

A SYSTEMATIC REVIEW OF WESTERN AND ABORIGINAL RESEARCH DESIGNS

*Assessing Cross-Validation to Explore
Compatibility and Convergence*

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CENTRE DE COLLABORATION NATIONALE
DE LA SANTÉ AUTOCHTONE



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EXECUTIVE SUMMARY



Background

There is a growing recognition of a distinct Aboriginal focus to research designs that explores the histories, socio-cultural realities, health conditions and lived experiences of Aboriginal communities and peoples (Aboriginal Education Research Centre, 2007; Canadian Institute of Health Research, 2007; Royal Commission on Aboriginal Peoples, 1996; Tuhiwai Smith, 1999). Aboriginal research designs have been developed to be congruent with ancestral knowledge, Aboriginal worldviews, values and traditions (Kawagley, 1995; Tuhiwai Smith, 1999). When Aboriginal research designs are used to translate knowledge, compatible methods are needed to reflect the values, traditions and worldviews of Aboriginal peoples, while also ensuring that the research remains authentic to community traditions and reflects the lived experiences of the participants involved in the studies. Aboriginal research designs provide a methodological process to provide space for the voices of Aboriginal communities and peoples in research and it provides a process to ensure these voices are heard, understood and acted upon (Tuhiwai Smith, 1999).

Despite the growing recognition of distinct Aboriginal research designs consistent with Aboriginal worldviews, there remains pressure for Aboriginal communities, academics, researchers, and decision-makers to demonstrate the reliability, validity, and credibility of Aboriginal research designs using Western notions of empirical social and health

science. There remains a debate over whether assessing Aboriginal research designs using Western scientific notions of ‘validity’ and ‘reliability’ should be considered when assessing the quality and credibility of Aboriginal research. Furthermore, there is a lack of attention in the literature regarding the cross-validity of Aboriginal and Western research methods. Exploring the applicability of transferring the experiences and ways of knowing from one knowledge system to another is important when determining the feasibility and limitations of using Western notions of reliability and validity to assess the credibility of Aboriginal approaches to knowledge creation in current public health systems.

Without a candid examination of the cross-validation of Western research designs and Aboriginal knowledge, the rules of accepted scientific research can be used as control mechanisms rather than expanding knowledge growth. In other words, when Aboriginal knowledge is evaluated by Western standards of reliability and validity, this can lead to assimilation into Western frameworks, and a preference for Aboriginal research most compatible with Western standards. It can create an illusion that Aboriginal research is primitive (Witt, 2007) and does not conform to Western standards. Such practice can be interpreted as epistemological ethnocentrism where the dominant paradigm establishes the parameters within which ‘legitimate’ discourse may take place (Reagan, 2005).

Although there is a growing recognition that Aboriginal research should

be rooted in traditions rather than following Western paradigms of scientific knowledge production (Alfred, 1999), more attention is needed to redress the barriers that limit the recognition and contribution of Aboriginal knowledge within Western funding bodies and academic circles (Blackstock, 2009). Aboriginal knowledge-based research has historically been devalued within Western notions of ‘acceptable’ research standards (Blackstock, 2009; Witt, 2007) and has been criticized for being ‘less valid.’ This is despite the lack of Western evidence to support these claims.

One way to assess the merits and limitations of using Western frameworks to assess the credibility of Aboriginal knowledge-based research design is to conduct a systematic review to explore the issue of cross-validation of research approaches. Since claims can be made on either side of the argument, a systematic review of the evidence is the most appropriate method to ensure the process is systematic, transparent and comprehensive. Although this method does not directly address the historical struggles to enhance the acceptability of Aboriginal research designs within the dominant discourse of scientific merit, it does provide a common framework that bridges the discourse of the applicability and credibility of research designs across worldviews. The ultimate goal of this project, therefore, is to enhance the relevancy and effectiveness of health policies and practices for First Nations, Inuit and Métis communities and peoples.

Objectives

The objective of this systematic review is to compare Western research designs and Aboriginal research designs to assess the cross-validation of these methods. Focusing on mixed-method designs that employ both Aboriginal and Western research designs provides a unique opportunity to explore the compatibility and convergence of using these methods within an Aboriginal context. This review includes a systematic retrieving strategy to include and screen all studies that have considered the cross-validity of Aboriginal and Western mixed-method research designs. The findings of this review will inform future considerations for research standards for Aboriginal research methods, inform discussion on Aboriginal research methods, and guide further inquiry.

Methods

Following protocols of the Campbell Collaborative and the Cochrane Collaboration, this systematic review completed a comprehensive information retrieval strategy for potential studies that have considered the cross-validation of Western and Aboriginal research methods. By focusing on studies that used a mixed-method design, triangulation of methods can be assessed for compatibility, convergence and Western notions of validity, reliability, and credibility.

Included Studies

In order to be comprehensive, various information retrieval strategies were performed during the systematic review process, including searches of electronic databases, hand searching selected journals relevant to Aboriginal research, searching pertinent online websites, searching for non-published literature, and checking full reference lists of included studies. All Western and Aboriginal research using

mixed-method designs were included. These included a combination of (1) Aboriginal research designs with (2) randomized controlled trials, quasi-randomized controlled trials or cross-sectional studies, longitudinal studies or qualitative studies.

Types of Cross-Validation Analysis for Mixed-Method Designs

The primary outcome included the cross-validity, triangulation, data reliability, data validity, complementary inference, conceptual consistency, convergent inference, divergent inference, data quality, external validity, transferability, operational transferability, temporal transferability and ecological transferability of Aboriginal research designs in comparison to Western notions of empirical evidence (adapted from Tashakkori and Teddlie, 2003).

Main Results

Results of the systematic review included 68 studies that have considered the credibility and authenticity of Aboriginal research designs. Although several included studies used mixed-method designs, none of these studies conducted a cross-validation analysis of Western and Aboriginal research designs. Although this result may not be surprising to Aboriginal scholars, academics and researchers, it provides an empirical account on the lack of evidence regarding the cross-validation of Western and Aboriginal research designs. An empty review is an important finding because it provides scientific support, based on a systematic and comprehensive review, that the question of cross-validation has not been adequately addressed by published and unpublished research studies. This information is critical, for example, when policy-makers or funders are making assumptions about the cross-validity of research designs, when no such evidence exists.

Conclusion

Aboriginal scholars, especially within academic circles, continue to find themselves “searching for rational justification to defend [their] cherished worldviews against the attack by those who constantly wish to denigrate them” (Witt, 2007, p. 231). This study found no cross-validation of Western and Aboriginal research designs using mixed methods, which suggests that there is a lack of evidence regarding the cross-validation of Aboriginal research designs and Western methodologies. Without this evidence, it is difficult to justify the need to use Western notions of validity and reliability given that there are no studies to support this kind of practice. There is no evidence to support the dismissal of Aboriginal research designs based on claims that this type of evidence is non-scientific or less valid. The findings add to the growing body of literature regarding the importance of considering culturally relevant standards for research methods, such as authenticity, participation, tradition, etc. (Tuhiwai Smith, 1999; Witt, 2007). The results support Aboriginal research methods moving away from the conformity of Western notions of scientific process by continuing to move towards providing space for the translation of voices within Aboriginal communities and peoples (Blackstock, 2009). Regarding the Aboriginal concept of “validity,” Kovach (2009) notes that in her research the use of tobacco signified that each person spoke the truth as they knew it. She argues that her research relied on relational validity, which is based on a mutual understanding that speaking the truth is necessary to maintain relational balance. She claims that this type of validity only lacks meaning if it is not contained within one’s worldview. Further research is needed, therefore to better understand reliability and validity within an Aboriginal worldview.

A SYSTEMATIC REVIEW OF WESTERN AND ABORIGINAL RESEARCH DESIGNS



Background

The National Collaborating Centre for Aboriginal Health, located at the University of Northern British Columbia in Prince George, BC, supports First Nations, Inuit and Métis peoples in realizing their health goals and reducing the health inequities that currently exist for Aboriginal peoples in Canada. The NCCAH is one of six National Collaborating Centres (NCC) established and funded by the Public Health Agency of Canada to support public health renewal in Canada. The Centres are hosted by various institutions in regions across the country, and aim to help improve response to public health threats, chronic disease and injury, infectious diseases, and health disparities. Each NCC focuses on a different aspect of public health: environmental health (NCCEH), infectious disease (NCCID), healthy public policy (NCCPP), methods and tools (NCCMT), social determinants of health (NCCSD), and Aboriginal health.

The National Collaborating Centre for Aboriginal Health is guided by a multidisciplinary advisory committee comprised of Inuit, Métis and First Nations individuals located across

Canada. The NCCAH supports the sharing of meaningful and relevant public health knowledge with communities, practitioners, policy-makers, and researchers. The NCCAH has developed a review process to ensure their work is both evidence-based and culturally relevant, and they are refining their knowledge translation approaches to incorporate Indigenous knowledge, as well as building a communications infrastructure to facilitate this work. A central principle is respect for Indigenous knowledge. The NCCAH seeks to build bridges between Western scientific approaches to research and evidence and Aboriginal ways of knowing (www.nccah.ca).

The National Collaborating Centre for Aboriginal Health is exploring the transfer of experience and ways of knowing from one knowledge system to another as it seeks a greater integration of Aboriginal approaches to health within the current public health system. The goal is to enhance the relevancy and effectiveness of health policies and practices for First Nations, Inuit and Métis communities and peoples. Part of this strategy is to conduct a research synthesis following the Campbell Collaborative systematic review protocol to retrieve all studies that have

considered the comparison of Western and Aboriginal research methods.

Research in Aboriginal Communities

Candace Uhlik (2006) suggests that there is a continuum of research involving Aboriginal peoples. From one end of the continuum, research involves exclusively Aboriginal communities in the planning, implementing, analyzing and reporting of research affecting the lives of the people who live in the communities. At the other end of the continuum, research may not be intended to involve Aboriginal peoples in the study, but they are nevertheless directly or indirectly affected by the methods used in the study, the results, and by subsequent action taken as a result of the study's findings and implications. Even in these situations, researchers should consult with Aboriginal representatives, since the process and/or the outcome of the research will likely affect the lives of Aboriginal communities and peoples.

The involvement of Aboriginal peoples in the creation of knowledge about Aboriginal peoples is critical given the longstanding misuse, abuse and mistreatment of Aboriginal peoples

involved in research. Evidence has ultimately shown that research on Aboriginal peoples has often been counterproductive in improving the health conditions for Aboriginal communities and peoples (Anderson, Young, Markovic, & Manderson, 2001). According to Henry, Dunbar, Arnott, Scrimgeour, and Murakami-Gold (2004), research has been seriously damaging, harmful, insensitive, intrusive and exploitative of Aboriginal communities (Johnstone, 1991, Bourke, 1995, Maddocks, 1992, NAHS 1989). Research has also reflected the exploitative history of colonialism in Canada, as well as in other countries such as the United States and Australia (Thomas, 2001, Humphery, 2000, 2001). Western 'science' has played a key role in the process of colonization, serving as a tool to justify racist policies of subjugation (Kovach, 2009). Research has often not addressed the needs of Aboriginal peoples within studies when researchers were focused on their academic, political or professional needs (NAHS, 1989).

