada. First, half of all research does not include any interaction with Indigenous peoples. On the one hand, theoretical or conceptual studies or those relying on only primary and secondary sources are not necessarily less supportive of Indigenous research sovereignty. On the other hand, such research could benefit from greater input and interaction with Indigenous peoples and communities. Second, research that involves interaction with Indigenous research participants could go much further to go beyond minimum requirements of Tri-Council policies and to deepen meaningful Indigenous participation in research. Third, relatively little research is led by Indigenous communities, uses Indigenous languages, or includes authors who self-identify as Indigenous. This, too, suggests room for improvement in supporting and promoting research participation by Indigenous peoples and scholars.

Our study is not without its own limitations. We are not unaware of the irony that our approach to classifying and analyzing existing peer-reviewed research is situated in a Western epistemological approach based on assumptions that abstract concepts (e.g., epistemology, method) can be imposed on existing studies (and that studies can be coded into parts, rather than

considering the "whole") and that systematic comparisons can yield valid insights into complex social processes like research. Our study also only included articles written in English, and we recognize the impact colonization has had on Indigenous languages. We also focus on peer-reviewed research, a very academic or scholarly form of knowledge dissemination or mobilization that may not be consistent or resonate with Indigenous communities or peoples and their worldviews or values (Smylie et al. 2004; Christensen 2012). We have also excluded unpublished or applied research conducted by governments and non-governmental organizations and work in a range of disciplines or fields. Further, we are unable to make comparisons with these other fields because similar studies do not exist to our knowledge.

Nevertheless, we believe our findings provide important new insights into the relationships among research ethics policies, social science research methodologies, and the extent of research participation by disempowered communities. In particular, we substantiate the ways in which some types of research evidence, methods, and epistemologies are more likely to be in research with more meaningful community participation in the social sciences. Further, our results suggest that ethics policies play an important role in promoting participatory research processes, but that in practice, researchers often engage communities only the minimum required. Greater empowerment of communities through research partnerships will likely require changes not only to existing research ethics policies but also other funding, university, and journal editorial policies as well.

In mid-2015, the TRC of Canada published its final report and Calls to Action created by the Indian Residential Schools Settlement Agreement (TRC of Canada 2015b, 2015a). Among the

Calls to Action are Call to Action #53, calling for legislation to "develop and implement a multi-year National Action Plan for Reconciliation" based on new "research and policy development" and , #63, calling for the establishment of multi-year funding streams to "advance understanding of reconciliation" (TRC of Canada 2015a, 10, 12). Given its focus, changes to research policies and practices were not explicitly addressed in the Calls to Action, and the Interagency Advisory Panel on Research Ethics, the body responsible for the Tri-council research ethics policy, has not since revised its policy. Nonetheless, we would expect that the TRC has raised awareness among Canadian researchers both of past abuses as well as the imperative of pursuing reconciliation through more respectful and empowering research relationships with Indigenous communities. We view our study as a snapshot of research practices among social scientists in this research space prior to the TRC. It would be worth revisiting this question in another decade to assess the extent to which social science researchers incorporated lessons from the TRC into research practices around Indigenous research in Canada.

References

Alcantara, C., D. Lalonde, and G. Wilson. 2017. "Indigenous Research and Academic Freedom: A View from Political Scientists." *International Indigenous Policy Journal* 8 (2).

Ball, J., and P. Janyst. 2008. "Enacting Research Ethics in Partnerships with Indigenous Communities in Canada: 'Do It in a Good Way.'" *Journal of Empirical Research on Human Research Ethics* 3 (2): 33–51

Banks, S., A. Armstrong, K. Carter, H. Graham, P. Hayward, A. Henry, T. Holland, et al. 2013. "Everyday Ethics in Community-Based Participatory Research." *Contemporary Social Science* 8 (3): 263–77.

Bastida, E. M., T.-S. Tseng, C. McKeever, and L. Jack. 2010. "Ethics and Community-Based Participatory Research: Perspectives From the Field." *Health Promotion Practice* 11 (1): 16–20.

