

A Guide to Conducting Systematic Reviews of Coaching Science Research

Andrew Bennie

Western Sydney University

Nicholas Apoifis

UNSW; Western Sydney University

Jeffrey Caron

McGill University

William Falcão

McGill University

Demelza Marlin

Macquarie University; Western Sydney University

Enrique García Bengoechea

Western Sydney University

Koon Teck Koh

Nanyang Technological University, National Institute
of Education

Freya Macmillan

Western Sydney University

Emma George

Western Sydney University

Andrew Bennie is the director of the Health and Physical Education program at Western Sydney University. His research interests include sports coaching and coach education; Indigenous sport participation; and teaching and learning in health and physical education. He is currently leading a team of collaborators who are exploring the experiences of Aboriginal and Torres Strait Islander sport coaches in Australia.

Nick Apoifis is a lecturer in the School of Social Sciences at UNSW. He has diverse research and teaching interests across the disciplines of sociology, international relations, politics, and sport coaching. He is currently working on a project exploring the experiences of Aboriginal and Torres Strait Islander sport coaches in Australia.

Jeff Caron is a postdoctoral research fellow in sport and exercise psychology in the Department of Kinesiology and Physical Education at McGill University. His research focuses on promoting and fostering safe and healthy social environments in the context of sport-related concussions, coach and athlete leadership, and individuals with physical disabilities.

William Falcão is a sport psychology doctoral student in the Department of Kinesiology & Physical Education at McGill University. His research focuses on coaching strategies that promote personal development, health, and well-being of athletes through sport. His research emphasises the experiences of coaches and athletes in low-socioeconomic settings as well as the paraspport context.

Demelza Marlin is the higher degree research learning advisor for social sciences at Macquarie University. She has diverse research and teaching interests across the disciplines of sociology, cultural studies, and health sciences. She is currently working on a project exploring the experiences of Aboriginal and Torres Strait Islander sport coaches in Australia.

Enrique García Bengoechea is a visiting fellow in the Institute of Sport, Exercise and Active Living at Victoria University, Melbourne. His research interests include school- and community-based physical activity and health promotion, and youth development through sport. He has been a member of the Kahnawake Schools Diabetes Prevention Project, which was awarded the 2010 Canadian Institute for Health Research Partnership Award, in recognition of advancing Indigenous-researcher ethical agreements.

Koon Teck Koh is an assistant head for graduate programmes in the Department of Physical Education and Sports Science at Nanyang Technological University Singapore. He has extensive experience working with athletes and coaches to improve coaching practice and performance. He holds key appointments at international and local levels, including: executive board member of World Association for Basketball Coaches, and executive board member of Asia Association of Coaching Science.

Freya MacMillan is a lecturer in health science at Western Sydney University. Her research focuses on the development and evaluation of lifestyle interventions using qualitative and quantitative research techniques. She also has expertise in conducting systematic reviews to guide the development of evidence-based interventions.

Emma George is a lecturer in health and physical education at Western Sydney University. With a background in physical activity and health promotion, her research aims to promote lifelong physical activity and improve health outcomes in populations including middle-aged men, sport fans, older adults and culturally diverse groups. She has a particular interest in community engagement and health promotion initiatives delivered through sport.

Address author correspondence to Andrew Bennie at a.bennie@westernsydney.edu.au.

Research in coaching science continues to grow and as such, there is a need for rigorous tools to help make sense of the rapidly expanding literature. The purpose of this paper is to provide a detailed description of a systematic review methodology that can be used to summarise literature in coaching science. To do so, we present a test case of a systematic review we conducted on the sport coaching experiences of global Indigenous populations. More precisely, we conducted a systematic review of English, Spanish, French, Mandarin, and Portuguese peer-reviewed journal articles, spanning twelve databases (e.g., Sport Discus, ERIC, and Scopus) from 1970 to 2014. ENTREQ and COREQ guidelines were followed to report the results of the systematic review, and Bronfenbrenner's ecological systems theory was used as a theoretical framework to extract and synthesise relevant findings from the included articles. In sum, this paper presents a robust methodology for systematically reviewing research in coaching science and provides practical insights for those who endeavour to conduct rigorous literature searches in this domain.

Keywords: literature review, systematic methodology, sport coaching, Indigenous

Sport coaching is a relatively new field of academic research. According to Fletcher (2006), early sport coaching research began in the 1920s with Griffith's pioneering study about the psychological principles of athletic competition. Interestingly, it was not until the late 1970s and 1980s that research in coaching science began to flourish. During this time, a series of quantitative explorations into coaching leadership (using questionnaires; e.g., Chelladurai & Carron, 1978; Smoll & Smith, 1989) and coach behaviours (using systematic observations; e.g., Smith, Smoll, & Hunt, 1977; Smith, Zane, Smoll, & Coppel, 1983) provided a pathway for future coaching research.

Qualitative sport coaching investigations rose to prominence in the late 1990s and early 2000s. Researchers used interviews, structured observations, and document analysis to explore the coach's role (Côté, Salmela, & Russell, 1995), personal coach characteristics (Bloom & Salmela, 2000), and sociological aspects of coaching (Cassidy, Jones, & Potrac, 2004). More recently, coaching researchers have used a variety of methodological approaches to better enable the development, delivery, and assessment of coaching practice across the globe (see Araya, Bennie, & O'Connor, 2015; Bertz & Purdy, 2011; Koh, Bloom, Fairhurst, Paiement, & Kee, 2014; Mallett, Trudel, Lyle, & Rynne, 2009; Werthner & Trudel, 2006).

The growth of coaching science research has been accompanied by an expansion in the number of coaching focused academic journals around the world (e.g., Sport Coaching Review, UK; International Sport Coaching Journal, USA). This has coincided with a plethora of formal, nonformal, and informal coach education opportunities (Coombs & Ahmed, 1975; Cushion, Nelson, Armour, Lyle, Sandford, & O'Callaghan, 2010). Formal learning takes place in chronologically graded, and hierarchically structured education system (e.g., the Australian National Coach Accreditation Scheme), nonformal education includes coaching conferences, seminars, workshops, and clinics (e.g., International Council for Coach Education ICCE Global Coach conferences), and informal learning involves information sourced from the Internet, coaching manuals, and journal articles (e.g., International Sport Coaching Journal). In addition, there has been an expansion of coaching science into university undergraduate (e.g., Bachelor of Sport

Coaching, University of Canterbury) and postgraduate (e.g., Master of Education [Coaching major], University of Sydney) degree programs for sport coaches. Recent efforts to professionalise sport coaching have culminated in the development of an International Sport Coaching Framework (ICCE, 2013) as well as a set of International Coaching Degree Standards for coach education (Lara-Bercial et al., 2016).

