

**WHAT SEX SPECIFIC ROLES DO CULTURAL CONNECTEDNESS AND
SOCIAL SUPPORT PLAY IN MEETING PHYSICAL ACTIVITY
GUIDELINES AMONG FIRST NATIONS AND MÉTIS PEOPLES IN
SASKATCHEWAN?**

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By

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ABSTRACT

Introduction: Physical activity (PA) and social support (SS) lower chronic illness risks among males and females. How cultural connectedness (CC) and SS affect PA among Métis and First Nations-Status (FN) males and females is unknown.

Objective: This study examines sex-specific associations of CC and SS on PA among Métis and FN-Status in Saskatchewan.

Methods: Indigenous Peoples at the University of Saskatchewan completed online surveys evaluating sex, PA, CC, SS, family/friends SS for PA, home communities (HM), foster care (FC) and discrimination experiences. Identity and sex-specific analyses evaluated CC and SS scores on muscle strengthening (MS) and moderate-to-vigorous physical activity (MVPA) guidelines. Across HM, discriminatory and FC experiences, identity, and sex-specific MS and MVPA were compared.

Results: Participants included 66 Métis and 115 FN-Status. Métis females meeting MVPA guidelines reported lower SS from community than those not meeting MVPA guidelines (12.6 ± 2.4 vs. 14.2 ± 2.1 , $p=0.03$). FN-Status females meeting MVPA guidelines reported lower CC spirituality (18.3 ± 6.5 vs. 21.7 ± 5.7 , $p=0.04$) than FN-Status females not meeting MVPA guidelines. FN-Status males meeting MVPA guidelines reported higher identity (53.2 ± 3.1 vs. 41.8 ± 7.8 , $p=0.003$) and overall CC (97.9 ± 13.4 vs. 74.0 ± 16.0 , $p=0.02$) than FN-Status males not meeting MVPA guidelines. FN-Status females reported higher MS when encouraged (2.0 ± 2.1 times/week vs. 1.1 ± 1.6 times/week, $p=0.04$) or watched (1.9 ± 2.0 times/week vs. 1.2 ± 1.8 times/week, $p=0.04$) by family/friends or family/friends participated in PA (2.1 ± 2.1 times/week vs. 1.1 ± 1.8 times/week, $p=0.02$) than those without SS for PA. FN-Status females reported higher

MVPA when encouraged (195.6 ± 220.8 min/week vs. 99.3 ± 165.8 min/week, $p=0.01$) or watched (183.6 ± 215.9 min/week vs. 124.9 ± 188.0 min/week, $p=0.02$) by family/friends than those without SS for PA. FN-Status females meeting MS guidelines reported greater discriminatory experiences (6.7 ± 1.7 vs. 5.7 ± 1.7 , $p=0.01$) than those not meeting MS guidelines. FN-Status females with personal/family FC experiences reported lower MVPA than those without FC experiences (135.5 ± 194.8 min/week vs. 221.3 ± 234.2 min/week, $p=0.03$). FN-Status females from off-reserve HM reported higher MVPA than on-reserve or both. FN-Status males and females from southern versus northern HM reported higher MVPA.

Conclusion: Community SS is associated with lower MVPA among Métis females. Among FN-Status males and females, CC, family/friends SS for PA, FC and off-reserve or southern HM are associated with greater PA.

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ਹਮ ਨਹੀ ਚੰਗੇ ਬੁਰਾ ਨਹੀ ਕੇਇ
I am not better than anyone, no one is worse than me.

-Guru Nanak Dev Ji

DEDICATION

I would like to dedicate this to those who have helped me along the way, you know who you are.

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CHAPTER 1

1.1 INTRODUCTION

The term “Indigenous” in Canada refers to three groups of Peoples: First Nations, Inuit, and Métis (Allan & Smylie, 2015; Government of Canada; Crown-Indigenous Relations and Northern Affairs, 2009). Indigenous Peoples have lived in Saskatchewan for at least 11,000 years and established self-sustaining societies (Stonechild, 2006). In the 2016 census, Saskatchewan had 175,015 people of Indigenous identity, accounting for 16.3% of the province’s population of 241,420 (S. C. Government of Canada, 2017b) (S. C. Government of Canada, 2017a).

Using the term “Indigenous” to refer to First Nations, Métis, and Inuit Peoples does not do justice to the vast diversity among Indigenous Peoples (Allan & Smylie, 2015; M. Anderson et al., 2006; G. of C. I. and N. A. Canada, 2011; Government of Canada; Crown-Indigenous Relations and Northern Affairs, 2009; Sealey & Lussier, 1975). Historically, First Nations Peoples occupied territories south of the Arctic Circle. Métis Peoples established a homeland in the Prairie Provinces and Ontario. Inuit Peoples established a homeland in Canada’s northern regions (Allan & Smylie, 2015; G. of C. I. and N. A. Canada, 2011; Walker et al., 2021). This study focuses on Métis and First Nations Peoples in Saskatchewan.

Métis are Canada’s second most populous Indigenous group (Andersen, 2014; Iseke-Barnes, 2009; Peterson & Brown, 2001; Sealey & Lussier, 1975). Also, Métis are among the

fastest-growing Indigenous groups, whose numbers more than doubled between 1996 and 2006 (*Population Growth*, 2015). Saskatchewan has the fifth-largest Métis population in Canada and one of the largest per capita populations of Métis in Canada (Government Of Canada, 2017; S. C. Government of Canada, 2017d). In the historic Northwest, during the 18th and 19th centuries, before Canada officially became a nation-state, the Métis began to emerge as a distinct people and nation (Métis Nation-Saskatchewan, 2022). Although the first children of these marriages were individuals with mixed ancestry, the gradual establishment of distinct Métis communities outside of First Nations and European cultures and settlements, as well as the ensuing inter-marriages between Métis women and Métis men, resulted in the genesis of a new Indigenous People - the Métis (Macdougall, 2017). Métis Nation-Saskatchewan has adopted the following definition of Métis: “a person who self identifies as Métis, is of historic Métis Nation ancestry, is distinct from other Aboriginal peoples, and is accepted by the Métis Nation” (Métis Nation-Saskatchewan, 2022). For a long time, the federal government refused to recognize the rights of Métis People of the Métis Nation. However, the Manitoba Act of 1870 established Manitoba as a province within Canada and promised to protect Métis rights and lands (Augustus, 2005, 2008). Additionally, section 35 of the 1982 Constitution Act guaranteed Indigenous rights, but they were not defined (Hanson, 2009a). The term “Métis” in section 35 of the 1982 Constitution Act does not encompass all individuals with mixed Indian and European heritage; instead, it refers to distinctive peoples who, in addition to their mixed ancestry, developed their customs and recognizable group identity separate from their Indian or Inuit and European forebears (*R. v. Powley*, 2003). The government’s failure to formally recognize a “Métis” person as anyone of mixed ancestry had implications for access to supports/resources and the component of Indigenous identity associated with “community,” resulting in Métis People fighting for their

rights in courts, such as Mr. Powley and Mr. Daniels (“Daniels Decision,” n.d.; *Daniels v. Canada (Indian Affairs and Northern Development)*, 2016; *R. v. Powley*, 2003; Magnet, 2017). Métis are a distinct Nation of Indigenous Peoples, comparable to the First Nations’ Cree/Nehiyawak, Blackfoot, and Wendat.

First Nations is a term used to identify one of the three broad Indigenous groups in Canada. The Canadian government classifies First Nations as status Indians or non-status Indians based initially on the *Indian Act*’s criteria passed in 1876 (Bartlett, 1977; Hanson, 2009e). Status-Indians are individuals who have been registered as Indians under the *Indian Act*, referred to in this thesis as First Nations-Status (Allan & Smylie, 2015; G. of C. A. A. and N. D. C. C. Branch, 2008; G. of C. I. and N. A. C. C. Branch, 2008a, 2008b; Crey & Hanson, 2009). Non-status Indians are also First Nations Peoples who can live on reserves and participate actively in their communities, but the government does not recognize them as Indians under the *Indian Act*’s rules; therefore, they do not have access to the same benefits and resources as status-Indians (Allan & Smylie, 2015; G. of C. A. A. and N. D. C. C. Branch, 2008; Crey & Hanson, 2009; K. Wilson, 2018). Given the diversity, differences in social organization, variable Provincial First Nations governments such as the Federation of Sovereign Indigenous Nations (a Saskatchewan-based First Nations organization), local governments such as Thunderchild First Nations and Poundmaker Cree Nation, and day-to-day experiences among First Nations communities across Canada, the findings of this study are unique to Saskatchewan (Federation of Sovereign Indigenous Nations, 2022; Poundmaker Cree Nation - Saskatchewan, SK, 2022; Thunderchild First Nation - Saskatchewan, Canada - Piyesiw-Awasis, 2022). Furthermore, due to differences in policies, services, and benefits based on whether a person is First Nations-Status or First

Nations-Non-Status as defined by the *Indian Act*, this study's population will consist of Métis and First Nations-Status Peoples in Saskatchewan (Bartlett, 1977; Hanson, 2009e).

1.1.1 Self-Situating

My name is Varinder Brar. I want to outline my background and position to conduct this study with First Nations and Métis Peoples because I believe it is essential for the participants to know who I am, my knowledge base, my supervisor, and what I hope to gain from this study. I am a Sikh male settler born in Punjab, India. When I was nine years old, I immigrated to Canada. I graduated from high school in Surrey, British Columbia, and then relocated to Saskatoon, Saskatchewan, to begin my undergraduate studies at the University of Saskatchewan. To pursue my lifelong goal of becoming a family physician, I started my undergraduate studies by majoring in biology. In 2018, I received my Bachelor of Science degree and continued my undergraduate studies in toxicology. I applied to the College of Medicine immediately after graduating with a toxicology degree in 2019. Although I was not accepted, I decided to shift my focus to research to better understand the community in which I might one day serve. I wanted to do research that would allow me to work with people and understand their experiences through the lens of healthcare, as it would be an eye-opening experience for my future career as a family physician. I came across Dr. Heather Foulds' research profile and was immediately drawn to her field of study. During my undergraduate studies, I took several courses about Indigenous Peoples and their cultures. The similarities between Sikhi and Indigenous cultures piqued my interest. Both Sikhi and Indigenous cultures believe in the importance of respecting nature and caring for those around us.

Coming from a rich cultural background, I am curious how past and ongoing colonization and settler colonialism have impacted Indigenous Peoples today. Most health-related research has been conducted with First Nations and Inuit Peoples (Drawson et al., 2017; Evans et al., 2012; P. L. T. Smith, 2013). Limited research focuses on First Nations and Métis Peoples separately, with most research grouping First Nations and Métis Peoples together (I. A. P. on R. E. Government of Canada, 2019). Many research projects combine First Nations (or First Nations and Métis Peoples), omitting the granulation of individual Nation's experiences (I. A. P. on R. E. Government of Canada, 2019; Hayward et al., 2021). It is important to realize that each Nation has its own culture and cultural practises, so combining identities means combining heterogeneous data and missing out on the opportunity to see how an individual's cultural and social components influence their experiences, whether related to PA or health (I. A. P. on R. E. Government of Canada, 2019; Hayward et al., 2021).

As a result, my goal is to provide Métis and First Nations communities with a sex-specific understanding of the associations between cultural connectedness and social support with PA participation. This information can support programming that encourages healthier lifestyles, incorporate cultural activity into the lives of Indigenous Peoples across Canada, and avoid a one-size-fits-all approach.

1.1.2 Significance of Study

Physical activity is any skeletal muscle movement that burns calories and increases heart rate and breathing (Bouchard et al., 2012). Musculoskeletal PA is linked to improved mobility, glucose homeostasis, bone health, psychological well-being, and overall quality of life (Churilla et al., 2012; Warburton et al., 2001a, 2001b, 2006). A variety of muscle-strengthening exercises

(push-ups, sit-ups, working with resistance bands, climbing stairs, cycling, and heavy gardening, such as digging and shovelling) can help build power and endurance (Bouchard et al., 2012; Oja & Titze, 2011; Ross et al., 2020). Aerobic activities (walking, running, swimming, bicycling, and dancing) raise the heart rate and breathing, strengthening the heart and lungs (Bouchard et al., 2012; Oja & Titze, 2011; Ross et al., 2020). Aerobic exercises can be performed at various intensities, from light to moderate to vigorous. The Canadian Society for Exercise Physiology (CSEP) recommends major muscle group strengthening activities (MS) twice a week and 150 minutes of moderate to vigorous physical activity (MVPA) for adults aged 18-64 years (Ross et al., 2020). The research questions that guided this work were to examine if there are any differences in cultural connectedness scale (CCS) and multigroup ethnic identity measure (MEIM) scores between those who meet MS activity or MVPA guidelines and those who do not meet these guidelines among Métis and Saskatchewan First Nations-Status males and females.

To fully appreciate the significance of this study, one must first have a basic understanding of the cultures of Métis and First Nations Peoples. Métis and First Nations Peoples have distinct identities and cultures. Therefore, a pan-Indigenous approach must be avoided by analyzing and presenting data separately for Métis and First Nations Peoples. The methods used in this study recognize and respect the distinct identities of Métis and First Nations Peoples involved in this project and hope to gain knowledge and understanding of the impacts of colonization on the lives of Métis and First Nations Peoples.

Due to pan-Indigenous approaches to research, Métis Peoples and Métis-specific experiences are often ignored (Evans et al., 2012; Macdougall, 2017). In addition to the lack of Métis-specific research, research including many different First Nations communities, such as the Cree/Nehiyawak or Mohawk, are often combined into a single First Nations group (Findlay,

2011; MacMillan et al., 2003). Individual First Nations face different challenges, such as differences in environmental, economic, social, health, and historical factors – which can lead to First Nations People having differences in their physical activity and day-to-day living experiences (Findlay, 2011; Garner et al., 2010; S. C. Government of Canada, 2016b, 2017c; Hajizadeh et al., 2018; Lemstra et al., 2013). The First Nations participants in this study are local to Saskatchewan and fall under the Federation of Sovereign Indigenous Nations, a Saskatchewan-based First Nations organization representing 74 First Nations in Saskatchewan (Federation of Sovereign Indigenous Nations, 2022). As a result, the findings of this study may not apply to First Nations Peoples living outside of Saskatchewan, as their challenges to meeting physical activity recommendations may differ from those faced by First Nations Peoples in Saskatchewan, specifically the First Nations Peoples who attend or work at the University of Saskatchewan. Therefore, this study aims to provide results that apply to First Nations-Status Peoples in Saskatchewan and avoid grouping the distinct First Nations groups who are not from Saskatchewan into a single group.

Indigenous Peoples embraced gender fluidity before Europeans arrived (Brayboy, 2017; Express Web Desk, 2017; Sheppard & Mayo Jr, 2013). There were no gender distinctions (Brayboy, 2017; Express Web Desk, 2017; Sheppard & Mayo Jr, 2013). There were men and women, but there were also feminine men, manly women, and transgender people (Brayboy, 2017; Express Web Desk, 2017; Sheppard & Mayo Jr, 2013). Those who adopted fluid gender roles were referred to as Two Spirit female or Two Spirit male (Carrier et al., 2020; Deschamps & 2-Spirited People of the 1st Nations, 1998; Sheppard & Mayo Jr, 2013). Indigenous participants coined the term in 1990 at the Third Annual Intertribal Native American/First Nations Gay and Lesbian Conference in Winnipeg (Elhakeem, 2007; Sheppard & Mayo Jr,

2013). A Two-Spirit is an Indigenous person who possesses both feminine and masculine spirits (Sheppard & Mayo Jr, 2013). Nevertheless, a recurring theme in the existing literature and community member accounts regarding Two-Spirit identity is that it is multifaceted, fluid, and cannot be reduced to a single definition (Carrier et al., 2020; Hunt, 2016; Robinson, 2017; Sheppard & Mayo Jr, 2013). Two-Spirit people were thought to be supremely gifted for having the knowledge and ability to understand two opposing sides and serve as healers, medicine people, or spiritual leaders (Deschamps & 2-Spirited People of the 1st Nations, 1998; Sheppard & Mayo Jr, 2013). There was no clear distinction between male and female roles; males and females could hunt, bead, care for their children, and care for their household (Halseth, 2013; Hanson, 2009b; Martino & Greig, 2012). Many First Nations were matrilineal, with wealth, power, and inheritance passed down from the mother (Halseth, 2013; McIver, 1995). Females held political power and leadership positions in their communities (Carter, 1996; Halseth, 2013). However, the colonial patriarchal social structure imposed by European colonizers eroded these First Nations' cultural values and roles (Halseth, 2013; Hanson, 2009b; Martino & Greig, 2012), leading to the colonial idea of male and female. Indigenous Peoples were considered an inferior class of people within the imposed structure, and Indigenous females were considered an inferior sex within that inferior class (Halseth, 2013). With the passage of the *Indian Act* in 1876, the patriarchal social structure was further armed to elevate male power and authority at the expense of females (Deschambault, 2020; McGrath & Stevenson, 1996; K. Wilson, 2018). In today's Western society, patriarchal views have pushed for more segregated ideas of male and female roles (Nahwegahbow, 2014). Therefore, it is important to analyze data separately for Métis and First Nations males and females.

Due to cultural differences in society, structures, values, and beliefs resulting from colonization, Indigenous Peoples have unique experiences with cultural connectedness, social support, and PA (Bartlett, 1977; Forsyth et al., 2012; H. J. Foulds et al., 2012a; Hanson, 2009e; A. Ironside et al., 2020, 2021; Lavallée, 2007; National Collaborating Centre for Aboriginal Health, 2016). By and large, the policies of European colonizers resulted in cultural genocide against Indigenous Peoples throughout Canada (Paradies, 2016). The prohibition of land use, ceremonies, and gatherings severely impacted cultural transmission by making it more difficult for Indigenous Peoples to gather and share their stories, as well as learn from their Elders (Bartlett, 1977, 1980; National Collaborating Centre for Aboriginal Health, 2016; Pashagumskum, 2018). Even today, First Nations Peoples living on reserves face substandard housing, a lack of safe drinking water, and limited access to medical care (Anand et al., 2019; G. of C. I. and N. A. Canada, 2017; Cauchie, 2013; Findlay, 2011; H. J. A. Foulds et al., 2013a; S. C. Government of Canada, 2017c; Hajizadeh et al., 2018). First Nations and Métis Peoples face a higher burden of chronic illnesses than non-Indigenous Peoples (Allan & Smylie, 2015; Bruce et al., 2014; King, 2011; Lix et al., 2009). Many First Nations communities do not have clean drinking water (G. of C. I. and N. A. Canada, 2017; *Safe Water for First Nations*, 2020; *Why Some First Nations Still Don't Have Clean Drinking Water — despite Trudeau's Promise*, 2019). In 2016, one in five (19.4%) of Indigenous Peoples lived in a house that needed major repairs, and 18.3% of Indigenous Peoples lived in crowded housing (S. C. Government of Canada, 2017c). These disparities make physical activity a minor priority for Indigenous Peoples, leading to physical inactivity and health disparities (Ahmed et al., 2021; Anand et al., 2019; S. C. Government of Canada, 2017c; Wahi et al., 2019). Social support has been established as a determinant of PA, reduced chronic disease prevalence and improved mental health (Beets et al.,

2006; Cohen et al., 2007; Freeborne et al., 2019; A. Ironside et al., 2020, 2021). Métis and First Nations Peoples place value on social support in the form of kinship, family, community, and being there for each other (H. J. A. Foulds et al., 2011; L. Kirmayer et al., 2003; L. J. Kirmayer et al., 2000; Walker et al., 2021). Social support from family, friends, and the community leads to a greater sense of cultural connectedness and participation in PA (H. J. A. Foulds et al., 2011; C. J. Ryan et al., 2018). Métis and First Nations Peoples' cultural connectedness and social support have been identified as determinants of PA (A. Ironside et al., 2020, 2021).

Along with western PA, such as muscle strengthening and aerobic exercises, traditional Indigenous activities such as hunting, fishing, gathering and harvesting food, Indigenous ball games, and dancing can help Métis and First Nations Peoples meet physical activity goals (Ahmed et al., 2021; Akbar et al., 2020; A. Ironside et al., 2020, 2021). As a result, it is critical to determine whether the frequency of participation in traditional activities is associated with PA among Métis and First Nations males and females – which is important to gain a better understanding of the importance of traditional activities in supporting and increasing PA among Métis and First Nations males and females. This study will investigate the associations between the frequency of traditional activity participation with MS activity and MVPA participation.

Currently, there is a lack of research focusing on the specific experiences of Métis and First Nations males and females and their participation in PA. Given the enforced switch from a matrilineal social structure to a patriarchal social structure among some First Nations communities, changes in political structure, gender roles, participation in traditional activities, and confinement to reserves, the experiences of Métis and First Nations males and females may differ since Métis, and First Nations females continue to face discrimination and injustices due to the colonial policies and imposition of European gender norms (Arvin et al., 2013; Guerrero,

2003; Hanson, 2009b, 2009c). With the knowledge that Métis and First Nations males and females have different experiences in their homes and communities, it is important to determine the roles of cultural connectedness, social support, and PA participation among males and females, which could explain the health disparities among males and females (Hanson, 2009b). Colonization has altered the physical and cultural activities that males and females engage in, resulting in a decrease in PA and an increased prevalence of chronic illnesses among Indigenous females compared to Indigenous males (Hanson, 2009b). Being culturally connected and having a sense of belonging to a group of people are essential factors in PA among Indigenous Peoples (A. Ironside et al., 2020, 2021). Indigenous Peoples are less physically active than in the past because of their history of trauma, attendance at residential schools, and living in remote communities (Bombay et al., 2013; H. J. A. Foulds et al., 2013a; A. Ironside et al., 2020, 2021). This study, which builds on previous work by Ironside et al. (2020, 2021), will investigate how Métis and First Nations males' and females' cultural connections and social support influence their muscle-strengthening activities, MVPA weekly and how the frequency of traditional activity participation influences PA participation.

1.1.3 Overview

This cross-sectional, quantitative study aims to work with the Indigenous students, staff, and faculty at the University of Saskatchewan. There are two main objectives this study seeks to accomplish. This first objective is to determine the sex-specific relationships of cultural connectedness and PA among the Métis and Saskatchewan First Nations-Status males and females at the University of Saskatchewan. In a 2020 study conducted with the Indigenous communities at the University of Saskatchewan, Ironside and colleagues identified cultural

factors associated with Indigenous Peoples' PA (A. Ironside et al., 2020). Cultural connectedness was positively associated with PA in First Nations but negatively associated with Métis participants (A. Ironside et al., 2020). Further investigation is needed to determine the relationships between cultural connectedness and PA among Métis and Saskatchewan First Nations-Status males and females.

The second objective is to determine the sex-specific social support relationships with PA among Métis and Saskatchewan First Nations-Status males and females. Social support was previously associated with PA among Indigenous Peoples at the University of Saskatchewan (A. Ironside et al., 2021). This study will further these evaluations to determine the sex-specific relationships of social support and PA engagement among Métis and Saskatchewan First Nations-Status males and females at the University of Saskatchewan.

A strength-based approach was used to identify potential cultural and social determinants by analyzing the strengths of Indigenous knowledge, community values, and cultural values (Drawson et al., 2017). Dr. Foulds and Avery Ironside held twelve meetings with Indigenous groups on campus to determine the variables to be evaluated as identified by Indigenous Peoples at the University of Saskatchewan. An Indigenous Community Advisory Committee (ICAC) was formed, including Indigenous undergraduate and graduate students, Indigenous staff, and an Indigenous Elder. The ICAC included Métis and First Nations males and females. The ICAC identified specific questions to be included (e.g., the inclusion of questions about discrimination) and determined wording (e.g., wording and developing questions that were specific to Indigenous Peoples, such as physical activity role model questions or questions relating to participation in traditional activities) and order of included questions (e.g., rearranging the order of Social Support Index questions). After the initial phase of this study, the Advisors met with

the research team to discuss the findings and provide an interpretation of meaningful and applicable results to the community. In addition, a Lunch and Learn session was held at Gordon Oakes Red Bear Student Centre, where compiled results were shared with the larger Indigenous community at the University of Saskatchewan. Attendees were also asked to share their perspectives and interpretations of the results. Including Indigenous groups on campus and the ICAC provided aid in ensuring this project is culturally sensitive and maintains genuine intentions. The current phase of this study expands on the initial findings by exploring sex-specific PA experiences among Métis and Saskatchewan First Nations-Status adults while maintaining existing community relationships. Once results from this second phase of the study are available, discussion and interpretation of results in partnership with Community Advisors will be held, followed by a Lunch and Learn or online sharing of results with the larger community of Indigenous Peoples at the University of Saskatchewan.

1.2 REVIEW OF LITERATURE

1.2.1 Sex and Gender

Sex refers to the set of biological attributes in humans and animals. Sex is associated with physical and physiological features, including chromosomes, gene expression, hormone levels and function, and reproductive/sexual anatomy (C. I. of H. R. Government of Canada, 2014). In addition to 22 pairs of chromosomes, humans have an additional pair of sex chromosomes (Short et al., 2013). Most females have two X chromosomes, and most males have an X and Y chromosome (Short et al., 2013). Gender is a culturally and historically determined social construction. It is in perpetual flux (J. L. Johnson et al., 2009). Gender refers to the socially imposed and experienced aspects of “femaleness” or “maleness” in a community and manifests

itself on multiple levels (Doyal, 2012; J. L. Johnson et al., 2009). Gender and our experience of it are inextricably intertwined with the social world. As a result, gender is also closely associated with social and economic standing, with maleness being universally favoured above femaleness (J. L. Johnson et al., 2009). These experiences and cultural norms culminate in socially defined gender roles that dictate behaviour, sustaining various sexes' interests, expectations, and labour divides (J. L. Johnson et al., 2009). These gender roles are maintained by practices and rules that influence gender identity at the individual level, gender relations at the interpersonal or group level, and institutional gender in the social sphere (J. L. Johnson et al., 2009). Institutionalized gender represents the distribution of power between the sexes in any given society's political, educational, religious, media, medical, and social institutions (J. L. Johnson et al., 2009). In many parts of the world, women and girls are less likely than men and boys to have access to adequate healthcare, food, or education (Choudhury et al., 2000; J. L. Johnson et al., 2009); women are frequently malnourished because they prioritize feeding their families over themselves (Ene-Obong et al., 2001); and women are less likely than men to have an adequate income (Attanapola, 2004); these factors have a direct impact on a woman's ability to achieve good health (J. L. Johnson et al., 2009). Sex and gender are recognized as determinants of PA (Azevedo et al., 2007; Craft et al., 2014; Plotnikoff et al., 2004; van Uffelen et al., 2017; Wenthe et al., 2009; H. J. Wilson et al., 2014)

Some studies claim to determine gender differences in physical activity status; however, they report that males tend to have higher physical activity than females (McCarthy & Warne, 2022), using male/female terms associated with sex. Another study looking at the gender differences in physical activity interchangeably used sex and gender terms in reporting; "In a population-based sample of Brazilian adults, the leisure-time physical activity level in males and

females was explored. Men presented higher activity levels than women in terms of moderate-intensity, vigorous-intensity, and total leisure-time physical activity practice” (Azevedo et al., 2007). As evident from the results above, the interchangeable use of man/woman and male/female terms leads to a misunderstanding of whether sex or gender is being reported (Clayton & Tannenbaum, 2016). The mixed-use of sex and gender terms not only creates confusion about whether sex or gender is being assessed/reported but also leads to research that lacks results specific to gender roles, gender identities, gender relations, and institutionalized gender among people who do not conform to being male/female or man/woman based on our understanding that sex and gender exist on a continuum (J. L. Johnson et al., 2009).