Burhansstipanov, L., S. Christopher, and Sr A. Schumacher. 2005. "Lessons Learned From Community-Based Participatory Research in Indian Country." *Cancer Control : Journal of the Moffitt Cancer Center* 12 (Suppl 2): 70–76.

Castleden, H., V. Sloan Morgan, and C. Lamb. 2012. "'I Spent the First Year Drinking Tea': Exploring Canadian University Researchers' Perspectives on Community-Based Participatory Research Involving Indigenous Peoples." *CANADIAN GEOGRAPHER-GEOGRAPHE CANADIEN* 56: 160–79.

Castleden, H., V. Sloan Morgan, and A. Neimanis. 2010. "Researchers' Perspectives on Collective/Community Co-Authorship in Community-Based Participatory Indigenous Research." *Journal of Empirical Research on Human Research Ethics* 5 (4): 23–32.

Chalmers, J. 2017. "The Transformation of Academic Knowledges: Understanding the Relationship between Decolonising and Indigenous Research Methodologies." *Socialist Studies/Études Socialistes* 12 (1): 97. https://doi.org/10.18740/S4GH0C.

Chilisa, B. 2012. *Indigenous Research Methodologies*. Thousand Oaks, California: SAGE Publications.

Chino, M., and L. DeBruyn. 2006. "Building True Capacity: Indigenous Models for Indigenous Communities." *American Journal of Public Health* 96 (4): 596–99. https://doi.org/10.2105/AJPH.2004.053801.

Christensen, J. 2012. "Telling Stories: Exploring Research Storytelling as a Meaningful Approach to Knowledge Mobilization with Indigenous Research Collaborators and Diverse Audiences in Community-Based Participatory Research." *The Canadian Geographer / Le Géographe Canadien* 56 (2): 231–42. https://doi.org/10.1111/j.1541-0064.2012.00417.x.

CIHR, NSERC, and SSHRC. 1998. "Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans." Ottawa, ON. http://www.pre.ethics.gc.ca/archives/tcps-eptc/docs/TCPS%20October%202005_E.pdf.

———. 2010. "Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans." 2. Ottawa, ON. http://www.pre.ethics.gc.ca/archives/tcps-eptc/docs/TCPS%20October%202005_E.pdf.

———. 2014. *Tri-Council Policy Statement. Ethical Conduct for Research Involving Humans 2*. Ottawa: Government of Canada.

Díaz Ríos, Claudia M., Michelle L. Dion, and Kelsey Leonard. 2018. "Institutional Logics and Indigenous Research Sovereignty in Canada, the United States, Australia, and New

Zealand." *Studies in Higher Education* 1–13.
https://doi.org/10.1080/03075079.2018.1534228.

Dion, Michelle, Claudia M. Díaz Ríos, Kelsey Leonard, and Chelsea Gabel. 2019. "Replication Data for: Research Methodology and Community Participation."
https://doi.org/10.7910/DVN/DETKCC. Harvard Dataverse.

Drawson, A., E. Toombs, and C. Mushquash. 2017. "Indigenous Research Methods: A Systematic Review." *The International Indigenous Policy Journal* 8 (2).

Evans, M., A. Miller, P. J. Hutchinson, and C. Dingwall. 2014. "Decolonizing Research Practice: Indigenous Methodologies, Aboriginal Methods, and Knowledge/Knowing." In *The Oxford Handbook of Qualitative Research*, edited by Patricia Leavy. New York: Oxford University Press.

Evering, B. 2012. "Relationships between Knowledge(s): Implications for 'Knowledge Integration.'" *Journal of Environmental Studies and Sciences* 2 (4): 357–68.

First Nations Information Governance Centre. 2014. "Ownership, Control, Access and Possession (OCAP^TM): The Path to First Nations Information Governance." Ottawa, ON: The First Nations Information Governance Centre. http://fnigc.ca/sites/default/files/docs/ocap_path_to_fn_information_governance_en_final.pdf.

Gobo, G. 2011. "Glocalizing Methodology? The Encounter between Local Methodologies." *International Journal of Social Research Methodology* 14 (6): 417–37.