In *Decolonizing Methodologies: Research and Indigenous Peoples*, Tuhiwai Smith (1999) noted that the word 'research' is "probably one of the dirtiest words in the indigenous world's vocabulary" (p. 1). Tuhiwai Smith went on to note that the study of Aboriginal research designs is a significant site of struggle between Western and Aboriginal interests and ways of knowing (p. 2). Further, she noted that many previous stories of both research and researchers were intertwined with stories about forms of colonization and injustices (p. 3). Further elaborating, she suggested that research is one of the ways in which the underlying code of imperialism and colonialism is both regulated and realized. It is regulated through the formal rules of individual scholarly disciplines and scientific paradigms, and the institutions that support them (p. 8). Through the discrediting of Aboriginal knowledge systems, Aboriginal people have historically been excluded from the

process of knowledge construction as defined by Western thought (Kovach, 2009). Therefore, it is imperative that research affecting Aboriginal peoples be scrutinized and assessed within an Aboriginal lens.

The history of exploitation of Aboriginal peoples in research for the benefit of Western academics and researchers is well documented (Tuhiwai Smith, 1999, p. 61). For decades, Aboriginal scholars have critiqued the colonizing practices of Western research methodologies and they have been calling for the development of Aboriginal research designs that are more consistent with Aboriginal worldviews, values and traditions (Kawagley, 1995; Tuhiwai Smith, 1999). Furthermore, if Aboriginal worldviews and research methodologies are not valued within spaces of formal knowledge creation, such as post-secondary institutions, these institutions continue to function as assimilationist tools (Kovach, 2009). Tuhiwai Smith (1999) stated that Aboriginal peoples "now want their voice in research, and they want it to be heard and understood" (p. 25).

Porsanger (2004) highlighted that the progression of Aboriginal peoples in research has moved from critiques of previous research conducted by outside researchers (Tuhiwai Smith, 1999; Rigney, 1999; Gegeo, 2001) and the mystification and fragmentation of Indigenous knowledge (Kawagley, 1995; Deloria, 1997; Grenier, 1998; Nakata, 1998; Struthers, 2001) towards Aboriginal approaches and the decolonization of research methodologies (Crazy Bull, 1997a; Tuhiwai Smith, 1999), considerations for culturally sensitive research methods (Archibald, 1992; Moody 1993; Warrior, 1999; Stover, 2002), explorations of ownership of Aboriginal knowledge (Everitt, 1994; Mead, 1995; Abdullah & Stringer, 1997; Schnarch, 2004), collaboration with researchers (Bishop, 1996; Castleden, Morgans, &

Neimanis, 2010; Crazy Bull, 1997a,b; Irwin, 1994), and the accountability of Aboriginal research designs (Champagne, 1998; Hernandez-Avila & Varese, 1999). There is also a growing attention towards the ethics of Aboriginal research designs (CIHR, 2007; Métis Centre, 2010; RCAP, 1996; Tri-Council Policy Statement, 2010) and criteria for authenticity, participation and traditions within Aboriginal research methods (Lomawaima & McCarty, 2002).

Aboriginal Research Designs

Aboriginal research designs are considered to be a collection of Aboriginal theoretical frameworks, methods, and approaches that guide the research process (Porsanger, 2004). Central to the purpose of employing Aboriginal research designs is often ensuring that the research process is performed in ways that are considered ethical, respectful, applicable, sympathetic, authentic, beneficial and relevant to the experiences of Aboriginal peoples (Porsanger, 2004). Kovach (2009) argues that all research methodologies contain within them a particular epistemology and that Aboriginal research design is differentiated by being based around an Aboriginal epistemology, or worldview. More specifically, she argues that these are tribal epistemologies, reflecting the importance of valuing the unique tribal cultures that emerged out of interrelationships bound to place. Kovach points out that this counters a pan-Indigenous approach that attempts to homogenize all Aboriginal cultures. Furthermore, she points out that while specific protocols and customs may vary, there is enough similarity in the underlying epistemology of the framework to make it relevant and knowable to Aboriginal people with differing tribal affiliations. She gives the example of her own research framework which was grounded in a Plains Cree worldview (Kovach, 2009). Within an Aboriginal research design, the process is often inclusive of all stakeholders. Further, the steps taken in

the research process are often transparent and consistent with Aboriginal theory and ancestral knowledge (Aboriginal Education Research Centre, 2007; Tuhiwai Smith, 1999).

It is important to emphasize that Aboriginal research designs are not static, but include a full and fluid spectrum of Aboriginal knowledge and experiences (Porsanger, 2004). Most traditional Aboriginal worldviews consider Earth and their life on Earth as an interconnected web of life functioning in a complex ecosystem of relationships (Thomas & Bellefeuille, 2006). Aboriginal worldviews are relational and value the relationships between all living things (Kovach, 2009). Battiste and Henderson (2000) offer the following description of this holistic worldview:

Aboriginal knowledge is not a description of reality but an understanding of the processes of ecological change and ever-changing insights about diverse patterns or styles of flux. Concepts about 'what is' define human awareness of the changes but add little to the actual processes of change. To see things as permanent is to be confused about everything: an alternative to that understanding is the need to create temporary harmonies of interdependence through alliances and relationships among all forms and forces. This web of interdependence is a never-ending source of wonder to the Aboriginal mind and to other forces that contribute to the harmony. (p. 246)

It should be noted that Aboriginal worldviews exist in relation to person and place. Therefore, the way that they inform a specific research framework will depend on the researcher and the circumstances of the research itself. Furthermore, "it is not one singular aspect of Indigenous inquiry that makes it unique, but the combination of each as they work in concert to form a distinctive whole" (Kovach, 2009,

p. 17). Kovach goes on to note that it can be problematic to discuss particular research methods as being Aboriginal without recognizing the underlying tribal epistemology. However, based on an Aboriginal worldview that values interconnectedness and holism, some characteristics emerge as key components of Aboriginal research designs, such as attention to personal research preparations and purpose, self-location, and a focus on decolonization and benefiting the community (Kovach, 2009; Lavallée, 2009; Weber-Pillwax, 2004).

Aboriginal research designs commonly focus on social justice, community engagement, and action to improve the health and well-being of Aboriginal communities and peoples. The inclusion of a decolonizing or praxis component within Aboriginal research designs is congruent with the value of giving back to the community (Weber-Pillwax, 2004), and is necessary given the ongoing colonial influence on research and knowledge creation (Kovach, 2009).

Aboriginal research designs have been described as adhering to the "natural ways of each community, its tradition and its members" (Lederman, 1998, p. 60). Within this naturalistic approach, healing circles form the basis of research, and circle stories provide knowledge that is inter-generationally and cross-culturally significant as research and healing are linked to policy in the struggle to confront the continuing cycle of re-traumatization of Aboriginal families and communities (Lederman, 1994). Likewise, Nabigon, Hagey, Webster, and MacKay (1999) define Aboriginal research as a project in seeking the roots of a given problem and convening the voices needed to remember the history and assess the future. From this perspective, research is by its very nature holistic and integral to governance and inseparable from the principles and visions of the medicine wheel (Kenny, Faries, Fiske, & Voyageur, 2004).

Story and narrative are research methods that are compatible with the non-binary nature of Aboriginal epistemologies (Kovach, 2009). Conversation, as both a research method and a way of presenting findings, allows for the symbolism and metaphor of story. It also allows for the interpretive communication that is created between the listener and the speaker, and its non-structured nature provides the research participant greater autonomy in determining how they will share their knowledge (Kovach, 2009). Other methods that allow for the inclusion of narrative and story are in-depth interviews and research/sharing circles (Kovach, 2009; Lavallée, 2009; Weber-Pillwax, 2004).

Walker (2001) noted that the spiritual experience continues to be a largely taboo topic within Western academic institutions of higher learning. Within the academy, the silencing of this integral aspect of many Aboriginal peoples' lives often results in research findings that are inaccurate, incomplete and invalid (Walker, 2001). Accessing inward knowledge is considered important from a traditional Cree perspective, and some of the activities used to do so include using dreams, ceremony and prayer, as well as seeking out Elders. From an Aboriginal research perspective, these are all important and valid methods of acquiring knowledge (Kovach, 2009).

A growing number of Aboriginal scholars are speaking and writing about the ways in which they integrate their spiritual beliefs, values and experience into their formal academic research, thus increasing its validity within Aboriginal communities and the wider academic community (Kovach, 2009; Lavallée, 2009; Struthers, 2001; Walker, 2001; Weber-Pillwax, 2004).

Another important consideration is community oversight to ensure that its priorities are voiced throughout the research project's duration (Fisher

& Ball, 2002). Researchers within an Aboriginal context must be particularly upfront about ownership, involvement requirements, and sharing of outcome data, to provide sufficient information for informed decision making (Turner & Sanders, 2007).

Within the emerging discourse of Aboriginal research designs, there is growing attention to formulating designs so they are sophisticated, credible and scholarly and that they are assessed appropriately and given equal credence in comparison to other methodologies included in Western scientific approaches. Graham Hingangaroa Smith (in Kovach, 2009) notes that the existing theoretical tools and knowledges available inside the academy are limited, and that there is a need for the validation of Indigenous theoretical tools in order to increase the options available to researchers. Aboriginal researchers must have the autonomy to conduct Aboriginal methodologies, not just in Aboriginal communities, but even at the most conservative and prestigious Western universities and in fields seemingly unrelated to Aboriginal theories (Kahakalau, 2004). This is critical to ensure Aboriginal research designs are not marginalized due to perceptions that they are somehow less valid or sophisticated than their counterparts. Aboriginal research designs require researchers and scholars to think critically about their methodologies and outcomes, bearing in mind that Aboriginal peoples' interests, experiences and knowledge must be at the centre of research methodologies as well as healing, mobilization, transformation and decolonization (Porsanger, 2004; Rigney, 1999).

Western Research Designs

Western research methods are generally defined as investigations or experiments aimed at the discovery and interpretation of facts (Porsanger, 2004). Research

within this dominant framework includes a systematic methodological approach to collecting and analyzing information to create new knowledge (Saini, 2010). The research process generally adheres to a set of strict protocols, methods, and established structures, as the research should be a transparent process to allow others enough information to replicate the study or to assess the credibility and applicability of the research findings. Thomas and Bellefeuille (2006) suggest that Aboriginal literature is highly critical of the dominant positivistic, rational paradigm because of its intent to generalize experiences, find universal truths and minimize differences. Kovach (2009) notes that qualitative research has been influential in creating space for relational/experiential methodologies such as Aboriginal research—particularly the postmodernist, narrative streams, and the transformative/postcolonialist streams have created space by questioning the hegemony of Western thought. However, she maintains that, while Indigenous thought may share some similarities with qualitative research, it is essential that it be seen as a unique methodology, not contained within this Western line of research that originates from a Western epistemological base.

Aboriginal and Western Perspectives on Research

Most Western research paradigms differ from Aboriginal research designs in that they are premised on the belief that knowledge is an individual entity, and can therefore be owned by an individual (CIHR, 2007). In contrast, an Aboriginal paradigm comes from the fundamental belief that knowledge is relational and shared (CIHR, 2007). When choosing a research design that is compatible with Aboriginal values, traditions and experiences, Bentz and Shapiro (1998) recommend searching for consistency between the worldview of the researcher,

the context to be studied, and the set of research methods to be used in the study.