This section aims to demonstrate the distinction between sex and gender. Sex and gender are defined differently, and it is inconsiderate to state gender as a boy, girl, man, woman, trans-man/woman, two-spirit man/woman or other because the complexities of gender are broader (Clayton & Tannenbaum, 2016). Therefore, gender is different from sex and needs further evaluation (Clayton & Tannenbaum, 2016; Rosenfeld, 2017; Short et al., 2013). Since gender identity is typically, but not always, based on sex, gender may have a similar impact on PA as sex (Rosenfeld, 2017; Trost et al., 2002). Research focusing on PA differences between Indigenous males and females is currently minimal. However, one study by Foulds et al. (2012) in British Columbia, Canada, with Indigenous Peoples identified that Indigenous males are more physically active than Indigenous females. While the current study will only examine the correlations between cultural connectedness, social support, and PA participation in Indigenous males and females, future research should seek gender-specific analyses to yield results that can better illuminate differences across numerous aspects of gender.

1.2.2 Possible Cultural Determinants of Physical Activity

1.2.2.1 Cultural Connectedness

Culture is defined as the dynamic and adaptive system of meaning that is learned, shared, and transmitted from one generation to the next and is reflected in the values, norms, practices, symbols, ways of life, and other social interactions of a given culture (Kreuter & McClure, 2004; National Collaborating Centre for Aboriginal Health, 2016). Culture has been recognized as an essential factor associated with health and health behaviours and a potential means of enhancing the effectiveness of health communication programs and interventions (Kreuter & McClure, 2004). Culture can be practiced by anyone who is taught or wants to learn. Physical activity participation among older adults can be enhanced by providing culture-specific exercise programs (Belza et al., 2004). A study conducted among female adolescents of South Asian background living in British Columbia found that culture and family influences were essential predictors of PA engagement (Ramanathan & Crocker, 2009).

Cultural connectedness (or cultural connections) refers to how a person rates their strength of connection to a specific group of people (Snowshoe et al., 2015, 2017). For Indigenous Peoples, this could mean their connections to their tribal culture, knowledge of and engagement with aspects of Indigenous culture, or political connections (Lucero, 2014; Métis Nation-Saskatchewan, 2022; Snowshoe et al., 2015, 2017). Through colonization and continued settler colonialism, Indigenous Peoples have experienced a disconnect from their culture and families (Amir, 2018; B. Davis, 2012; Howard-Hassmann, 2015; St-Denis & Walsh, 2016). Research conducted by Ironside et al. (2020) among the university population in the first phase of this project found that First Nations and specifically Cree/Nehiyawak adults who were

physically active, reported greater identity, spirituality, traditions, commitment, affirmation/belonging, and overall cultural connectedness. Increased cultural connectedness may help youth avoid certain behaviors, such as substance use and having sex (Poon et al., 2010). It may increase the likelihood that youth will pursue higher educational goals and participate in school activities such as art and clubs, provided they have access to these programs and facilities (Poon et al., 2010). Increased cultural connectedness among youth has also been associated with volunteering, fewer binge drinking episodes, and more weekly PA (Saewyc et al., 2013). Income, which is correlated with gender, can also influence many of these behaviors in males and females, as a sufficient income is required to participate in many of these activities (J. L. Johnson et al., 2009). Cultural connectedness is also a critical factor in psychosocial variables determining First Nations youth's mental health outcomes (Snowshoe et al., 2017). Research studies suggest that cultural connectedness – which includes an individual's efforts to learn about their ethnic group, the sense of belonging to the group, and cultural components such as identity, spirituality, and traditions – is an essential factor contributing to Indigenous Peoples' health, further highlighting the fact that cultural connectedness in addition to income and gender may be an influencing factor (Poon et al., 2010; Saewyc et al., 2013; Snowshoe et al., 2017).

On the other hand, Davis et al. (2012) discovered that Indigenous youth who were spiritually balanced, where spirituality is defined as the ability of an individual to embed themselves in something greater than themselves and the motivation to search for connectedness, meaning, purpose, and contribution to the world around them (Benson et al., 2019; Fleming & Ledogar, 2008; Wong et al., 2006), across the cultural, physical, mental and spiritual elements of the medicine wheel and whose community strengths included languages and traditional ceremonies were more likely to report depression. Therefore, culturally connected Indigenous

Peoples who participate in cultural ceremonies or embrace their Indigenous languages can have health benefits, whereas others may not. Other factors, such as one's environment, family history, and socioeconomic status, may influence an individual's health. It has also been reported that First Nations adults with at least one parent who attended residential school reported higher levels of depressive symptoms compared to those who did not have these experiences (Bombay et al., 2011). Additionally, Saewyc et al. (2013) discovered that, despite increased cultural connectedness and language revitalization, Indigenous youth on reserves reported poorer health and a higher prevalence of risky behaviour. Furthermore, Ironside et al. (2020) found no difference in cultural connectedness measures between Métis adults with low and high PA. These findings indicate that cultural ties alone are insufficient to protect against critical risk exposures such as food insecurity, exposure to violence, and unstable housing (Anand et al., 2019; Bailie & Wayte, 2006; M. Clark et al., 2002; Flanagan, 2020). Cultural connectedness alone will not suffice to overcome some unhealthy behaviours or poor health reported by Indigenous Peoples (S. C. Government of Canada, 2016b; Greenwood et al., 2015; National Collaborating Centre for Aboriginal Health, 2016). When studying the determinants of health and physical activity of Métis and First Nations males and females, the environment, such as living on reserves or in rural areas and historical trauma, must be considered (Findlay, 2011; S. C. Government of Canada, 2017c; Lix et al., 2009; Martin et al., 1987). As a result, when examining physical activity participation among Métis and First Nations males and females, this study will include home communities and historical trauma.

Connectedness to one's culture may be a predictor of PA. Individuals with a more robust cultural connection exercise regularly (Saewyc et al., 2013). Indigenous youth's participation in traditional First Nations physical activities was also contingent upon their knowledge and use of

the Indigenous language, spiritual balance, living with at least one biological parent, and having relatives who could assist youth in understanding their culture (First Nations Information Governance Centre et al., 2015). Attending a cultural event and having a high level of spirituality was positively associated with leisure-time PA and higher levels of physical transportation, such as walking, among Métis adults (C. J. Ryan et al., 2018). Additionally, a study in collaboration with the Yup'ik in the Yukon Territory revealed that higher levels of enculturation - the process of becoming acquainted with, identifying with, and practising one's traditional culture - were significantly more active (Bersamin et al., 2014). Multiple studies have identified that including a cultural component in PA interventions increases their effectiveness (Crowe et al., 2017; Oyibo, 2016; C. J. Ryan et al., 2018). Among Métis Peoples, traditional knowledge, language, and cultural identity are important determinants of health and mental wellness (National Aboriginal Health Organization [NAHO], 2008). Métis youth have stated that cultural practices promote positive mental health by instilling cultural pride, self-esteem, and a sense of belonging (Tourand et al., 2016). With their provincial study, Tourand and colleagues (2016) also discovered that Métis youth (aged 12–19) who participated in cultural activities within the previous year (25 percent of the total sample) were more likely to rate their overall health as good or excellent (83% vs. 71%). These studies emphasize the critical role of cultural connectedness in determining PA. Culture promotes emotional well-being and connects participants to a sense of identity and belonging (Crowe et al., 2017). Additional research is necessary to ascertain the precise role that cultural connectedness plays in the lives of Indigenous Peoples, as well as consider the location and resources available to an individual. Additionally, PA programming should be culturally appropriate to avoid a one-size-fits-all approach (Bennie et al., 2015; Crowe et al., 2017; B. Davis, 2012; Oyibo, 2016; C. J. Ryan et al., 2018). This study

will therefore avoid a one-size-fits-all approach by focusing on the university population in Saskatoon, where everyone has equal access to the university's cultural programming on campus, multiple recreational facilities on campus, including wheelchair-accessible spaces to play basketball, volleyball, badminton, squash courts, an indoor walk/jog track, a swimming pool, a climbing wall, and a fitness center. Research among the university population permits cultural connectedness examination within a population where individuals can access cultural programming and physical activity resources.

1.2.2.2 Discriminatory Experiences

Discrimination is defined as the unjust or prejudicial treatment of different people or things, most notably based on race, age, gender or cultural level (*Discrimination / Definition of Discrimination by Oxford Dictionary on Lexico.Com Also Meaning of Discrimination*, 2020). Discrimination can occur at many levels, including but not limited to health care, education, and justice (Adelson, 2005; Cunneen, 2006; Devlin, 2009; C. Lee et al., 2009; Senese & Wilson, 2013). Indigenous Peoples face more provider discrimination in health care and are more likely to postpone medical services than non-Indigenous Peoples (Adelson, 2005; Allan & Smylie, 2015; C. Lee et al., 2009; Wylie & McConkey, 2019). The exposure of a low-income mother to racial discrimination during pregnancy may be linked to low birth weight in her infant compared to mothers who are not exposed to racial discrimination during pregnancy (Collins et al., 2000). Additionally, perceived discrimination and stress among mothers during pregnancy are indirectly related to increased levels of postpartum depressive symptoms, lower birth weights, lower gestational ages, and an increased number of doctor's visits for the baby (Hackney et al., 2021). Researchers have found that racial discrimination among African Americans is strongly linked to

psychiatric symptoms that result from the trauma of discriminatory experiences and that racial discrimination is linked to cigarette smoking among African Americans and Asian Americans (Borrell et al., 2013; Chae et al., 2008; Collins et al., 2000; Guthrie et al., 2002; Krieger et al., 2005; Landrine et al., 2006). Racial discrimination is also linked to the poorer health outcomes experienced by African Americans compared to Whites (Borrell et al., 2013; Hausmann et al., 2008). Racial discrimination has also been linked to poor cardiovascular health in African Americans (Guyll et al., 2001). Unfair treatment can contribute to illness and subsequent prescription medication use among Filipino Americans (Gee et al., 2007). Some people may turn to illegal drugs and alcohol to cope with the stress of unequal treatment (Gee et al., 2007). Health discrimination is also linked to poor or fair self-rated health and lower neighbourhood social capital. Discrimination is associated with risky behaviours such as reduced PA, heavy smoking, and poor sleep quality (Chen & Yang, 2014). Participants in a study conducted in suburban and rural South Carolina discovered that race and ethnicity, rather than socioeconomic status, are the significant factors influencing youth PA (Barr-Anderson et al., 2017). Discrimination can lead to physical inactivity and increase individuals' risk of chronic illnesses (Allan & Smylie, 2015; González et al., 2017; Williams & Mohammed, 2009). Some people, however, use PA to cope with their experiences of racism and discrimination (Edwards & Cunningham, 2013). African American adults who had experienced moderate to severe discrimination were more physically active than those who had not experienced discrimination (Borrell et al., 2013). The increase in PA among people who are discriminated against may demonstrate the buffering effect of PA against the stress of racism (Borrell et al., 2013; Buttar et al., 2005; Hernandez et al., 2014). Individual discrimination can result in various illnesses, addiction to alcohol and drugs, and a decrease in PA (Gee et al., 2007; Rosenfeld, 2017).

Discriminatory experience is a proximal determinant of health among Indigenous Peoples of what is now known as Canada, influencing health in the most visible and direct ways (de Leeuw et al., 2015; Greenwood et al., 2015; C. Reading, 2018; C. L. Reading & Wien, 2009; Wylie & McConkey, 2019). Discrimination, poverty, a lack of education, unemployment, poor working conditions, and an inadequate or harmful physical environment all have a negative impact on physical, mental, emotional, spiritual, and social conditions (Greenwood et al., 2015; Marmot, 2005; C. L. Reading & Wien, 2009). According to research conducted among African American, Hispanic, Asian, and Indigenous communities in Canada, African Americans and Indigenous Peoples reported being treated with less courtesy or respect than other groups and feared by others (Siddiqi et al., 2017). Discrimination determines chronic disease and chronic disease risk factors in Canada, and African Americans and Indigenous Peoples are more likely to face discrimination than other groups (Siddiqi et al., 2017). There is a higher rate of systemic racism faced by Indigenous athletes and youth in western settings than non-Indigenous athletes and youth (Bell, 2019; Henhawk, 2009). They also face difficulties when trying to play sports outside of the Indigenous community (Bloom, 1996; Bruner et al., 2016; Pickard, 2008; Recollet-Saikonnen, 2010). Racism is cited as a barrier to PA by Indigenous university students (Ferguson & Philipenko, 2016). Physical activity is beneficial and proactive in the prevention of many mental health conditions and chronic diseases; thus, physical activities must be more inclusive and respect individuals of all races and ethnicities (Barr-Anderson et al., 2017; Bauman et al., 2012; Edwards & Cunningham, 2013; H. J. Foulds et al., 2011). There is currently little research focusing on PA and its relationship to health among Indigenous Peoples. Furthermore, there is limited research on the sex-specific effects of discrimination on the amount of PA among First Nations-Status and Métis Peoples in Saskatchewan.

1.2.3 Possible Social Determinants of Physical Activity

1.2.3.1 Social Support

Social support entails the feeling of being cared for, loved, respected, and valued, as well as the reassuring knowledge that one is part of a network of communication and mutual obligation (Marmot & Wilkinson, 2005; C. L. Reading & Wien, 2009). Social support can come from various sources, including family, friends, coworkers, organizations, and the larger community (Nurullah, 2012). As with cultural connectedness, social support acts as a buffer against a wide variety of chronic illnesses and increased social support results in increased PA (Compare et al., 2013; Eyler et al., 1999; Freeborne et al., 2019; Hernandez et al., 2014; G. L. Smith et al., 2017). Social support appears to help prevent or delay the onset of CVD in its early stages (Hernandez et al., 2014). Additionally, social support confers resilience to stress (Baqtayan, 2011; Ozbay et al., 2007; Reeve et al., 2013). There is limited evidence that increased perceived spousal support is associated with improved compliance and survival in females on dialysis (Cohen et al., 2007). Additionally, individuals who received moderate to high levels of emotional support had lower mortality risks than those who received low levels of emotional support (Gronewold et al., 2020; Penninx et al., 1997; Uchino et al., 2018; Wilkins, 2003). Social support is critical for increasing PA among sedentary females of diverse racial/ethnic origins (Eyler et al., 1999). Social support from family members plays a critical role in increasing adults' leisure-time PA (G. L. Smith et al., 2017). There is a positive correlation between parental and peer support and PA among adolescents (Beets et al., 2010; Hohepa et al., 2007; Silva et al., 2014). High levels of social support are also beneficial in smoking cessation

and the maintenance of short-term abstinence (Granado-Font et al., 2018; Mermelstein et al., 1986; R. P. Murray et al., 1995; Soulakova et al., 2018).

Regarding social support, Indigenous Peoples have an advantage over non-Indigenous groups because they place a high value on kinship, family, community, and being there for each other (National Collaborating Centre for Aboriginal Health, 2015; Richmond et al., 2007). Social support is critical for Indigenous athletes in overcoming barriers and achieving success in PA (Lavallée, 2007). Social support is critical to fostering healthy behaviours, a strong community, and re-establishing connections to the land and Indigenous knowledge among Indigenous youth (Big-Canoe & Richmond, 2014). Increased social support from family, friends, and community can increase cultural connectedness and PA participation (Ryan et al., 2018). Generally, perceived social support can come from various sources, such as family, friends, romantic partners, pets, community ties, and coworkers (Beets et al., 2006, 2010; Nurullah, 2012; Plumb, 2011; Richmond et al., 2007). Social support is a well-established predictor of PA, chronic disease prevalence reduction, and improved mental health (Beets et al., 2006; Cohen et al., 2007; Freeborne et al., 2019; A. Ironside et al., 2020, 2021). However, the sex-specific role of social support in PA engagement and its association with chronic conditions is unknown and warrants additional research among Indigenous males and females (Beets et al., 2010; Dishman et al., 1985; Hohepa et al., 2007; A. Ironside et al., 2020, 2021; W. C. Taylor et al., 1994).

1.2.3.2 Family Influences

Positive family influences through support, encouragement, involvement and watching physical activity are positively associated with PA (Bauman et al., 2002; Dishman et al., 1985; W. C. Taylor et al., 1994; Trost et al., 2002). Studies have shown that parental role models and

encouragement from parents positively impact their children's level of PA (Bauman et al., 2002; Wang et al., 2015). Parents can encourage their children to engage in more PA by participating alongside them or providing support through organized physical activities (Edwardson & Gorely, 2010; Rebold et al., 2016; Wang et al., 2015). Parents who involve themselves in physical activity with their children can also positively impact their child's physical activity participation (Edwardson & Gorely, 2010). A study found that a greater number of accelerometer counts were accumulated during parents participating ($109,523 \pm 32,155$ counts) and parent watching ($85,624 \pm 44,985$ counts) than the alone ($67,938 \pm 37,857$ counts) conditions (Rebold et al., 2016). A systematic review reports three articles investigating family influences on PA among children (Bauman et al., 2012). One study found that family influences correlate with PA (Van Der Horst et al., 2007). One study was inconclusive on support for physical activity from parents and family (Craggs et al., 2011). The third study found that family support was not a determinant of physical activity (Craggs et al., 2011). The effect of parents' support on their adolescent's PA is inconclusive (Edwardson & Gorely, 2010). On the other hand, PA tracks well from childhood to adulthood (Telama et al., 2014); thus, if parental influences correlate in childhood, this may affect PA in adulthood. There is a lack of current research on family influence on adult PA (Bauman et al., 2012). Overall, there is strong evidence suggesting that families who support their children through encouragement, involvement or simply watching them engage in physical activity can positively influence physical activity (Bauman et al., 2012; Rebold et al., 2016).

There is a lack of literature on Indigenous family history, family values, or parental role models. Given that family/friends support is a critical predictor of PA in non-Indigenous Peoples (Bauman et al., 2012; Edwardson & Gorely, 2010), and family ties are a critical component of Indigenous culture (Absolon, 2010; Greenwood et al., 2015), family/friends social support for

PA may also be a critical predictor of PA in Indigenous Peoples. Thus, it may be possible to suggest that social support from family members can instill a value for PA in children.

Additional research is needed to determine whether the family/friends' social support for PA influences an individual's PA, specifically among Indigenous males and females. If family influences are identified as possible predictors of PA, future health interventions should incorporate family support into PA programs.

1.2.3.3 Residential School and Foster Care Experience

Indigenous Peoples have endured numerous traumatic experiences due to forced residential school admissions and the federal government's colonization efforts. Church-run residential schools were one of these efforts to assimilate First Nations children into Euro-Canadian society; these schools opened during the 1840s and the Gordon Residential School in Punnichy, Saskatchewan, was the last one to close in 1996 (MacDonald & Hudson, 2012; Miller et al., 2012; Regan, 2010). In many cases, the federal government did not take the responsibility of paying for Métis children's education in Residential schools. Therefore, while some Métis children were forced to attend residential schools, many Métis children attended day schools run by the church or provincial government in their local communities (Truth and Reconciliation Commission of Canada, 2016c). An estimated 150,000 Indigenous children went through the residential school system (Truth and Reconciliation Commission of Canada, 2016a) and an estimated 80,000 residential school students are alive today (Global News, 2015). Indigenous children were subjected to physical, emotional, mental, and spiritual abuse at the hands of their teachers (Eshet, 2015; Miller et al., 2012). Additionally, children were denied essential medical services and adequate nutrition, resulting in malnutrition and the death of many children from

preventable illnesses (Mosby, 2013). Many children in residential schools were provided food that did not meet basic nutritional requirements, resulting in malnutrition and turning schools into a laboratory for studying human nutrient requirements and the effects of dietary interventions on a group of malnourished children (Blackstock, 2007; Eshet, 2015; Mosby, 2013). In other words, students were denied access to essential medical services due to the researchers' plan to seek as much knowledge as possible about human health by conducting health experiments without the participants' consent (Mosby, 2013). By today's standards for medical research ethics, this kind of experiment would have never been allowed (Mosby, 2013). The residential schools' goal of forced assimilation of Indigenous children into Euro-Canadian culture resulted in a breakdown of cultural transmission, which has been recognized as cultural genocide (Amir, 2018; Howard-Hassmann, 2015; MacDonald & Hudson, 2012).

The adoption of Indigenous children in Canada between 1960 and the mid-1980s was first coined the "Sixties Scoop" (Sinclair, 2007). During this time, it was common for First Nations, Métis and Inuit children to be "scooped" by the federal government from their homes without their mothers' and communities' knowledge or consent (Sinclair, 2007; Stevenson, 2020). The Sixties Scoop accelerated the dramatic overrepresentation of Indigenous children in the child welfare system, and these children were primarily adopted by non-Indigenous Peoples across Canada, in the United States, and even overseas (Alston-O'Conner, 2010; Blackstock et al., 2004; Sinclair, 2007; Trocmé et al., 2004; Truth and Reconciliation Commission of Canada, 2016b). As adoptive families lacked Indigenous cultural knowledge, the continued removal of Indigenous children from their homes disrupted cultural values, beliefs, practices, and parenting knowledge (Allan & Smylie, 2015; Sinclair, 2007, 2017). Most Indigenous children were adopted or placed with white foster parents, and some were abused by their adoptive families

(Hanson, 2009d). Indigenous children placed outside their communities suffered from identity confusion, low self-esteem, addictions, lower levels of educational achievement and unemployment (Perreault, 2011; Truth and Reconciliation Commission of Canada, 2016b, p. 5). The Sixties scoop marked a rapid increase in Indigenous children in the child welfare system in Canada – 44% in Alberta, 51% in Saskatchewan, and 60% in Manitoba (B. McKenzie & Hudson, 1985; Sinclair, 2007). In addition, from 1967 to 1969, the province of Saskatchewan piloted the Adopt Indian and Métis Project as a targeted program to increase the adoptions of overrepresented Indigenous children (Henderson, 2017). The Adopt Indian and Métis Project’s advertisements implied that Métis parents could not care for their children. Secondly, the advertisements degraded Indigenous children as inferior and unwanted (Henderson, 2017). Indigenous children who were apprehended or relinquished during this period were denied contact with their families and communities and any knowledge of their cultural heritage (Henderson, 2017). Social workers viewed Indigenous families as contagious, and their communities were thought to have nothing of value to offer Indigenous children, who would be better off making a clean break (Henderson, 2017).

The mental and physical abuse suffered by Indigenous children in residential schools, as well as the widespread placement of Indigenous children in the foster care system during the Sixties Scoop, left many deep wounds that have yet to heal and continue to have an impact on Indigenous Peoples’ health (Allan & Smylie, 2015; M. Anderson et al., 2006; Caldwell & Sinha, 2020; Eshet, 2015; Heart, 2003; Sinclair, 2007, 2017; Wilk et al., 2017). There is a distinct difference in health outcomes between those who went to residential schools, those who were removed from their homes during the Sixties Scoop, and those who are related to people who went to these schools (Pearce et al., 2008; Sinclair, 2007; Wilk et al., 2017). There is an

increased risk of stress, depression, and suicide in people who attended or had a family member who attended a residential school (Bombay et al., 2013; Ritland et al., 2021). Individuals and their families who attended residential schools are more likely to develop a learning disability or engage in smoking behaviours (Bombay et al., 2014; Wilk et al., 2017). There is a higher risk of incarceration, substance abuse, and suicide among those placed in the foster care system (Barker et al., 2014; Gypen et al., 2017; Ritland et al., 2021; Sinclair, 1969; Tait et al., 2013).

Additionally, these adoptees are more likely to encounter poverty, alcoholism, and other negative stereotypes during their adult years (Barker et al., 2014; Gypen et al., 2017; Sinclair, 1969; Tait et al., 2013).

The historical trauma caused by residential schools and the foster care system continues to have long-lasting effects on Indigenous Peoples today (Berube, 2015; Bombay et al., 2013, 2014). Furthermore, the “birth alert” system, which allows child welfare systems to apprehend newborns immediately after birth without the knowledge or consent of the parents, is also disproportionately used against Indigenous mothers in Canada (Buchner, 2020; National Inquiry into Missing and Murdered Indigenous Women and Girls (Canada), 2019). According to the Census 2016, over half of the children in foster care are Indigenous, but Indigenous children only account for 7.7% child population in Canada (G. of C. I. S. Canada, 2018). Indigenous children continue to make up a large proportion of children in foster care; this has been termed the “millennial scoop” to describe the children apprehended from the 1980s to today after the “Sixties Scoop” (Foster, 2018; Haight et al., 2018). There are more Indigenous children in the foster care system today than there were at the height of the residential school and Sixties Scoop eras, indicating that the foster care system has become the new residential school/Sixties Scoop where Indigenous children are continually taken away from their family/community and placed

with non-Indigenous families all over the world (Bombay et al., 2013; Foster, 2018; Haight et al., 2018; Navia et al., 2018; Somos, 2021).

In Canada, the detrimental effects of residential schools and the foster care system on the health of Indigenous Peoples are well-known (Bombay et al., 2013; Pearce et al., 2008; Sinclair, 1969). However, the extent to which residential school and foster care-related trauma affect PA is unknown. There is no research on the effect of residential schools and the foster care system on PA. Willows et al. 2012, established a link between historical trauma and a decreased likelihood of parents making optimal choices for their children's PA, which results in an increased risk of obesity among Indigenous children. Bombay et al. (2014) demonstrated that residential school and foster care experiences might affect Indigenous Peoples' determinants of PA. Individuals who attended residential schools or were in foster care are more likely to live in a crowded homes with food and income insecurity than the general population (Bombay et al., 2014). For the non-Indigenous population, income influences PA (Macniven et al., 2016; A. M. McNeill et al., 2005; Parks et al., 2003). It has been observed that colonial policies and practices, such as residential schooling, have an impact on determinants such as income, education, and housing, which can affect PA among Indigenous Peoples (Bombay et al., 2013; MacDonald & Hudson, 2012; C. L. Reading & Wien, 2009; Sinclair, 1969). Minority groups that have endured historical trauma are more likely to increase cultural connectedness, which predicts PA (Bombay et al., 2013; A. Ironside et al., 2020).