Goodman, N., K. Bird, and C. Gabel. 2017. "Towards a More Collaborative Political Science: A Partnership Approach." *Canadian Journal of Political Science* 50 (1): 201–18.

Grant, D. 2016. "When Research Is a Dirty Word: Sovereignty and Bicultural Politics in Canada, Australia and New Zealand Ethics Policies." Thesis, University of Otago. https://ourarchive.otago.ac.nz/handle/10523/6917.

Grover, J. G. 2008. "Challenges in Applying Indigenous Evaluation Practices in Mainstream Grant Programs to Indigenous Communities." *The Canadian Journal of Program Evaluation; Toronto* 23 (2): 33.

Harding, A., B. Harper, D. Stone, C. O'Neill, P. Berger, S. Harris, and J. Donatuto. 2012. "Conducting Research with Tribal Communities: Sovereignty, Ethics, and Data-Sharing Issues." *Environmental Health Perspectives* 120 (1): 6–10.

Holkup, P. A., T. Tripp-Reimer, E. Matt Salois, and C. Weinert. 2004. "Community-Based Participatory Research." *ANS. Advances in Nursing Science* 27 (3): 162–75.

Inuit Tapiriit Kanatami. 1998. *Negotiating Research Relationships: A Guide for Communities*. Iqaluit and Ottawa, ON: Nunavut Research Institute and Inuit Tapirisat of Canada.

———. 2005. "Checklist: Inuit Involvement in Research Projects." *ITK Environment Bulletin* 3: 5–26.

Israel, B. A., A. J. Schulz, E. A. Parker, and A. B. Becker. 1998. "Review of Community-Based Research: Assessing Partnership Approaches to Improve Public Health." *Annual Review of Public Health* 19 (1): 173–202.

Kirkness, V. J., and R. Barnhardt. 1991. "First Nations and Higher Education: The Four R's — Respect, Relevance, Reciprocity, Responsibility." *Journal of American Indian Education* 30 (3): 1–15.

Koster, R., K. Baccar, and R. H. Lemelin. 2012. "Moving from Research ON, to Research WITH and FOR Indigenous Communities: A Critical Reflection on Community-Based Participatory Research." *The Canadian Geographer / Le Géographe Canadien* 56 (2): 195–210.