Literature Reviews in Coaching Science

As a result of the broadening scope of literature in coaching science, researchers have sought to purposefully capture the breadth and depth of literature by identifying key publications, exploring gaps in existing knowledge, and locating influential coaching academics (Gilbert & Trudel, 2004; Rangeon, Gilbert, & Bruner, 2012). There are at least 14 different types of literature reviews that have been used to summarise bodies of research (cf. Grant & Booth, 2009). Selecting a type of review; however, depends on a number of factors including, but not limited to, the amount of literature in a given area and the intended outcomes of the review (Arksey & O'Malley, 2005; Grant & Booth, 2009). For example, Grant and Booth (2009) noted that mapping reviews are useful for categorising existing research to commission further reviews and/or conduct primary research (e.g., Lorenc et al., 2012), whereas meta-analytic reviews are an exhaustive literature search that aims to provide a precise effect of current available evidence (e.g., Lonsdale, Rosenkranz, Peralta, Bennie, Fahey, & Lubans, 2013). In Lorenc and colleagues' (2012) mapping review, their methodology was appropriate because so little was known about the state of research surrounding the links between fear of crime and wellbeing; however, a mapping review approach would not have been suitable for Lonsdale and colleagues' review of the evidence on physical activity interventions given the breadth of existing literature in that domain. Thus, it is important for researchers to consult available resources (e.g., academic texts) and individuals (e.g., librarians) before selecting the type of review.

Although reviews are commonly used in a variety of fields in the health sciences, they have rarely been employed in coaching research. In fact, Gilbert and Trudel (2004) conducted the first systematic approach to reviewing the literature in coaching science. They used a four-phase approach to analyse peer-reviewed articles from 1970 to 2001 to create an expedient bibliographical list of coaching studies. In Phase 1, the authors conducted an exhaustive literature search of electronic databases; Phase 2 involved obtaining full-text copies of all relevant articles; Phase 3 was to ensure accuracy and consistency of the bibliography by consulting journals and experts in the field; and, in Phase 4, the authors conducted a qualitative thematic analysis of the bibliographic list to present the salient themes emerging from coaching science research. Since its publication, Gilbert and Trudel's (2004) paper has been cited more than 300 times and has been an invaluable resource to coaching science researchers.

Within the past five years, researchers have begun to utilise systematic reviews in coaching science (e.g., Evans, McGuckin, Gainforth, Bruner, & Côté, 2015; Langan, Blake, & Lonsdale, 2013; Rangeon et al., 2012; Turnnidge & Côté, 2016); however, there is a growing need to understand how these tools can be used to review and interpret the ever-expanding literature in this domain. As a result, the present paper aims to guide readers through the process of conducting systematic reviews in sport coaching by providing examples from a test case: a systematic literature review we conducted on the sports coaching experiences of Indigenous¹ peoples. We will guide the reader through the steps followed in our systematic review, as well as provide insights and advice about the challenges and lessons learned while conducting the review.

Selecting Appropriate Guidelines for Completing Systematic Reviews

Researchers must consider the following questions before choosing a type of review: What are the gaps in existing knowledge? What types of questions you would like to answer? What is the state of current available evidence? Has the majority of research been quantitative or qualitative? What theories have guided existing inquiry? We conducted several manual searches (e.g., Google scholar) in the early stages of developing our research questions to help answer the abovementioned questions. In addition, we consulted with librarians and senior academics before (a) determining which type of literature search we were going to conduct, and (b) choosing which guidelines to follow. Ultimately, we decided to use a systematic review methodology for the test case because it allowed us to synthesise findings from different studies and assess the quality of available evidence (Arksey & O'Malley, 2005). Arksey and O'Malley (2005) stated that a systematic review also enables a team to "review a large

number of studies [with] only a small percentage ... included in the final report" (p. 27), which, as noted later in this article, suitably represents the limited information available in the field of coaching research with Indigenous peoples.

There are well-established guidelines that provide step-by-step instructions for performing systematic reviews. Systematic reviews can focus on quantitative research (e.g., intervention strategies/experimental research) or qualitative studies (e.g., observational/interview research), or occasionally a combination of both. For quantitative systematic reviews, researchers have created specific guidelines for reporting the methodology, methods, and results from studies such as randomised controlled trials (CONSORT² Schulz, Altman, & Moher, 2010), systematic reviews and meta-analyses (PRISMA³ Moher, Liberati, Tetzlaff, Altman, 2009), and observational studies (STROBE⁴ von Elm et al., 2007). As for qualitative systematic reviews, similar guidelines have been created for the reporting studies in the form of ENTREQ⁵ (Tong, Flemming, McInnes, Oliver, & Craig, 2012) and RATS⁶ (BioMed Central, 2016) statements. Although there is a distinction between qualitative and quantitative approaches, both approaches require authors to extract and synthesise content to produce new collective ideas about a topic, as well as analyse the quality of methodological procedures by using tools that are contextually appropriate.

Although our initial search (i.e., using Google scholar) into the field of Indigenous sport coaching included qualitative and quantitative studies (because we were unsure how many studies existed in this emerging field), the final list of studies relevant to our research only included qualitative methods (as noted in the 'results' section later in this paper). As such, we followed the ENTREQ guidelines (Tong, Flemming et al., 2012) for qualitative systematic review protocols.

Methodology

Qualitative Research Review Guidelines: The ENTREQ Statement

Tong, Flemming and colleagues (2012) note that the ENTREQ statement is not a "definitive framework" (p. 7), yet it lists 21 'items' broken down into 5 domains to promote "explicit and comprehensive reporting of ... qualitative studies" (p. 7). Please see Table 1 for a step-by-step overview of the ENTREQ guidelines, the relationship between ENTREQ 'items' and 'domains', and how we applied the ENTREQ statement to our test case of the sport coaching experiences of Indigenous peoples.