1.2.3.4 Home Residence

An individual's home residence determines their health, sedentary behaviour, and PA levels (Bauman et al., 2002; A. Ironside et al., 2020, 2021; Macniven et al., 2016; Porter, 2016).

Indigenous Peoples live all over what is now known as Canada; some live in northern areas, some live in southern areas, some live in remote areas, and some live in big cities like Saskatoon and Regina (Turner et al., 2013). Métis were the most likely to live in a city, with 62.6% living in a metropolitan area of at least 30,000 people (S. C. Government of Canada, 2017d). In contrast, nearly half (44.2%) of First Nations-Status Peoples live on reserve, with the remainder living off-reserve (S. C. Government of Canada, 2017d). Indigenous Peoples living on reserves have a higher prevalence of arthritis, asthma, diabetes, cardiovascular disease, and obesity than non-Indigenous Peoples (Public Health Agency of Canada, 2018). First Nations Peoples from on-reserve (17.2%) and off-reserve (10.3%) home communities have a higher rate of diabetes compared to the general population (5%) (Crowshoe et al., 2018). Diabetes prevalence is higher among Indigenous Peoples living off-reserve in southern Canada than in northern Canada (6.4% vs. 3.8%) (Lix et al., 2009). Furthermore, 7.1% of Indigenous adults and 5% of non-Indigenous adults suffer from cardiovascular disease (H. J. A. Foulds et al., 2018; Garner et al., 2010). Compared to the general Canadian population, Indigenous Peoples living on reserves and in remote communities do not have equal access to healthcare services (Michiel Oosterveer & Kue Young, 2015; National Collaborating Centre for Indigenous Health, 2019). Because of the scarcity of health professionals in Indigenous communities, many people are transported to hospitals in urban and southern areas for medical emergencies, hospitalization, appointments with medical specialists, diagnosis, and treatment, often leaving behind families and support networks for extended periods (Huot et al., 2019; Mew et al., 2017; Michiel Oosterveer & Kue Young, 2015; National Collaborating Centre for Indigenous Health, 2019; Patterson et al., 2018; Wallace, 2014). Living in a city can provide easier access to various healthcare services. However, research indicates that Indigenous Peoples may face multiple and intersecting barriers

to accessing urban healthcare services, including racism and discrimination, lengthy wait times, and culturally unsafe care (Cameron et al., 2014; Goodman et al., 2017; McCallum & Perry, 2018; National Collaborating Centre for Indigenous Health, 2019; Smylie et al., 2018).

Indigenous Peoples in northern communities face unique challenges. Indigenous Peoples in Canada's remote or northern regions do not have equal access to nutritious foods such as fruits and vegetables as non-Indigenous Peoples (Levi & Robin, 2020). One in every two First Nations households is food insecure (Levi & Robin, 2020). To meet the food guide recommendations, Indigenous Peoples living in remote communities must pay a very high price for basic staples such as flour and sugar despite food subsidy programs, leading to an unhealthier lifestyle (Anand et al., 2019; Flanagan, 2020). Furthermore, finding clean water can be difficult for Indigenous Peoples living outside of major urban areas. Currently, 36 long-term drinking water advisories are in effect in 29 communities, five of which are in Saskatchewan (G. of C. I. and N. A. Canada, 2017). Indigenous Peoples are more likely to live in homes with mould or mildew, lacking dependable and safe power supplies, lacking essential safety equipment such as working smoke detectors, and have structural flaws or require major repairs (Bailie & Wayte, 2006; Riva, Larsen, et al., 2014; Riva, Plusquellec, et al., 2014). Indigenous Peoples are also more likely to live in overcrowded conditions, as measured by the number of inhabitants per habitable room or bedroom (Bailie & Wayte, 2006). Northern communities, like on-reserve communities, face numerous barriers and challenges that make physical activity difficult for residents (H. J. A. Foulds et al., 2018). Northern communities are isolated, with little or no access to urban centers, where most exercise gyms are located (Anand et al., 2019; Skinner et al., 2006). They are also subjected to harsh cold weather, which prevents people from leaving their homes for most of the year (H. J. A. Foulds et al., 2018). Northern residents must travel long distances to access

essential services, resulting in a more sedentary lifestyle (H. J. A. Foulds et al., 2018; A. K. Ironside, 2019). Due to the cold environment in Saskatchewan, lack of infrastructure in northern communities for physical activity, food insecurity and overcrowded housing faced by many First Nations living on reserves, similar results are expected among First Nations adults when looking at their PA based on home communities.

Food insecurity, health disparities, healthcare inaccessibility, lower PA levels, and unemployment all affect the health and well-being of Indigenous Peoples (Public Health Agency of Canada, 2018; Saewyc et al., 2013). Indigenous Peoples remain in their home communities despite substandard living conditions because they feel connected to their land (Porter, 2016). Some Indigenous Peoples prefer to remain in their home communities where they have most of their family and friends (Porter, 2016). When moving away from their home community, First Nations Peoples may encounter racism when travelling off the reserve (Anand et al., 2019). When they move to a city or away from their home community, they are more likely to leave behind their social support system (Anand et al., 2019).

According to Ironside (2019), there are no differences in PA between Indigenous groups from urban and rural home communities. However, Indigenous Peoples who grew up in northern communities were less physically active than those who did not (A. Ironside et al., 2021). This finding is consistent with the barriers to PA that northern communities face due to their isolation from neighbouring communities and adverse weather conditions (H. J. Foulds, 2017). Furthermore, Foulds et al. (2012) discovered geographic differences in PA. Participants living on reserve, in rural areas, or the interior region of British Columbia were more likely to be physically inactive than those living off-reserve, in urban areas, or in the Vancouver-Lower Mainland region (H. J. Foulds et al., 2012a). Métis and First Nations peoples living off-reserve,

in urban areas, and southern home communities should have higher PA than their counterparts. With the knowledge that PA is lower among Indigenous Peoples living on-reserve, rural, northern home communities, it is important to determine how Métis and First Nations male and females PA is influenced by their home community.

1.2.4 Wholistic Approach to Health Research

In contrast to the disease-focused health paradigm in Western culture, Indigenous culture emphasizes a wholistic view of healing and wellness (Lavallée, 2007; Marsden, 2005). Indigenous worldviews view health as a harmonious relationship between individuals and their relationships with themselves, others, the community, and the larger cosmos (Lavallée, 2007). While Western culture takes a biomedical approach to health and sees it as a personal responsibility, it fails to consider the relationships one has with their surroundings (S. B. Johnson, 2013). Health and wellness are intrinsically linked to the collective well-being and identity achieved through the delicate balance of body, heart, mind, and spirit in Indigenous cultures (S. B. Johnson, 2013; L. Kirmayer et al., 2003). As a result, health and wellness are more broadly defined as the interconnection of the medicine wheel's physical, mental, emotional, and spiritual elements (Graham & Stamler, 2010; Lavallée, 2007; Wenger-Nabigon, 2010). Deficiencies in any element of the medicine wheel can lead to a less-than-optimal experience among the other elements depicted (Dapice, 2006; Wenger-Nabigon, 2010). Culture is strongly linked to all four quadrants of the medicine wheel (physical, mental, emotional, and spiritual) (Lavallée, 2007). Participating actively in community activities and developing a sense of cultural identity promotes physical activity (PA) and emotional and mental stability (Lavallée, 2007). A biopsychosocial lens reflects a wholistic approach to health (Engel, 1977). It

emphasizes cultural, social and psychological aspects as essential determinants of well-being (Engel, 1977). This wholistic approach could investigate the disparity in chronic illness burden between Indigenous and non-Indigenous Peoples across Canada (*A Holistic Approach to Indigenous Health*, 2020; Absolon, 2010; Marsden, 2005).

1.2.5 Physical Activity

Any bodily movement produced by skeletal muscles that results in energy expenditure and increases heart rate and breathing is considered PA (Bouchard et al., 2012). There are numerous types of PA, such as aerobic activity (walking, running, swimming, bicycling, dancing, and many others), that increase your heart rate and breathing, thereby strengthening your heart and lungs (Bouchard et al., 2012; Oja & Titze, 2011; Ross et al., 2020). Muscle-strengthening physical activities (push-ups, sit-ups, weightlifting, climbing stairs, gardening, and many others) increase muscle strength, power, and endurance (Bouchard et al., 2012; Oja & Titze, 2011; Ross et al., 2020). Aerobic activities can be classified into three different intensities: light, moderate, and vigorous. Light intensity activities are defined as those with an energy cost of 3 metabolic equivalents or less, 55-64% of maximum heart rate and the individual should be able to sing (Leeds, Grenville and Lanark District Health Unit, 2022; Saint-Maurice et al., 2018). Moderate-intensity activities are defined as those with an energy cost of 3 to 5.9 metabolic equivalents, 65-74% of maximum heart rate, the individual may not be able to sing, but they can talk (Leeds, Grenville and Lanark District Health Unit, 2022; Saint-Maurice et al., 2018). Vigorous-intensity activities are those expending six or more metabolic equivalents, 75-90% of maximum heart rate, and the individual may not be able to carry on a conversation (Leeds, Grenville and Lanark District Health Unit, 2022; Saint-Maurice et al., 2018). Leisure-time

physical activities are not required as essential daily living activities and are done at the individual's discretion (Bouchard et al., 2012; Committee, 2008; Moore et al., 2012; Oja & Titze, 2011; Ross et al., 2020). Sports, exercise, and recreational walking are examples of leisure-time physical activities (Bouchard et al., 2012; Committee, 2008; Moore et al., 2012; Oja & Titze, 2011; Ross et al., 2020). The CSEP recommends that Canadian adults 18-64 years should engage in MS activities at least twice a week and 150 minutes MVPA (Ross et al., 2020).

In addition to an individual's income levels, age, gender, and ethnicity can impact PA level (Bouchard et al., 2012; Brown & Roberts, 2011; Dishman et al., 1985; Plotnikoff et al., 2004). Physical activity levels peak in childhood and gradually decline throughout adolescence and adulthood (Bouchard et al., 2012; Bradley et al., 2011; Farooq et al., 2018; Haas et al., 2021). Compared to younger adults, older adults engage in less vigorous physical activities and have lower overall levels of leisure-time PA (Bouchard et al., 2012). There are also noticeable sex differences in PA levels that begin in childhood and continue throughout life (Armstrong et al., 2018; Caspersen et al., 2000; Gomez et al., 2021; Guthold et al., 2018). Males are generally more physically active than females and engage in more vigorous physical activities (Armstrong et al., 2018; Bouchard et al., 2012; Caspersen et al., 2000; Gomez et al., 2021; Guthold et al., 2018). Furthermore, ethnicity can help to explain differences in PA that may not be explained by age or gender. For example, cultural practices and religious beliefs may influence PA (D'Alonzo, 2012; Ma et al., 2010). Physical activity is further influenced by an individual's culture, social values and family/community structures that may vary between ethnic groups. Access to recreational resources may differ by ethnicity, owing to potential socioeconomic status differences between ethnic groups (August & Sorkin, 2011; Bland et al., 2000; Bouchard et al., 2012; D'Alonzo, 2012; Kandula & Lauderdale, 2005; Ma et al., 2010; Stella et al., 2015; Yi et

al., 2016). African Americans and Hispanics have lower leisure-time PA than white males and females (August & Sorkin, 2011; Bland et al., 2000; Bouchard et al., 2012; Kandula & Lauderdale, 2005; Stella et al., 2015; Yi et al., 2016). Males are more physically active than females in each group (August & Sorkin, 2011; Bland et al., 2000; Bouchard et al., 2012; Kandula & Lauderdale, 2005; Stella et al., 2015; Yi et al., 2016). Sociocultural correlates of activity among Latina immigrants included gender roles for activity, the importance of support from family and husband, childcare issues related to having few relatives who lived nearby, language, and community isolation (Evenson et al., 2002). African-American women who met the recommendations or were insufficiently active (as opposed to being inactive) were more likely to have a higher level of education, be married or have a partner, be in excellent or very good health, have a higher self-efficacy, see people exercising in their neighborhood, have more positive views of women who exercise (social issues score), have less social role strain, and live in a place with sidewalks or lighter traffic (Ainsworth et al., 2003). In some cultures, family and community duties are more important than leisure activities (Caperchione et al., 2009). Some people might think it is selfish to take time to work out (Caperchione et al., 2009). Some religious practices and holidays may make it hard for a person to participate in planned activities. Throughout the year, Muslim males and females pray five times daily (Caperchione et al., 2009; Guerin et al., 2003; Rogerson & Emes, 2006). Muslim males and females also observe the month of Ramadan once a year. (Caperchione et al., 2009; Guerin et al., 2003; Rogerson & Emes, 2006). A scheduled physical activity program may not be able to accommodate these time constraints (Caperchione et al., 2009; Guerin et al., 2003; Rogerson & Emes, 2006). Therefore, it is important to consider the cultural and social determinants of PA among Métis and First Nations males and females.

1.2.5.1 Benefits of Physical Activity

Regular PA can be highly beneficial to both males' and females' health; lowering the risk of premature death from chronic illness and improving mental health (Biddle et al., 2019; Canning & Hicks, 2020; Helmrich et al., 1991; Moore et al., 2012; Warburton et al., 2006; Zhao et al., 2014). Physical activity has been shown to reduce the risk of death by 30% among physically active individuals (Committee, 2008). Furthermore, data from six cohort studies in the United States of America involving 654,827 individuals aged 21 to 90 years old revealed that 75 minutes of brisk walking per week was associated with a 1.8-year increase in life expectancy and 450 minutes or more of brisk walking per week was associated with a 4.5-year increase in life expectancy (Moore et al., 2012). Additionally, males and females who report increased PA and fitness levels have a 20-35% reduction in their risk of death (Macera et al., 2003; Macera & Powell, 2001). Compared to physically active middle-aged females, physically inactive middle-aged females had a 52% increase in all-cause mortality, a doubling in cardiovascular mortality, and a 29% increase in cancer mortality (Hu et al., 2004). Even minor increases in PA can result in significant risk reductions (Erikssen, 2001; Erikssen et al., 1998). Aerobic and resistance exercises are linked to a lower risk of type 2 diabetes (Helmrich et al., 1991, 1994; Lynch et al., 1996; Manson et al., 1992; Warburton et al., 2001a, 2001b, 2006). One prospective cohort study found that walking at least 2 hours per week was associated with a 39–54% reduction in premature death from any cause and a 34–53% reduction in the incidence of cardiovascular disease among diabetic patients (Gregg et al., 2003). Another cohort study found that physically inactive men with type 2 diabetes had a 1.7-fold higher risk of premature death than physically active men with type 2 diabetes (Wei et al., 2000). Furthermore, PA has been shown to reduce the occurrence of certain cancers, particularly colon and breast cancer (Kampert et al., 1996;

Paffenbarger et al., 1992; Sesso et al., 1998; Thune & Furberg, 2001; Wannamethee et al., 1993). Physically active men and women had a 30–40% lower risk of colon cancer, and active women had a 20–30% lower risk of breast cancer (I.-M. Lee, 2003). The benefits of muscle-strengthening activities have been established (Bennie et al., 2020; Csapo & Alegre, 2016; Mcleod et al., 2019; Yang et al., 2014). Muscle-strengthening activities increase skeletal muscle mass (Haff & Triplett, 2015; Ralston et al., 2017; Schoenfeld et al., 2017), bone mineral density (Martyn-St James & Carroll, 2009, 2010), the ability to perform daily activities (Mangione et al., 2010), improve cardiometabolic health (Ashton et al., 2020; Strasser et al., 2010), and reduce symptoms of depression and anxiety (Gordon et al., 2017, 2018). Physical inactivity and a sedentary lifestyle in urban and rural areas can predispose an individual to various chronic diseases (Castrillon et al., 2020; González et al., 2017; Lippi et al., 2020; Popa et al., 2020; Qureshi & Memon, 2020).

1.2.6 Physical Activity among Indigenous Peoples

Indigenous Peoples have historically maintained a healthy, active lifestyle (H. J. A. Foulds et al., 2013a). First Nations groups in different locations engaged in various activities such as fishing, hunting, lacrosse, canoeing, and food gathering and preparation (H. J. A. Foulds et al., 2013a). However, because of significant cultural shifts and the introduction of Western activities such as video games and television streaming services that promote a sedentary lifestyle, and the introduction of a western diet that mainly consisted of calorie-dense foods such as potato chips and fast foods, altered Indigenous Peoples' traditional lifestyles (Campbell, 2000; H. J. A. Foulds et al., 2013a; Kuhnlein et al., 2013). The transition away from traditional lifestyles has resulted in an increased burden of chronic illness among Indigenous Peoples in

Canada compared to non-Indigenous Peoples, even though Indigenous Peoples are more physically active daily (Bruce et al., 2014; H. J. Foulds et al., 2012b, 2012a; H. J. A. Foulds et al., 2013a). As a result, despite their increased PA, many Indigenous Peoples have a higher prevalence of chronic diseases (Bruce et al., 2014; H. J. Foulds et al., 2011, 2012a, 2012b; H. J. A. Foulds et al., 2013a).

PA can be beneficial in decreasing the incidence and progression of conditions such as cardiovascular disease, diabetes, cancer, and premature death, which may be particularly important to Indigenous Peoples who face disproportionate rates of chronic disease, increased mortality rates and decreased life expectancy (Humphreys et al., 2014; King, 2011; Reiner et al., 2013; Warburton et al., 2006, 2007). Regular participation in PA and sports has been shown to benefit Indigenous Peoples' physical, mental, and emotional health (Forsyth et al., 2012). The benefits of muscle-strengthening activities have been established (Bennie et al., 2020; Csapo & Alegre, 2016; Mcleod et al., 2019; Yang et al., 2014). Recent research indicates that Indigenous Peoples living in urban areas across Canada are not physically active enough to reap the benefits of sport and PA due to barriers such as cost, accessibility/availability, capacity building, community support, and insufficient programs/training (H. J. A. Foulds et al., 2013a; C. W. Mason et al., 2019; Pelletier et al., 2017; Skinner et al., 2006). Physical activity levels were significantly higher among Indigenous Peoples on rural reserves and northern communities in British Columbia, Canada, than among non-Indigenous Peoples in general (H. J. Foulds et al., 2012a). A systematic review identified that few Indigenous adults in Canada and the United States met the PA guidelines: 27% when self-reporting and only 9% when using an accelerometer (H. J. A. Foulds et al., 2013a). The research demonstrates that Indigenous Peoples struggle to meet daily PA recommendations, likely related to historical and contemporary

colonization (H. J. Foulds et al., 2012a; H. J. A. Foulds et al., 2013a). Physical activity has numerous established benefits and can be used to prevent various chronic illnesses (Reiner et al., 2013; Warburton et al., 2006). While there are numerous underlying causes of chronic illnesses, PA has improved the quality of life for Indigenous Peoples living with chronic illnesses (H. J. A. Foulds et al., 2011; Lavallée, 2007; Reiner et al., 2013). Indigenous adults of all ages and genders have benefited from community-based interventions that promote PA participation (H. J. A. Foulds et al., 2011).

1.2.6.1 Physical Activity Among Males and Females

From previous research, it is known that PA among males and females is not equal (Azevedo et al., 2007; Craft et al., 2014; Guthold et al., 2018; The Lancet Public Health, 2019; van Uffelen et al., 2017; *WHO / Physical Activity and Women*, 2021). Azevedo et al. (2007) found that males had higher levels of moderate-intensity, vigorous-intensity, and leisure-time PA than females in a population-based sample of Brazilian adults. A strong association between socioeconomic status and leisure-time PA was found for both genders (Azevedo et al., 2007; Kwak et al., 2016). Males are less active and more sedentary when unemployed, and females are also less active (Kwak et al., 2016). Furthermore, across most countries, females are less physically active than males (Guthold et al., 2018; The Lancet Public Health, 2019). Another study discovered that females reported significantly higher levels of PA and overall better quality of life than males (Craft et al., 2014). Additionally, females exercised more for weight loss and muscle toning than males, whereas males exercised for enjoyment (Craft et al., 2014). The differences noted in the amount of PA and the reasons for doing PA between males and females suggest that sex differences exist. Some of these differences may be attributed to females having

a lower income than males. Therefore, the cost of access to PA may be a barrier, and females also have a workload in the home and caregiving roles which may limit the time available for them to engage in PA (*WHO / Physical Activity and Women*, 2021). Additional research is required to explore these differences further to understand how they can impact the role of PA among Indigenous Peoples.

Physical activity has a beneficial effect on both physical and mental health. Males are generally more active than females among Indigenous Peoples, according to a 2006 review, and people who live in a supportive social environment are also more likely to be physically active (Coble & Rhodes, 2006). As noted in the review, measurement inconsistencies necessitate additional research on the correlates of PA among Indigenous males and females in Canada (Findlay, 2011). Off-reserve First Nations (37%) and Métis Peoples (39%) are significantly more active in their leisure time than the non-Indigenous Peoples (30%) (Findlay, 2011). Additionally, the odds of being active among Métis People are higher amongst those who are male (1.72 vs 1.00 for females) and younger (3.88 for 12-17 years old vs 1.00 for 18-34 years old). They have higher educational attainment (3.82 postsecondary vs 2.00 for secondary graduation) (Findlay, 2011). Similarly, the odds of being active among First Nations Peoples are higher amongst those who are male (1.66 vs 1.00 for females), younger (3.97 for 12-17 years old vs 1.00 for 18-34 years old), and have higher educational attainment (2.80 some postsecondary vs 0.82 for secondary graduation) (Findlay, 2011). Leisure-time PA was positively associated with being male, living in British Columbia, having a higher household income level, having a positive self-perception of health, and attending a Métis cultural event among Métis Peoples (C. Ryan, 2014; C. J. Ryan et al., 2018). Age, smoking status, and body mass index are all negatively associated with leisure-time PA (C. Ryan, 2014; C. J. Ryan et al., 2018). However, the influences of PA on

an individual's emotional and spiritual elements need to be considered to fully appreciate the benefits of PA from a wholistic health perspective (M. Anderson et al., 2006; Findlay, 2011; King et al., 2009). Ironside et al. (2020) previously identified associations between cultural and social dimensions of health and PA; however, the specific nature of these relationships among males and females is unknown.

Indigenous Peoples engage in a magnitude of traditional activities to support each other and as a way to be physically active. Land-based activities include but are not limited to hunting, fishing, gathering and harvesting food, Indigenous ball games, including lacrosse, bone, and stick games; cultural activities include dancing, carving, weaving, and beading (Forsyth et al., 2012). These games and activities were essential to understanding culture, strength, patience, agility, and cooperation (Forsyth et al., 2012). Many cultural activities and games were shared among communities and adapted as desired (Forsyth et al., 2012). Anyone could participate in these traditional activities and games (Forsyth et al., 2012). The *Indian Act* policies stripped First Nations Peoples of their traditional names, devalued females, outlawed cultural practices, replaced traditional leadership and governance, moved communities onto reserves, and took away their independence (Hanson, 2009e). Colonial policies enforced European patriarchal ways of life on Indigenous Peoples (Deschambault, 2020). European settlers expected that activities such as hunting and gathering should only be performed by males and activities such as weaving or bedding be performed by females (Deschambault, 2020; Guerrero, 2003). The *Indian Act* included legislation that banned various First Nations cultural ceremonies such as the Potlatch, Sun Dance, and Powwow, leading to the disruption of cultural transmission and community engagement (Asikinack, 2022; Hanson, 2009e; Pettipas, 1994). The introduction of a patriarchal society, banning of ceremonies, and confinement to reserves led to First Nations Peoples'

decreased participation in traditional activities, disrupting the transmission of cultural values and beliefs from one generation to the next, leading to cultural genocide (Bartlett, 1977, 1980; Deschambault, 2020; Hanson, 2009e, 2009e; Pettipas, 1994).

1.2.7 Summary and Purpose

Indigenous Peoples continue to have a higher rate of chronic illnesses than non-Indigenous Peoples, even though they are more physically active than non-Indigenous Peoples (Bruce et al., 2014; H. J. Foulds et al., 2012b; H. J. A. Foulds et al., 2013b; King, 2011). Numerous factors affecting non-Indigenous Peoples' PA have been identified (Bauman et al., 2002; Plotnikoff et al., 2004; Trost et al., 2002), but little is known about the specific factors affecting Indigenous Peoples' PA. Social support, family influences, education, home communities, sex, and gender influence the amount of PA engaged in by non-Indigenous Peoples (Bauman et al., 2002; Findlay, 2011; Mesters et al., 2014; Plotnikoff et al., 2004). How these factors influence, the amount of PA among Indigenous Peoples is still unclear. Knowing the influence of these factors can provide critical support for Indigenous Peoples' PA (S. Anderson et al., 2017). Ironside et al. (2020) reported that individuals connected to their culture were more likely to engage in PA. Ironside et al. (2021) also identified that discrimination, social support, family influences, historical trauma, income, home community, and sex play a role in PA engagement. How cultural connectedness and social support are associated with PA specific, to males and females from First Nations and Métis communities, need further examination.

This study aims to provide the Indigenous community at the University of Saskatchewan with an understanding of the sex-specific associations of cultural connectedness and social support with PA among Indigenous Peoples. These findings will support appropriate strategies

and policies for supporting male and female-specific PA programs as determined among Indigenous communities.

1.2.8 Objectives & Hypotheses

The primary objective of this study was to determine the sex-specific relationships of cultural connectedness on the amount of PA performed by Métis and Saskatchewan First Nations-Status males and females. It is hypothesized that males and females who meet the CSEP's PA guidelines of performing MS activities at least twice a week or accumulation of at least 150 minutes of MVPA per week would report higher cultural connectedness scores than those who did not meet these PA guidelines. In addition, it is hypothesized that those who frequently engage in traditional activities would engage in more MS activity and MVPA than those who never or infrequently engaged in traditional activities.

The secondary objective of this study was to examine the sex-specific relationships of social support on the amount of PA undertaken by Métis and First Nations males and females in Saskatchewan. It is hypothesized that Métis and First Nations males and females who meet the CSEP's PA guidelines of performing MS activities at least twice a week or weekly accumulation of at least 150 minutes of MVPA would report higher social support scores than those who do not meet these PA guidelines. Family and friends' support for PA among Métis and First Nations males and females and the amount of MS activity and MVPA they engaged in will also be examined. It is hypothesized that Métis and First Nations males and females who received social support for PA from family/friends engaged in higher MS activity and MVPA compared to those who never received social support for PA from family and friends.