Kovach, M. 2010. *Indigenous Methodologies: Characteristics, Conversations and Contexts*. To-
    ronto: University of Toronto Press.
Kowal, E. 2008. "The Politics of the Gap: Indigenous Australians, Liberal Multiculturalism, and
    the End of the Self-Determination Era." *American Anthropologist* 110 (3): 338–48.
Lambe, J. P. 2011. "As We Come to Being: Indigenous Knowledge, Figurative Language, and
    Dynamics of Relationships." *The Canadian Journal of Native Studies* 31 (2): 77-84,188.
Leigh, D. 2009. "Colonialism, Gender and the Family in North America: For a Gendered Analy-
    sis of Indigenous Struggles." *Studies in Ethnicity and Nationalism* 9 (1): 70–88.
Lincoln, Y. S., S. Lynham, and E. Guba. 2011. "Paradigmatic Controversies, Contradictions, and
    Emerging Confluences, Revisited." In *The SAGE Handbook of Qualitative Research*, ed-
    ited by Norman K. Denzin and Yvonna Lincoln, 97–128. SAGE.
Louis, R. P. 2007. "Can You Hear Us Now? Voices from the Margin: Using Indigenous Method-
    ologies in Geographic Research." *Geographical Research* 45 (2): 130–39.
Métis Centre. 2010. "Principles of Ethical Métis Research." National Aboriginal Health Organi-
    zation.
Minkler, M. 2004. "Ethical Challenges for the 'Outside' Researcher in Community-Based Partic-
    ipatory Research." *Health Education & Behavior* 31 (6): 684–97.
———. 2005. "Community-Based Research Partnerships: Challenges and Opportunities." *Jour-
    nal of Urban Health* 82 (2): ii3–12. https://doi.org/10.1093/jurban/jti034.
Moore, C., H. Castleden, S. Tirone, and D. Martin. 2017. "Implementing the Tri-Council Policy
    on Ethical Research Involving Indigenous Peoples in Canada: So, How's That Going in
    Mi'kma'ki?" *The International Indigenous Policy Journal* 8 (2).
Mosby, I. 2013. "Administering Colonial Science: Nutrition Research and Human Biomedical
    Experimentation in Aboriginal Communities and Residential Schools, 1942–1952." *His-
    toire Sociale/Social History* 46 (1): 145–72.
Mosby, I., and T. Galloway. 2017. "'Hunger Was Never Absent': How Residential School Diets
    Shaped Current Patterns of Diabetes among Indigenous Peoples in Canada." *Canadian
    Medical Association Journal* 189 (32): E1043–45.
Muhammad, M., N. Wallerstein, A. L. Sussman, M. Avila, L. Belone, and B. Duran. 2015. "Re-
    flections on Researcher Identity and Power: The Impact of Positionality on Community
    Based Participatory Research (CBPR) Processes and Outcomes." *Critical Sociology* 41
    (7–8): 1045–63.
Nicholls, R. 2009. "Research and Indigenous Participation: Critical Reflexive Methods." *Inter-
    national Journal of Social Research Methodology* 12 (2): 117–26.
Rainie, S. C., J. L. Schultz, E. Briggs, and P. Riggs. 2017. "Data as a Strategic Resource: Self-
    Determination, Governance, and the Data Challenge for Indigenous Nations in the United
    States." *The International Indigenous Policy Journal* 8 (2).
Riddell, J., A. Salamanca, D. Pepler, S. Cardinal, and O. McIvor. 2017. "Laying the Ground-
    work: A Practical Guide for Ethical Research with Indigenous Communities." *The Inter-
    national Indigenous Policy Journal* 8 (2).
Rigney, L.-I. 1999. "Internationalization of an Indigenous Anticolonial Cultural Critique of Re-
    search Methodologies: A Guide to Indigenist Research Methodology and Its Principles."
    Wicazo Sa Review 14 (2): 109–21
Simonds, V. W., and S. Christopher. 2013. "Adapting Western Research Methods to Indigenous
    Ways of Knowing." *American Journal of Public Health* 103 (12): 2185–92.
Smith, L. T. 1999. *Decolonizing Methodologies: Research and Indigenous Peoples*. Zed Books.

Smithers Graeme, Cindy, and Eric Mandawe. 2017. "Indigenous Geographies: Research as Reconciliation." *International Indigenous Policy Journal* 8 (2).

Smylie, J., C. M. Martin, N. Kaplan-Myrth, Leah Steele, Caroline Tait, and William Hogg. 2004. "Knowledge Translation and Indigenous Knowledge." *International Journal of Circumpolar Health* 63 (sup2): 139–43.

Sumner, J. L. 2018. "The Gender Balance Assessment Tool (GBAT): A Web-Based Tool for Estimating Gender Balance in Syllabi and Bibliographies." *PS: Political Science & Politics*, January, 1–5.

Teele, D. L., and K. Thelen. 2017. "Gender in the Journals: Publication Patterns in Political Science." *PS: Political Science & Politics* 50 (2): 433–47.

Tobias, J. K., C. A. M. Richmond, and I.Luginaah. 2013. "Community-Based Participatory Research (Cbpr) with Indigenous Communities: Producing Respectful and Reciprocal Research." *Journal of Empirical Research on Human Research Ethics* 8 (2): 129–40.

Tolich, M., and B. P. Smith. 2014. "Evolving Ethics Envy—New Zealand Sociologists Reading the Canadian Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans." *Kōtuitui: New Zealand Journal of Social Sciences Online* 9 (1): 1–10.

TRC of Canada. 2015a. "Calls to Action." Winnipeg, Manitoba: Truth and Reconciliation Commission of Canada. http://nctr.ca/assets/reports/Calls_to_Action_English2.pdf.

———. 2015b. *Honouring the Truth, Reconciling for the Future: Summary of the Final Report of the Truth and Reconciliation Commission of Canada.* Winnipeg, Manitoba: Truth and Reconciliation Commission of Canada. http://epe.lac-bac.gc.ca/100/201/301/weekly_acquisition_lists/2015/w15-24-F-E.html/collections/collection_2015/trc/IR4-7-2015-eng.pdf.