In what follows, we provide readers with examples from our test case of the sport coaching experiences of Indigenous peoples. To do so, we outline Tong, Flemming and colleagues' (2012) domains and identify what we did for each step (see Table 1). Given that we have already covered domains 1 and 2 in earlier sections of this paper (i.e., the aim and synthesis methodology), we

Table 1 Collation of Procedures for Systematic Review of Qualitative Research

ENTREQ Guidelines (Tong, Flemming et al., 2012)		Test case on the Sport Coaching Experiences of Indigenous Peoples
Number and Item	Domains	How we addressed ENTREQ checklist items
1. Aim	1, 2) Introduction, Methods, and Methodology	1. Indigenous peoples sport coaching experiences
2. Synthesis methodology		2. Thematic analysis
3. Approach to searching		3. Comprehensive
4. Inclusion criteria		4. Table 2: Inclusion/Exclusion criteria
5. Data sources		5. 12 databases and experts; no grey literature, websites; 2014
6. Electronic Search strategy	3) Literature Search	6. Table 3: Databases and key words
7. Study screening methods	3) Literature Selection	7. Title, abstract, full—4 authors conducted screening
8. Study characteristics		8. Table 5: Study Characteristics
9. Study selection		9. PRISMA flow diagram
10. Rationale appraisal		10. Assessment of included articles quality
11. Appraisal items	4) Appraisal	11. COREQ
12. Appraisal process		12. Two authors conducted appraisal
13. Appraisal results		13. Table 4: All included
14. Data extraction	5) Synthesis of Findings	14. Results, discussion, conclusions analysed in excel
15. Software		15. Endnote/Word
16. Number of reviewers		16. Two authors conducted coding and analysis
17. Coding		17. Line-by-line
18. Study comparison		18. Subsequent studies coded into existing concepts
19. Derivation of themes		19. Deductive
20. Quotations		20. Participant quotations
21. Synthesis output		21. Table 6: Models of evidence

will focus attention on literature search and literature selection (domain 3), appraisal (domain 4), and synthesis of findings (domain 5).

Literature Search

To produce a “search which is reproducible and comprehensive” (Tong, Flemming et al., 2012, p.4), a literature review should include a complete description of why a certain electronic search strategy was chosen (i.e., rationale), where the search strategy was executed (i.e., information sources such as databases, grey literature), and when the search was conducted. The write up should also include how decisions were made in relation to the search dimensions (i.e., inclusion criteria) and what the search involved (e.g., preplanned or open-ended/iterative strategies). It is at this point that researchers determine their search strategy before entering their keywords and other parameters into library databases.

Literature Search Strategy: Examples From the Indigenous Coaching Test Case. Our approach to search was preplanned in that we were interested in

gathering all available peer-reviewed studies related to our topic area. We used specific inclusion and exclusion criteria to rationalise down the breadth of literature sourced during early phases of research to more specifically tie in with our research questions to be answered. An example of the inclusion/exclusion criteria for our test case is available in Table 2.

Below is an explanation of the types of choices that can be made with your inclusion/exclusion criteria, as well as further examples from our test case, with respect to deciding on the type of studies (e.g., qualitative) and publications (e.g., peer-reviewed journals), as well as population, language, and date parameters.

Population. Often researchers make decision to choose a population based on age, gender, race, socioeconomic characteristics, geographic locality etc. As we wanted to keep our population broad due to this being the first attempt to investigate Indigenous coaching experiences, we included any study that involved perspectives about Indigenous coaches’ experiences in team and individual sports from any country across urban, rural, and remote areas. This included high performance and community

Table 2 Inclusion/Exclusion Criteria

Inclusion Criteria
Topic: Facilitators and barriers to coaching for Indigenous people, Indigenous sport coaches, athlete and administrator perspectives about the facilitators/barriers for Indigenous sport coaches, athlete transition and the facilitators/barriers to coaching roles.
Population: Indigenous sport coaches (Indigenous descent as part of title, abstract, participants, and/or topic). This included male or female athletes, coaches, administrators or perspectives from Elders and leaders within the community.
Language: English, French, Portuguese, Spanish, Mandarin.
Study Type: Qualitative and quantitative research.
Publication Types: Peer reviewed journal manuscripts.
Time frame: 1970–2014.
Exclusion Criteria
Publication Type: Edited books, editorials, dissertations, commentaries, narrative reviews, newspaper/nonacademic sources, bulletins, conference abstracts/papers, popular culture books (e.g., autobiography).

coaches from youth and open age settings, as well as volunteers or paid professionals.

Language. Most research involving systematic reviews focuses on studies published in English. In our case, we wanted to go beyond the norm and focused on publications in English, French, Spanish, Mandarin, and Portuguese due to the multilingual capacities of our research team. This choice was further justified by the fact that most previous research about Indigenous populations has been published in English, which may neglect a significant part of the global Indigenous population that have experienced colonisation from Spanish, French, Portuguese, and Chinese nations. We also believed that performing a multilingual search added to the rigor of our approach.

Study Type. This generally refers to focusing on qualitative, quantitative, or both types of research. In some cases, researchers explain whether they decide to include subtypes of qualitative or quantitative research (e.g., case-study research) to provide more specific details about the approach taken. As mentioned earlier, our search considered both qualitative and quantitative studies about sport coaching experiences of Indigenous peoples, including studies where Indigenous athletes, officials and administrators spoke about the barriers and facilitators facing Indigenous coaches. This is because of the limited number of studies that we found from our initial scoping search.

Publication Types. When conducting a systematic review, authors often make choice about the type of materials to include in the analysis such as blind peer reviewed academic publications (most highly regarded in academic settings), organisational websites (e.g., National Sport Organisations), and ‘grey’ materials (e.g., book chapters, reports, dissertations, and conference papers). Choices in this part of a systematic review are often also time bound (i.e., limited to the duration of a grant), related to availability of staff, or dependent on the breadth of available evidence. We chose to solely focus on

blind peer reviewed publications in our project because no systematic review of Indigenous coaching experiences has been conducted before and grey materials have been excluded from previous detailed analyses of coaching science (see Gilbert & Trudel, 2004, p.389).