Lastly, the influences of personal/family residential school attendance, foster care experience, discriminatory experience and home communities on PA among Métis and First Nations males and females will be examined. It is hypothesized that Métis and First Nations males and females with personal/family residential school or foster care experiences will engage in lower amounts of MS activity and MVPA than their counterparts. It is also hypothesized that Métis and First Nations males and females who meet MS activity and MVPA guidelines will report higher discriminatory experiences than their counterparts. Lastly, it is hypothesized that Métis and First Nations males and females from off-reserve, urban, southern and those who do not leave their home communities will engage in higher MS activity and MVPA compared to those from on-reserve, rural, northern and those who moved away from their home communities for an extended period due to work or school.

CHAPTER 2

2.1 ETHICAL CONSIDERATIONS

Research, including Indigenous Peoples, has not always adhered to ethical standards, which has fostered distrust of researchers. One example of such unethical research behaviour is the nutritional experiments performed on Indigenous children at six residential schools between 1942 and 1952 (Macdonald et al., 2014; Mosby, 2013). Fear of being stereotyped due to misrepresentation and misapplied results is another reason for Indigenous participants' distrust (Marshall & Rotimi, 2001). Another source of mistrust is the researcher's "helicopter approach," in which the researchers fly in, collect the data they need, and then fly out with little regard for the health and safety of those participating in the study and with no interaction during or after the project is completed (Macaulay & Nutting, 2006). This project seeks to avoid the helicopter approach in favour of establishing trust and a long-term relationship with the participants in this study. An ICAC is involved in this research to help guide the project and provide context and interpretations of study results. The University of Saskatchewan Behavioural Ethics Board provided ethical approval prior to the start of this study (Beh ID 200) (See Appendix A). This study was carried out following the methodologies outlined in Chapter 9 of the Tri-Council Policy Statement 2. (2014) (I. A. P. on R. E. Government of Canada, 2019). Furthermore, a decolonizing lens was used to shift away from western research approaches, create knowledge from Indigenous cultural practices and involve participants as much as possible in the study to

ensure effective and respectful data collection (P. L. T. Smith, 2013). The current study continues Ironside and colleagues' previous work (A. Ironside et al., 2020, 2021). His initial study was reviewed, revised, and compiled in collaboration with the ICAC. After their approval and guidance, the initial ethics application was submitted to the University of Saskatchewan ethics board. Avery Ironside determined that cultural connectedness and social support were significant determinants of PA among Indigenous Peoples (A. Ironside et al., 2020, 2021). Following data collection, the data was evaluated, analyzed, and the results were interpreted in collaboration with Community Advisors. Following consultations with Community Advisors, a Lunch and Learn session was organized for the larger campus community of Indigenous Peoples. At this session, results were shared, and participants were invited to offer input on the findings. After this input from the community, publications were pursued. Following discussions with the ICAC and community members, it was determined that additional research on the sex-specific influence of cultural connectedness and social support on PA participation among Métis and First Nations males and females was necessary to understand these determinants better.

2.2 KNOWLEDGE TRANSLATION & APPLICATION OF FINDINGS

All participants and other community members will be invited to join a virtual meeting in April 2023 to share the findings of this research study and the future directions. The session will take place virtually to prevent the spread of COVID-19 and ensure the safety of all community members. This session will allow the researchers to meet with participants to share the results, receive any questions/concerns/feedback in real time, and shape the direction of future studies in this area. It is essential to present the finding to the community to draw more significant input and interpretations from the broader community. During the knowledge translation session,

participants will have the opportunity to discuss the significance of the results and opportunities for these results to change existing physical activity programs or implement new physical activity programs to better support Indigenous males and females on campus and in their home communities. During this discussion, participants and community members can share their relevant experiences in the study. Once the Thesis Committee and ICAC approve the final thesis, a summary of the results will be sent to each participant if they elect to share the results. The complete thesis will also be available if they wish to read it.

Increasing knowledge of the physical activity of Indigenous Peoples can impact physical activity, decrease the risk of chronic diseases, and benefit Indigenous Peoples' health overall. Along with the Ironside et al. 2020 study and the current study, Métis and First Nations communities can implement new physical activity programming based on the cultural and social factors influencing males' and females' physical activity participation. The Indigenous communities can use the findings to determine the most beneficial ways of encouraging physical activity participation in their communities, which could lead to improvements in mental, spiritual, emotional, and cultural health.

2.3 Methods

2.3.1 Research Participants

This study, conducted in collaboration with the Indigenous Graduate Student Association, the Indigenous Student Achievement Program, staff at the Aboriginal Students' Centre, and other partnering Indigenous groups on the University of Saskatchewan campus, invited Indigenous students, staff, and faculty to participate. Participants for this study were recruited through a general advertisement at the University of Saskatchewan. During the 2019/2020 academic year,

3442 students and faculty self-identified as Indigenous at the University of Saskatchewan (Student Headcount and Demographics. Statistics. Information and Communications Technology - Reporting and Data Systems. University of Saskatchewan, 2020). This study's inclusion criteria included a minimum age of 18 and self-identification as Indigenous. The participants in the study who identified themselves as Métis or First Nations-Status Peoples in Saskatchewan were the focus of the data analysis for this thesis. Members of the Cree/Nehiyawak, Saulteaux, Assiniboine, Dakota/Sioux, and Dene Nations were included as part of Saskatchewan First Nations-Status for this study specifically (Belanger, 2007). Participants were divided by sex, either male or female, and none of the participants identified their sex as "Other." Male and female data were analyzed separately based on their Indigenous identity, Métis, and First Nations. Indigenous students, staff, and faculty of any gender, PA level, or medical status were eligible to participate in the study. Participation in this study was only available online through a survey on SurveyMonkey (SurveyMonkey Inc., San Mateo, California, USA, www.surveymonkey.com). SurveyMonkey is an internet programme that allows for creating and sharing a survey for use over the internet. After this study is completed, the findings will be shared through a virtual event with Indigenous Peoples at the University of Saskatchewan. Invitations and advertisements for this event will be shared through the Aboriginal Student Centre newsletter. Attendees can question and discuss the study findings during this virtual event.

2.3.2 Recruitment

Participants were recruited from September 2018 to January 2019 for the first phase of this study conducted by Ironside (2019). Additional participants were recruited for this study

phase from February 2021 to March 2022. Recruitment of participants was achieved through the University of Saskatchewan student website (PAWS) and shared through partnering with Indigenous groups on campus. An advertisement to recruit participants was posted on the PAWS website regularly. Participants signed online consent forms before beginning the survey (See Appendix B). Participants completed the online survey independently. Participants had the option to enter a draw to win one of six \$50 Wanuskewin Gift Shop gift cards.

2.3.3 Sample Size

The effect size was calculated from the study by Avery Ironside (2019). Means and standard deviations from the low and high physical activity groups in the CCS and MEIM were used to calculate the effect size for this study. Using G*Power version 3.1.9.6, the effect sizes for Métis and First Nations participants were 0.96 and 0.52 for CCS, respectively (Heinrich Heine University Düsseldorf, Germany; Faul et al., 2007). Using G*Power version 3.1.9.6, the effect sizes were calculated for Métis and First Nations as 0.75 and 0.78 for MEIM, respectively (Faul et al., 2007). The respective effect size for each Indigenous group for CCS and MEIM, a confidence level of 95%, a margin of error of 5%, and a power of 0.80 was set to calculate sample sizes for Métis and Saskatchewan First Nations-Status groups in G*Power. Using G*Power, the sample size of Métis Peoples was determined as 15 participants per group for CCS and 23 participants per group for MEIM. Using G*Power, the sample size of First Nations Peoples was determined as 46 participants per group for CCS and 21 participants per group for MEIM.

The largest sample size of 23 Métis and 46 First Nations participants per group were calculated. The total sample size required to determine significant differences was 46 Métis and

92 First Nations participants. Due to Métis and First Nations Peoples' unique history, culture, and traditions, results obtained from studies by grouping Métis and First Nations Peoples as a single group may not be helpful to the respective communities, participants, and health policy guidance. Therefore, Métis and First Nations Peoples' distinct identities must be considered to produce meaningful results for each group (Tri-Council Policy Statement - Ethical Conduct for Research Involving Humans, 2014).

2.3.4 Online Survey

To benefit the community, this quantitative, cross-sectional study drew on the expertise of members of the target audience. The research questions necessitated using a cross-sectional approach to collect participants' responses through an online questionnaire. Participants accessed the online survey on the SurveyMonkey (SurveyMonkey Inc., San Mateo, California, USA, www.surveymonkey.com) website by following a web link or scanning QR codes posted on the university's website (PAWS). Participants were required to give their consent on the SurveyMonkey website before beginning the survey. At the end of the survey, participants were given the option to link to another survey to enter a draw for one of six \$50 gift cards to the Wanuskewin Gift Shop. This separate survey ensured that the survey data could not be linked to participants identities on the survey used for the gift card draws. Due to the ongoing COVID-19 pandemic, no in-person testing sessions were held.

2.3.5 Measurements

2.3.5.1 Demographic Measures

Demographic information collected included age, sex, gender identity, Indigenous group, and Indigenous Nations. Sex was classified as male/female/other. Gender included the categories

of man, woman, two-spirited male, two-spirited female, and transgender. Questions surrounding income levels were not included due to the inaccuracy of income as an indicator of a university student's class or financial status. While attending university/college, some students may not be paying rent while staying with family or may have received scholarships to supplement their income. As a result, these factors may provide university/college students with a much higher social status, financial stability, and access to resources than their reported income would indicate. Participants were asked to identify their Indigenous group as Métis, Inuit, First Nations-Status, or First Nations-Non-Status. Indigenous Nation had a text field for participants to enter their respective Indigenous Nation. The Indigenous group and Indigenous Nation data collection allowed specific Indigenous group analysis: Métis and Saskatchewan First Nations-Status. Based on the Federation of Sovereign Indian Nations, which is the representative body of Saskatchewan's seventy-four First Nations, participants who identified their Indigenous nations as Cree/Nehiyawak, Saulteaux, Assiniboine, Dakota/Sioux, and Dene Nations were included in the Saskatchewan First Nations-Status group (Belanger, 2007). Participants also provided information about their education level; options included 8th grade or less, some high school, high school diploma, vocational school or some college, college degree, and professional or graduate degree. Participants who reported 8th grade or less were combined with some high school and high school diploma participants due to low sample sizes in these categories.

2.3.5.2 Physical Activity Questionnaire

The Godin Leisure-Time Exercise Questionnaire (GLTEQ) was used to assess PA (Godin & Shephard, 1985). The GLTEQ measures PA using a seven-day recall period, counting the number of times a person engaged in light, moderate, or strenuous exercise during the preceding

seven days (Shephard & Godin, 1997). The GLTEQ has been used in previous studies to assess Indigenous Peoples' PA (Kirby et al., 2007). The two-week test-retest reliability coefficients for strenuous, moderate, and mild intensities were reported to be 0.94, 0.46, and 0.48, respectively (Shephard & Godin, 1997). The total number of PA minutes per week was calculated by multiplying the number of times they were active during the week by the amount of time they spent doing PA to arrive at this measure (minutes/week) for moderate and vigorous PA. Based on the total amount of minutes participants spent engaging in MVPA, they were divided into two groups, those who met the CSEP's 150 minutes of MVPA guideline and those who did not (Ross et al., 2020). The GLTEQ was modified to include examples of traditional Indigenous physical activities for strenuous (vigorous dancing), moderate (dancing, Anishinaabe jingle dancing, hunting large game, trapping), and mild exercises (gardening, arts, and crafts berry picking). From the CSEP Physical Activity Training for Health (CSEP-PATH) questionnaire, participants were asked how often they perform muscle-strengthening activities, such as resistance training, each week to assess muscle-strengthening activities. Participants' responses were evaluated to determine whether they met the CSEP recommendation of two or more muscle-strengthening activities per week (Ross et al., 2020). Participants selected how frequently (options included: frequently, infrequently, or never) they participated in traditional activities involving PA, such as ceremonies, dance, hunting, or trapping (Forsyth et al., 2012).

The first phase of this study was conducted pre-COVID-19 pandemic, and the second phase was conducted during the COVID-19 pandemic. Participants of the second phase were asked four questions to assess any changes in PA during the COVID-19 pandemic to understand better the pandemic's impact on the quality and quantity of PA. These questions inquired if the pandemic has affected a participant's regular PA routine, how the frequency of engaging in PA

that causes sweating and a rapid heart rate changed due to COVID-19, how the COVID-19 pandemic changed traditional activity participation, and if the time spent with family during PA changed during the pandemic.

2.3.5.3 *Cultural Determinants*

The Cultural Connectedness Scale and the Multigroup Ethnic Identity Measures assessed cultural connectedness. The Cultural Connectedness Scale was created to assess First Nations People's connection to their culture (Snowshoe et al., 2015). The MEIM, on the other hand, was designed for the general public (Phinney, 1992). Both tools use a variety of sub-measures to gauge a person's cultural familiarity. It has been found that the Cultural Connectivity Scale and Multigroup Ethnic Identity Measure are reliable and valid (Phinney, 1992, 2010; Snowshoe et al., 2015, 2017). The MEIM has been used in many studies and has shown good reliability with alphas above 0.80 and validity across a wide range of ethnic groups and ages (Habibi et al., 2021; Ponterotto et al., 2003; Roberts et al., 1999; Sarno & Mohr, 2016).

In 2015, the Cultural Connectedness Scale was developed to assess cultural connectedness among First Nations populations (Snowshoe et al., 2015). The Cultural Connectedness Scale measures spirituality, traditions, identity, and overall cultural connectedness (Snowshoe et al., 2015). The Cultural Connectedness Scale's criterion validity was established through a significant correlation with other well-being measures from other questionnaires (Snowshoe et al., 2015). The Cultural Connectedness Scale aligns with the most recent theories and research (Snowshoe et al., 2015). It has been used with Indigenous youth to measure their mental health (Snowshoe et al., 2017). Many of the scale's questions ask about cultural connections to specific First Nations Peoples, e.g., *I know my culture/spirit name. The*

eagle feather or a similar item has a lot of meaning to me. How often do you use sage, sweetgrass, or cedar in any way or form? etc. (Snowshoe et al., 2017). In addition to measuring cultural connectedness among First Nations Peoples, this questionnaire has also been used with other Indigenous populations (Snowshoe et al., 2017). Among the 29 questions on the Cultural Connectedness Scale, 11 are dichotomous (yes or no), and 15 are Likert 5-point scales (Snowshoe et al., 2015). Three questions require either a never, once, or twice in the past year, monthly, weekly, or daily response (Snowshoe et al., 2015). The sum of seven different questions determines a person's spirituality score (Snowshoe et al., 2015). Next, the responses to 11 questions were tallied for the traditions score (Snowshoe et al., 2015). Lastly, responses to 11 questions comprised an identity score, and the total of all 29 questions comprised the overall cultural connectedness score (Snowshoe et al., 2015).

In 1992, the Multigroup Ethnic Identity Measure (MEIM) was created to assess ethnic identity as a general concept across all ethnicities (Phinney, 1992). The MEIM assesses ethnic identity, ethnic commitment, ethnic exploration, ethnic identity search, affirmation and belonging, and overall ethnic identity (Phinney, 1992). The MEIM consists of 14 questions covering various aspects of ethnicity (Phinney, 1992). Commitment is calculated by averaging the responses to three items, exploration is calculated by averaging the responses to four questions, identity is calculated by averaging the responses to five questions, and affirmation and belonging are calculated by averaging the responses to seven items. The total Multigroup Ethnic Identity Measure score is the average of all fourteen responses (Ponterotto, Gretchen, Utsey, Stracuzzi, & Saya, 2003). Some questions are used to compute the scores for multiple sections (Ponterotto, Gretchen, Utsey, Stracuzzi, & Saya Jr, 2003). Because these two questionnaires assess different sub-characteristics of cultural connectedness, both were included in this study.

2.3.5.4 *Social Measures*

The ICAC advised the researchers that the home communities could impact PA. Participants answered questions about their home communities where they grew up as potential predictors of PA. Participants were asked if they were from a rural, urban, or rural/urban community. In addition, participants were asked if they were from northern or southern communities. Participants were also asked if their home community was on a reserve, off a reserve, or both. Participants also reported if they moved away from their home community for an extended period due to work or study.

Social support was quantified using the Social Support Index (SSI) (Distelberg et al., 2014; McCubbin et al., 1996; Plumb, 2011), employing a multidimensional approach. The Social Support Index: Multidimensional Approach assesses four dimensions of social support: community support, family support, friendship support, and positive perception of support (Distelberg et al., 2014). This metric is reliable and valid (Distelberg et al., 2014; McCubbin et al., 1996; Plumb, 2011). The SSI comprises 17 questions that ask participants to indicate their agreement or disagreement with a statement (Plumb, 2011). The range in score on the SSI is 0 to 68. A higher score indicates a higher level of social support (Plumb, 2011). These responses were graded on a 5-point Likert scale, with 1 indicating strong disagreement and 5 indicating strong agreement (Distelberg et al., 2014; Plumb, 2011). Six responses were scored in reverse order (questions 2, 6, 8, 13, 14, and 17) scored, i.e., 5 = strongly disagree to 1 = strongly agree. The sum of the responses to four questions was used to calculate community support (questions 1, 7, 10, and 11) (Distelberg et al., 2014). Family support was calculated by summing the responses to three questions (questions 3, 5, and 12). Friendship support was calculated by summing the responses to three questions (questions 9, 15, and 16). Positive perception of

support was calculated by summing the responses to five questions (questions 2, 8, 13, 14, and 17). Overall social support was calculated by summing the responses to all 17 questions (Distelberg et al., 2014).

The Family Support Questionnaire from the Family Influences on Physical Activity study was used to assess family influences on PA (Wang et al., 2015). The following three questions were used to assess family/friends' social support for PA. (1) How many days per week on average do your family/friends encourage you to engage in PA; (2) how many days per week on average do your family/friends watch you engaging in PA; and (3) how many days per week on average do your family/friends involve themselves in your activities, that is, being physically active together with you? (Wang et al., 2015). Among the response, options were: (1) never or less than weekly; (2) 1-2 days/week; (3) 3-4 days/week; (4) more than five days per week (Wang et al., 2015). Participants were divided into two groups for data analysis, those who never received social support for PA and those who received social support for PA 1-2 days/week or more. Stakeholders mentioned a family history of PA as a potential determinant of PA. Participants responded to one question developed by the ICAC, "My family/friends are very physically active," on a 5-point Likert scale ranging from 1-Strongly Disagree to 5-Strongly Agree.

Following consultation and discussion with the Indigenous Community Advisors, the Elder on the Advisory Committee requested that questions about residential schools and foster care be included in the survey. Participants were asked to answer four questions to investigate the effects of past trauma on PA. The first question concerned residential school attendance and whether the participant attended residential school, response options were "Yes" or "No." Next, the second question asked participants if anyone in their family had attended residential school;

response options were “Yes” or “No.” If the participant answered “Yes” to anyone in their family attending residential school, then they selected all who attended residential school; response options were “Parent(s),” “Sibling(s),” “Grandparent(s),” “Auntie(s)/Uncle(s),” “Cousin(s),” “Children,” or “Other.” The third question, which followed the foster care experience, asked if the participant had ever been placed in foster care, response option “Yes” or “No.” The fourth question asked participants if one of their family members had ever been placed in foster care; response options included “Parent(s),” “Sibling(s),” “Grandparent(s),” “Auntie(s)/Uncle(s),” “Cousin(s),” “Children,” or “Other.”

Perceived racism in the community, lifetime discrimination, daily discrimination, and discrimination as a barrier to PA was considered when evaluating discriminatory experiences. As directed by the Community Advisors, four questions were included regarding discrimination taken from larger questionnaires (Edwards & Cunningham, 2013; Williams, 1999; Williams et al., 1997). As directed by the ICAC, only four questions were used to determine the discriminatory experience of each participant. One question assessed perceived community racism: “Is racism and discrimination a problem in your community?” (Edwards & Cunningham, 2013). One question from the Detroit Area Study’s Lifetime Discrimination Scale was used to measure lifetime discrimination. The question asks, “Has racism and discrimination had an effect on you at some point in your life?” (Williams, 1999). This question can help highlight the racism and discrimination that First Nations and Métis individuals face when they move away from their home communities at some point in their life (Paradies, 2016; Porter, 2016). The Detroit Area Study’s Lifetime Discrimination Scale is valid (T. R. Taylor et al., 2004). One question from the Everyday Discrimination Scale adapted from the Detroit Area Study asked, “Is racism a problem in your town, city, or rural area where you currently reside?” (Williams et al., 1997). The

Everyday Discrimination Scale has been deemed valid and reliable across diverse populations (Gonzales et al., 2016; Krieger et al., 2005; T. R. Taylor et al., 2004). One question assessed racism as a barrier to PA from the ICAC: “Has racism and discrimination had an impact on your PA levels?”. Yes (2), Unsure (1), or No (0) were all possible answers to all the questions, and the total discriminatory experiences score was calculated by summing the responses to these questions.

2.3.6 Data Analysis

Western quantitative research methods were adapted and tailored to the community’s requests and vision for this project. This was a quantitative observational study with a survey research design, all participants were given the same survey, and no Indigenous group or sex comparisons were carried out. All analyses were discussed with the ICAC to ensure the respectful, practical, and ethical presentation of knowledge gained from this study. The intended analysis was not pan-Indigenous, providing analysis of individual Indigenous Nations and groups where possible. It was impossible to avoid a pan-First Nations approach in data analysis and presentation because most participants identified as Métis or First Nations-Status local to Saskatchewan. Other identities and nation-specific analyses were not evaluated due to the small number of participants from other individual Indigenous identities and distinct First Nations groups outside of Saskatchewan. Indigenous group analyses conducted included separate analyses of First Nations and Métis groups, reflecting their diverse histories, cultures, and traditions (G. of C. I. and N. A. Canada, 2011; B. Davis, 2012; S. C. Government of Canada, 2016b; National Collaborating Centre for Aboriginal Health, 2016; Sealey & Lussier, 1975; Teillet, 2019). Furthermore, sex-specific analysis was conducted to present the findings specific

to Métis and First Nations-Status males and females in Saskatchewan. Due to the low sample size, First Nations (non-Status) and Inuit data were not analyzed in this thesis. If a participant was missing data for a specific question or a section of one of the questionnaires, their score for that sub-measure was to be removed, yet the other complete sub-measures were included.

Significance was set at p-value <0.05. At the discretion of the ICAC, outliers were not removed from the data for data transformation purposes. Instead, non-parametric tests were utilized. Data analysis was performed in Statistical Package for the Social Sciences (SPSS) Version 28.0.1.0 statistical software suite developed by IBM (SPSS Inc., Chicago, Illinois, USA, <https://www.ibm.com/analytics/spss-statistics-software>). Statistical analysis included independent samples t-test (two-tailed), Mann-Whitney U test, one-way ANOVA and Kruskal-Wallis H test.

Independent samples t-tests and Mann-Whitney U tests were used to compare cultural connectedness scores between participants who met the MS activity recommendations twice a week and those who did not. Similarly, independent samples t-tests and Mann-Whitney U tests were used to compare cultural connectedness scores between participants who met the 150 minutes of MVPA recommendations and those who did not. Independent samples t-tests and Mann-Whitney U test analysis were repeated to compare CCS and MEIM sub-scores and overall scores between those who met MS activity and MVPA guidelines and those who did not among Métis and First Nations-Status males and females. Physical activity levels were analyzed based on their frequency of participation in traditional activities. The percentage of participants who met the muscle-strengthening activity guidelines and 150 minutes of MVPA guidelines were compared between the three categories (never, infrequently, frequently) of traditional activity participation using the one-way ANOVA or Kruskal-Wallis H test.

Independent samples t-test and Mann-Whitney U test compared social support index scores between participants who met the muscle-strengthening activity recommendations twice a week and those who did not. Similarly, the independent samples t-test and Mann-Whitney U test compared social support index scores between participants who met the 150 minutes of MVPA guidelines and those who did not. The percentage of participants meeting the MS activity and 150 minutes of MVPA guidelines were compared between those who had residential school experiences and those who did not and those who had foster care experiences and those who did not. Discriminatory experience score calculated from the responses to four questions (details provided in section 2.3.5.4) was compared between participants who met the muscle-strengthening guidelines and those who did not among males and females using independent samples t-tests and Mann-Whitney U tests. Similarly, the discriminatory experience score was compared between participants who met the 150 minutes of MVPA guidelines and those who did not among males and females using independent samples t-tests and Mann-Whitney U tests. Lastly, PA was also analyzed between different home communities by the amount of MS activity and 150 minutes of MVPA performed by participants using independent samples t-tests, Mann-Whitney U tests, one-way ANOVA and Kruskal-Wallis H tests. A posthoc test was performed where significant differences were found using one-way ANOVA and Kruskal-Wallis H tests. Tukey's B post hoc tests were used to determine specific differences if simple ANOVA was significant. Dunn's multiple comparisons posthoc tests were used to determine specific differences if the Kruskal-Wallis H test was significant.

Independent samples t-tests were used to compare the means of two independent groups, and one-way ANOVA tests were used to compare the means of three or more independent groups to determine statistically significant differences when the data were parametric. However,

most of the data in the current study were non-parametric, did not meet normality assumptions, and had significant outliers. Mann-Whitney U tests were used to compare outcomes between two independent groups, and the Kruskal-Wallis H test was used to compare outcomes between two or more independent groups. Data analysis where independent samples t-tests were used is stated in the results sections; most of the data analysis was done using Mann-Whitney U and Kruskal-Wallis H tests.

All assumptions of independent samples t-tests, Mann-Whitney U test, one-way ANOVA and Kruskal-Wallis H tests were examined. Independent t-test assumptions included normally distributed dependent variables, homogeneity of variance, a random sample, and no significant outliers. One-way ANOVA assumptions include normally distributed continuous dependent variable (analyzed using Shapiro-Wilk test), independent variable consisting of two or more categorical, independent groups, independence of observations, no significant outliers (analyzed using box plots), and homogeneity of variance (analyzed using Levene's test). Mann-Whitney U test and Kruskal-Wallis H test assumptions include one dependent variable measured at the continuous or ordinal level, one independent variable consisting of two categorical, independent groups, and independence of observations.

CHAPTER 3

3.1 Results

Of 220 people who opened the survey, 192 completed the survey. Out of the 140 participants who opened the survey during the initial phase of the study, only 125 completed the survey, with a question completion rate of 89.3%. During the study's second phase, 80 participants opened the survey, and 67 participants continued with the survey, attaining a question completion rate of 83.8%. There were sixty-six Métis, 117 First Nations-Status, six First Nations-Non-Status, two participants identified as Inuit, and one did not identify their Indigenous group. Among females, one participant was excluded from the current analysis who identified as First Nations-Non-Status and excluded two First Nations-Status females who identified as an Indigenous nation outside Saskatchewan. Among males, five participants identified as First Nations-Non-Status were excluded from the analysis. In addition to those already mentioned, two Inuit participants and one participant with an unknown Indigenous identity were excluded from analyses. A total of 11 participants were excluded; the final sample size was 181.