United Nations General Assembly. 2007. *United Nations Declaration on the Rights of Indigenous Peoples*. https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html.

Wais, K., N. VanHoudnos, and J. Ramey. 2016. *GenderizeR: Gender Prediction Based on First Names* (version 2.0.0). https://cran.r-project.org/web/packages/genderizeR/index.html.

Walter, M., and C. Andersen. 2013. *Indigenous Statistics: A Quantitative Research Methodology*. New York: Routledge.

Wilson, S. 2001. "What Is an Indigenous Research Methodology?" *Canadian Journal of Native Education* 25 (January).

———. 2009. *Research Is Ceremony: Indigenous Research Methods*. Black Point, N.S: Fernwood Publishing.

Wingert, S., and J. White. 2017. "Introduction to the Special Issue: Reconciling Research: Perspectives on Research Involving Indigenous Peoples." *The International Indigenous Policy Journal* 8 (2).

Table 1: Definitions of epistemology, evidence source, and analysis methods

Epistemology, or knowledge worldview	
Positivist or post-positivist	Reality can be measured, although may be imperfect.
Constructivist	Reality is socially constructed.
Critical	Reality is constructed by historical or institutional oppression.
Construction-ist/post-modern	Reality is individually, internally constructed by experience.
Indigenous	Reality is relational and constructed through relationships
Evidence sources	
Experiments	Participants complete tasks in a lab, in the field, or on a survey.
Surveys	Questions administered in person, online, by mail, or telephone.
One-on-one dialogue	One-on-one interactions, conversations, or interviews with participants
Experience	Participating in or attending events, meetings, or other activities.
Group dialogue	Group interviews or conversations
Primary sources	Archival, digital or online documents/media or collections, government-generated data/statistics, administrative datasets from government, "big data", newspapers, photos, ethnographic films, diaries, audio recordings, objects or artefacts. Usually these sources were not created for the research.
Secondary sources	Grey literature (government, NGO reports), scholarly or peer-reviewed literature.
Reflexive sources	Text or other media (e.g., visual arts, photography, videography, maps) sources created specifically for the research by participants at direction of researchers.
Other	Other sources not described above.
Method of analysis	
Quantitative descriptive	Descriptive statistics (e.g., means, frequencies, cross-tabulations) of a sample.
Quantitative inferential	Inferential statistics to establish correlations or causation.
Interpretive ethnography	Participation and/or observation to understand shared meanings.
Qualitative content analysis	Analysis of written and oral language, visual imagery, or cultural media.
Discourse analysis	Analysis of how texts, institutions, practices, etc. reveal power dynamics.
Qualitative comparative case analysis	Case studies that explain outcomes through comparisons of necessary and sufficient causal conditions.
Inductive analysis	Analysis to develop theory inductively without relying on preconceived theories.
Participatory methods	Research subjects actively participate in analysis and interpretation of evidence or research creation (or arts-based) activities

Modelling/sim-ulation	Using computers to simulate hypothetical human behavior.
Other	Any methods of analysis not described above

Source: Authors' elaboration based on (Chilisa 2012; Kovach 2010; Lincoln, Lynham, and Guba 2011; Wilson 2001)
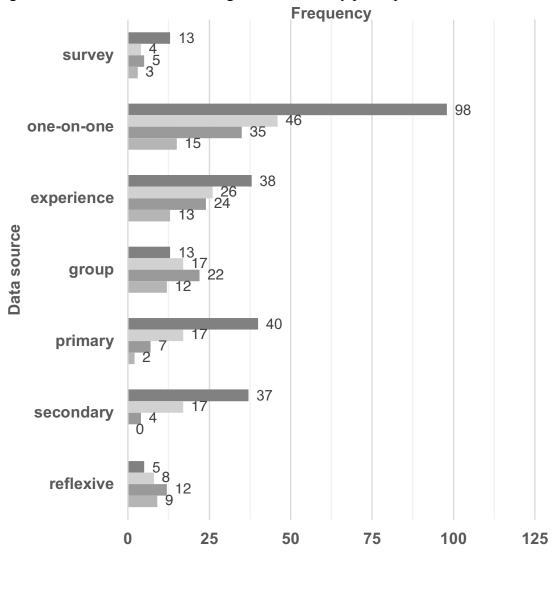
Table 2: Epistemology and Indigenous participation