Stevens, Estrada, Glider and McGrath (1998) suggest that Aboriginal communities have depths of highly contextual social-cultural life that may not be perceived by non-Aboriginal people. They note that Aboriginal researchers are the best authorities on the current status of their lifeways and, therefore, they are in the best position to conduct research affecting Aboriginal communities and peoples. Dominant Western research paradigms can suppress Aboriginal knowledge by imposing Eurocentric paradigms on research involving Aboriginal communities and peoples (Walker, 2001). Throughout colonization, Western standards for empirical research have considered the spiritual foundation of Aboriginal epistemologies to be primitive (Tuhiwai Smith, 1999; Walker, 2001). The sacred dimensions of Aboriginal research methods have historically been discarded by Western research paradigms and “relegated to religion or labeled as lacking rigour” (Walker, 2001, p. 19). This is despite multiple examples in which Aboriginal knowledge and the use of Aboriginal ways of knowing within a specific context have produced more extensive understanding than might be obtained through Western knowledge and scientific methods (Cochran, et al., 2008). Cindy Blackstock (2009), for example, reported that First Nations have been calling for the transformation of child welfare for years because child protection workers were removing a disproportionate number of First Nations children from their communities, but these calls were not seriously considered by non-Aboriginal child welfare authorities until Western research evidence supported these claims with the quantitative evidence of the Canadian Incidence Study on Reported Child Abuse and Neglect (Trocmé, et al., 2001). She notes that recent attention on Aboriginal research methods is built up

on a long history of Indigenous science informing Western science in the areas of pharmacology, medicine, agriculture, and architecture, to name a few.

Johnson and Ruttan (1991) suggest that there are several obstacles that make it difficult to integrate Aboriginal knowledge with Western assumptions of empirical evidence. First, they note that it is difficult to translate one knowledge system into another given that Aboriginal knowledge has been passed down through oral tradition and is only available in the community in which it originated. Aboriginal knowledge is often revealed through stories, legends and songs and therefore this local knowledge is difficult for non-Aboriginal people to understand, interpret or apply in a scientific form. Second, existing attempts to document Aboriginal knowledge into scientific frameworks have been difficult because scientific methods attempt to force Aboriginal knowledge into irrelevant frameworks. In attempting to translate this knowledge to research frameworks, conceptual subtleties can be lost in the translation. Thirdly, it has been argued by some professionals, academics and researchers that Aboriginal knowledge is no longer applicable given the high degree of social, cultural and economic changes in Aboriginal communities today. But Aboriginal researchers confirm that (where cultural genocide has not occurred) Aboriginal knowledge is successfully evolving and adapting to changing technology. Lastly, the existing biases of Western knowledge have dismissed much of what Aboriginal knowledge has to offer, especially when it conflicts with Western beliefs.

Cross-Validity of Aboriginal and Western Research Designs

Given the institutional barriers to the emergence of Aboriginal knowledge, Aboriginal research designs require suitable criteria to reflect the values, traditions and

worldviews of Aboriginal communities and peoples, while ensuring that the research remains authentic to Aboriginal knowledge and reflects the lived experiences of the participants involved in the study. Without criteria for the credibility and quality of Aboriginal research designs, this research is at risk of being devaluated and placed in a subordinate position to methodologies with evidence that supports reliability and validity of its designs. As well, without a clear plan for measuring methodological 'quality,' Aboriginal research designs are in jeopardy of being evaluated by Western standards of validity and reliability, which can lead to assimilation into Western frameworks, preferences for Aboriginal research most compatible with Western standards, and rejection of more radical methods that do not conform to Western standards. Conversely, without criteria for the credibility and quality of Aboriginal research designs, it is difficult to assess whether a study has followed a process to ensure the findings are credible, authentic and representative of the experiences of the participants in the study while remaining consistent with Aboriginal worldviews, histories, ancestral knowledge, values and traditions.

The cross-validation of research methods can be studied on many levels. Cross-validation of research methods is generally the comparison of methods used to answer similar events, phenomenon, and/or problems. Different research methods for a common topic are thought to ensure a different research perspective and an increased validity of the findings. Although there are different methods for assessing cross-validation of research methods, the most common method is the use of mixed-method methodology. Mixed-method methodology is simply a methodology with methods that have comparisons between two types of data collection methods. Mixed-method research designs are popular in several disciplines, including nursing, education, health sciences and research evaluation.

However, mixed-methods also have a controversial history due to the challenges of mixing methods from different epistemological worldviews (e.g. post-positive and interpretive). Researchers turn to mixed-method approaches to address the practical challenges and resultant uncertainty of being limited to any single method (Datta, 1997; O' Cathain, Murphy, & Nicholl, 2007), as well for the purpose of cross-validation or triangulation of methods. Kovach (2009) noted that a mixed-method approach may be a strategic concession in Aboriginal research "given the newness of Indigenous methodologies in the academy" (p. 35). In Western science, the terms 'accuracy,' 'reliability' and 'validity' are used to make evaluative judgments of measurement or data collection methods. The term reliability means 'repeatability' or 'consistency.' A measure is considered reliable if it will give us the same result over and over again (Trochim, 2006). Validity refers to the accuracy of the method to measure what it set out to measure. A research method is considered to be valid when it measures what it is supposed to measure and performs the function it purports to perform.

Triangulation is a process by which a single phenomenon is examined with multiple observers, theories, methods, or data sources to determine the degree of convergence across components (Patton, 2002). Triangulation can also minimize common method bias (Jick, 1979). The two goals of triangulation are convergence, the linking of arguments and evidence, and completeness, the linking of different methods to provide a more complete description of a phenomenon (Yu, 2004). There are three common comparative analyses for cross-validation of research methods: 1) statistical confirmatory investigation by combining research methods with statistical analysis and inference; 2) qualitative confirmatory investigation by combining research methods with qualitative analysis and

inference; and 3) combination of statistical and qualitative confirmatory investigation by combining research methods and completing separate and combined quantitative and qualitative analyses inference (Tashakkori & Teddlie, 1998).

Objectives

The central focus of this systematic review was aimed at assessing the cross-validity of Aboriginal and Western research methods by reviewing and synthesizing mixed-method studies that compare the compatibility and convergence of these research designs.

Methods for the Systematic Review

Since there have been no previous reviews to consider the cross-validation of Western and Aboriginal research designs, the primary focus of this systematic review was to retrieve, screen and analyze mixed-method study designs to consider the convergence and compatibility of Western and Aboriginal research designs. The systematic review was guided by protocols and standards established by the Campbell Collaboration (www.campbellcollaboration.org) and the Cochrane Handbook for Systematic Reviews of Interventions (Version 5.0.0) (www.cochrane.org/resources/handbook).

A systematic review is an application of precise, transparent and replicable procedures that limit bias in the collection, critical appraisal, summary, and analysis of all relevant studies on a topic (Boruch & Petrosino, 2004 cited in Wade, Turner, Rothstein, & Lavenberg, 2006). The Campbell and Cochrane Collaborations are international networks of researchers, practitioners, and others working to develop, maintain and disseminate systematic reviews on the effects of prevention and intervention programs in the areas of social welfare, health care, crime and justice, and education.

The systematic protocol developed by these collaborations uses conventional systematic review methods: sensitive searching, systematic screening, and independent quality assessment. Published and unpublished materials relevant to the topic of interest are retrieved using an iterative electronic search strategy of applying and modifying key terms. Published materials include journal articles, reference lists, conference proceedings, and government documents. Unpublished or non-published literature such as informally published conference papers and research reports may also be included and are located through contacting key authors and examining individual issues of key journals.

Criteria for Considering Studies for this Review

Types of studies

All mixed-methods of Aboriginal research designs with randomized controlled trials, quasi-randomized controlled trials, cross-sectional studies, longitudinal studies, and qualitative studies were included.

Types of participants

The term 'Aboriginal' in this review referred to First Nations, Inuit and Métis Peoples. Indigenous is used interchangeably with Aboriginal, usually in international contexts. Where sources refer to specific groups, such as First Nations, the terminology of the source is retained.

Types of research designs

The term 'research' in this review was defined as an activity intended to investigate, document, bring to light, analyse, or interpret matters in any domain, to create knowledge for the benefit of society or of particular groups. 'Aboriginal research' in this review included any research design that was identified by the authors as such and touched on the lives and well-being of Aboriginal peoples.

Types of cross-validation analysis for mixed-method designs

Types of cross-validation analysis for mixed-method designs included triangulation, data reliability, data validity, complementary inference, conceptual consistency, convergent inference, divergent inference, data quality, external validity, transferability, operational transferability, temporal transferability and ecological transferability of Aboriginal research designs in comparison to Western notions of empirical evidence (adopted from Tashakkori and Teddlie, 2003).

Search Strategy for Identification of Relevant Studies

In order to be comprehensive, various information retrieval strategies were performed during the systematic review process. The information retrieval strategy included bibliographic databases, hand searching selected journals relevant to Aboriginal research, searching pertinent online websites, searching for non-published literature, and checking full reference lists of included studies. Bibliographic databases searched included: MEDLINE; Psychological Abstracts (PsycINFO, PsycLIT, ClinPsyc-clinical subset); EMBASE; All EBM Reviews – Cochrane DSR, ACP Journal Club, DARE, CCTR, CMR, HTA, and NHSEED; ASSIA (applied social sciences); ERIC; CINAHL; Social Work Abstracts; Social Sciences Abstracts; Social Service Abstracts; Dissertation Abstracts International (DAI); Bibliography of Native North Americans; America: History and Life; CSA FRANCIS (Humanities & Social Sciences); International Bibliography of the Social Sciences (IBSS); and Library and Archives Canada: Aboriginal Peoples.

A primary feature of systematic reviews is that they incorporate a comprehensive search strategy to ensure all possible titles and abstracts are located that may be eligible for the review. When deciding on

Box 1: Definitions for the Types of Cross-Validation



Triangulation	A vehicle for cross-validation by which a single phenomenon is examined to determine the degree of congruency and convergence across distinct methods
Data Reliability	An assessment of whether obtained results of observation accurately reflect the magnitude, intensity, or quality of the attribute or phenomenon that is being observed
Data Validity	An assessment of whether the results of data collection truly represent the construct or phenomenon that they are expected to capture
Complementary Inference	The results of two strands of a mixed methods study provide two different but non-conflicting conclusions or interpretations
Conceptual Consistency	The degree to which the inferences are consistent with each other and with the known state of knowledge and theory
Convergent Inference	Conclusions or interpretations of two strands of a mixed methods study are consistent with each other
Divergent Inference	Conclusions or interpretations of two strands of a mixed methods study are inconsistent with each other
Data Quality	The degree to which the collected data meets the standards of quality of each method considered
External Validity	The presumption that the causal relationship can be generalized to and across different types of persons, settings, and times
Transferability	A qualitative analogue to external validity
Operational Transferability	The degree to which the inferences that are made on the basis of the results of the study are generalizable to other methods of observing the entities or attributes that the inference is about
Temporal Transferability	The generalizability or applicability of inferences obtained in a study to other time periods
Ecological Transferability	The generalizability or applicability of inferences obtained in a study to other settings or contexts

the search string of terms, it is important to ensure that the terms produce the maximum amount of hits (sensitivity), while ensuring that the results are specific enough to the overall research question of the review (specificity). In other words, the goal of the information retrieval strategy is to identify all of the best available evidence, while attempting to keep the number of irrelevant articles to a minimum. To accomplish the balance

between sensitivity and specificity, subject headings and word text were both searched using a systematic process. For example, searches for MEDLINE were as follows:

1. (Aborigine* or Aboriginal* or Aboriginal Population* or Torres Strait Islander or Maori or American Indian* or North American Indian* or Indian* or Alask* Nativ* or Native Hawaiian* or Hawaii Nativ* or Native American* or

American Samoan or Eskimo* or Inuit* or Aleut* or Métis or First Nation* or Indigenous).mp. [mp=title, original title, abstract, name of substance word, subject heading word]