Time Frame. Given that systematic reviews often try to tie together available evidence in relation to their research question, it is prudent to place a date range so as to narrow the focus to a specific period that may not have previously been reviewed, or, because that period of time is especially pertinent to the topic. We selected publications from 1970 to 2014 because academic studies about coaching began to emerge in the early 1970s (LaVoi & Dutove, 2012), and detailed research about Indigenous sport participation has only developed within the past 30 years (Hallinan & Judd, 2012). Therefore, searching well beyond this timeframe would likely not have produced a plethora of additionally relevant studies.

Our data sources for the test case included 12 electronic databases, specific journal reviews (see Table 3), scanning of reference lists of relevant articles, and consultation with experts in the field of Indigenous sport for relevant studies. Phase one involved a systematic search for literature about the sport coaching experiences of Indigenous peoples using various keywords in multiple languages (see Table 3). As the terminology for Indigenous populations also varied between countries, we used a broad array of search terms and synonyms for “Indigenous” and “coach” to return data on as many populations as possible. Database e-mail alerts (i.e., Google alerts) were also set up to capture publications not sourced during the initial search. A final search was performed on 21 November 2014.

Literature Selection

Selection of literature is an important stage for numerically analysing the number of relevant studies to include in the final report. This stage is also vital for gathering

Table 3 Databases and Key Word Searches

Databases:
AUSPORT (1989-present), China National Knowledge Infrastructure (1970-present), ERIC (1970-present), Google Scholar (1970-present), Indigenous Collection (1977-present), Pro Quest (1971-present), PsychArticles (1970-present), PsycINFO (1970-present), SciELO (1970-present), Science Direct (1970-present), Scopus (1970-present), SPORT Discus (1970-present).
Specific Journals:
Australian Aboriginal Studies Journal, Australian Journal of Indigenous Education, Pimatisiwin, Canadian Journal of Native Studies, Native Studies Review, International Journal of Indigenous Health, New Zealand Journal of Sociology, MAI Journal.
<i>1. Example search strategy: Sport Discus (English)</i>
Keywords: Population
Indigenous or aborigin* or Torres Strait or native or South African* or American Indian* or Maori or ethnic or minorit* or black* or ethnic or first nation* or Blackfella* or African or Alaska* native* or Inuit or Métis or Indigenous peoples or native Australians or minorities in sports or ethnic groups or black athletes
AND
Keywords: Coaching
Coach* or sports coach* or coach* career* or sports instructor* or sports trainer * or athletic coach* or sport* instructor* or sports leader* or sport* identit* or black coach* or ethnic coach* or sports transition or sport* career or sports mentor* or native peoples coach
<i>2. Example search strategy: SciELO (Portuguese)</i>
Keywords: Population
Indigenas or indigeous or aborigene or aborigenes or aboriginal or nativa or nativas or native or hispanico or hispanicos or etnica or etnicas or etnicidad or etnicidade or etnico or etnicos or minoria or minorias or negra or negras or negro or negros or africano or africano americano or africanos brasileiros or african-american or african-americans or african-brazilian or africana or africanas or africano or africanos or africanos or afro or afro american or afro brazilian children or afro-amazonian
AND
Keywords: Coaching
Tecnica or tecnicas or tecnico or tecnicos or treinador or treinadores or treinamento or treino or treino esportivo or instrutor or lider or liderancas or lideres or mentor or mentores or mentoria or mentoring or mentors

data about the nature of the population involved in the study and locality of where the research has been undertaken. Regardless of whether the systematic review involves qualitative or quantitative studies, this process is often represented diagrammatically based on the PRISMA guidelines to capture researchers' decisions at each stage of the systematic review (Tong, Flemming et al., 2012). Below are an outline of the procedures we followed and results of our actions when selecting appropriate literature for our study.

Procedures From the Indigenous Coaching Test Case.

First, the result of entering key words into databases leads to a total number of 'hits' of studies that include potentially relevant information for the search strategy. In many cases, the search strategy also reveals some irrelevant studies that are omitted based on previously established 'exclusion' criteria. After completing the final search in each language, the lead author saved a full list of references to one Endnote file before removing duplicates. Next, two authors conducted an initial

screening of article titles. Two authors conducted an initial screening of articles in Endnote based on title and abstract. Two other authors then repeated this process (independently).

Studies that had titles which clearly did not relate to the research questions and inclusion criteria identified in Table 2 were moved to a folder in Endnote titled 'not relevant'. Subsequently, we read the abstracts from the remaining studies and sorted studies into either the 'include' or 'exclude' folder. Whenever there was doubt about whether to exclude the article or not, the authors erred on the side of inclusion and placed the reference in the 'include' folder for further review. At this point, authors reviewed the abstracts of the 'included' papers to establish further decisions about whether to include or exclude the paper. On some occasions, further consideration was required, where a review of the full paper took place, before making a final decision about including or excluding the paper. The four authors discussed any discrepancies regard-

ing inclusion status until reaching consensus for the final list of full-text peer reviewed articles. Two of the paper's authors then developed a data extraction sheet (see Synthesis of Findings section below) based on key words commonly associated with ecological models of human behaviour in coaching and Indigenous contexts (LaVoi & Dutove, 2012; Nelson, Abbott, & Macdonald, 2010).

Results From the Indigenous Coaching Test Case. The purpose of the 'results' section in a systematic review is to report on the number, type, and quality of studies included for analysis in the systematic review (Moher et al., 2009). In our test case, 842 articles were found through database searching, of which, 645 were eliminated based on irrelevant title and abstract content. All included articles were written in English despite the multilingual approach to gathering data. Sixty-six full-text articles were assessed for eligibility before further reduction based on exclusion criteria. Seven articles from the search met inclusion criteria and one article was identified from included article reference lists, resulting in a total of eight articles incorporated into the review (Figure 1).