Table 3-1 provides the details for Métis and First Nations males' and females' gender identity, age, education, personal/family residential school or foster care experiences, and home community.

Table 3-1 Female and Male Demographic Characteristics Table, N (%), Mean \pm SD

Characteristic	Métis Females N=52	Métis Males N=14	First Nations- Status Females N=100	First Nations- Status Males N=15
Gender Identity				
Man	NR	14(100)	NR	15(93.3)
Women	43(86.0)	NR	92(97.9)	NR
Man [♦] , Woman* Trans male/Trans man, Trans woman/Trans female, Genderqueer/non-conforming or Two-Spirit*	7(14.0)	0(0.0)	NR	NR
Age (years)				
Mean \pm SD	27.45 \pm 10.3	24.9 \pm 10.1	29.2 \pm 9.8	34.3 \pm 14.1
Median	24.0	21.5	26.0	28.0
Range	18-57	18-55	18-54	19-63
Education				
High school diploma or less	12(23.8)	6(52.9)	20(20.4)	4(26.7)
Vocational school or some college	18(34.6)	2(14.3)	38(38.8)	6(40.0)
College/university degree	10(19.2)	6(42.8) [‡]	25(25.5)	5(33.3) [‡]
Professional/graduate degree	12(23.1)	NR	15(15.3)	NR
Residential School/Foster Care				
Residential School Self/Family Attendance	17(43.6)	2(14.3)	71(94.7)	12(80.0)
Self/Family Foster Care Experience	14(35.9)	3(21.4)	48(64.0)	8(53.3)
Home Community				
On Reserve	0(0.0)	0(0.0)	24(24.7)	6(40.0)
Off Reserve	47(90.4)	14(100.0) ^{**}	46(47.4)	6(40.0)
Both (On and Off Reserve)	5(9.6)	NR	27(27.8)	3(20.0)
Rural	18(34.6)	4(28.6)	33(34.0)	6(40.0)
Urban	20(38.5)	5(35.7)	28(28.9)	NR [‡]
Both (Rural and Urban)	14(26.9)	5(35.7)	36(37.1)	9(60.0)
Northern Community	11(21.2)	4(28.6)	24(24.5)	4(26.7)
Move away from home for extended period				
Yes	35(67.3)	7(50.0)	76(77.6)	12(80.0)
No	17(32.7)	7(50.0)	22(22.4)	3(20.0)

N, Number of Participants; SD, Standard Deviation; [♦], Gender identity combined due to small sample size; NR, Not reported to preserve the anonymity of small size; *, Each gender identity not identified explicitly due to small sample sizes; [‡], Métis and First Nations males two highest levels of education combined to maintain anonymity due to small sample size; **, Includes Métis

Characteristic	Métis Females N=52	Métis Males N=14	First Nations- Status Females N=100	First Nations- Status Males N=15
males from the both (on and off reserve) home community; ‡, First Nations males who reported urban home community were combined with First Nations males in the both (urban and rural) group; and (%) are based on responses received, not the total number of respondents.				

3.1.1 COVID-19 and its Impact on Physical Activity Participation among Females and Males

The COVID-19 pandemic’s impact on PA was measured by asking all participants in the second phase of the study four questions. The responses are shown in Figure 3.1. Overall, most of the Métis females (N=18, Figure 3-1A), and First Nations females (N=34, Figure 3-1B), reported that COVID-19 affected their regular PA routine. Most participants reported that PA that causes sweating and rapid heart rate decreased due to the pandemic, while also revealing that their participation in traditional activities remained either unchanged or decreased due to the pandemic. Métis females reported decreased time spent with family during PA, while First Nations females reported their time spent with family during PA remained unchanged. Overall, most of the Métis males (N=4, Figure 3-1C), and First Nations males (N=2, Figure 3-1D) reported that COVID-19 affected their regular PA routine. Most Métis males reported that their frequency of participating in PA that caused sweating and rapid heart rate increased during the pandemic. First Nations males reported that their participation in PA caused sweating and a rapid heart rate to decrease or increase. Inclusively, all males reported increased PA that caused sweating or a rapid heath rate during the pandemic. Métis male participants largely reported no change in their involvement in traditional activities during the pandemic; most First Nations males reported a decrease in traditional activity participation. Lastly, Métis males reported no change in the amount of time spent with family members during a PA during the quarantine

period. Many First Nations males reported either no change or decreased time spent with family during PA. Encompassing all males, no change was reported in time spent with family during a PA during the pandemic.

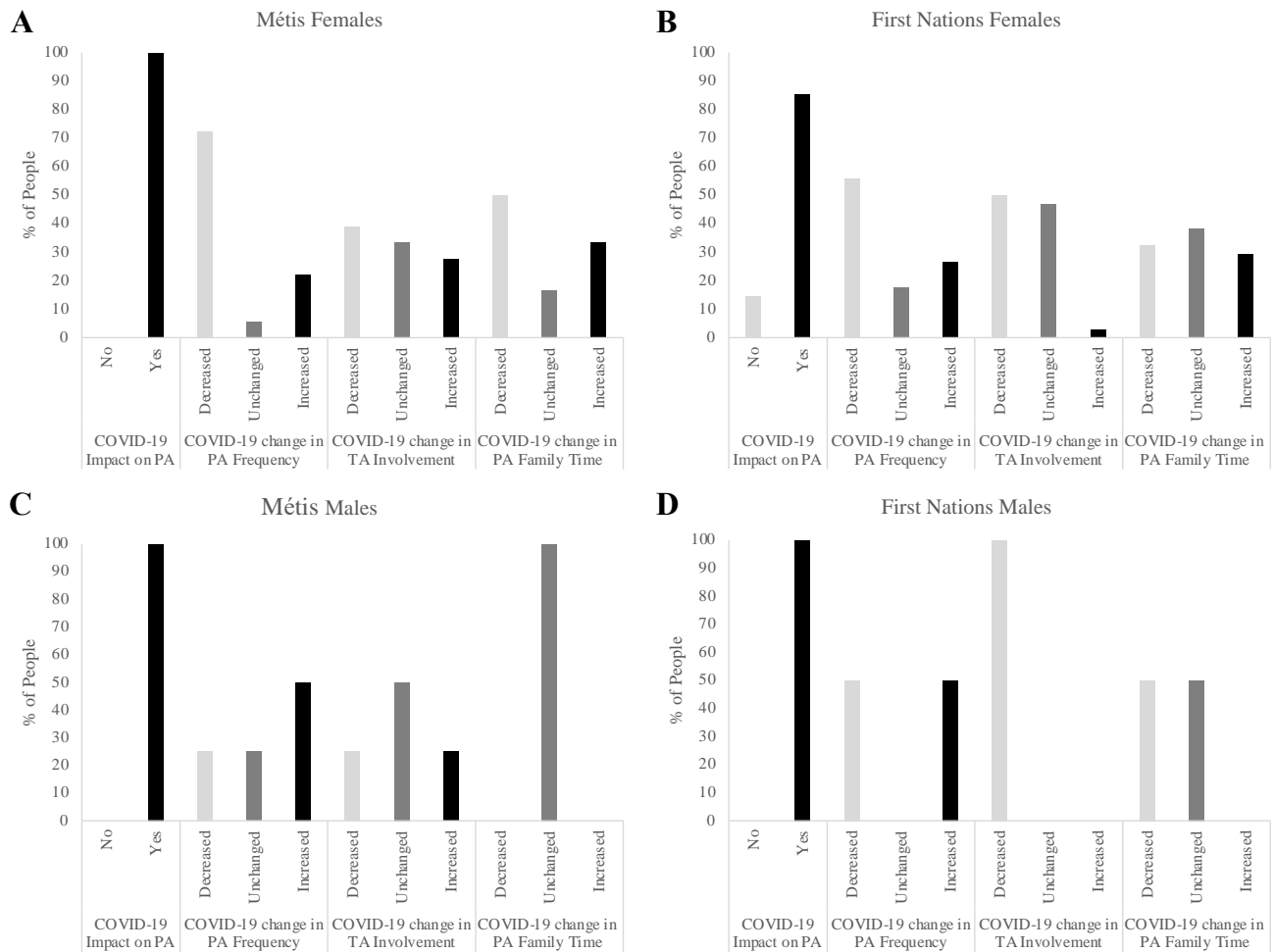


Figure 3-1 Métis females (A), First Nations females (B), Métis males (C), First Nations males (D) responses to the questions evaluating the impact of COVID-19 on physical activity (PA) participation, changes in PA engagement frequency, changes in traditional activity (TA) participation, and changes in time spent with family during PA.

3.1.2 Associations of Cultural Connectedness and Physical Activity Among Females and Males

3.1.2.1 Métis Females

Among female Métis (Figure 3-2A), based on the Mann-Whitney U test, CCS cultural identity ($p=0.27$) scores were similar between participants who met the MS activity guidelines and those who did not. Based on independent samples t-test, cultural traditions ($p=1.00$), cultural spirituality ($p=0.23$), and overall cultural connectedness ($p=0.39$) scores were similar between participants who met the MS activity guidelines and those who did not. When MEIM scores were compared by MS activity participation, based on the Mann-Whitney U test, Métis females (Figure 3-2B) showed no significant differences in commitment to ethnicity ($p=0.95$), ethnic exploration ($p=0.68$), ethnic identity search ($p=0.45$), affirmation and belonging ($p=0.65$), and overall MEIM scores ($p=0.98$) between those who met the MS activity guidelines and those who did not.

As illustrated in Figure 3-2C, based on the Mann-Whitney U test, among Métis females, CCS cultural identity ($p=0.51$) scores were similar between participants who met the MVPA guidelines and those who did not. Based on independent samples t-test, cultural traditions ($p=0.19$), cultural spirituality ($p=0.57$), and overall cultural connectedness ($p=0.67$) scores were similar between participants who met the MVPA guidelines and those who did not. Similarly, when analyzing Métis females' MEIM scores by MVPA participation (Figure 3-2D), based on the Mann-Whitney U tests, there were no statistically significant differences in commitment to ethnicity ($p=0.09$), ethnic exploration ($p=0.95$), ethnic identity search ($p=0.90$), affirmation and

belonging ($p=0.13$), or overall MEIM scores ($p=0.37$) among participants who met the MVPA guidelines and those who did not.

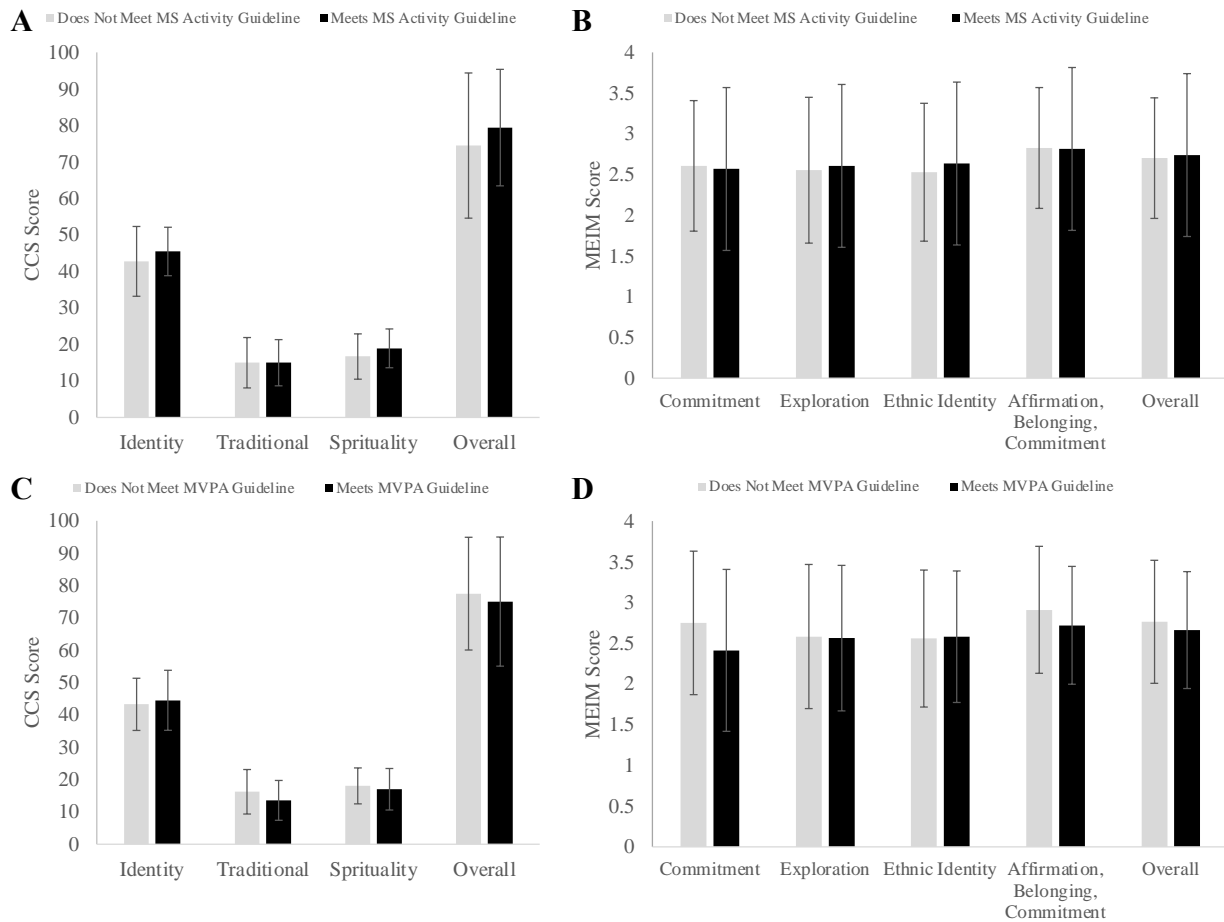


Figure 3-2 Métis females' who meet and do not meet muscle strengthening (MS) activity at least twice a week guidelines (A and B) and meet and do not meet 150 minutes of moderate to vigorous physical activity (MVPA) guidelines (C and D) Connectedness Scale scores (CCS) (A and C) and Multigroup Ethnic Identity Measure Scores (MEIM) (B and D). No statistically significant differences were found.

3.1.2.2 Métis Males

Métis males (Figure 3-3A) did not differ significantly in CCS scores based on MS activity participation, as determined using the Mann-Whitney U test, cultural identity ($p=0.91$) scores were similar between participants who met the MS activity guidelines and those who did not. As determined using independent samples t-tests, cultural traditions ($p=0.25$), cultural

spirituality ($p=0.56$), and overall cultural connectedness ($p=0.50$) scores were similar between participants who met the MS activity guidelines and those who did not. Based on independent samples t-tests (Figure 3-3B), participants who met the MS activity guidelines had a similar commitment to ethnicity ($p=0.75$), ethnic exploration ($p=0.34$), ethnic identity search ($p=0.33$), affirmation and belonging ($p=0.46$), and overall MEIM scores ($p=0.38$) as those who did not meet MS activity guidelines.

Among Métis males, similar trends were observed in CCS scores by MVPA (Figure 3-3C), based on the Mann-Whitney U test, cultural identity ($p=0.61$) scores were similar between participants who met the MVPA guidelines and those who did not. Based on independent samples t-tests, cultural traditions ($p=0.46$), cultural spirituality ($p=0.75$), and overall cultural connectedness ($p=0.58$) scores similar among participants who met the MVPA guidelines and those who did not. As shown in Figure 3-3D, based on independent samples t-tests, commitment to ethnicity ($p=0.06$), ethnic exploration ($p=0.20$), ethnic identity search ($p=0.25$), affirmation and belonging ($p=0.17$), and overall MEIM scores ($p=0.18$) were similar between participants who met the MVPA guidelines and those who did not.

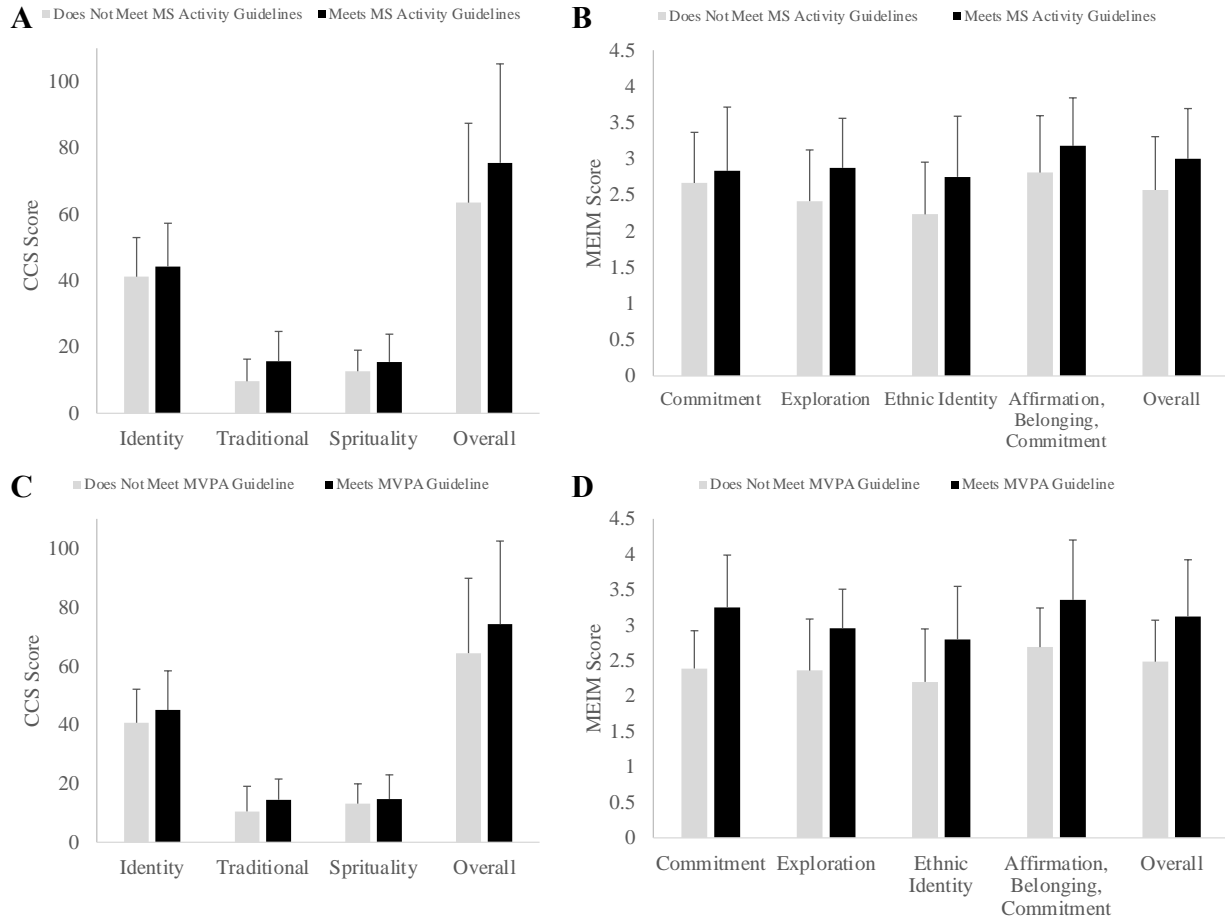


Figure 3-3 Métis males’ who meet and do not meet muscle strengthening (MS) activity at least twice a week guidelines (A and B) and meet and do not meet 150 minutes of moderate to vigorous physical activity (MVPA) guidelines (C and D) Connectedness Scale scores (CCS) (A and C) and Multigroup Ethnic Identity Measure Scores (MEIM) (B and D). No statistically significant differences were found.

3.1.2.3 First Nations Females

Based on Mann-Whitney U tests, no significant differences were found in CCS scores among First Nations females based on MS activity (Figure 3-4A): cultural identity ($p=0.78$), cultural traditions ($p=0.98$), cultural spirituality ($p=0.78$), and overall cultural connectedness scores ($p=0.80$) were similar between First Nations females who met MS activity guidelines and those who did not. When comparing MEIM scores by MS activity participation, First Nations females (Figure 3-4B), based on the Mann-Whitney U tests, showed no significant differences in

the means of commitment to ethnicity ($p=0.79$), ethnic exploration ($p=0.30$), ethnic identity search ($p=0.64$), affirmation and belonging ($p=0.66$), and overall MEIM score ($p=0.95$) between First Nations females who met the MS activity guidelines and First Nations females who did not meet the MS activity guidelines.

As shown in Figure 3-4C, based on the Mann-Whitney U test, First Nations females who met the MVPA guidelines had lower cultural spirituality scores ($p=0.04$) than those who met MVPA guidelines. Based on Mann-Whitney U tests, CCS scores were similar for cultural identity ($p=0.44$), cultural traditions ($p=0.29$), and overall cultural connectedness ($p=0.09$) between First Nations females who met and those who did not meet MVPA guidelines. Furthermore, similar trends were observed when comparing MEIM scores by MVPA (Figure 3-4D). Based on Mann-Whitney U tests, there were no significant differences in commitment to ethnicity ($p=0.77$), ethnic exploration ($p=0.56$), ethnic identity search ($p=0.76$), affirmation and belonging ($p=0.44$), or overall MEIM scores ($p=0.78$) between First Nations females who met the MVPA guidelines and those who did not.

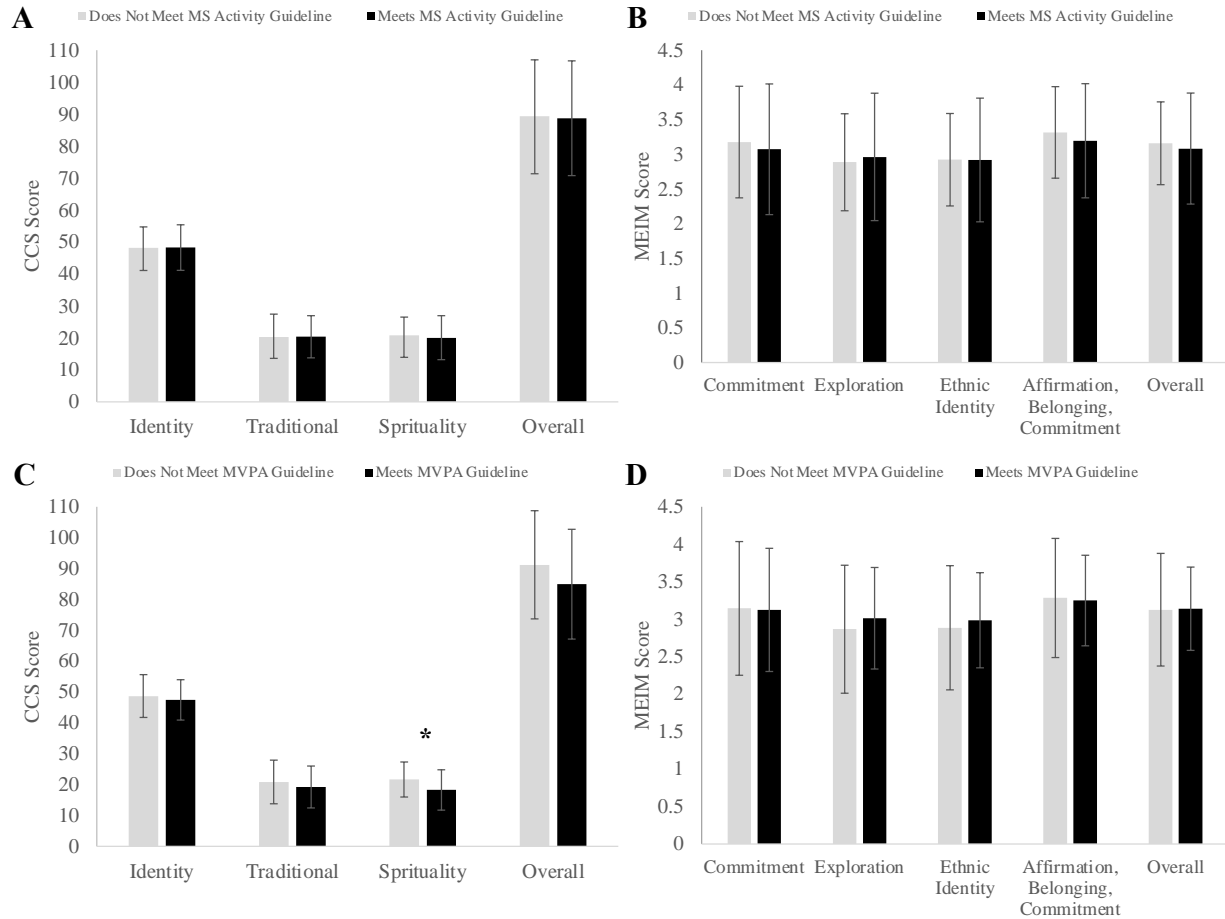


Figure 3-4 First Nations females' who meet and do not meet muscle strengthening (MS) activity at least twice a week guidelines (A and B) and meet and do not meet 150 minutes of moderate to vigorous physical activity (MVPA) guidelines (C and D) Connectedness Scale scores (CCS) (A and C) and Multigroup Ethnic Identity Measure Scores (MEIM) (B and D). No statistically significant differences were found. Asterisk (*) indicates a significant difference, $p < 0.05$.

3.1.2.4 First Nations Males

Based on the Mann-Whitney U test, cultural identity ($p=0.44$) scores were similar among First Nations males who met the MS activity requirement versus those who did not meet the MS activity guidelines (Figure 3-5A). Based on independent samples t-tests, cultural traditions ($p=0.91$), cultural spirituality ($p=0.31$), and overall cultural connectedness scores ($p=0.64$) were similar among First Nations males who met the MS activity requirement versus those who did not meet the MS activity guidelines (Figure 3-5A). There were no statistically significant

differences between MEIM scores and MS activity (Figure 3-5B) among First Nations males. Based on the Mann-Whitney U test, commitment to ethnicity ($p=0.52$) and affirmation and belonging ($p=0.52$) scores were similar between participants who met the MS activity guidelines and those who did not. Based on independent samples t-tests, ethnic exploration ($p=0.89$), ethnic identity search ($p=0.49$), and overall MEIM score ($p=0.59$) were similar between participants who met the MS activity guidelines and those who did not.