2. (research or methodology or investigation or quantitative method* or qualitative research or research design or methodological or experiment* or method* or analy* or participatory action research or participative action research or community-based research or participatory research or participat* research).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
3. (validity or reliability or critical appraisal or quality of research or process evaluation* or process assessment* or mechanism evaluation* or mechanism assessment* or outcome evaluation* or outcome assessment* or quality evaluation* or success evaluation* or success assessment* or impact evaluation* or impact assessment* or effect evaluation* or effect assessment*).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
4. “1” and “2” and “3”

A Systematic Information Retrieval Coding Sheet (SIRC) was used to record each search for the review. The SIRC logged results for each database and non-published literature searched. Data that was logged included: 1) the date(s) of the search; 2) the name of the researcher; 3) the database used for the search; 4) the specific search terms used in combination (including limiters and expanders); and 5) the number of results for each search strategy. The SIRC allowed for replication of the search strategy because each search has been recorded and filed. Furthermore, the search strategy reduced errors because it allowed for “copy and pasting” into the database search fields. In addition to the

bibliographic databases noted above, the following sources were also searched for relevant studies:

- **Reference lists:** Reviewers checked the reference lists of all relevant articles obtained. Potentially relevant articles were identified, retrieved and assessed for possible inclusion in the review.
- **Hand searching journals:** Relevant websites, including those maintained by users, governments, other agencies, and academics, reference lists from previous reviews, and all excluded studies were searched by the primary reviewer. As well, the following journals were hand searched: 1) The Journal of Aboriginal Health; 2) Canadian Journal of Native Education; and 3) First Peoples Child & Family Review.
- **Non-published literature:** Special attention was made to search and collect relevant studies captured in the non-published literature. Specifically, the review searched for the following types of non-published literature using various search term combinations: 1) conference proceedings; 2) research reports; 3) government reports; 4) book chapters; 5) dissertations; 6) policy documents; 7) personal networks; and 8) research organizations' web sites.

Description of Methods Used in Primary Research

Selection of studies

All titles and abstracts were entered into Endnotes, duplicates were then removed, and then the final list of titles and abstracts was imported into a spreadsheet. Two raters (Primary Investigator and Research Assistant) independently reviewed all titles and abstracts based on standardized inclusion criteria to determine the eligibility of studies for inclusion in the systematic review. The screening of the studies was carried out by a three-stage hierarchical process (see Figure 1).

Level 1: initial screening

The first stage consisted of an initial screen to quickly determine whether the articles were potentially appropriate for the review based on the study's title and abstract. The purpose of this initial screen was to include all possible relevant studies related to the objectives of the systematic review and the inclusion and exclusion criteria. Level one screening consisted of the following questions:

- Does the article consider an Aboriginal research design?
- Is this a study (quantitative, qualitative, Aboriginal or other)?

Level 2: strict screening

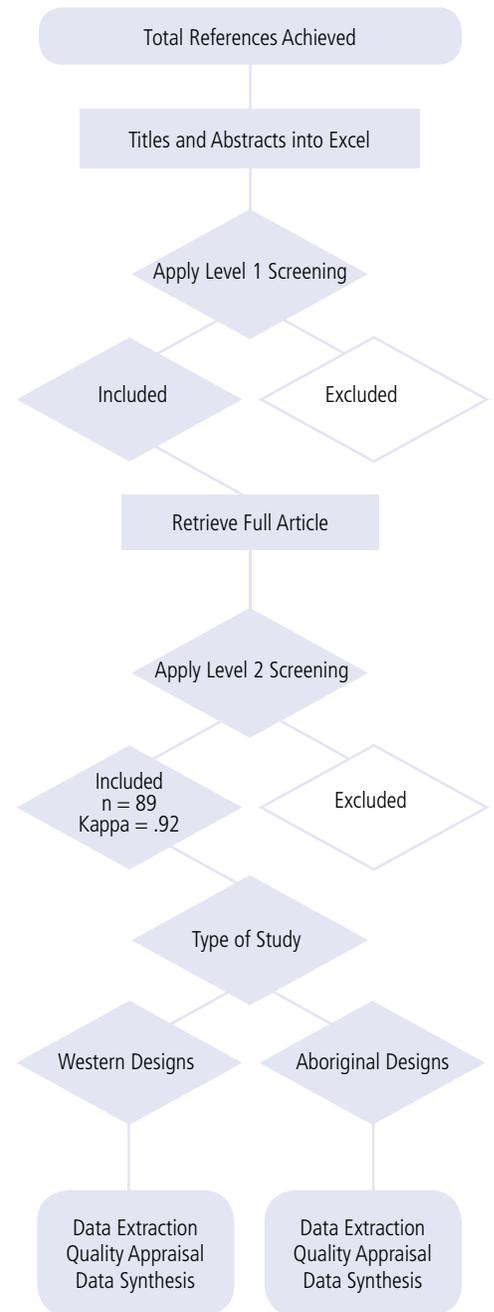
The second stage consisted of a strict screening process, which included two reviewers independently reviewing full copies of articles to determine whether studies should remain in the review based on the inclusion and exclusion criteria. Any disagreements were resolved by consensus. Level two screening consisted of the following questions:

- Did the study include a mixed-method design of an Aboriginal research design with randomized controlled trials, quasi-randomized controlled trials, cross-sectional studies, longitudinal studies or qualitative studies?
- Did the study examine the cross-validation of Aboriginal research design to notions of Western empiricism?

Level 3: data extraction and management

The third stage consisted of data extraction to record data from studies that made it past the two previous screening levels. The study details were extracted by two independent reviewers. Differences between coders were identified and resolved to ensure consistent extraction and management of the data and to establish inter-rater reliability. Any discrepancies were subsequently resolved by referral back to the source of the material.

Figure 1: Process of Information Retrieval



RESULTS OF SYSTEMATIC REVIEW



Description of Studies

Based on the information retrieval strategy, 3,560 titles were retrieved, and of these, 1,036 were excluded because they were duplicates. The remaining 2,524 titles were screened and categorized by two independent raters (See Table 1).

Cohen's Kappa¹ formula was used to calculate inter-rater reliability between the two raters during the initial screen. The formula is $k = (Po - Pc) / (1 - Pc)$, where 'Po' is the observed proportion of agreement and 'Pc' is the proportion predicted by chance (Crewson, 2005). A Kappa score of 0.7 is generally considered to be the cutoff point for good inter-rater reliability. Based on the initial screen of 2,524 titles, the raters passed 232 titles to the second screen with a Cohen's Kappa of .81. Based on the second screen of full text articles, 68 studies were passed to the third phase for data extraction and included in the final analysis. It is also important to highlight that many other articles were located that provided the reader with an introduction on the salient elements of Aboriginal research designs. These articles, although very useful for the discussion of Aboriginal research designs, were excluded from this review because they were conceptual articles written about Aboriginal research designs.

Main Results

None of the included studies assessed the cross-validation of Western and Aboriginal

research designs. Although there are now several examples of mixed-method designs, none of the studies located examined the cross-validation of the two types of designs. Therefore, the degree of cross-validation of Aboriginal and Western research designs remains unknown based on the results of this systematic review. Regarding an Aboriginal concept of "validity," Kovach (2009) notes that in her research the use of tobacco signified that each person spoke the truth as they knew it. She argues that her research relied on relational validity, which is based on a mutual understanding that speaking the truth is necessary to maintain relational balance. She claims that this type of validity only lacks meaning if it is not contained within one's worldview.

Each of the 68 studies considered the benefits and challenges of using Aboriginal research designs based on study planning, data collection, data analysis, involvement of stakeholders and the dissemination of the results.

Most research paradigms that are used when conducting research can fit with an Aboriginal framework; however, most Western research paradigms differ from the Aboriginal research designs in that they believe that knowledge is an individual entity, and therefore that knowledge may be owned by an individual (CIHR, 2007). In contrast, an Aboriginal paradigm comes from the fundamental belief that knowledge is relational

and it is shared (CIHR, 2007). When choosing a research design compatible with Aboriginal values, traditions and experiences, Bentz and Shapiro (1998) recommended searching for 'a good fit' between the worldview of the researcher, the context to be studied, and the set of research methods to be used in the study. Based on the review, studies used qualitative, quantitative and community-based approaches.

Quantitative designs

Although there is much qualitative data collected within Aboriginal communities, quantitative research methods, such as cross-sectional, national longitudinal and randomized control trials, are not entirely absent as a method in Aboriginal studies as there have been a number of recent trials within Aboriginal communities (Barker & Thomas, 1994; Barlow, et al., 2006; Bhattacharyya, 2007; Boyd-Ball, 2003; Caballero, et al., 1998; Calver, et al., 2005; Christofides, et al., 2005; Couzos, Lea, et al., 2003; Couzos, Traven, et al., 2005; Davis, et al., 2003; Gibson, et al., 1996; Govula, et al. 2007; Harrison & Veronneau, 2010; Himes & Ring, 2003; Kattelmann, et al., 2009; Kenny, 2002; Lawrence, et al., 2008; Martens & Martens, 2001; Morris, 1999; Nagel, et al., 2009; Patten, et al., 2010; Sawchuk, et al., 2008; Sibthorpe, et al., 2002; Simmons, et al., 2008; Stevens, Story, et al., 2003; Tobe, et al., 2006; Turner, Richards, & Sanders, 2007; Valery, Masters, et al., 2010; Valery, Torzillo, et al., 2006; Walkup, et al., 2009).

Quantitative research methods are considered valuable to Aboriginal communities when, in active collaboration with the community, quantitative methods provide generalizable and valid information on the health and well-being of people living in the communities. In these situations, results from using

¹ Cohen's Kappa is a common technique for estimating independent rater agreement of raters screening titles during the process of completing a systematic review.

Kappa is a coefficient that represents agreement obtained between two raters beyond expected by chance alone. A value of 1.0 represents perfect agreement. A value of 0.0 represents no agreement (Crewson, 2005).

quantitative methods can help community leaders and administrators make decisions about resources needed, types of facilities, programming needs, and the allocation of scarce resources (Kenny, 2002). Glor (1987) found that applying holistic frames of reference to quantitative work can be frustrating as they arise from epistemologies in opposition. However, quantitatively-based evaluations of public programs and policy can substantiate the impact of holistically based innovations, thus providing evidence for further funding and support.

Turner and Sanders (2007) reflect on their use of a randomized controlled design comparing an intervention group and control group and they report that this design can pose challenges in community settings because the idea of randomly assigning participants to wait for an intervention or to receive care as usual may not be accepted by the community. They suggest that researchers need to be able to adapt or alter their research design to make an evaluation project viable if originally negotiated procedures become unacceptable within a community. Stairs (1987) notes Aboriginal communities are not homogeneous and research findings from quantitative studies should be tempered with consideration for differences in social values. Likewise, Beals, Manson, Mitchell, and Spicer (2003) note that health needs of populations have been historically measured using large-sample surveys with standardized methods and measures, but these studies rarely include adequate subsamples of culturally defined populations to provide valid conclusions about their specific needs. Beals et al. (2003) further suggest that by not adapting and testing these surveys with cultural populations, the standardized procedures are likely to yield invalid results in such populations.

Qualitative designs

Some researchers have suggested that qualitative research methods that include

individual and group interviews, focus groups and participant observation can be more compatible with Aboriginal culture compared to quantitative designs such as using survey instruments (Kenny, 2004; Stickland, 1987; Thomas & Bellefeuille, 2006). Thomas and Bellefeuille (2006) suggested that Aboriginal literature is highly critical of the dominated positivistic, rational paradigm because of its intent to generalize experiences, find universal truths and minimize differences. By contrast, qualitative research has been described as a method that aims to enhance understanding and seeks to understand the lived experiences of people in all its complexity and diversity and without any intention of uncovering a universal truth about experience (Thomas & Bellefeuille, 2006, p. 5).