Epistemological approach	Non-participatory		Low participation		High participation		Total
	None	Omitted	Ack.	Engage	Collab.	Empwr	
Indigenous	5	0	1	0	5	3	14
+ Constructivist	2	0	0	1	3	3	9
+ Critical	11	2	0	1	3	4	21
+ Positivist	1	0	0	1	0	0	2
+ Post-modern	0	0	0	3	0	1	4
+ Critical + Constructivist	1	0	0	1	0	0	2
+ Post-modern + Critical	3	0	0	1	2	0	6
Constructivist	13	3	27	10	9	4	66
+ Positivist	2	1	2	2	1	1	9
Critical	53	4	33	10	13	2	115
+ Constructiv.	6	0	6	3	2	0	17
+ Positivist	2	0	1	0	1	0	4
Positivist	80	8	22	10	1	1	122
Post-modern	13	0	8	4	1	0	26
+ Constructivist	3	0	2	1	0	1	7
+ Critical	40	4	10	10	4	1	69
+ Critical + Constructivist	2	0	1	1	0	0	4
Total	235	22	115	59	45	21	497

Source: Authors' elaboration.

Table 3: Self-identification, probable gender, and organizational affiliation of first five authors

	First	Second	Third	Fourth	Fifth	All authors
Number of authors	497	241	126	63	29	958
Author probable gender based on given (first) name						
Male	216	100	54	29	16	415
% Male	43.5%	41.3%	42.9%	46.0%	55.2%	43.3%
Female	254	125	61	30	11	481
% Female	51.1%	51.7%	48.4%	47.6%	37.9%	50.2%
Not coded	27	17	11	4	2	62
% Not coded	5.4%	7.0%	8.7%	6.4%	6.9%	6.5%
Author self-identification						
Indigenous	34	16	12	10	8	80
% Indigenous	6.8%	6.7%	9.5%	15.9%	27.6%	8.4%
non-Indigenous	49	20	11	1	0	81
% non-Indigenous	9.9%	8.3%	8.7%	1.6%	0.0%	8.5%
Unknown	414	204	103	52	21	794
% Unknown	83.3%	85.0%	81.8%	82.5%	72.4%	83.1%
Author organizational affiliation type						
Education	426	203	93	44	15	781
% Education	85.7%	84.2%	73.8%	69.8%	62.1%	81.7%
Indigenous gov't	3	4	5	2	4	18
% Indigenous gov't	0.6%	1.7%	4.0%	3.2%	13.8%	1.9%
Colonial gov't	15	9	5	3	3	35
% Colonial gov't	3.0%	3.7%	4.0%	4.76%	10.3%	3.7%
Non-government	22	13	13	9	2	59
% Non-gov't	4.4%	5.4%	10.3%	14.3%	6.9%	6.2%
Unknown	31	12	10	5	5	63
% Unknown	6.2%	5.0%	7.9%	7.9%	17.2%	6.6%

Source: Authors' elaboration.

Figure 1: Evidence sources and Indigenous community participation

Frequency

Data source (categories, top to bottom):

- **survey**: acknowledge 13, engage 4, collaborate 5, empower 3
- **one-on-one**: acknowledge 98, engage 46, collaborate 35, empower 15
- **experience**: acknowledge 38, engage 26, collaborate 24, empower 13
- **group**: acknowledge 13, engage 17, collaborate 22, empower 12
- **primary**: acknowledge 40, engage 17, collaborate 7, empower 2
- **secondary**: acknowledge 37, engage 17, collaborate 4, empower 0
- **reflexive**: acknowledge 5, engage 8, collaborate 12, empower 9

Legend: ■ acknowledge ■ engage ■ collaborate ■ empower

Source: Authors' elaboration

Figure 2: Method of analysis and Indigenous community participation

Frequency

Source: Authors' elaboration