All studies utilised qualitative approaches (primary research; Blodgett et al., 2008; 2010; Hoeber, 2010; Schinke et al., 2007; Stronach & Adair, 2010; Thomson, Darcy, & Pearce, 2010; Yu & Bairner, 2012), including one study that completed document analysis (secondary research; Tynan & Briggs, 2013). Surprisingly, *no study included a sample solely comprised of Indigenous coaches*. While this meant that we could not follow through with reporting on data directly from studies where coaches were the sole participant, we believed it would be feasible to include information about facilitators and barriers facing Indigenous coaches from studies that focused on, or included the perspectives of, Indigenous athletes, officials, administrators, and community members about the sport coaching experiences of Indigenous peoples. Hence, six studies included Indigenous athletes and their perspectives about coaching pathways (Blodgett et al., 2008; Hoeber, 2010; Schinke et al. 2007; Stronach & Adair, 2010; Thomson et al., 2010; Tynan & Briggs, 2013), while two studies included a sample of coaches, athletes, and community members who discussed their experiences with coaches and coaching pathways (Blodgett et al., 2010; Yu &

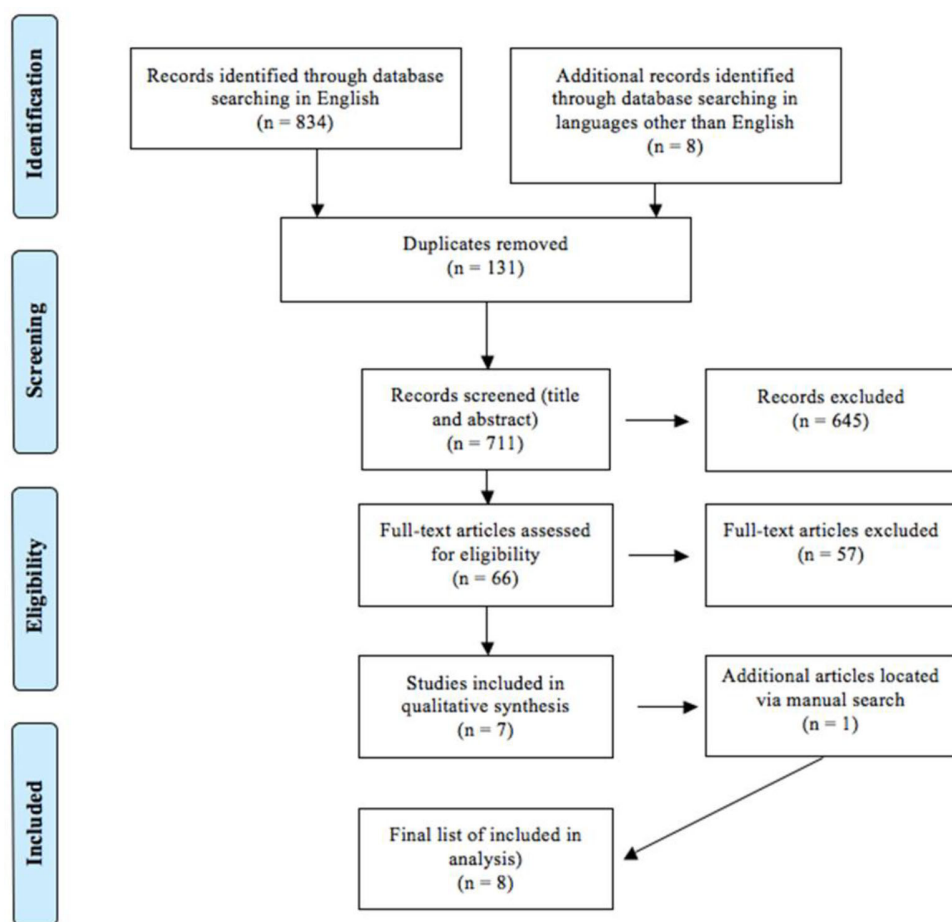


Figure 1 — PRISMA flow diagram: search results and screening process from the test case

Bairner, 2012). Included studies sourced participants from remote, rural, and urban areas with Indigenous and non-Indigenous coaches, athletes, and community members. The majority of studies were based in Canadian ($n = 4$) and Australian ($n = 3$) contexts, with one source from Taiwan.

Appraisal

While there are overarching guidelines for what to include, and how to conduct a systematic review, researchers have created checklists that can be used to appraise the methodological quality of qualitative research (see COREQ⁷; Tong, Sainsbury, Craig, 2007 or CASP Checklist⁸; Critical Appraisal Skills Program, 2014). According to Tong, Flemming et al. (2012), quality appraisal involves the “assessment of study conduct, appraisal of study reporting, and implicit judgement of the content and utility of the findings for theory development” (p.6). Furthermore, quality assessment enables readers to gain a deeper understanding of included papers by reviewing how the authors interpreted the findings and reported on the research process in a transparent and trustworthy manner. This appraisal helps to establish an in-depth understanding about the comprehensiveness of reporting of included studies and whether to exclude any further studies from the systematic review, due to lack of quality in the overall project (Tong et al., 2007, 2012). We chose to use the COREQ statement because this checklist has been used in previous qualitative systematic reviews (Morton, Tong, Howard, Snelling, & Webster, 2010; Tong, Jones, Craig, & Singh-Grewal, 2012).

Appraisal processes: Examples From the Indigenous Coaching Test Case. Two authors independently appraised papers using the COREQ checklist (Tong et al., 2007) before meeting to resolve any discrepancies. This was the most involved process of the systematic review, in which we used the 32-item COREQ checklist to cross check each included study for quality in terms of research processes and reporting of the findings. Please see Table 4 for the results of the quality assessment in relation to our test case. We encourage researchers in coaching science to do a quality assessment of articles included in systematic reviews because it enables readers to evaluate the trustworthiness and transferability of the findings to their own settings.