Baum (1998) identified four main applications of qualitative research methods for Aboriginal communities to explore health and well-being: 1) to study and explain the economic, political, social and cultural factors that influence health and disease; 2) to understand how people interpret health and disease and make sense of their health experiences; 3) to elaborate causal hypotheses emerging from epidemiological and clinical research; and 4) to provide contextual data to improve the validity and cultural specificity of quantitative survey instruments (Baum, 1998, p. 149). Chenhall (2008) conducted ethnographic analysis of a drug treatment program, suggesting that evaluations of these services are often too focused on adherence factors, such as treatment length, as key indicators for the success of the program. He argues that evaluating treatments within Aboriginal communities may be too complex and layered with multiple levels of meaning to be adequately captured in standard quantitative evaluation designs.

Community-based research

Many Aboriginal research designs, including quantitative and qualitative,

Electronic Database	# Hits
MEDLINE	691
Psychological Abstracts (PsycINFO, PsycLIT, ClinPsyc-clinical subset)	485
EMBASE	620
All EBM Reviews - Cochrane DSR, ACP Journal Club, DARE, CCTR, CMR, HTA, and NHSEED	265
ASSIA (applied social sciences)	62
ERIC	318
CINAHL	438
Social Work Abstracts	17
Social Sciences Abstracts	151
Social Service Abstracts	42
Dissertation Abstracts International (DAI)	176
Bibliography of Native North Americans	73
America: History and Life	61
CSA FRANCIS (Humanities & Social Sciences)	107
International Bibliography of the Social Sciences (IBSS)	54
Library and Archives Canada: Aboriginal Peoples	0
Results	3560
Total Duplicates	1036
Actual Total (without duplicates)	2524

involve the use of community-based approaches. Participatory research has been described as a methodology most accepted by Aboriginal communities (Castellano, 2004; Garwick & Auger, 2003; Mill, Jackson, Worthington,

Archibald, Wong, Myers, et al., 2008). Community-based designs are favoured as they provide a process of sharing power and benefits among researchers and community members, and they are grounded in activities in a holistic tradition that seeks to link the internal balance of Aboriginal peoples and their relationships to the socio-ecological factors implicating health status and well-being (Chester, Robin, Koss, Lopez, and Goldman, 1994; Dickson, 2000; Fiske, Newell, & George, 2001; Haig-Brown, 1992; Kenny, 2002). Armstrong (2002), for example, completed a process evaluation and found that community-based research was better at addressing the multiple barriers to health services within Aboriginal communities than a clinic-based approach.

An example of a community-based model is the Tribal Participatory Research Model (TPR) (Fisher & Ball, 2002). The TPR model is designed to infuse the Aboriginal research process with an understanding of the impact of historical events on life in Aboriginal communities today, and to employ research as an instrument of empowerment and social change. Another example is the Participatory Action Research (PAR) model (Brydon-Miller, 1997). PAR emphasizes the involvement of community members in all phases of the research process (Greenwood, Whyte & Harkavy, 1993), using Aboriginal values, traditions and beliefs to form the research process (Park, 1999).

Community-based studies also provide the opportunity for community collaboration and a sharing of decision-making within the research process (Garwick, Rhodes, Peterson-Hickey, & Hellerstedt, 2008; Watts, Christopher, Streitz & McCormick, 2005). Fiske, Newell, and George (2001) found that the hereditary chiefs and elders took leadership roles within the research process, which resulted in the research moving beyond the focus group methods favoured by

the researchers, as the hereditary chiefs and elders directed their meetings with the team in accordance with traditional principles and contemporary governing practices. Likewise, Gone (2006) remarked there was “ample precedent in tribal tradition for a younger man such as myself seeking out an elderly community member for authoritative consultation on pressing cultural matters” (p. 336), and that seeking consultation was congruent with his traditional values.

Connection to Aboriginal worldviews

Most traditional Aboriginal worldviews consider Earth and their life on Earth as an interconnected web of life functioning in a complex ecosystem of relationships (Cohen, 2001; Thomas & Bellefeuille, 2006). Battiste and Henderson (2000, p. 246) offer the following description of this holistic worldview:

Aboriginal knowledge is not a description of reality but an understanding of the processes of ecological change and ever-changing insights about diverse patterns or styles of flux. Concepts about ‘what is’ define human awareness of the changes but add little to the actual processes of change. To see things as permanent is to be confused about everything: an alternative to that understanding is the need to create temporary harmonies of interdependence through alliances and relationships among all forms and forces. This web of interdependence is a never-ending source of wonder to the Aboriginal mind and to other forces that contribute to the harmony.

Aboriginal research designs have been described as adhering to the “natural ways of each community, its tradition and its members” (Lederman, 1994, p. 60). Within this naturalistic approach, healing circles form the basis of research, and circle stories provide knowledge that is inter-generationally and cross-culturally significant as research and healing are linked to policy in the struggle to confront the continuing cycle of re-traumatization of Aboriginal families and communities

(Lederman, 2004). Likewise, Nabigon, Hagey, Webster, and MacKay (1999) define Aboriginal research as a project in seeking the roots of a given problem and convening the voices needed to remember the history and assess the future. From this perspective, research is by its very nature holistic and integral to governance and inseparable from the principles and visions of the medicine wheel (Kenny, 2004).

Community oversight

The literature also suggests that Indigenous communities respond more favourably to research efforts which actively engage and involve communities in the planning, conduct, evaluation and publication of research (MacMillan, 1996; Reath & Usherwood, 1998; Posti & Whitmore, 1988; Tupper, 1988) and which are culturally appropriate or sensitive (O’Neil, 1995; Reath & Usherwood, 1998; Miller & Rainow, 1997). Community oversight is especially relevant in communities that have and continue to experience oppression and discrimination. Community oversight helps to ensure that the community’s priorities are voiced throughout the research project’s duration (Fisher & Ball, 2002). Turner and Sanders (2007) found that a critical element of a research project’s success with Aboriginal peoples was community support. They report that a key influential person may garner community support or may turn a community against participation in a project. While community engagement and ownership are important in terms of attachment to or investment in the research, this does not equal intellectual property in a program being evaluated. Researchers must be upfront about ownership, involvement requirements, and sharing of outcome data, to provide sufficient information for informed decision making (Turner & Sanders, 2007). Likewise, Baldwin, Rolf, Johnson, Bowers, Benally, and Trotter (1996) found that using an ethnographic methodology enabled the research team to obtain consistent and intensive input from community members, and allowed

for the opportunity for the research to be culturally sensitive to the needs of the community.

The spiritual experience

Walker (2001) notes that the spiritual experience continues to be a largely taboo topic within Western academic institutions of higher learning. Within the academy, the silencing of this integral aspect of many Aboriginal peoples' lives often results in research findings that are inaccurate, incomplete and invalid (Walker, 2001). A growing number of Aboriginal scholars are speaking and writing about the ways in which they integrate their spiritual beliefs, values and experience into their formal academic research, thus increasing its validity within Aboriginal communities and the wider academic community.

Story-telling

Aare (2003) suggests that the validation of 'story' as a critical component of personal experience methodology is equally valid within the context of undertaking research with Aboriginal peoples because it provides people with the opportunity to engage in an oral tradition compatible with their Aboriginal traditions. Aare further suggests that story-telling can be a particularly effective mechanism for capturing Aboriginal viewpoints because story-telling is the means by which oral societies pass on their knowledge.

Cultural patterns of communications

Based on 15 focus groups conducted, Strickland (1999) found that communication patterns, roles, relationships and traditions were important elements that must be considered for cross-cultural research with Aboriginal peoples. Gone (2006) noted most Aboriginal peoples historically relied upon ferocity, tenacity, and uncommon 'strength of mind' to negotiate their nomadic life and later to contend with Euro-American colonialism. Gone notes that this history

has resulted in a subtle but influential cultural patterning of distress that governs who talks with whom about which kinds of troubling experiences and under what conditions (p. 336). The principal challenge confronting Gone's (2006) project was to identify an existing interpersonal or relational context in which communication about the experience and expression for the purposes of community action research was possible. While reflecting on the patterns of communication, Nelson and Nelson (2007) also note that research should follow procedures commonly used by Aboriginal peoples when meeting new people, including sharing more about oneself rather than launching directly into the interview.

Authenticity

Aare (2003) argues that the analysis, interpretations and reporting of Aboriginal stories within the context of research is not about the generalizations of experiences but about the experiences themselves, based on personal and social histories that give meaning to the phenomenon. Therefore, a principle purpose of any study of Aboriginal peoples should be to establish the authenticity of orally transmitted knowledge (RCAP, 1996).

Local evaluations of authenticity, whether dependent on research subject or research investigator, should be respected in accord with the principle of self-determination, even as researchers struggle to work out their often anomalous positions as "insider," "outsider," or some combination of both (Brayboy & Deyhle, 2000).

'Insider' / 'Outsider'

Stevens (1998) opines that Aboriginal communities have depths of highly contextual social-cultural life that may not be perceived by non-Aboriginal people. They note that Aboriginal researchers are the best authorities on the current status of their lifeways, and therefore, they are in the

best positions to conduct research affecting Aboriginal communities and peoples. May and Hymbaugh (1989) reported that the key to the success of their research was the training of a cadre of trainers in all local communities served by the Indian Health Service. Similar trends have been found when involving local community members within research (d'Abbs, Schmidt, Dougherty, & Senior, 2008; Fremantle, Zurynski, Mahajan, D'Antoine, & Elliott, 2008; Giblin & Giblin, 1989). Bailie, Togni, d'Abbs, and Robinson (2006) found in their community-based study that the presence of Aboriginal health workers was associated with higher adherence to the study, but only if the Aboriginal health workers received adequate training, were given clear roles, and had stable relationships with non-Aboriginal researchers.

Sibthorpe, et al. (2002) cautioned about the use of 'insiders' in research settings. They found that participants were often too embarrassed or resentful about being approached by researchers about their issues, and they did not want to discuss it with researchers from their community who often already knew of it. Researchers were also uncomfortable about approaching participants, especially those who were older, known to them socially, or members of their extended families. Alexander and Richman (2008) included high-risk youth to assist in data gathering in their community-based research and struggled with the ethical challenges of increasing the participants' social risks due to their participation and concerns regarding the overall validity of data. Alexander and Richman (2008) note that researchers should be aware of and address the potential ethical issues raised by including high-risk youth in community-based studies and evaluations.

Conversely, when researchers are from the 'outside,' the researcher must recognize that his or her positioning in the research as 'an expert' and a member of a university

that values Western ontologies may undermine the ability of the research participant to really speak their mind or assert their knowledge (Nelson & Nelson, 2007). In these cases, research validity is threatened by researchers imposing their own cultural categories, descriptors and frames of reference onto the people, culture and environments they study (Stevens, 1998).

Banks (2007) notes that community members, researchers, and practitioners, both Aboriginal and non-Aboriginal, need to build partnerships to help ensure that all children have the opportunity to reach their potential and contribute accordingly in their respective communities.

Reflection of the researcher

Nelson and Nelson (2007) note that reflective notes may be used as a tool to help identify when the participant seems to be free to exercise power or when the researcher is aware of his or her power as 'the expert' limiting the interview (Toll & Crumpler, 2004). Researchers should provide sufficient description to address their understanding of their roles in knowledge production, how the process of research shapes the outcomes, and their understanding about how and why the study arrived at the end results.