Based on the Mann-Whitney U test, the cultural identity ($p=0.003$) score was higher among First Nations males who met MVPA guidelines than those who did not meet MVPA guidelines. Based on the independent samples t-test, overall cultural connectedness ($p=0.02$) scores were higher among those who met MVPA guidelines than those who did not meet MVPA guidelines. Based on independent samples t-tests, cultural traditions ($p=0.15$) and cultural spirituality ($p=0.07$) scores were similar among First Nations males who met MVPA guidelines versus those who did not meet the guidelines (Figure 3-5C). There were no significant differences in MEIM scores between First Nations males who met the MVPA guidelines and those who did not meet these guidelines (Figure 3-5D). Based on the Mann-Whitney U test, First Nations males who met the MVPA guidelines had similar levels of commitment to ethnicity ($p=0.08$) and affirmation and belonging ($p=0.08$) scores to those who did not meet MVPA guidelines. Based on independent samples t-tests, ethnic exploration ($p=0.17$), ethnic identity search ($p=0.12$), and overall MEIM scores ($p=0.052$) were similar between First Nations males who met MVPA guidelines and those who did not meet MVPA guidelines.

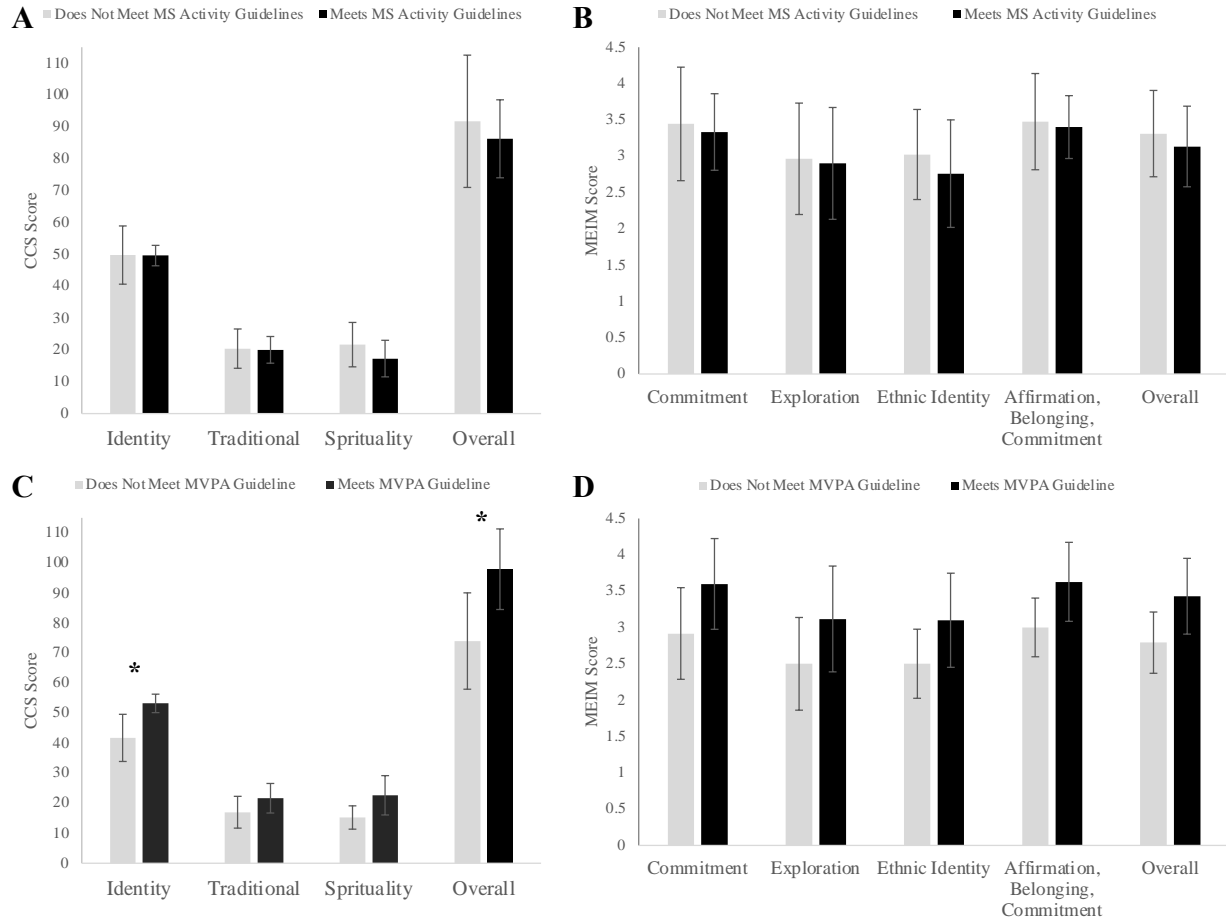


Figure 3-5 First Nations males’ who meet and do not meet muscle strengthening (MS) activity at least twice a week guidelines (A and B) and meet and do not meet 150 minutes of moderate to vigorous physical activity (MVPA) guidelines (C and D) Connectedness Scale scores (CCS) (A and C) and Multigroup Ethnic Identity Measure Scores (MEIM) (B and D). No statistically significant differences were found. Asterisk (*) indicates a significant difference, $p < 0.05$.

3.1.3 Associations of Traditional Activity Participation and Physical Activity

Participation among Females and Males

3.1.3.1 Métis Females and Males

Based on Kruskal-Wallis H tests, no significant differences were found in the weekly frequency of MS activity ($p=0.34$; Figure 3-6A) or the total number of minutes spent doing MVPA activity ($p=0.17$; Figure 3-6B) among Métis females by their frequency of participation

in traditional activities. Similarly, based on the Kruskal-Wallis H test, Métis males showed no significant differences in their frequency of MS activity ($p=0.74$; Figure 3-6C) and based on the one-way ANOVA test, the total number of minutes spent doing MVPA ($p=0.66$; Figure 3-6D) by their frequency of participation in traditional activities were similar between groups.

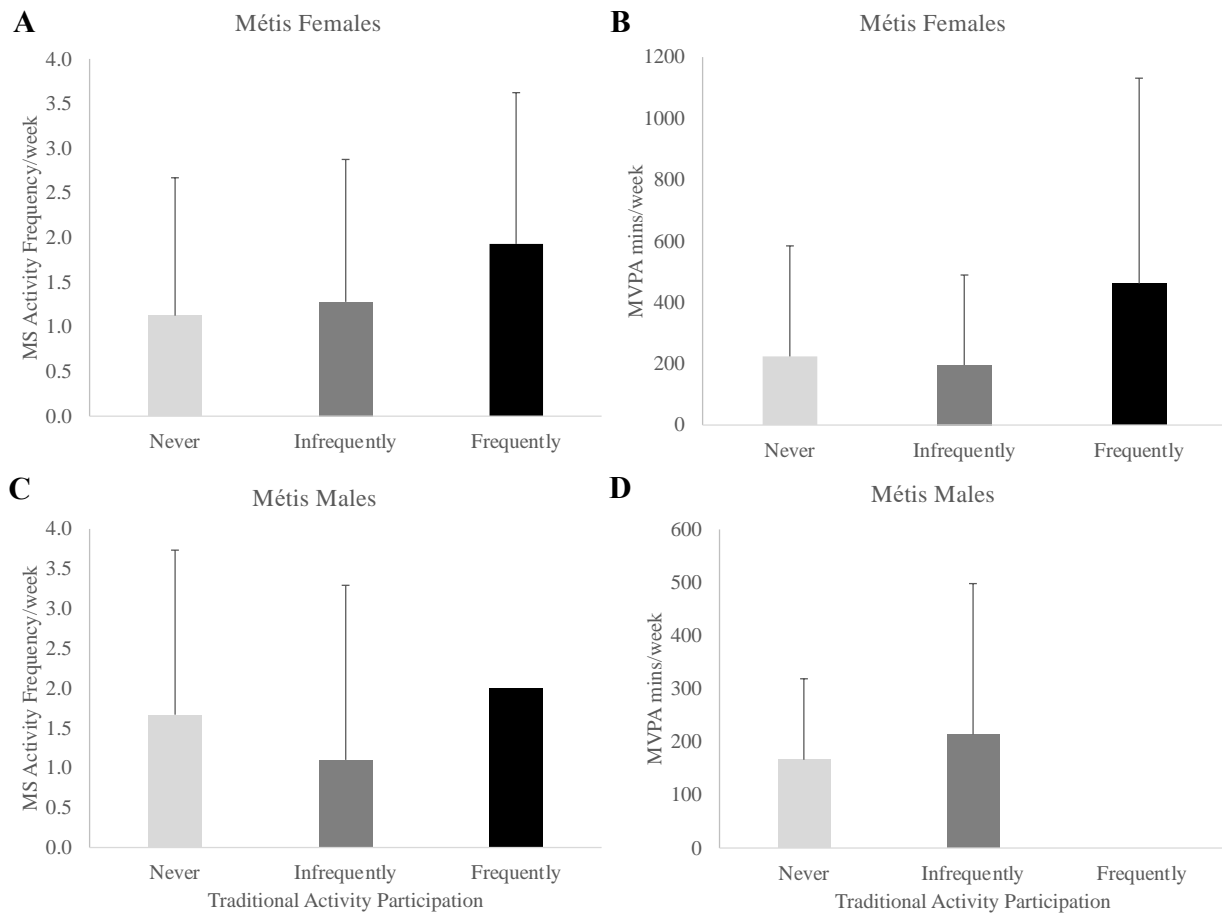


Figure 3-6 Métis females' (A and B) and males' (C and D) weekly frequency of muscle-strengthening (MS) activity participation (A and C) and total number of minutes of moderate to vigorous physical activity (MVPA) in a week (B and D). No statistically significant differences were found.

3.1.3.2 First Nations Females and Males

Based on Kruskal-Wallis H tests, no significant differences were found in the frequency of MS activity ($p=0.34$; Figure 3-7A) and the total number of minutes spent doing MVPA

activity ($p=0.31$; Figure 3-7B) among First Nations females based on their frequency of participation in traditional activities. Similarly, based on Kruskal-Wallis H tests, no significant differences were found in the weekly frequency of MS activity ($p=0.74$; Figure 3-7C) or the total number of minutes spent doing MVPA activity ($p=0.45$; Figure 3-7D) among First Nations males based on their participation in traditional activities.

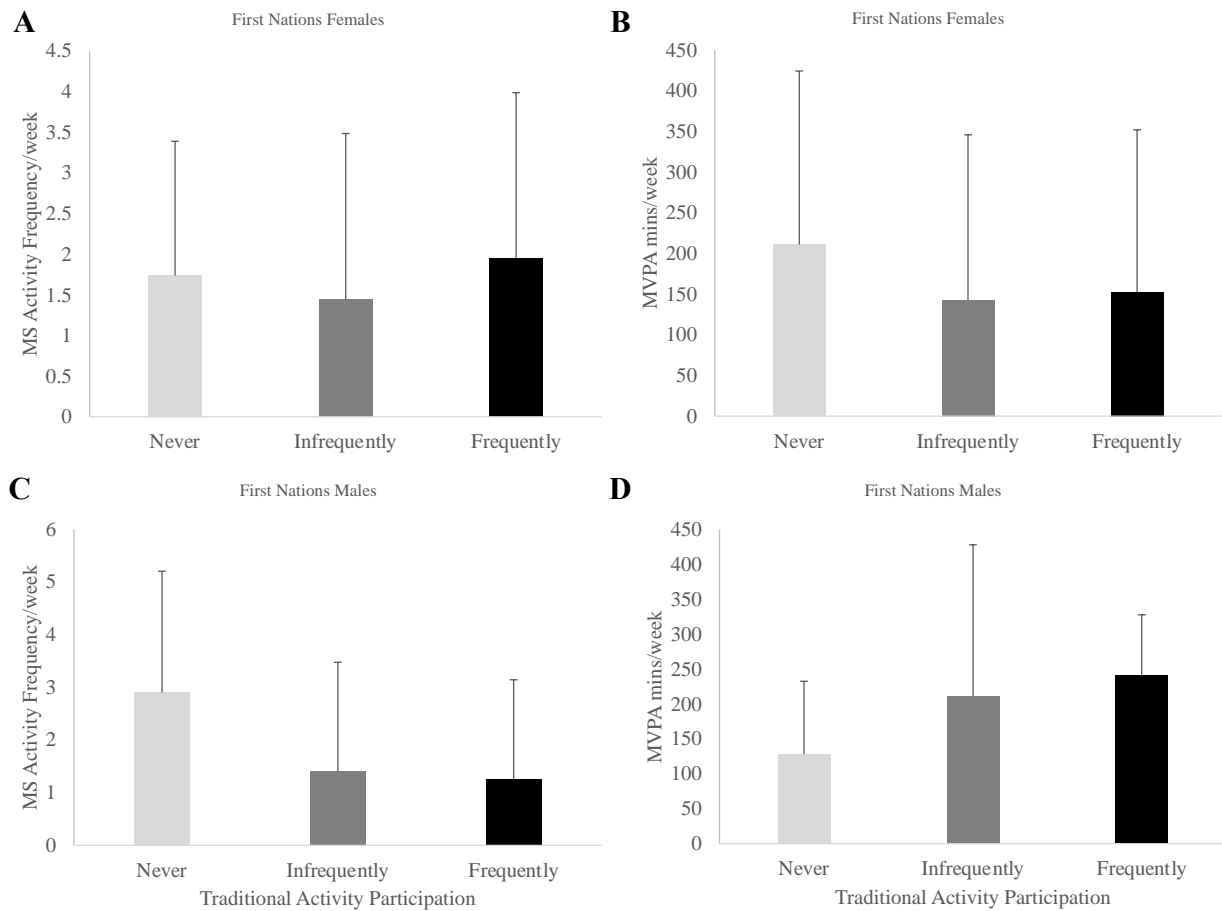


Figure 3-7 First Nations females' (A and B) and males' (C and D) weekly frequency of muscle-strengthening (MS) activity participation (A and C) and total number of minutes of moderate to vigorous physical activity (MVPA) in a week (B and D). No statistically significant differences were found.

3.1.4 Associations of Social Support and Physical Activity Among Females and Males

3.1.4.1 Métis Females and Males

As shown in Figure 3-8A, based on the Mann-Whitney U test, community support ($p=0.81$) scores were similar between Métis females who met and did not meet the MS activity guidelines. Based on independent samples t-tests, family support ($p=0.06$), and based on the Mann-Whitney U test, friendship support ($p=0.07$), positive perception of support ($p=0.14$), and overall SSI scores ($p=0.11$) were similar between Métis females who met and did not meet the MS activity guidelines. Based on the Mann-Whitney U test, Métis females (Figure 3-8B) who did not meet the MVPA guidelines, on the other hand, reported higher community support scores ($p=0.03$) than Métis females who did meet the MVPA guidelines. Based on the Mann-Whitney U test, Métis females who met the MVPA guidelines and those who did not have similar levels of family support ($p=0.52$), friendship support ($p=0.73$), positive perception of support ($p=0.31$), and overall SSI scores ($p=0.81$).

No significant differences were found in SSI scores by MS activity or MVPA participation among Métis males. As shown in Figure 3-8C, based on the independent samples t-test, community support ($p=0.22$), friendship support ($p=0.26$), positive perception of support ($p=0.35$), and overall SSI scores ($p=0.12$) scores were similar between Métis males who met and did not meet the MS activity guidelines. Based on the Mann-Whitney U test, the family support ($p=0.26$) score was similar between Métis males who met and those who did not meet the MS activity guidelines. Similarly, as shown in Figure 3-8D, based on the independent samples t-tests, Métis males who met the MVPA guidelines and those who did not have similar community

support ($p=0.84$), friendship support ($p=0.73$), positive perception of support ($p=0.27$), and overall SSI scores ($p=0.54$). Based on the Mann-Whitney U test, family support ($p=0.48$) scores were similar between Métis males who met the MVPA guidelines and those who did not.

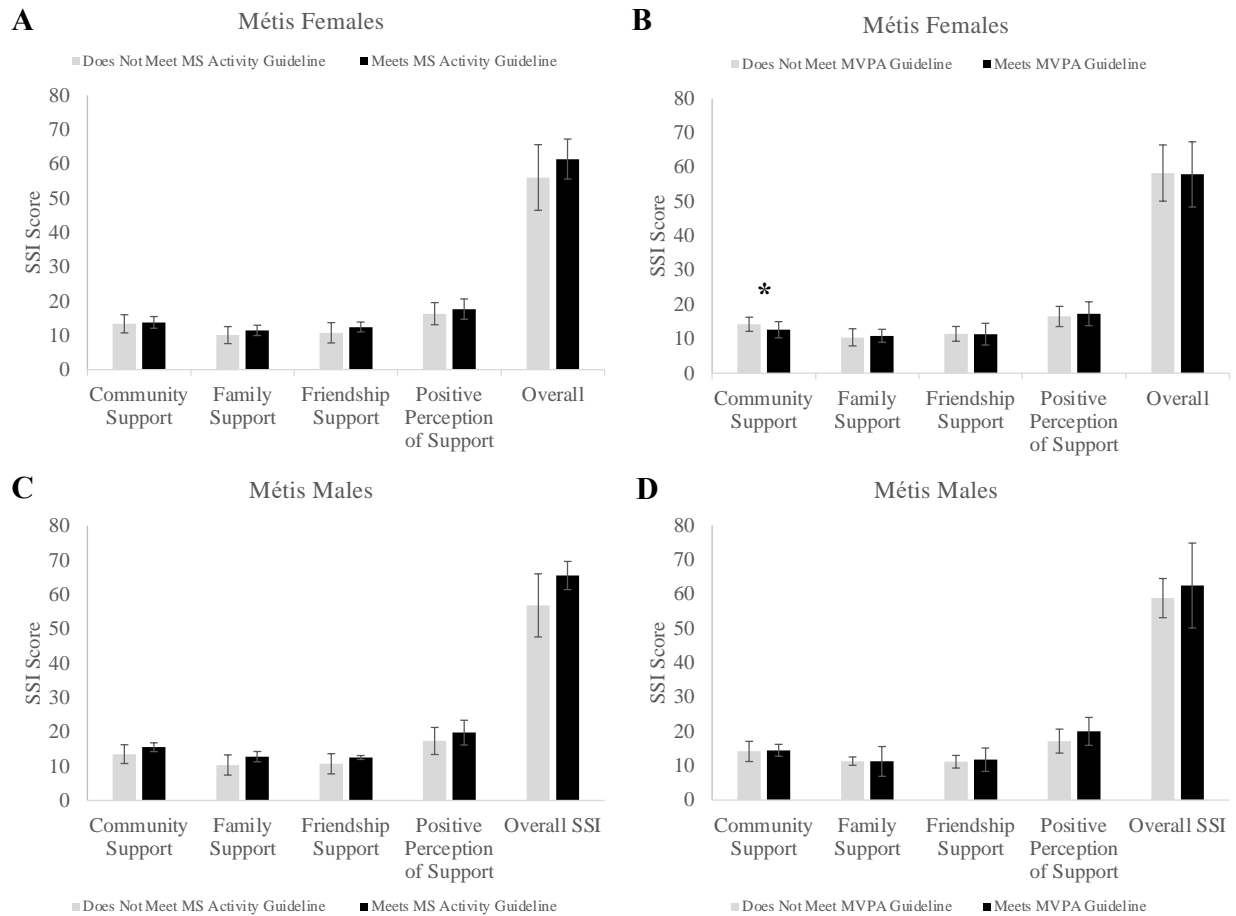


Figure 3-8 Métis females' (A and B) and males' (C and D) Social Support Index (SSI) scores among those meeting and not meeting the Canadian Society for Exercise Physiology's (CSEP) muscle strengthening (MS) activity at least twice a week (A and C) and meeting and not meeting CSEP weekly 150-minutes of moderate to vigorous physical activity (MVPA) guidelines (B and D). Asterisk (*) indicates a significant difference, $p<0.05$.

3.1.4.2 First Nations Females and Males

No significant differences were found in SSI scores by MS activity or MVPA among First Nations females. As shown in Figure 3-9A, based on the independent samples t-test, community support ($p=0.88$) scores were similar between First Nations females who met and

those who did not meet the MS activity guidelines. Based on Mann-Whitney U tests, family support ($p=0.36$), friendship support ($p=0.57$), positive perception of support ($p=0.77$), and overall SSI scores ($p=0.76$) were similar between First Nations females who met and did not meet the MS activity guidelines. Similarly, as shown in Figure 3-9B, based on the independent samples t-test, community support ($p=0.87$) scores were similar between First Nations females who met the MVPA guidelines and those who did not. Based on Mann-Whitney U tests, family support ($p=0.36$), friendship support ($p=0.86$), positive perception of support ($p=0.80$), and overall SSI ($p=0.70$) scores were similar between First Nations females who met the MVPA guidelines and those who did not.

Based on independent samples t-tests, there were no significant differences in SSI scores between First Nations males based on MS activity (Figure 3-9C) or MVPA (Figure 3-9D). Community support ($p=0.36$), family support ($p=0.51$), friendship support ($p=0.40$), positive perception of support ($p=0.42$), and overall SSI scores ($p=0.75$) were comparable between First Nations males who met and did not meet the MS activity guidelines. Likewise, the scores for community support ($p=0.66$), family support ($p=0.19$), friendship support ($p=0.92$), positive perception of support ($p=0.33$), and overall SSI ($p=0.59$) were comparable between First Nations males who met the MVPA guidelines and those who did not.

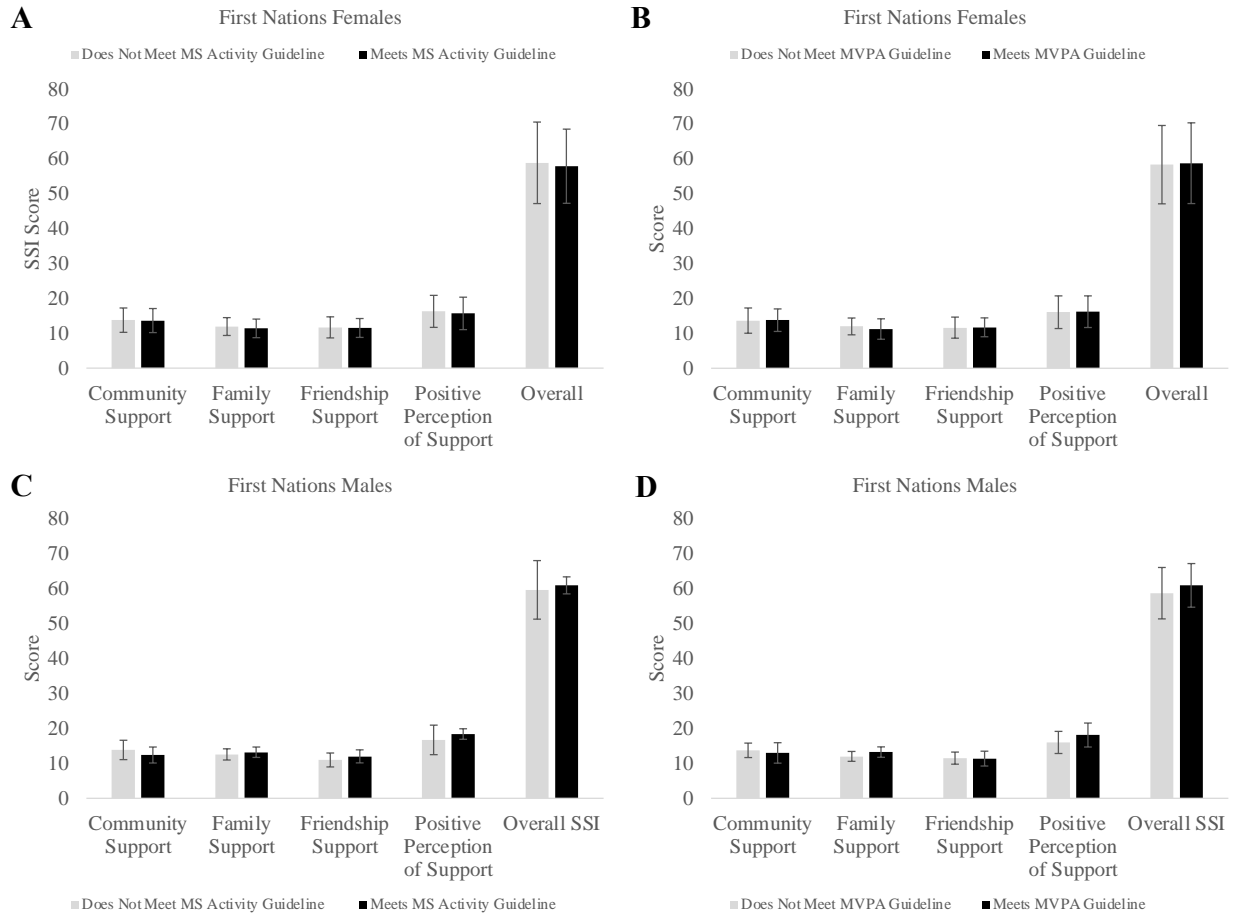


Figure 3-9 First Nations females' (A and B) and males' (C and D) Social Support Index (SSI) scores among those meeting and not meeting the Canadian Society for Exercise Physiology's (CSEP) muscle strengthening (MS) activity at least twice a week (A and C) and meeting and not meeting CSEP weekly 150-minutes of moderate to vigorous physical activity (MVPA) guidelines (B and D). No statistically significant differences were found.

3.1.5 Family and Friends Social Support of PA among Females and Males

3.1.5.1 Métis Females and Males

Métis females (Figure 3-10A-B) and males (Figure 3-10C-D), family and friends' social support in encouraging, watching, and involving themselves with the individual while they engaged in PA did not show any significant differences in weekly MS activity frequency (Figure 3-10A and C) or MVPA participation (Figure 3-10B and D). Based on Mann-Whitney U tests,

Métis females did not report significant differences in MS activity (Figure 3-10A) regardless of family/friends' encouragement to engage in PA ($p=0.26$), family/friends watching the participant engage in PA ($p=0.30$), and family/friends involving themselves in PA with the participant ($p=0.91$). Similarly, based on Mann-Whitney U tests, Métis females did not report significant differences in MVPA activity (Figure 3-10B) regardless of family/friends' encouragement to engage in PA ($p=0.19$), family/friends watching the participant engage in PA ($p=0.48$), and family/friends involving themselves in PA with the participant ($p=0.57$).

Among Métis males, based on Mann-Whitney U tests, there were no significant differences in MS activity (Figure 3-10C) regardless of family/friends' encouragement to engage in PA ($p=0.21$), family/friends watching the participant engage in PA ($p=0.93$), and family/friends involving themselves in PA with the participant ($p=0.81$). Similarly, based on independent samples t-tests, Métis males did not report significant differences in MVPA activity (Figure 3-10D) regardless of family/friends' encouragement to engage in PA ($p=0.80$), family/friends watching the participant engage in PA ($p=0.75$), and family/friends involving themselves in PA with the participant ($p=0.32$).