Comprehensiveness of Reporting: Examples From the Indigenous Coaching Test Case. Most manuscripts included more than 50% of items from the 32-item COREQ checklist (Table 4). Three papers reported on 27 items (Blodgett et al., 2008; 2010; Schinke et al. 2007), with two papers attending to 17–21 (Stronach & Adair, 2010; Thomson et al., 2010), and one study failing to meet the majority of checklist items (Yu & Bairner, 2012). One paper involved document analysis for data collection (Tynan & Briggs, 2013) and therefore, much of the checklist was not applicable. Some of the reporting was noted as ‘unclear’ when included studies yielded

vague statements that could not be interpreted as having ‘met’ or ‘failed to meet’ COREQ checklist items. Overall, seven out of the eight studies had clearly distinguishable reporting of their methodological approach. The only study that failed to include transparent data (Yu & Bairner, 2012) was still included due to the low number of available studies and relevance of findings. As a result, no studies were excluded or weighted based on the quality of reporting assessment (Morton et al., 2010). This means that the majority of studies adequately met a ‘low’ standard of quality with reporting their methodological procedures.

Synthesis of Findings

The synthesis of findings is arguably the most important stage in a systematic review and usually involves a two-step process. During the first stage of synthesis, data extraction takes place to identify important elements of included studies such as the research aims, participant information, theoretical approach, and methods (Tong, Flemming et al., 2012). In most cases, these data are extracted and placed into a table for utility (see Table 5).

Tong and colleagues (2012) noted the next step is to complete an analysis of findings by reviewing included studies’ results, discussion, and conclusion sections of included studies to generate “rich, compelling and new insights that go beyond a summary of the primary studies” (p. 7). This stage usually involves coding and thematic analysis. At this stage, it is important to choose software to help organise and analyse your data (e.g., Microsoft Word, Microsoft Excel, Nvivo, or Hyper research) as this will help synthesise findings and display results most effectively. Tong, Flemming et al. (2012) suggest that during this stage, qualitative systematic reviewers can be guided by a preestablished approach for synthesising data in the form critical interpretive synthesis, grounded theory synthesis, meta-ethnography, meta-study, or thematic synthesis. We used a form of thematic synthesis (Thomas & Harden, 2008) to review, synthesise, and report on the findings from included studies in a Microsoft Word document.

Synthesis of Findings: Examples From the Indigenous Coaching Test Case. According to Tong, Flemming et al. (2012), thematic synthesis is a useful tool when exploring ‘thinner’ studies or areas of research that may not have comprehensive primary data about the topic of interest. This strategy resonated well with our test case given the limited number of included studies and recent emergence of research conducted with Indigenous peoples in the past 30 years. Rather than follow a purely inductive analytic strategy, we also decided to use Bronfenbrenner’s ecological systems theory (EST, 1977) as a predetermined guide for the analysis and synthesis. This is because it is an important foundational theory for social, sport, and health sciences that has been used in similar literature reviews in the past (see LaVoi and Dutove, 2012; Nelson et al., 2010). The theory shows how individual experience

Table 4 Consolidated Criteria for Reporting Qualitative Studies (COREQ) Checklist

Number and Item	Blodgett et al. (2008)	Blodgett et al. (2010)	Hoerber (2010)	Schinke et al. (2007)	Stronach & Adair (2010)	Thomson et al. (2010)	Tynan & Briggs (2013)	Yu & Bairner (2012)
Domain 1: Research team and reflexivity								
<i>Personal Characteristics</i>								
1. Interviewer/facilitator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear
2. Credentials	Yes	Yes	No	Yes	Unclear	No	Yes	Unclear
3. Occupation	Yes	Yes	No	Yes	Unclear	No	Yes	Unclear
4. Gender	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear
5. Experience and training	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Unclear
<i>Relationship with participants</i>								
6. Relationship established	Yes	Yes	Unclear	Yes	Unclear	Unclear	N/A	No
7. Participant knowledge of the interviewer	Yes	Yes	Yes	Yes	Yes	Unclear	N/A	No
8. Interviewer characteristics	Yes	Yes	Yes	Yes	Yes	Yes	N/A	No
Domain 2: study design								
<i>Theoretical framework</i>								
9. Methodological orientation and Theory	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
<i>Participant selection</i>								
10. Sampling	Yes	Yes	Yes	Yes	Yes	Yes	N/A	No
11. Method of approach	Yes	Yes	Yes	Yes	Yes	Yes	N/A	No
12. Sample size	Yes	Yes	Yes	Yes	Yes	Yes	N/A	Yes
13. Nonparticipation	No	No	No	No	No	No	N/A	No
<i>Setting</i>								
14. Setting of data collection	Yes	Yes	Yes	Yes	No	Yes	Yes	No
15. Presence of nonparticipants	No	No	No	No	No	No	N/A	No
16. Description of sample	Yes	Yes	Yes	Yes	Yes	Yes	N/A	Yes
<i>Data collection</i>								
17. Interview guide	Yes	Yes	No	Yes	No	No	N/A	No
18. Repeat interviews	No	No	No	No	No	No	N/A	No
19. Audio/visual recording	Yes	Yes	Yes	Yes	No	No	N/A	No
20. Field notes	Yes	Yes	No	Yes	No	Yes	N/A	No
21. Duration	Yes	Yes	Yes	Yes	No	No	N/A	No
22. Data saturation	No	No	No	No	No	No	N/A	No
23. Transcripts returned	Yes	Yes	Yes	Yes	Yes	Yes	N/A	No
Domain 3: analysis and findings								
<i>Data analysis</i>								
24. Number of data coders	Yes	Yes	Yes	Yes	No	Yes	Unclear	No
25. Description of the coding tree	Yes	Yes	Unclear	Yes	Yes	Yes	No	No
26. Derivation of themes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
27. Software	No	No	No	No	No	Yes	No	No
28. Participant checking	Yes	Yes	Yes	Yes	Yes	Yes	N/A	No
<i>Reporting</i>								
29. Quotations presented	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30. Data and findings consistent	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear
31. Clarity of major themes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
32. Clarity of minor themes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

Table 5 Data Extraction Table for the Test Case on the Sport Coaching Experiences of Indigenous Peoples