Ethics

Given that there is usually no direct benefit for participants for being involved in research, research should ensure that participants are protected from both deception and harm during and after the research process. Proxy measures of whether participants have been protected from deception and harm can be assessed by determining whether the research was reviewed and approved by an Ethics Review Committee and Aboriginal community representatives. But Turner and Sanders (2007) suggest that obtaining ethical clearances from research committees, state, district and local government bodies and

service managers, as well as Aboriginal community representatives (e.g. Elders councils, medical boards and health action groups) can significantly delay the commencement of a project.

Gone (2006) highlights that research strategies can depart substantively from the institutionalized norms dictating, for example, how consent is obtained (e.g., signed contractual documentation versus trustworthy interpersonal relations) or compensation provided (e.g., payment for services rendered versus generous inauguration of a cycle of reciprocity) (p. 339). Gone grappled with conventional notions of confidentiality in community research, desiring both to represent and reflect his 'home' community (and his place within it) with transparency, fidelity, and respect, while simultaneously protecting the anonymity of the participants.

Summary

The systematic review of the cross-validation of Aboriginal research designs and Western scientific methodologies resulted in an empty review (a systematic review that finds no evidence that supports the original research question). An empty review is an important finding because it provides scientific support, based on a systematic and comprehensive review, that the question of cross-validation has not been adequately addressed by published and unpublished research studies. This information is critical, for example, when policy-makers or funders are making assumptions of the cross-validity of research designs, when no such evidence exists.

Aboriginal research designs require scholars to think critically about their research processes and outcomes, bearing in mind that Aboriginal peoples' interests, experiences and knowledge must be at the center of research methodologies and the construction of knowledge concerning Aboriginal peoples (Rigney,

1999). As Tuhiwai Smith (1999) stated, "methodology is important because it frames the questions being asked, determines the set of instruments and methods to be employed and shapes the analyses...Indigenous methodologies are often a mix of existing methodological approaches and indigenous practices" (Tuhiwai Smith 1999, p. 143). Castellano (2004) emphasizes that Aboriginal research designs must be compatible with Aboriginal values, traditions and worldviews, and they must be compatible with Aboriginal methods of investigation and validation. Tuhiwai Smith (1999) states that the "struggle for the validity of Indigenous knowledge may no longer be over the recognition that indigenous people have ways of knowing the world which are unique, but over proving the authenticity of, and control over, our own forms of knowledge" (p. 104).

The results of this systematic review add to the growing information about the foundation of Aboriginal research designs because it finds no existing body of evidence to assess the cross-validation of Western standards and traditional notions of the types of knowledge that are valued within political, academic and research circles. The lack of empirical evidence in this regard diminishes the framing of knowledge within Western notions of external validity and generalizability for Aboriginal communities and peoples because there is no empirical support to base this assumption. Framing knowledge in Western designs is both without evidence and antithetical to knowledge formation within Aboriginal ways of knowing as arising out of observation within context, place and community.

Deliberations are needed to begin forming cogent criteria for assessing the credibility and authenticity of Aboriginal research designs, distinct from Western notions of what is considered valid research. Criteria of credibility and authenticity clearly

deserve thorough analyses, public debates and significant attention by both Aboriginal communities and academia. At the core of discussions about validity of Aboriginal research designs are the historical, philosophical, and epistemological differences between Western and Aboriginal research methodologies. The goal of such questioning is not to drive a wedge between Western and Aboriginal methodologies, “but rather to address the long historical inequity that has impaired creative dialogues and thus evaded the construction of more open, inclusive, multicultural, ‘universal’ scientific and humanistic systems” (Varese & Gonzalez, 1998, p. 7).

Regardless of the research paradigm, it is now commonly accepted that the quality of scientific research has to be judged by its own paradigm’s terms (Healy & Perry, 2000; Thomas & Bellefeuille, 2006). The criteria for assessing Western notions of scientific quality, such as being objective, unbiased, reliable, valid, generalizable, randomized and accurate, needs to be reconsidered for Aboriginal research designs (Lomawaima & McCarty, 2002; Westmeyer, 1981).

It is important to create criteria and guidelines for doing research with Aboriginal peoples that are culturally relevant, appropriate and credible.

REFERENCES



- Aare, A. (2003). Indigenous Research – a communal act. Available online from <http://www.aare.edu.au/03pap/her03635.pdf>
- Abdullah, J. & Stringer, E. (1997). Indigenous knowledge, Indigenous learning, Indigenous research. Perth, AU: Curtin Indigenous Research Centre, University of Technology, Western Australia, Discussion paper #7.
- Aboriginal Education Research Centre (2007). Indigenous research methods and perspectives. Saskatoon, SK: AERC, available online at <http://aerc.usask.ca/>
- *Alexander, L.B. & Richman, K.A. (2008). Ethical dilemmas in evaluations using Indigenous research workers. *American Journal of Evaluation*, 29(1): 73-85.
- Alfred, T. (1999). *Peace, power, righteousness: An Indigenous manifesto*. Don Mills, ON: Oxford University Press Canada.
- Anderson, I., Young, H., Markovic, M., & Manderson, L. (2001) *Aboriginal primary health care in Victoria: Issues for policy and planning*. Victoria, AU: VicHealth Koori Health Research Unit, Centre for Health and Society, Melbourne School of Population Health, Discussion Paper #1.
- *Armstrong, D.L. (2000). A community diabetes education and gardening project to improve diabetes care in a Northwest American Indian tribe. *Diabetes Educator*, 26(1): 113-20.
- Archibald, J. (1992). Giving voice to our ancestors. *Canadian Journal of Native Education*, 19(2): 141-143.
- *Bailie, R.S., Togni, S.J., d'Abbs, P. H., & Robinson, G.W. (2006). Aboriginal health workers and diabetes care in remote community health centres: A mixed method analysis. *Medical Journal of Australia*, 185(1): 40-5.
- *Baldwin, J.A., Rolf, J.E., Johnson, J., Bowers, J., Benally, C., & Trotter, R.T., II. (1996). Developing culturally sensitive HIV/AIDS and substance abuse prevention curricula for Native American youth. *Journal of School Health*, 66(9): 322-7.
- *Banks, S.R. (1997). Caregiver and professional perceptions of assessment practices and validity for American Indian/Alaska Native families. *Journal of American Indian Education*, 37(1): 16-44.
- *Barker R.N. & Thomas, D.P. (1994). A practical intervention to address ear and lung disease in Aboriginal primary school children of central Australia. *Journal of Paediatrics and Child Health*, 30(2):155-9.
- *Barlow, A., Varipatis-Baker, E., Speakman, K., Ginsburg, G., Friberg, I., Goklish, N., Cowboy, B., et al. (2006). Home-visiting intervention to improve child care among American Indian adolescent mothers: A randomized trial. *Archives of Pediatrics & Adolescent Medicine*, 160(11): 1101-7.
- *Bhattacharyya, O.K.Y. (2007). A knowledge translation intervention to improve cholesterol management in diabetes in remote aboriginal communities. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 68(6-B): 3668.
- Battiste, M. & Henderson, J.Y. (2000). *Protecting Indigenous knowledge and heritage: A global challenge*. Saskatoon, SK: Purich Press.
- Baum, F. (1998). *The new public health: An Australian perspective*. Melbourne, AU: Oxford University Press.
- *Beals, J., Manson, S.M., Mitchell, C.M., & Spicer, P. (2003). Cultural specificity and comparison in psychiatric epidemiology: Walking the tightrope in American Indian research. *Culture, Medicine & Psychiatry*, 27(3): 259-89.

* References with asterisks passed the second phase of the screening process and were used to inform the analysis.

- Bentz, V.M. & Shapiro, J.J. (1998). *Mindful inquiry in social research*. Thousand Oaks, CA: Sage.
- Bishop, R. (1996). *Collaborative research stories: Whakawhanaungatanga*. Palmerston North, NZ: Dunmore Press.
- Blackstock, C. (2009). First Nations children count: Enveloping quantitative research in an Indigenous envelope. *First Peoples Child and Family Review*, 4(2): 135-143.
- Boruch, R.F. & Petrosino, A. (2004). Meta-analyses, systematic reviews, and research syntheses, Chapter 7. In *Handbook of practical program evaluation*, 2nd edition, J. Wholey, H. Hatry, & K. Newcomer (eds.). San Francisco, CA: Jossey-Bass.
- Bourke, E.A. (1995) Dilemmas of integrity and knowledge: Protocol in Aboriginal research. In *Serving rural and remote Australia through health information and research: Proceedings of the 1st National Rural Health Research Workshop Whyalla, July 13-15*, pp. 7-54. Whyalla, AU, University of South Australia (ARHI).
- *Boyd-Ball, A.J. (2003). A culturally responsive, family-enhanced intervention model. *Alcoholism: Clinical & Experimental Research*, 27(8): 1356-60.
- *Brayboy, B.M. & Deyhle, D. (2000). Insider-outsider: Researchers in American Indian communities. *Theory into Practice*, 39(3): 163-169.
- Brydon-Miller, M. (1997). Participatory action research: Psychology and social change. *Journal of Social Issues*, 53(4): 657-666.
- *Caballero, B., Davis, S., Davis, C.E., Ethelbah, B., Evans, M., Lohman, T., Stephenson, L., Story, M., et al. (1998). Pathways: A school-based program for the primary prevention of obesity in American Indian children. *The Journal of Nutritional Biochemistry*, 9: 535-43.
- *Calver, J., Wiltshire, A., Holman, C.D.J., Hunter, E., Garfield, C., & Rosman, D.L. (2005). Does health assessment improve health outcomes in Indigenous people? An RCT with 13 years of follow-up. *Australian and New Zealand Journal of Public Health*, 29: 107-111.
- Campbell Collaboration (2001). *Campbell systematic reviews: Guidelines for the preparation of review protocols*. Accessed online at <http://www.campbellcollaboration.org/guidelines.asp>.
- Canadian Institutes of Health Research (CIHR) (2007). *Guidelines for health research involving Aboriginal people*. Ottawa, ON: CIHR, Available online at <http://www.cihr-irsc.gc.ca/e/29134.html>
- Castellano, M. (2004). Ethics of Aboriginal research. *Journal of Aboriginal Health*, 1(1): 98-114.
- Castleden, H., Morgan, V.S., & Neimanis, A. (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.
- Champagne, D. (1998). American Indian studies is for everyone. In *Natives and academics: Researching and writing about American Indians*, D.A. Mihesuah (ed.), pp. 181-189. Lincoln, NB: University of Nebraska Press.
- *Chenhall, R. (2008). What's in a rehab? Ethnographic evaluation research in Indigenous Australian residential alcohol and drug rehabilitation centres. *Anthropology & Medicine*, 15(2): 105-16.
- *Chester, B., Robin, R., Koss, M., Lopez, J., & Goldman, D. (1994). Grandmothers dishonoured: Violence against women by male partners in American Indian communities. *Violence and Victims*, 9(3): 249-258.
- *Christofides, A., Schauer, C., Sharieff, W., & Zlotkin, S.H. (2005). Acceptability of micronutrient sprinkles: A new food-based approach for delivering iron to First Nations and Inuit children in Northern Canada. *Chronic Diseases Canada*, 26(4): 114-20.
- Cochrane Collaboration (2008). *Cochrane handbook for systematic reviews of interventions*. Version 5.0.0, updated February 2008. Available online at <http://www.cochrane.org/resources/handbook/>
- Cochran, P., Marshall, C., Garcia-Downing, C., Kendall, E., Cook, D., McCubbin, L., & Gover, M. (2008). Indigenous ways of knowing: Implications for participatory research and community. *American Journal of Public Health*, 98(1): 22-27.
- Cohen, B. (2001). The spider's web: Creativity and survival in dynamic balance. *Canadian Journal of Native Education*, 24(2): 140-148.
- *Couzos, S., Lea, T., Mueller, R., Murray, R., & Culbong, M. (2003). Effectiveness of otitopical antibiotics for chronic suppurative otitis media in Aboriginal children: A community-based, multicentre, double-blind randomised controlled trial. *Medical Journal of Australia*, 179(4): 185-90.
- *Couzos, S., Traven, L., Murray, R., & Culbong, M. (2005). 'We are not just participants - We are in Charge': The NACCHO ear trial and the process for Aboriginal community-controlled health research. *Ethnicity & Health*, 10(2): 91-111.
- Crazy Bull, C. (1997a). A native conversation about research and scholarship. *Tribal College: Journal of American Indian Higher Education*, 9(1): 16-24.
- Crazy Bull, C. (1997b). Advice for the non-Native researcher. *Tribal College: Journal of American Indian Higher Education*, 9(1): 24-25.
- Crewson, P.E. (2005). Reader agreement studies. *American Journal of Roentgenology*, 184: 1391-1397.
- d'Abbs, P., Schmidt, B., Dougherty, K., & Senior, K. (2008). Implementing a chronic disease strategy in two remote Indigenous Australian settings: A multi-method pilot evaluation. *Australian Journal of Rural Health*, 16(2): 67-74.
- Datta, L-E. (1997). A pragmatic basis for mixed-method designs. In *Advances in mixed-method evaluation: The challenges and benefits of integrating diverse paradigms*. *New Directions for Evaluation* 74, J.C. Greene and V.J. Caracelli (eds.), pp. 33-46. San Francisco, CA: Jossey-Bass.
- *Davis, S.M., Clay, T., Smyth, M., Gittelsohn, J., Arviso, V., Flint-Wagner, H., Rock, B.H., et al. (2003). Pathways curriculum and family interventions to promote healthful eating and physical activity in American Indian schoolchildren. *Preventive Medicine*, 37(suppl): 24-34.
- Deloria, V. (1997). *Red earth, white lies: Native Americans and the myth of scientific fact*. Golden, CO: Fulcrum Publishing.
- *Dickson, G. (2000). Aboriginal grandmothers' experience with health promotion and participatory action research. *Qualitative Health Research*, 10(2): 188-203.
- Everitt, J. (1994). Australian museums: A role to play in a changing Indigenous environment. In *Issues in the control of Aboriginal knowledge*, pp. 1-16. Auckland, AU: University of Auckland, Research Unit for Maori Education, Monograph 21.
- *Fink, A. & McCloskey, L. (1990). Moving child abuse and neglect prevention programs forward: Improving program evaluation. *Child Abuse and Neglect*, 14: 187-206.
- *Fisher, P.A. & Ball, T. (2002). *The Indian Family Wellness Project: An application of the tribal*