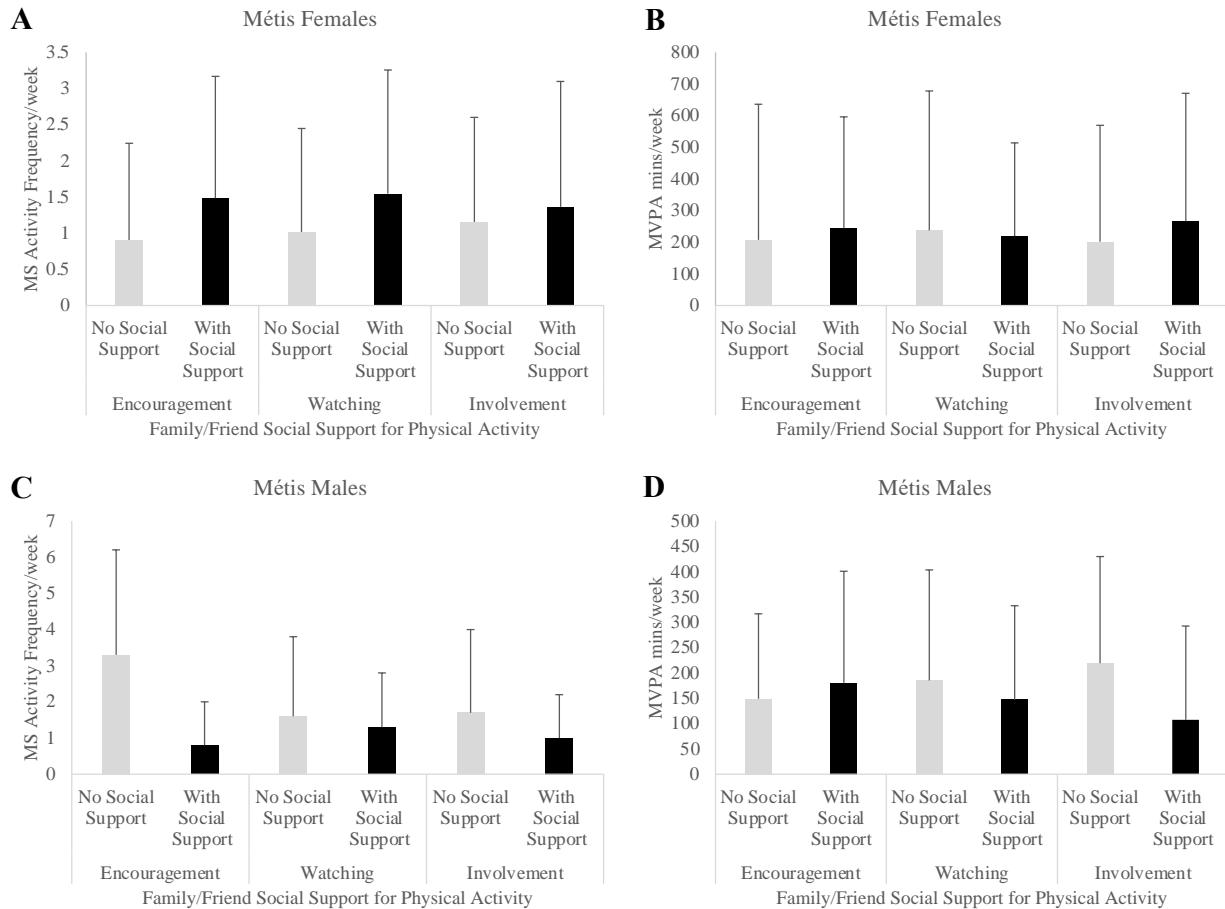


Figure 3-10 Métis females (A and B) and males (C and D) weekly muscle strengthening (MS) activity (A and C) and moderate to vigorous physical activity (MVPA) (B and D) by family and friends social support for physical activity. No statistically significant differences were found.

3.1.5.2 First Nations Females and Males

First Nations females (Figure 3-11A-B), family and friends' social support in encouraging, watching and involvement in PA with the individual as they engage in PA showed significant differences in weekly MS activity frequency and MVPA participation. Based on Mann-Whitney U tests, First Nations females who were encouraged ($p=0.04$; Figure 3-11A) or watched ($p=0.04$; Figure 3-11A) by family/friends reported a higher frequency of weekly MS activity than First Nations females who were never encouraged or watched by family/friends and First Nations females whose family/friends involved themselves in PA reported higher MS

activity ($p=0.02$; Figure 3-11A) compared to those whose family/friends were never involved in PA with the individual. Similarly, based on Mann-Whitney U tests, First Nations females who were encouraged ($p=0.01$; Figure 3-11B) or watched ($p=0.02$; Figure 3-11B) by family/friends had a higher frequency of weekly MVPA than First Nations females who were never encouraged or watched by family/friends while engaging in PA. Based on the Mann-Whitney U test, First Nations females did not show a significant difference in MVPA participation ($p=0.13$; Figure 3-11B) regardless of family/friends involving themselves in PA with the individual as they engaged in PA.

Based on Mann-Whitney U tests, First Nations males did not show significant differences in MS activity (Figure 3-11C) regardless of family/friends' encouragement to engage in PA ($p=0.85$), regardless of family/friends watching the participant engage in PA ($p=0.41$), and regardless of family/friends involving themselves in PA with the participant ($p=0.24$). Similarly, based on Mann-Whitney U tests, First Nations males did not show significant differences in MVPA (Figure 3-11D) participation regardless of family/friends' encouragement to engage in PA ($p=0.96$), regardless of family/friends watching the participant engage in PA ($p=0.86$), and regardless of family/friends involving themselves in PA with the participant ($p=0.95$).

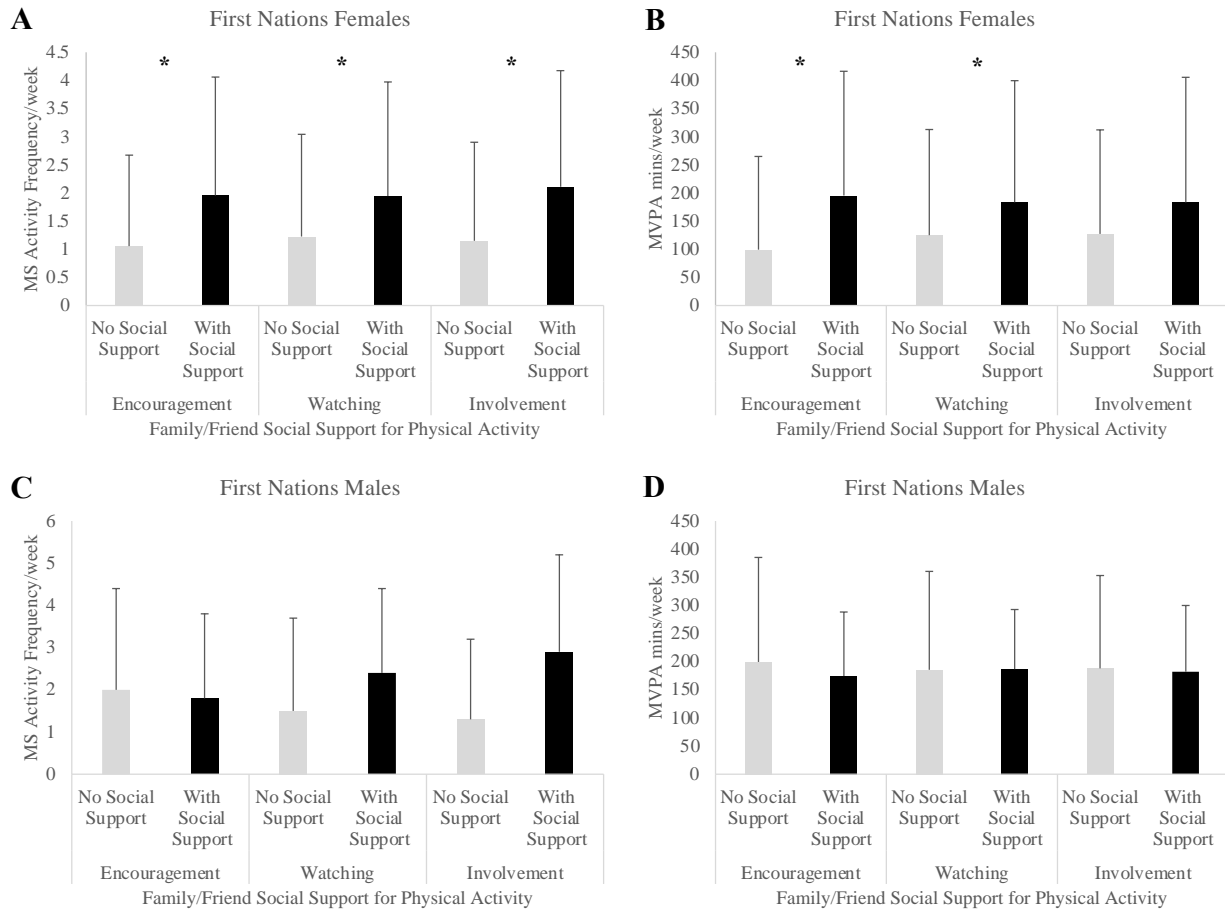


Figure 3-11 First Nations females (A and B) and males (C and D) weekly muscle strengthening (MS) activity (A and C) and moderate to vigorous physical activity (MVPA) (B and D) by family and friends social support for physical activity. Asterisk (*) indicates a significant difference, $p < 0.05$.

3.1.6 Historical Trauma, Discriminatory Experiences and Physical Activity

Levels Among Females and Males

3.1.6.1 Métis Females and Males

Based on Mann-Whitney U tests, Métis females (Figure 3-12A) did not report significant differences in weekly MS activity between those with personal/family members' residential school ($p=0.81$) or foster care experience ($p=0.33$) versus those without personal/family residential or foster care experience. Similarly, based on Mann-Whitney U tests, Métis females

(Figure 3-12B) showed no significant differences in the amount of MVPA participation between those with personal/family members' residential school ($p=0.69$) or foster care experience ($p=0.051$) versus those without personal/family residential or foster care experience.

Based on Mann-Whitney U tests, Métis males (Figure 3-12C) did not show any significant differences in weekly MS activity between those with personal/family members' residential school ($p=0.40$) or foster care experience ($p=0.67$) versus those without personal/family residential or foster care experience. Similarly, based on independent samples t-tests, Métis males (Figure 3-12D) showed no significant differences in the amount of MVPA participation between those with personal/family members' residential school ($p=0.62$) or foster care experience ($p=0.35$) versus those without personal/family residential or foster care experience.

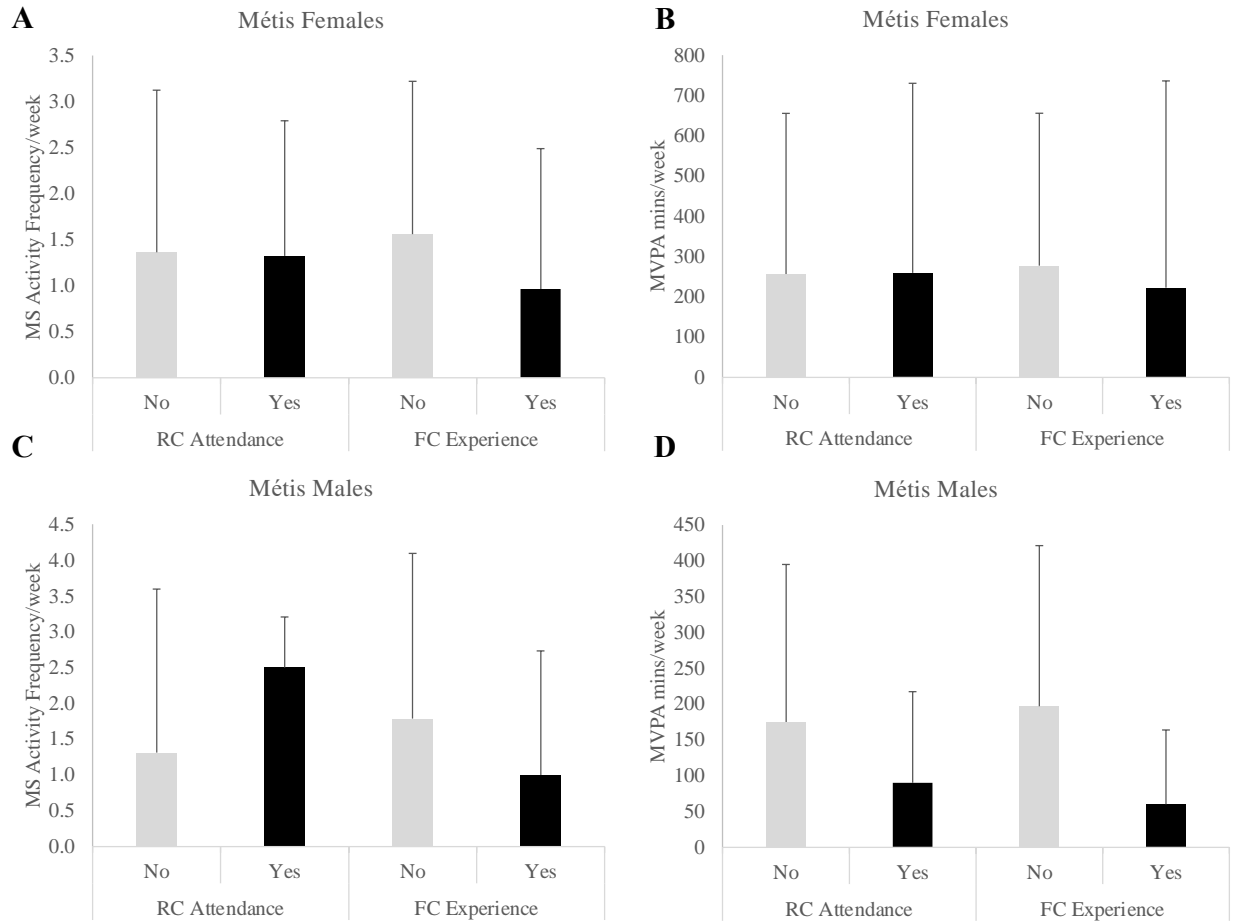


Figure 3-12 Métis females (A and B) and Métis males (C and D) personal/family member’s residential school and foster care experience by weekly MS activity frequency (A and C) and the total number of minutes of MVPA activity (B and D). No statistically significant differences were found.

As shown in Figure 3-13A, discrimination scores were compared between Métis females who met the MS or MVPA guidelines and those who did not. Based on the independent samples t-test, no significant difference in discrimination scores was observed between those who met the MS activity guidelines and those who did not ($p=0.66$). Similarly, based on the independent samples t-test, no significant differences in the discrimination scores were observed between Métis females who met the MVPA guidelines ($p=0.72$) and those who did not meet MVPA guidelines.

Based on the independent samples t-test, among Métis males (Figure 3-13B), no significant difference in discrimination scores was observed between those who met the MS activity guidelines ($p=0.71$) and those who did not meet the MS guidelines. Furthermore, based on the independent samples t-test, there was no significant difference in discrimination scores between those who met MVPA guidelines ($p=0.62$) and those who did not meet MVPA guidelines.

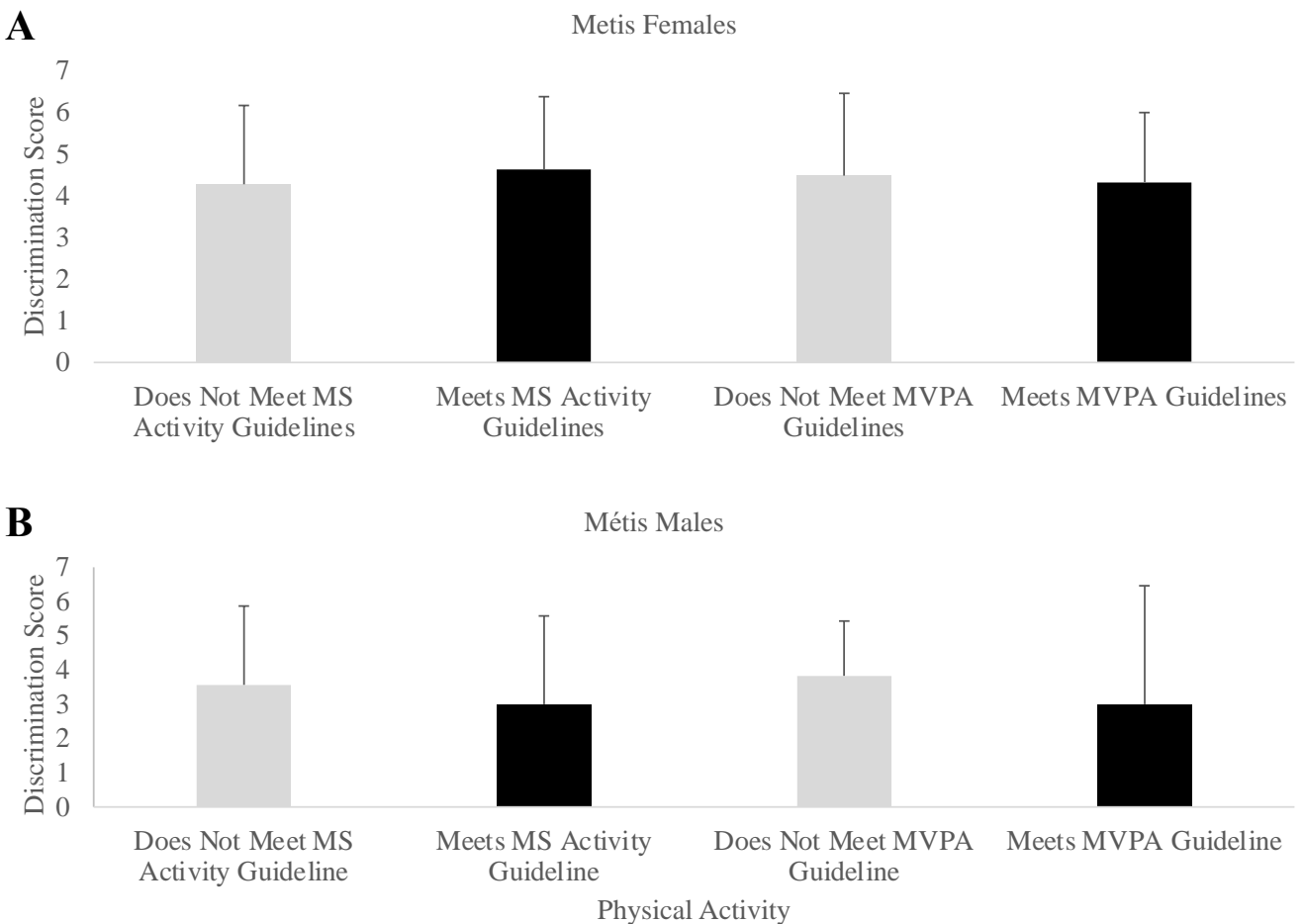


Figure 3-13 Métis females (A) and Métis males (B) discriminatory experience scores between individuals who meet CSEP’s muscle strengthening (MS) activity guidelines and those who meet CSEP’s moderate to vigorous physical activity (MVPA) guidelines versus those who do not meet these guidelines. No statistically significant differences were found.

3.1.6.2 First Nations Females and Males

Based on Mann-Whitney U tests, First Nations females (Figure 3-14A) did not demonstrate significant differences in weekly MS activity between those with personal/family members' residential school ($p=0.58$) or foster care experience ($p=0.16$) versus those without personal/family residential or foster care experience. Similarly, based on Mann-Whitney U tests, First Nations females (Figure 3-14B) showed no significant differences in the amount of MVPA participation between those with personal/family members' residential school ($p=0.45$) versus those without personal/family residential school experience. However, First Nations females with personal/family foster care experience ($p=0.03$) had lower MVPA activity than those without personal/family foster care experience.

All First Nations males had personal/family residential school attendance. Therefore, MS activity (Figure 3-14C) or MVPA (Figure 3-14D) comparison was not possible between those who had personal/family residential school experience and those who did not. First Nations males (Figure 3-25C) showed no significant differences in weekly MS activity between those with personal/family members' foster care experience ($p=0.28$) versus those without personal/family foster care experience. Similarly, First Nations males (Figure 3-14D) showed no significant differences in the amount of MVPA participation between those with personal/family members' foster care experience ($p=0.68$) versus those without personal/family foster care experience.

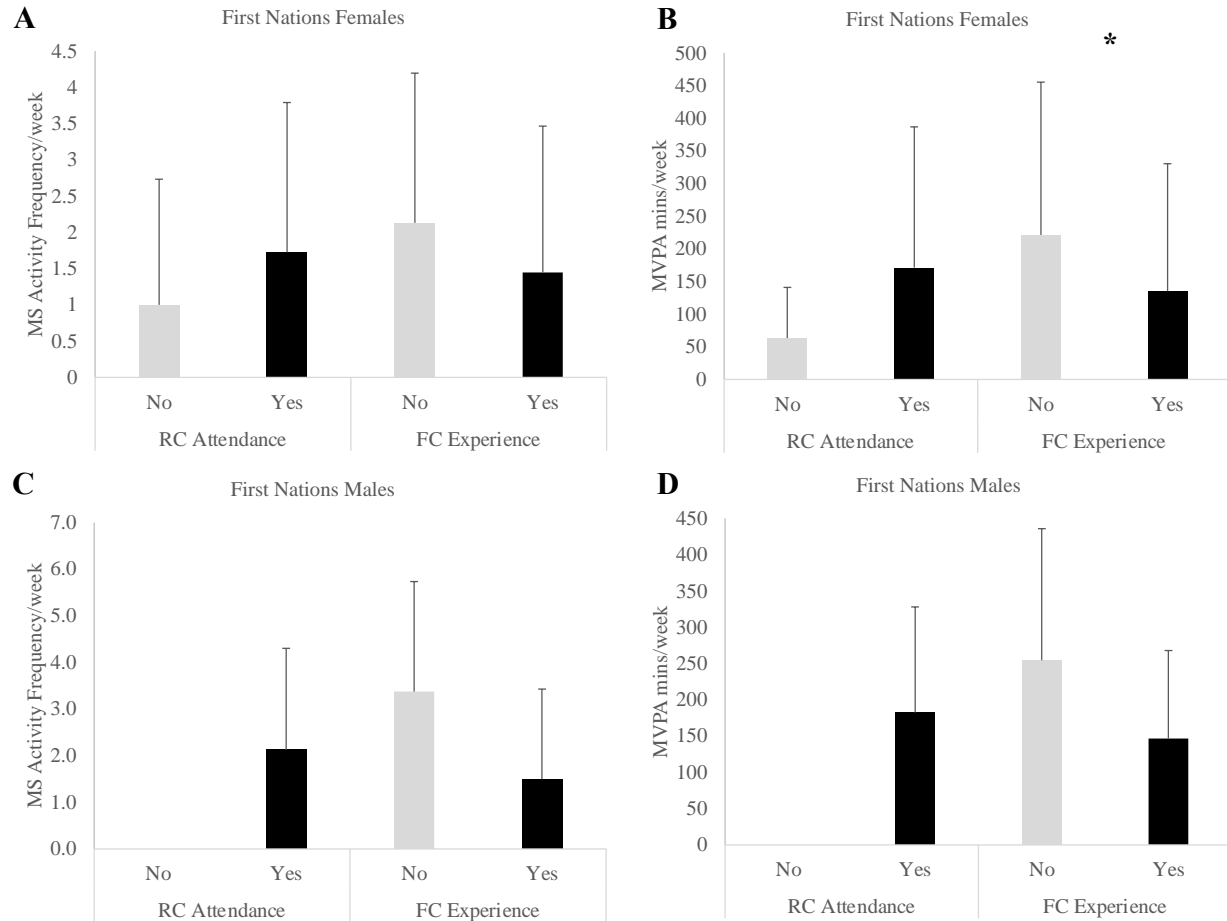


Figure 3-14 First Nations females (A and B) and First Nations males (C and D) personal/family member’s residential school and foster care experience by weekly MS activity frequency (A and C) and the total number of minutes of MVPA activity (B and D). Asterisk (*) indicates a significant difference, $p < 0.05$.

Among First Nations females (Figure 3-15A), based on the Mann-Whitney U test, those who met the MS activity guidelines reported a higher discrimination score than those who did not ($p=0.01$). However, based on the Mann-Whitney U test, First Nations females reported no significantly different discrimination scores whether they met the MVPA guidelines or not ($p=0.20$).

Figure 3-15B shows that based on the Mann-Whitney U test, First Nations males who met the MS activity guidelines and those who did not meet the MS activity guidelines reported

similar discrimination scores ($p=0.47$). Similarly, based on the Mann-Whitney U test, First Nations males who met the MVPA guidelines and those who did not meet the MVPA guidelines reported similar discrimination scores ($p=0.26$).

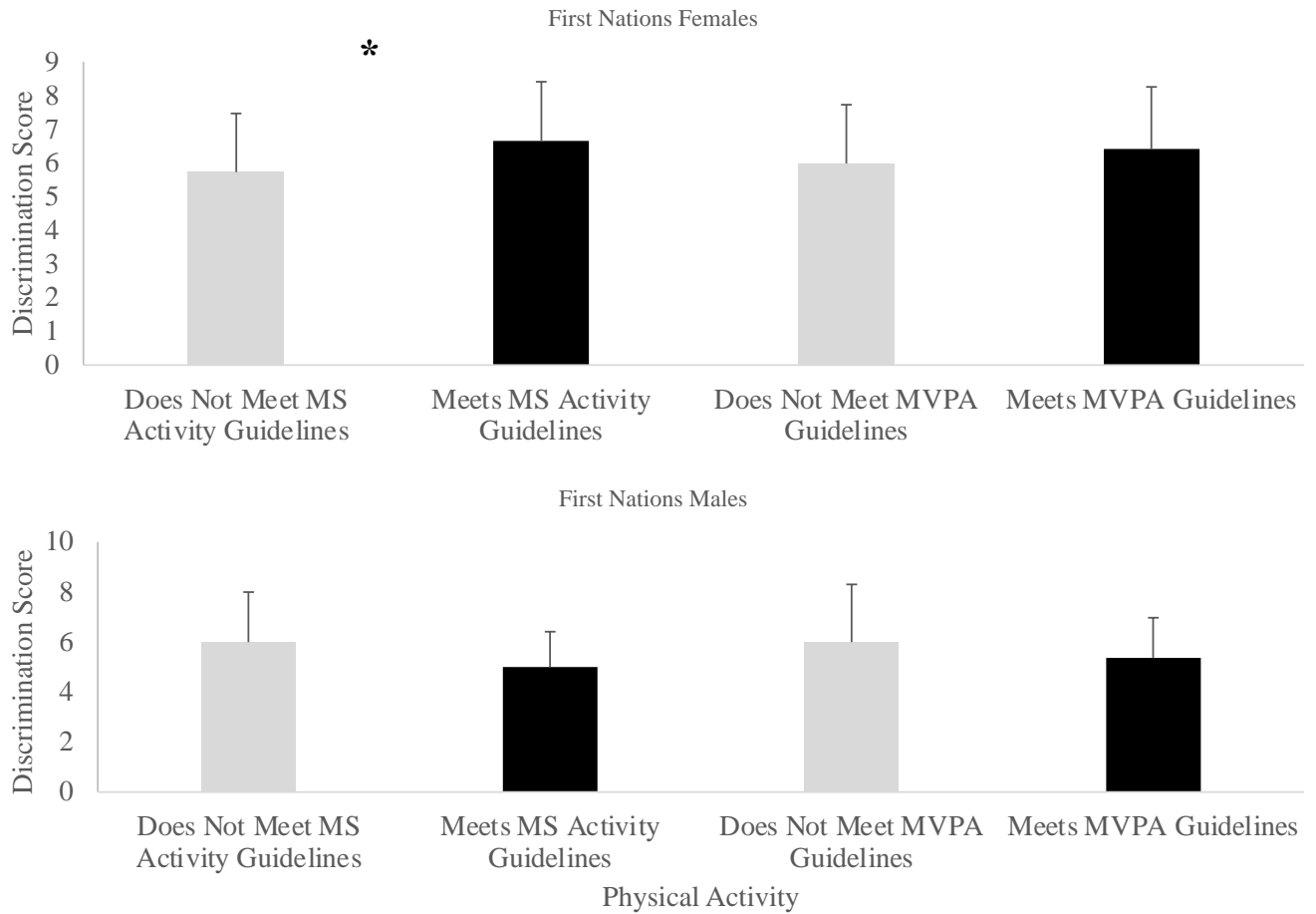


Figure 3-15 First Nations females (A) and First Nations males (B) discriminatory experience scores between individuals who meet CSEP’s muscle strengthening (MS) activity guidelines and those who meet CSEP’s moderate to vigorous physical activity (MVPA) guidelines versus those who do not meet these guidelines. Asterisk (*) indicates a significant difference, $p < 0.05$.