Study	Aim	Participant Information	Theoretical Framework/Model	Method
Blodgett, Schinke, Fisher, George, Peltier, Ritchie, & Pickard (2008)	Delineate the barriers to youth sport participation among the Canadian Aboriginal athletes (Wikwemikong) and develop recommendations to inform practice.	Study 1—23 elite Canadian Aboriginal athletes (university level or higher). 16 males and seven females. Nine ice hockey (7 males, 2 females), seven boxing (6 males, 1 female), two lacrosse (1 male, 2 female), two cross-country running (2 females), one track and field (1 male), one soccer (1 female), and one tae kwon do (1 male). Average age 28.09 years (range 17–42).	Cultural Sport Psychology (Butryn, 2002; Fisher, Butryn, & Roper, 2003)	Study 1—Semistructured interviews
		Study 2—Wikwemikong community's sport and recreation program coordinator, the youth centre program manager, a community-appointed elder, a community coach, and the mainstream authors. Age and gender not stated.		Study 2—Talking circles
Blodgett, Schinke, Fisher, Yungblut, Recollet-Saikkonen, Peltier, Ritchie, & Pickard (2010)	Explore the subjective experiences of community members from a Canadian Aboriginal reserve (Wikwemikong).	Two talking circles with approximately 15 participants in each circle, including youth, present and former athletes, family members, teachers, coaches, sport and recreation staff, and elders. Participant age and gender not stated.	Cultural Sport Psychology (Ryba & Wright, 2005)	Talking circles; decision-making consensus
Hoeber (2010)	Examine the experiences of Canadian Aboriginal individuals as sport volunteers.	Study 1—63 participants (30 men and 33 women). Their volunteer positions ranged from event-day support (e.g., server, set up, clean up) to leadership positions (i.e., coaches, officials, coordinators).	Model of volunteering (Cnaan, Handy, & Wadsworth, 1996)	Focus groups
		Study 2—73 individuals (41 men and 36 women). Volunteers participated in a range of local, provincial, national, and international events. Their positions included informal unstructured roles (e.g., setting up and cooking), roles that required little training (e.g., scorekeeper and admissions), roles that required some training (e.g., first aid worker), former leadership roles (coach and game coordinator), and culturally important positions (e.g., elder and pipe holder). Age not stated.		
Schinke, Ryba, Danielson, Michel, Pickard, Peltier, Enosse, Pheasant, & Peltier (2007)	Explore the sport experiences of elite Canadian Aboriginal athletes coached by non-Aborigines.	23 elite Canadian Aboriginal athletes. 16 males and seven females. Nine ice hockey, seven boxing, two lacrosse, two cross-country running, one track and field, one soccer, and one tae kwon do. Average age 28.08 years (range 17–42).	Cultural Sport Psychology (Ryba & Wright, 2005)	Semistructured interviews

(continued)

Table 5 (continued)

Study	Aim	Participant Information	Theoretical Framework/Model	Method
Stronach & Adair (2010)	To analyse the postcareer decision-making and retirement experiences of Indigenous Australian athletes.	14 male boxers (Seven amateur and seven professional) M = 31.21 yrs.	Pierre Bourdieu's (1984) habitus, capital and field; interpretative phenomenological analysis	One-on-one interviews
Thomson, Darcy & Pearce (2010)	To analyse organisational approaches to: (a) structure and governance, (b) sport-development philosophies, and (c) and cultural inclusiveness of the programmes.	Three sport Development programs created for Aboriginal and Torres Strait Islander youth. Age and gender of the programme directors not specified.	Ganma Theory (Marika et al., 1992)	Case study; one-on-one interviews; document analysis; observation
Tynan & Briggs (2013)	To identify the complexities of racism facing sport organisations.	N/A	Critical Race Theory (Hylton, 2008)	Document analysis
Yu & Bairner (2012)	Examine the extent to which baseball in Taiwan reflects the ongoing influence of Confucian attitudes toward physical cultures in Taiwanese society not least in relation to the stereotyping of the island's indigenous population.	Eight athletes and former athletes and four coaches (all male) in Taiwan. One baseball club president (male). Age not stated	Confucianism (Lau et al., 2007)	Document analysis; semistructured interviews; personal communications

is shaped by various socioecological contexts, ranging from the most *proximal* (individual and interpersonal) to the most *distal* (community and sociocultural environment; Bronfenbrenner, 1999). Academics using EST posit that ecological models have various layers of influence often in four interrelated levels—individual, interpersonal, organisational and sociocultural (see LaVoi & Dutove, 2012; Nelson et al., 2010). In the case of Indigenous coaches, they may rely on individual factors (e.g., ability, motivation to coach) as much as they do on interpersonal (e.g., family support), organisational (e.g., institutional racism or support), and sociocultural contexts (e.g., community perceptions of Indigenous talent and ability) when pursuing or experiencing sport coaching roles.

To assist with the assessment and utility of the included studies' findings, facilitators were defined as factors that positively influenced opportunities for Indigenous people to gain, maintain, and progress in coaching roles. Barriers included factors that reduced opportunity or obstructed Indigenous people from gaining coaching roles, or led to attrition from existing coaching positions. In terms of our analytic technique, quotations from participants and text from the results and discussion sections of included studies were placed into a Microsoft Word document for coding and analysis. The data were reviewed line-by-line for information regarding facilitators and barriers for Indigenous sport coaches from the perspectives of coaches, athletes, game

administrators, and community members. Any relevant information was deductively coded into the four levels of the ecological model (Individual, Interpersonal, Organisational, Sociocultural) as a facilitator or barrier across all included studies. For example, the following comment was placed into the Interpersonal level as a facilitator because the authors' describe a finding that relates to the influence of coaches on an individual's likelihood of becoming a coach:

It appears that Aboriginal coaches play a central role in teaching youth the value of sport as well as mentoring future generations of coaches to ensure programming longevity (Blodgett et al., 2008, p.407).

Some of the facilitators and barriers appeared in more than one category, which is consistent with ecological models of human behaviour that emphasise interactions within and across different levels of ecological influence (Bronfenbrenner, 1999). Data extraction sheets were independently pilot tested by two authors (on three randomly selected studies). Disagreements were resolved by discussion before refining the data-coding sheet and generating the final content for reporting. The same two authors independently extracted the data using line-by-line coding to search for concepts. Table 6 presents the codes as part of an ecological model for factors that facilitate and impede Indigenous coaches' experiences.