- participatory research model. *Prevention Science*, 3(3): 235-40.
- *Fiske, J., Newell, M., & George, E. (2001). First Nations women and governance. A study of custom and innovation among Lake Babine Nation women. In *First Nations women, governance and the Indian Act: A collection of policy research reports*, J.F. Sayers, K.A. MacDonald, J.-A. Fiske, M. Newell, E. George, & W. Cornet (eds.), pp. 55-116. Ottawa, ON: Status of Women, Canada.
- *Fremantle, E., Zurynski, Y., Mahajan, D., D'Antoine, H., & Elliott, E. (2008). Indigenous child health: Urgent need for improved data to underpin better health outcomes. *Medical Journal of Australia*, 188(10): 588-91.
- *Garwick, A.W. & Auger, S. (2003). Participatory action research: The Indian Family Stories Project. *Nursing Outlook*, 51(6): 261-6.
- *Garwick, A.W., Rhodes, K.L., Peterson-Hickey, M., & Hellerstedt, W.L. (2008). Native teen voices: Adolescent pregnancy prevention recommendations. *Journal of Adolescent Health*, 42(1): 81-8.
- Gegeo, D. (2001). Cultural rupture and Indigeneity: The challenge of (re)visioning "place" in the Pacific. *Contemporary Pacific: A Journal of Island Affairs*, 13(2): 491-507.
- *Giblin, P.T. & Giblin, P. (1989). Effective utilization and evaluation of indigenous health care workers. *Public Health Reports*, 104(4): 361-8.
- *Gibson, P., Stuart, J., Włodarczyk, J., Oloson, L., & Henley, M. (1996). Nasal inflammation and chronic ear disease in Australian Aboriginal children. *Journal of Paediatrics and Child Health*, 32: 143-147.
- Greenwood, D.J., Whyte, W.F., & Harkavy, I. (1993). Participatory action research as a process and as a goal. *Human Relations*, 46(2): 175-192.
- Grenier, L. (1998). *Working with indigenous knowledge: A guide for researchers*. Ottawa, ON: International Development Research Centre.
- *Glor, E.D. (1987). Impacts of a prenatal program for Native women. *Canadian Journal of Public Health*, 78: 249-254.
- *Gone, J.P. (2006). Research reservations: Response and responsibility in an American Indian community. *American Journal of Community Psychology*, 37(3-4): 333-40.
- *Govula, C., Kattelman, K., & Ren, C. (2007). Culturally appropriate nutrition lessons increased fruit and vegetable consumption in American Indian children. *Topics in Clinical Nutrition*, 22(3): 239-245.
- *Haig-Brown, C. (1992). Choosing border work. *Canadian Journal of Native Education*, 19(1):96-116.
- *Harrison, R. & Veronneau, J. (2010). Design and implementation of a dental caries prevention trial in remote Canadian Aboriginal communities. *Trials*, 11: 54.
- Healy, M. & Perry, C. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative Market Research*, 3(3): 118-126.
- Henry, J., Dunbar, T., Arnott, A., Scrimgeour, M., & Murakami-Gold, L. (2004). Indigenous research reform agenda - A review of the literature. Darwin, AU: CRC for Aboriginal Health, Links Monograph Series 5, retrieved online at <http://www.crcah.org.au/publications/downloads/IRRA5LinksMonographs.pdf>
- Hernandez-Avila, I. & Varese, S. (1999). Indigenous intellectual sovereignties. *Wicazo Sa Review*, 14(2): 77-92.
- *Himes, J.H. & Ring, K. (2003). Impact of the Pathways intervention on dietary intakes of American Indian school children. *Preventive Medicine*, 37(Suppl 1): S55-S61.
- Humphery, K. (2000). Indigenous health and western research. Victoria, AU: VicHealth Koori Health Research Unit, Centre for Health and Society, Melbourne School of Population Health, Discussion Paper No. 2.
- Humphery, K. (2001) Dirty questions: Indigenous health and Western research. *Australian and New Zealand Journal of Public Health*, 25(3): 197-202
- Irwin, K. (1994). Maori research methods and processes: An exploration. *Sites: A Journal for South Pacific Cultural Studies*, 28: 25-43.
- Jick T. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24(4): 602-610.
- Johnstone, M.J. (1991). Improving the ethics and cultural suitability of Aboriginal health research. *Aboriginal and Islander Health Worker Journal*, 15(2): 10-13.
- Johnson, M. & Ruttan, R. (1991). Documentation of Dene traditional environmental knowledge - Pilot project. Hay River, NWT: Dene Cultural Institute.
- *Kahakalau, K. (2004). Indigenous heuristic action research: Bridging Western and Indigenous research methodologies. *Hūlili: Multidisciplinary Research on Hawaiian Well-Being*, 1(1): 19-33.
- *Kattelman, K., Conti, K., & Ren, C. (2009). The medicine wheel nutrition intervention: A diabetes education study with the Cheyenne River Sioux Tribe. *Journal of the American Dietetic Association*, 109(9): 1532-9.
- Kawagley, A.O. (1995). *A Yupiaq worldview: A pathway to ecology and spirit*. Prospect Heights, NY: Waveland Press.
- *Kenny, C. (2002). North American Indian, Métis, and Inuit women speak about culture, education and work. Ottawa, ON: Status of Women Canada.
- Kenny, C., Faries, E., Fiske, J., & Voyageur, C. (2004). A holistic framework for Aboriginal policy research. Ottawa, ON: Status of Women Canada.
- *Kovach, M. (2009). *Indigenous methodologies: Characteristics, conversations, and contexts*. Toronto, ON: University of Toronto Press.
- Lavallée, L.F. (2009). Practical application of an Indigenous research framework and two qualitative Indigenous research methods: Sharing circles and Anishnaabe symbol-based reflection. *International Journal of Qualitative Methods*, 8(1): 21-40.
- *Lawrence, H.P., Binguis, D., Douglas, J., McKeown, L., Switzer, B., Figueiredo, R., & Laporte, A. (2008). A 2-year community-randomized controlled trial of fluoride varnish to prevent early childhood caries in Aboriginal children. *Community Dentistry and Oral Epidemiology*, 36: 503-516.
- *Lederman, J. (1994). Trauma and healing in Aboriginal families and communities. *Native Social Work Journal*, 2(1): 59-90.
- Leininger, M. (1994). Evaluation criteria and critique of qualitative research studies. In *Critical issues in qualitative research methods*, J.M. Morse (ed.), pp. 95-115. Thousand Oaks, CA: Sage.
- Lomawaima, K.T. & McCarty, T.L. (2002). Reliability, validity and authenticity in American Indian and Alaska Native research. *ERIC Digest*, accessed online at <http://www.ericdigests.org/2003-4/native-research.html>

- *MacMillan, H.L. MacMillan, A.B., Offord D.R., & Dingle, J.L. (1996). Aboriginal health. *Canadian Medical Association Journal*, 155(11): 1569-78.
- Maddocks, I. (1992). Ethics in Aboriginal research: A model for minorities or for all? *Medical Journal of Australia*, 157: 553-555.
- *Martens, P.J. (2001). The effect of breastfeeding education on adolescent beliefs and attitudes: A randomized school intervention in the Canadian Ojibwa community of Sagkeeng. *Journal of Human Lactation*, 17(3): 245-55.
- *May, P.A. & Hymbaugh, K.J. (1989). A macro-level fetal alcohol syndrome prevention program for Native Americans and Alaska Natives: Description and evaluation. *Journal of Studies on Alcohol*, 50: 508-518.
- Mead, A. (1995). *Nga tikanga, nga taonga: Cultural and intellectual property – The rights of Indigenous peoples*. Auckland, AU: Research Unit for Maori Education, University of Auckland, Monograph 23.
- Métis Centre (2010). Six principles of ethical Métis research. Ottawa, ON: National Aboriginal Health Organization, available online at <http://www.naho.ca/publications/>
- *Mill, J.E, Jackson, R.C., Worthington, C.A., Archibald, C.P., Wong, T., Myers, T., Prentice, T., et al., (2008). HIV testing and care in Canadian Aboriginal youth: A community based mixed methods study. *BMC Infectious Diseases*, 8: 132.
- Miller, P. & Rainow, S. (1997). Commentary: Don't forget the plumber: Research in remote Aboriginal communities. *Australian and New Zealand Journal of Public Health*, 21(1): 96-97.
- Moody, R. (1993). *The indigenous voice: Visions and realities* (Rev. 2nd ed). Utrecht: International Books, accessed online at www.sifc.edu/Indian%20Studies/IndigenousThought/fall99/tobacco.htm
- *Nabigon, H., Hagey, R., Webster, S., & MacKay, R. (1999). The learning circle as a research method: The Trickster and Windigo in research. *Native Social Work Journal*, 2(1): 113-137.
- *Nagel, T., Robinson, G., Condon, J., & Trauer, T. (2009). Approach to treatment of mental illness and substance dependence in remote Indigenous communities: Results of a mixed methods study. *Australian Journal of Rural Health*, 17: 174–182.
- *Nakata, M. (1998). Anthropological texts and Indigenous standpoints. *Australian Aboriginal Studies*, 2: 3-12.
- National Aboriginal Health Strategy (NAHS) Working Party (1989). *A National Aboriginal Health Strategy*. Canberra, AU: Government of Australia.
- *Nelson, A. (2007). Seeing white: A critical exploration of occupational therapy with Indigenous Australian people. *Occupational Therapy International*, 14(4): 237-55.
- O’Cathain, A., Murphy, E., & Nicholl, J. (2008). The quality of mixed methods studies in health services research. *Journal of Health Services Research Policy*, 13(2): 92-98.
- O’Neil, J. (1995). Issues in health policy for Indigenous peoples in Canada. *Australian Journal of Public Health*, 19: 559-66.
- Park, P. (1999). People, knowledge, and change in participatory research. *Management Learning*, 30(2): 141–157.
- *Patten C.A., Windsor, R.A., Renner, C.C., Enoch, C., Hochreiter, A., Nevak, C., Smith, C.A., et al. (2010). Feasibility of a tobacco cessation intervention for pregnant Alaska Native women. *Nicotine & Tobacco Research*, 12(2): 79-87.
- Patton, M.Q. (2002). *Qualitative research and evaluation methods*, 3rd ed. Thousand Oaks, CA: Sage.
- Porsanger, J. (2004). An essay about Indigenous methodology. Available online at <http://uit.no/getfile.php?PageId=977&FileId=188>.
- *Posti, B. & Whitmore, R. (1988). A plan for the transfer of control of health services to Indian communities in Manitoba. *Arctic Medical Research*, 47(suppl 1): 346-49.
- Reagan, T. (2005). *Non-western educational traditions: Indigenous approaches to educational thought and practice* (3rd ed). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- *Reath, J. & Usherwood, T. (1998). Improving cervical cancer screening in a remote Aboriginal Community. *Australian and New Zealand Journal of Public Health*, 22(6): 659-63.
- Rigney, L. (1999). Internationalization of an indigenous anticolonial cultural critique of research methodologies. *Wicazo Sa Review*, 14(2): 77-92.
- Royal Commission on Aboriginal Peoples (RCAP) (1996). *Renewal: A twenty-year commitment*, Appendix E: Ethical guidelines for research, Vol. 5. Ottawa, ON: Canada Communications Group. Available online at <http://www.ainc-inac.gc.ca/ap/rrc-eng.asp>
- Saini, M. (2010). *Research*. Oxford bibliographies online guide. Oxford University Press.
- *Sawchuk, C.N., Charles, S., Wen, Y., Goldberg, J., Forquera, R., Roy-Byrne, P., & Buchwald, D. (2008). A randomized trial to increase physical activity among native elders. *Preventive Medicine*, 47(1), 89-94.
- Schnarch, B. (2004). Ownership, control, access, and possession (OCAP) or self-determination applied to research: A critical analysis of contemporary First Nations research and some options for First Nations communities. *Journal of Aboriginal Health*, 1(1): 80-94.
- *Sibthorpe, B., Bailie, R., Brady, M., Ball, S., Sumner-Dodd, P., & Hall, W. (2002). The demise of a planned randomised controlled trial in an urban Aboriginal medical service. *The Medical Journal of Australia*, 176(6): 273-276.
- *Simmons, D., Rush, E., & Cook, R. (2008). Development and piloting of a community health worker-based intervention for the prevention of diabetes among New Zealand Maori in Te Wai Rona: Diabetes prevention strategy. *Public Health Nutrition*, 11(12): 1318–1325.
- *Stairs, A. (1987). Evaluating the role of first language in native education: Developmental results in a Canadian Inuit setting. Washington, DC: paper presented at the Annual Meeting of the American Educational Research Association, Eric Database Report: ED283394. 21.
- *Stevens, R.H. (1998). American Indian and indigenous peoples' sovereignty and authority in cultural, historical and environmental studies: Developing cooperative research for resource management, repatriation and education. *Dissertation Abstracts International*, Vol: 4201.
- Stevens, S.J., Estrada, A.L., Glider, P.J., & McGrath, R.A. (1998). Ethnic and cultural differences in drug-using women who are in and out of treatment. *Drugs and Society*, 13: 81-95.
- *Stevens, J., Story, M., Ring, K., Murray, D.M., Cornell, C.E., Juhaeri, & Gittelsohn, J. (2003). The impact of the Pathways intervention on psychosocial variables related to diet and physical activity in American Indian schoolchildren. *Preventive Medicine*, 37(6): S70-9.
- Stover, D. (2002). Postcolonial sun dancing at Wakpamni Lake. In *Readings in indigenous religions*, G. Harvey (ed.), pp. 173-194. London, UK: Continuum.

- *Strickland, C.J. (1999). Conducting focus groups cross-culturally: Experiences with Pacific Northwest Indian people. *Public Health Nursing*, 16(3): 190-7.
- Struthers, R. (2001). Conduction sacred research: An Indigenous experience. *WICAZO SA Review*, 16(1): 125-133.
- Tashakkori, A. & Teddlie, C. (2003). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage.
- Tashakkori, A. & Teddlie, C. (1998). Mixed methodology: Combining qualitative and quantitative approaches. In *Applied social sciences research methods series (Vol. 46)*, L. Bickman & D.J. Rog (eds.). Thousand Oaks, CA: Sage.
- *Tobe, S.W., Pylypchuk, G., Wentworth, J., Kiss, A., Szalai, J.P., Perkins, N., Hartman, S. et al. (2006). Effect of nurse-directed hypertension treatment among First Nations people with existing hypertension and diabetes mellitus: The Diabetes Risk Evaluation and Microalbuminuria (DREAM 3) randomized controlled trial. *Canadian Medical Association Journal*, 174(9): 1267-71.
- Toll, C.A. & Crumpler, T.P. (2004). Everything is dangerous: Pastoral power and university researchers conducting interviews. In *Dangerous coagulations? The uses of Foucault in the study of education*, B. Baker and K. Heyning (eds.). New York: Peter Lang.
- Thomas, D. (2001). *The beginnings of health research in Australia*. Victoria, AU: VicHealth Koori Health Research Unit, Centre for Health and Society, Melbourne School of Population Health, Discussion Paper No.3.
- *Thomas, W. & Bellefeuille, G. (2006). An evidence-based formative evaluation of a cross cultural Aboriginal mental health program in Canada. *Australian e-Journal for the Advancement of Mental Health*, 5(3): 1446-7984.
- Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. (2010). Chapter 9: Research Involving the First Nations, Inuit and Métis Peoples of Canada. Ottawa, ON: Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council, and Social Sciences and Humanities Research Council. Available online at <http://www.pre.ethics.gc.ca/eng/policy-politique/initiatives/tcps2-eptc2/Default/>
- Trochim, W.M. (2006). *The research methods knowledge base (2nd Ed.)*. Web Centre for Social Research Methods, available online at <http://www.socialresearchmethods.net/kb/>
- Troc me, N., MacLaurin, B., Fallon, B., Daciuk, J., Billingsley, D., Tourigny, M., Mayer, M. et al. (2001). Canadian incidence study of reported child abuse and neglect: Final report. Ottawa, ON: Health Canada.
- Tuhiwai Smith, L. (1999) *Decolonizing methodologies: Research and Indigenous peoples*. London, UK: Zed Books.
- *Tupper, C. (1988). The changing role of health program managers during a period of transfer of responsibility for health services to Indian people. *Arctic Medical Research*, 47(suppl 1): 338-40.
- *Turner, K.M., Richards, M., & Sanders, M. (2007). Randomised clinical trial of a group parent education programme for Australian Indigenous families. *Journal of Paediatrics and Child Health*, 43(6): 429-437.
- *Turner, K. & Sanders, M. (2007). Family intervention in Indigenous communities: Emergent issues in conducting outcome research. *Australasian Psychiatry*, 15(Suppl 1): S39-43.
- Uhlik, C. (2006). Ethical guidelines and principles for doing research with Aboriginal peoples. Available online at www.usask.ca/research/aboriginal_working_group/Downloads/AEWG-Principles-25-April-2006-FINAL.doc
- *Valery, P.C., Masters, I.B., Taylor, B., Laifoo, Y., O'Rourke, P.K., & Chang, A.B. (2010). An education intervention for childhood asthma by Aboriginal and Torres Strait Islander health workers: A randomised controlled trial. *Medical Journal of Australia*, 192(10): 574-9.
- *Valery, P.C., Torzillo, P.J., Boyce, N., White, A., Stewart, P., Wheaton, G., Purdie, D., et al. (2006). Zinc and vitamin A supplementation in Australian indigenous children with acute diarrhoea: A randomised controlled trial. *Medical Journal of Australia*, 184(3): 107-112.
- Varese, S. & Gonzalez, T. (1998). Directorio de Profesionales Indigenas/Directory of Indigenous Professionals: Sobre el Directorio/About the Directory. EScholarship, University of California, accessed online at <http://escholarship.org/uc/item/95h4c53q#page->
- Wade, C.A., Turner, H.M., Rothstein, H.R., & Lavenberg, J.G. (2006). Information retrieval and the role of the information specialist in producing high-quality systematic reviews in the social, behavioural and education sciences. *Evidence & Policy*, 2(1): 89-108.
- *Walker, P. (2001). Journeys around the Medicine Wheel: A story of Indigenous research in a western university. *The Australian Journal of Indigenous Education*, 29(2): 18-21.
- *Walkup, J.T., Barlow, A., Mullany, B.C., Pan, W., Goklish, N., Hasting, R., Cowboy, B., et al. (2009). Randomized controlled trial of a paraprofessional-delivered in-home intervention for young reservation-based American Indian mothers. *Journal of the American Academy of Child & Adolescent Psychiatry*, 48(6): 591-601.
- Warrior, R. (1999). The Native American scholar: Toward a new intellectual agenda. *Wicazo Sa Review*, 14(2): 46-54.
- *Watts, V.M., Christopher, S., Streitz, J.L., & McCormick, A.K.H.G. (2005). Evaluation of a lay health adviser training for a community-based participatory research project in a Native American community. *American Indian Culture and Research Journal*, 29(3): 59-79.
- Weber-Pillwax, C. (2004). Indigenous researchers and Indigenous research methods: Cultural influences or cultural determinants of research methods. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health*, 2(1): 78-90.
- Westmeyer, P. (1981). *A guide for use in planning and conducting research projects*. Springfield, IL: Charles C. Thomas.
- Witt, N. (2007). What if indigenous knowledge contradicts accepted scientific findings? The hidden agenda: Respect, caring and passion towards aboriginal research in the context of applying western academic rules. *Educational Research in Review*, 2(3): 225-235.
- Wolcott, H.F. (1994). On seeking – and rejecting – validity in qualitative research. In *Transforming qualitative data: Description, analysis, and interpretation*, H. Wolcott (ed.), pp. 337-373. Thousand Oaks, CA: Sage Publications.
- Yu, C.H. (2004). Misconceived relationships between logical positivism and quantitative research. ERIC database, accessed from <http://www.eric.ed.gov/PDFS/ED452266.pdf>