Table 6 Socioecological Facilitators and Barriers for Indigenous Sport Coaches

	Facilitators	Barriers
Individual	<ul style="list-style-type: none"> • Passion for sport • Personal experiences in sport • Passionate coaches 	<ul style="list-style-type: none"> • Time constraints • Illiteracy • Avoiding responsibility
Interpersonal	<ul style="list-style-type: none"> • Grooming and mentoring • Cultural inclusivity • Expressing gratitude • Extrinsic rewards • Passionate coaches 	<ul style="list-style-type: none"> • Secondary parental role • Limited recognition • Limited longevity of coaching roles • Lack of role models • Limited capacity to earn money
Organisational	<ul style="list-style-type: none"> • Formal training • Succession planning • Grooming and mentoring • Holistic programs • Cultural inclusivity • Aboriginal only courses • Training programs in community • Sport manuals for Indigenous communities • Increased access to professional development 	<ul style="list-style-type: none"> • Police checks • Limited recognition • Limited employment • Limited capacity to earn money • Lack of opportunity • Lack of role models • Positional segregation
Sociocultural	<ul style="list-style-type: none"> • Cultural inclusivity • Sport manuals for Indigenous communities 	<ul style="list-style-type: none"> • Racism • Systemic mistrust • Societal norms • Limited opportunity • Police checks • Illiteracy

Summary and Conclusions

The value of a using systematic review methodology lies in its ability to provide a comprehensive description of a field of research. In this section, we provide a brief summary of the quantity and quality of evidence from the test case and then offer some concluding remarks. In particular, we hope the recommendations will be of interest to researchers who endeavour to conduct literature reviews in coaching science.

Quantity of Evidence

Systematic reviews are a robust methodology in which researchers conduct a detailed and structured search strategy to discover important factors about a body of research. The quantity of evidence can be strategically traced, and clearly noted through established procedures, which enhances the transparency of the research search process and reported results. Results from a systematic review can demonstrate

whether substantial research exists (i.e., large quantity of papers meeting inclusion criteria) or whether there is a significant gap in research evidence (i.e., low quantity of included studies) in a particular field. Specific to our test case, there were very few articles on the experiences of Indigenous sport coaches, which indicates there is gap in the literature worthy of further research and attention.

Quality of Evidence

In our test case about the sport coaching experiences of Indigenous peoples, only three out of the eight included studies met the majority of quality measures based on the COREQ checklist, which brings certain issues to the forefront. First, the COREQ checklist was developed for use across all qualitative research contexts, yet there is limited evidence of its use outside the health sciences. The present study was the first—to our knowledge—to use the COREQ checklist to synthesise research in coaching science. Evidently, more research is needed to understand

how this tool can be used in fields outside of health-related fields, including coaching science. In addition, the use of COREQ can also help guide authors before publication in coaching science journals as a checklist of things that could be included to enhance the quality of submission before receiving reviewer feedback.

Second, we found a large number of lower quality articles related to Indigenous sport coaching. This could be attributed to the fact that there has been very little empirical research with Indigenous sport coaches; however, it may also be reflective of the state of research in coaching science. That is, coaching science is still a relatively new field and researchers are building the foundations for consistent and professional scientific research practices. Based on the results of our test case, it is clear that researchers favoured qualitative methodologies, which is appropriate given the oral history approach Indigenous people have used to share cultural knowledge between generations for millions of years (Solonec, 2015).

In sum, the purpose of the current paper was to present a guide for conducting systematic reviews in coaching science. To do so, we presented a test case of a systematic review conducted on the sport coaching experiences of Indigenous peoples. In this paper, we highlighted the steps we followed to conduct our search, as well as offered some insights and lessons learned based on our experience. Below, we offer some suggestions based on the key lessons learned from completing our systematic review:

- Conduct an initial literature search (e.g., Google scholar) to better understand the body of literature, which will also help establish research questions or hypotheses
- Consult resources (e.g., academic texts) and/or individuals (e.g., librarians) before selecting a methodology for your literature review
- Follow previously established guidelines (e.g., ENTREQ, COREQ) to report on the findings of the review.
- Clearly articulate inclusion/exclusion criteria and databases/keywords (e.g., Tables, Figures) used in the literature search
- Use software (e.g., Endnote) to store articles retrieved from the search
- Critical appraisal checklists can be informative for evaluating transparency in the methodological processes of qualitative research
- Theoretical frameworks are useful to underpin the research questions and/or to synthesise results from literature searches.
- While Microsoft Word or Excel are sufficient data sorting mechanisms, software (e.g., NVivo, Hyper-research) can be used to organise your data in preparation for analysis
- Literature reviews are challenging and time consuming. Surround yourself with a research team that can

provide you with the necessary support and expertise to carry out the review.

Overall, systematic reviews provide a strategy for researchers to summarise bodies of literature in a manner that is consistent with agreed upon standards in the academic community. Producing quality systematic literature reviews is of critical importance for advancing research and theory within coaching science, and we hope that this paper is useful for researchers conducting systematic literature reviews within this domain.

Notes

1. Although there is no official definition of Indigenous people (United Nations, n.d.), the United Nations suggested that Indigenous people are those who self-identify with the term 'Indigenous' and who are part of a community that has historical continuity before colonial and/or settler arrival. While we acknowledge there are differences between First Nations populations within and across different countries, the term 'Indigenous' is used in this paper because of the global nature of the study. According to Western Sydney University guidelines, the use of the term 'peoples' as opposed to 'people' is preferred on the basis that it recognises the distinctive identities, status and rights of various Indigenous communities (see https://www.westernsydney.edu.au/oatsiee/aboriginal_and_torres_strait_islander_employment_and_engagement/workplace_relations)

2. Consolidated Standards of Reporting Trials

3. Preferred Reporting Items for Systematic Reviews and Meta-Analyses

4. Strengthening the Reporting of Observational Studies in Epidemiology

5. Enhancing Transparency in the Reporting of Qualitative Health Research.

6. Relevance of study question, Appropriateness of method, Transparency of procedures, Soundness of interpretive approach

7. Consolidated Criteria for Reporting Qualitative Research

8. Critical Appraisal Skills Program

Acknowledgements

The authors would like to acknowledge the assistance of the Katrina Chaudry, a Western Sydney University librarian who supported the search strategy process. We would also like to thank the editors and reviewers who took the time to consider our submission.

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