3.1.7 Home Community and Physical Activity Guidelines Association Among Females and Males

3.1.7.1 Métis Females and Males

The frequency of MS activity and the total number of minutes of MVPA participation were compared among Métis females and males and their home communities. There were no significant differences in the frequency of MS activity (Figure 3-16A) among Métis females who lived on or off-reserves or both ($p=0.75$) (based on Kruskal-Wallis H tests), in rural or urban areas or both ($p=0.95$) (based on Kruskal-Wallis H test), in northern or southern communities ($p=0.99$) (based on Mann-Whitney U test), or who moved away from their home community versus those who did not move away ($p=0.33$) (based on Mann-Whitney U test). Similarly, significant differences were found in MVPA participation among Métis females (Figure 3-16B) whether they lived on or off reserves, or both ($p=0.48$) (based on Kruskal-Wallis H tests), in rural or urban areas, or both ($p=0.91$) (based on Kruskal-Wallis H tests), in northern or southern communities ($p=0.83$) (based on Mann-Whitney U test) or moved away from their home community versus those who did not move away ($p=0.86$) (based on Mann-Whitney U test).

There were no significant differences among Métis males' MS activity frequency (Figure 3-16C) whether they lived on or off reserves or both ($p=0.35$) (based on Kruskal-Wallis H test), in rural or urban areas or both ($p=0.17$) (based on Kruskal-Wallis H test), in northern or southern communities ($p=0.78$) (based on Mann-Whitney U test), or who moved away from their home community versus those who did not move away ($p=0.82$) (based on Mann-Whitney U test). Similarly, significant differences were found in MVPA participation among Métis males (Figure 3-16D) who lived on or off reserves, or both ($p=0.40$) (based on one-way ANOVA), in rural or urban areas, or both ($p=0.29$) (based on one-way ANOVA), in northern or southern communities ($p=0.12$) (based on independent samples t-test) or moved away from their home community versus those who did not move away ($p=0.72$) (based on independent samples t-test).

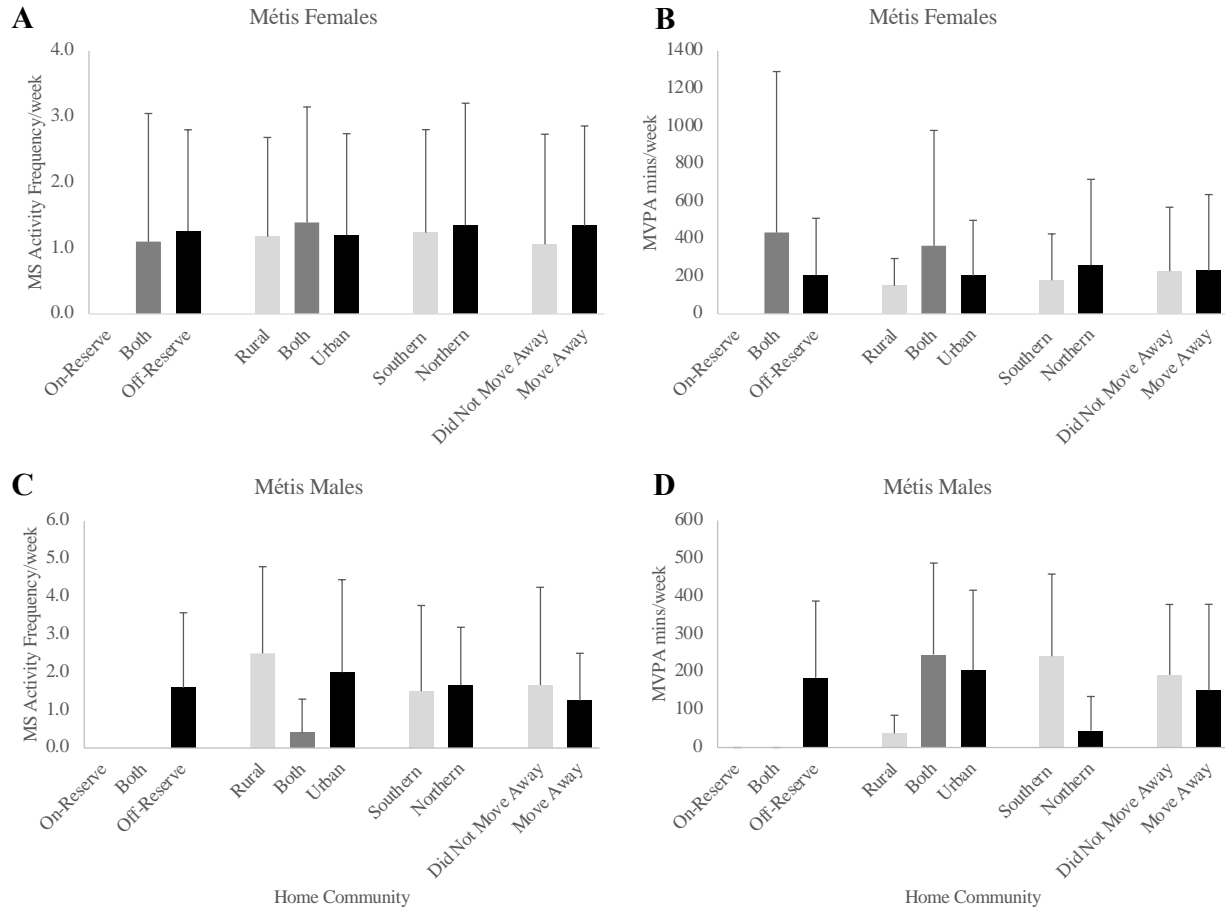


Figure 3-16 Métis females (A and B) and males (C and D) weekly muscle-strengthening (MS) activity frequency (A and C) and total weekly moderate to vigorous physical activity (MVPA) activity (B and D) by home community. No statistically significant differences were found.

3.1.7.2 First Nations Females and Males

As shown in Figure 3-17A, based on Kruskal-Wallis H tests, First Nations females from off-reserve ($p=0.02$) and females from both on-reserve and off-reserve home communities ($p=0.03$) reported higher weekly MS activity than females from on-reserve home communities. First Nations females had similar MS activity whether they lived in rural or urban areas or both ($p=0.11$) (based on Kruskal-Wallis H tests), whether they lived in southern or northern communities ($p=0.08$) (based on Mann-Whitney U test) or whether they moved away from their home community or not ($p=0.27$) (based on Mann-Whitney U test). Figure 3-17B shows that

based on Kruskal-Wallis H tests, First Nations females from off-reserve home communities reported higher MVPA ($p=0.02$) than females from on-reserve home communities. Additionally, First Nations females from off-reserve home communities reported higher MVPA ($p=0.04$) than females from both on-reserve and off-reserve home communities. Based on the Mann-Whitney U test, First Nations females (Figure 3-17B) from southern communities had a higher total number of minutes of MVPA ($p=0.03$) than First Nations females from northern home communities. However, First Nations females (Figure 3-17B) did not show significant differences in MVPA participation regardless of whether they lived in rural or urban areas or both ($p=0.11$) (based on Kruskal-Wallis H tests) or whether they moved away from their home community or not ($p=0.73$) (based on Mann-Whitney U test).

Among First Nations males (Figure 3-17C), no significant differences were found in MS activity whether they lived on or off reserves or both (on and off reserve) ($p=0.53$) (based on Kruskal-Wallis H tests), whether they lived in rural or urban/both (urban and rural/urban) home communities ($p=0.35$) (based on Mann-Whitney U test – participants who reported urban home communities were combined with those who reported both (rural and urban home communities) to preserve anonymity due to the small sample size), whether they lived in southern or northern home communities ($p=0.33$) (based on Mann-Whitney U test) or whether they moved away from their home community or not ($p=0.09$) (based on Mann-Whitney U test). Moreover, First Nations males (Figure 3-17D) showed no significant differences in MVPA participation whether they lived on or off reserves or both ($p=0.31$) (based on Kruskal-Wallis H tests), whether they lived in rural or urban/both (rural and urban) home communities ($p=0.15$), or whether they moved away from their home community or not ($p=1.0$) (based on Mann-Whitney U test). However, based on the Mann-Whitney U test, First Nations males (Figure 3-17D) from southern communities had a

higher total number of minutes of MVPA ($p=0.02$) than First Nations males from northern home communities.

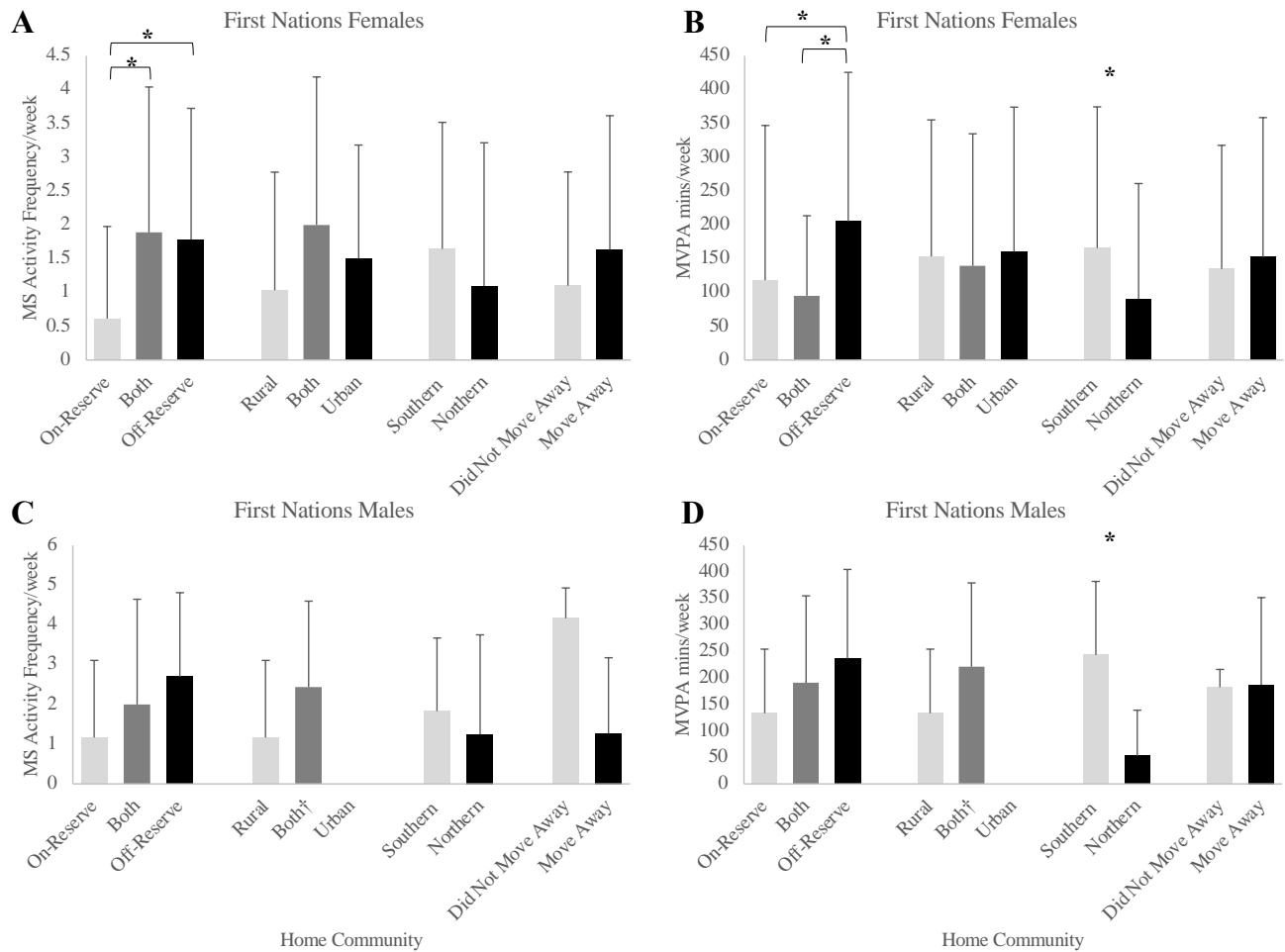


Figure 3-17 First Nations females (A and B) and males (C and D) weekly muscle-strengthening (MS) activity frequency (A and C) and total weekly moderate to vigorous physical activity (MVPA) activity (B and D) by home community. †; Due to the small sample size, participants who reported urban home community were combined with participants who reported both rural and urban home community. Asterisk (*) indicates a significant difference, $p < 0.05$.

CHAPTER 4

4.1 Discussion

This study identified varying associations of cultural connectivity and social support on Métis and First Nations-Status males' and females' physical activity participation in Saskatchewan. Physical activity involvement varies according to an individual's identity, residential school and foster care experiences, discriminatory experiences, and home communities. Due to the limited number of responses to the gender identity questionnaire, it was not feasible to conduct an analysis based on gender. Due to sex referring to the biological attributes of humans that encompass anatomy, physiology, genders and hormones; all these components affect how an individual is labelled (J. L. Johnson et al., 2009). It was not possible to use sex analysis to inform gender analysis in this study because gender refers to the socially constructed gender roles (behavioural norms applied to males and females that influence an individual's everyday actions, expectations, and behaviours), gender identity (how an individual sees themselves on the continuum of masculinity and femininity or transgender, cisgender, or gender non-conforming or two-spirited), and gender relations (how an individual interacts with others or is treated by others based on their ascribed gender) and institutionalized gender (reflects the distribution of power between the genders in political, educational, religious, media, medical, and social institutions of women, men, and gender-diverse people) (C. I. of H. R. Government of Canada, 2014; J. L. Johnson et al., 2009). Nevertheless, based on the sex-specific

findings of this study, future research could use questionnaires such as the Personality Attributes Questionnaire (Spence et al., 1975), Bem Sex Role Inventory (Bem, 1981), Male Role Norms Scale (E. H. Thompson et al., 1992), Sex Role Behaviour Scale (Orlofsky, 1981), and Women's Empowerment: Measuring the Global Gender Gap (Lopez-Claros et al., 2005) to measure gender identity, gender relations and institutional gender in order to present findings that go beyond the differences in physical activity between males and females, that are more comprehensive, contribute to cost savings in the health care system, provide benefits to families and communities, support economic gains, and promote social justice (J. L. Johnson et al., 2009). There were no significant differences in CCS or MEIM scores among Métis males or females based on CSEP MS and MVPA guidelines. Métis females who did not meet MVPA guidelines reported receiving higher community support than those who met MVPA guidelines. There were no significant differences in MS activity or MVPA between Métis males and females based on family/friend social support for PA. There were no significant differences in discrimination scores reported by Métis males or females between those who met MS or MVPA activity guidelines and those who did not. First Nations females who did not meet MVPA guidelines reported higher CCS spirituality scores than First Nations females who met MVPA guidelines. It was determined that First Nations males who met MVPA activity guidelines reported higher CCS identity and overall CCS scores than those who did not meet the MVPA guidelines. There were no significant differences in MS activity or MVPA participation among males and females from Métis and First Nations groups based on traditional activity participation. When their family/friends encouraged or watched them, or when their family/friends were involved in PA, First Nations females had the highest MS activity. Additionally, when watched or encouraged by family/friends, First Nations females had higher MVPA than First Nations females who were not

watched or encouraged by their family/friends. There were no significant differences in PA among First Nations males based on social support for PA from family/friends. First Nations females who met MS activity guidelines reported higher discriminatory experiences than those who did not meet MS activity guidelines. There were no significant differences in discrimination scores reported by First Nations males between those who met MS or MVPA activity guidelines and those who did not. First Nations females with personal/family foster care experiences participated in significantly lower MVPA than those without personal/family foster care experiences. Greater MVPA was found among First Nations females and males from southern home communities. First Nations females from off-reserve or both on and off-reserve home communities had higher MS and MVPA activity than First Nations females from on-reserve home communities.

4.1.1 Cultural Influences on Physical Activity of Females and Males

In the previous study by Ironside et al. (2020), significant differences were found between high and low physical activity groups in the First Nations population on the CCS identity score, traditions score, spirituality score and overall CCS score; however, in this study, no significant differences were identified in MEIM scores by MS activity or MVPA participation among females from the First Nations group. First Nations females who did not meet MVPA guidelines reported higher CCS spirituality scores than those who met MVPA guidelines. No significant differences were observed between CCS scores by MS activity or MVPA participation among females from the First Nations group. Among First Nations males, it was found that those who met MVPA activity guidelines reported higher CCS Identity and overall CCS scores than those who did not meet the MVPA guidelines. Ironside et al. (2020) reported no

significant differences in CCS and MEIM scores between Métis People meeting and not meeting MS activity guidelines. Similarly, no significant differences in CCS or MEIM scores based on CSEP MS and MVPA guidelines were found among Métis males or females.

The results of the current study may be different from those presented in the Ironside et al. (2020) study due to differences in experiences between sexes. There are significant differences in males' and females' physical activity participation, with males having higher physical activity than females (Azevedo et al., 2007). As evident from other research, male and females PA may be influenced differently by multiple factors such as culture, family ties, and geography (Azevedo et al., 2007; Bauman et al., 2012; Beets et al., 2006; Dowda et al., 2007; Findlay, 2011; H. J. Foulds et al., 2012a; H. J. A. Foulds et al., 2011; Richmond et al., 2007; C. J. Ryan et al., 2018); however, in this study, no significant differences in PA based on culture, family ties, and geography were found among Métis males and females. In contrast, in this study, First Nations females showed significant PA differences based on cultural ties, family ties and geography and First Nations males showed significant differences in PA based on culture and geography. A study of Indigenous Australian females discovered that their stories contained a complex amalgamation of cultural beliefs and traditions, history, gendered factors, and geography (Stronach et al., 2016). Sport and physical activity were highly regarded as opportunities for females to build strong communities, preserve culture, and develop distinct identities as 'enablers.' The females emphasized the importance of culturally safe spaces for PA and Indigenous female role models (Stronach et al., 2016). Secondly, instead of dividing the participants into low and high physical activity groups based on the group's MVPA mean, cultural connectedness was compared between those who met CSEP-recommended physical

activity guidelines and those who did not in this study. Using CSEP guidelines to analyze data in this study helped provide more practical and apparent findings compared to other studies.

The findings among First Nations females do not align with findings from past research. In contrast, findings among First Nations males corroborate previous research indicating that an increase in cultural connectedness is associated with increased healthy behaviours, including exercising more days per week (Saewyc et al., 2013), greater odds of higher educational goals and art/club participation (Poon et al., 2010) and a decrease in unhealthy behaviours such as binge drinking (Saewyc et al., 2013), lower odds of substance use and ever having sex (Poon et al., 2010) amongst Indigenous youth. A study among Arabs in Israel found that religion was considered a facilitating factor of physical activity because the scriptures supported physical activity (Shuval et al., 2008), similar to the medicine wheel concept ascribed by many First Nations, which requires a balance between the mental, emotional, physical and spiritual elements for an individual to be in harmony with oneself and the surroundings (Dapice, 2006; Lavallée, 2007). It should be noted that religion and spirituality are not the same, religion is defined as a particular system of faith and worship or the reverential human recognition of a higher or unseen power, and spirituality is a trait that goes beyond religious beliefs and seeks inspiration, reverence, awe, meaning and purpose, even in those who do not believe in any god (Lepherd, 2015; McSherry et al., 2004; R. B. Murray & Zentner, 1979). Religion is an organized part of a person's inner being, whereas spirituality is a broader state of mind that may not involve formal organization (Lepherd, 2015). Different groups of people can be motivated to engage in physical activity based on their religion or spirituality (Dapice, 2006; Lavallée, 2007; Shuval et al., 2008). Additionally, improved mental health in Indigenous populations has been associated with a stronger sense of cultural connectedness (Snowshoe et al., 2015). The introduction of the

patriarchal society by colonizers, where First Nations females were forced to give up their leadership and central roles within their Indigenous families and communities, contributes to First Nations females' lower CCS spirituality scores among those who met MVPA guidelines (Hanson, 2009b). As a result, First Nations females might not participate as frequently in cultural ceremonies or community gatherings, may not understand the significance of particular First Nations symbols like the eagle feather, and might not turn to their First Nations culture for support or direction (Snowshoe et al., 2015). Furthermore, since this study was among the university population, it is also possible that as an individual gains more education, they may be less likely to rely on their cultural teachings, score lower on the spirituality sub-measure, and rely on their education to understand the benefits of PA rather than rely on their cultural and spiritual teachings (Mayrl & Oeur, 2009; Saenz & Barrera, 2007; Uecker et al., 2007). Lastly, the current study population consisted of participants enrolled at the university; these participants have access to various physical activity facilities on campus (such as the physical activity complex at the University of Saskatchewan, Saskatoon, SK) regardless of their income, which could allow them to take part in various physical activities at the university. Access to physical activity facilities may not be readily available to First Nations females who do not attend university due to transportation and economic constraints (C. Mason & Koehli, 2012; C. W. Mason et al., 2019). Due to the introduction of a patriarchal society, higher education and access to physical activity facilities, First Nations females who met MVPA may not be as culturally connected and may not look to their community for spiritual aid and continue to meet MVPA guidelines. The association between cultural connectedness and physical activity may be differ among First Nations females who do not attend the University of Saskatchewan. First Nations males who identify more with their culture were more physically active than males in other

groups. In contrast, First Nations females who did not meet MVPA guidelines reported higher CCS spirituality than those who met MVPA guidelines.

4.1.1.1 Traditional Activity

No significant differences were found in MS activity or MVPA participation based on traditional activity participation among males and females from all Indigenous groups. The findings of this study were like those of Ironside et al. (2020). They did not find differences in PA based on participation in traditional activities such as ceremonies, dances, or Indigenous games. These findings disagree with current literature that states that Indigenous Peoples who live a more traditional lifestyle and have less stress are more physically active than their peers (Bersamin et al., 2014). A systemic review found that traditional activities have many emotional, mental, and spiritual benefits for Indigenous youth worldwide (Akbar et al., 2020). In another study among Indigenous youth in Australia, traditional Indigenous games delivered in primary schools every week over three months did not contribute to any statistically significant improvement in intervention and control groups in physical activity levels or cultural connectedness (Kiran & Knights, 2010). Lastly, another study among Indigenous Peoples found that lack of culturally relevant opportunities, economic disparity, and gender-specific opportunities was recognized as the challenges to physical activity participation (Kirby et al., 2007). The physical activity recommendations included increased physical activity through land-based traditional activities such as fishing and hunting, increased access by decreasing cost, and providing opportunities that appeal to both males and females (Kirby et al., 2007). Due to the mixed associations between participation in traditional activities and physical activity participation, it is challenging to draw any conclusion from the current research. Research by

Ryan et al. (2018) indicates that Métis People who attended a Métis cultural event had positive associations with leisure-time physical activity; in contrast, no associations between traditional activity participation and PA among Métis males and females were found in this study. Among First Nations Peoples, it was found that a higher percentage of males in all age groups were more likely to participate in traditional activities than females, a higher percentage of males reported living on the land than females, and a higher percentage of males reported acquiring food through hunting, fishing, and trapping (K. Wilson & Rosenberg, 2002), in contrast to the lack of difference in MVPA and MS activity by traditional activity in the current study. Furthermore, a much higher percentage of First Nations Peoples living on reserves report spending time on the land, participating in traditional activities, and acquiring food through hunting, fishing, and trapping, relative to individuals living in the census metropolitan areas and other urban areas (K. Wilson & Rosenberg, 2002). First Nations males may have more time to participate in traditional activities than First Nations females because females are usually tasked with looking after children; many females living in urban areas may need to devote their time to employment to pay for housing and food in addition to childcare (J. L. Thompson et al., 2002). Additionally, females earn less income than males; in the 2021 census, First Nations males' median income \$30,600, and First Nations females' income was \$26,600 (Statistics Canada, 2022). The income gap may prevent females from attending traditional cultural activities or the ability to pay for PA programming at their local gym if they are not able to afford food, sufficient housing, and childcare. These findings illustrate that participation in traditional activities can vary by sex, place of residence, and income. Furthermore, the findings among First Nations Peoples reflect a gender division of labour. Spending time on the land, participating in traditional activities and acquiring food through hunting, fishing, and trapping are generally associated with male band

members (Janssen et al., 2014). Lastly, a systemic review found numerous emotional, mental and spiritual benefits of traditional physical activity, and youth experiences were affected by familial and communal relationships and systemic factors (Akbar et al., 2020). Cultural activities such as powwows, hunting and fishing are related to subsistence and exercise (Crowe et al., 2017; Pigford et al., 2012). Furthermore, it has also been reported that ceremonies such as the Sweat Lodge can positively impact an individual's physical, mental, spiritual, and emotional domains (Schiff & Moore, 2006). Additional research is required to understand how traditional activities influence physical activity among Métis and First Nations males and females.

4.1.2 Social Influences on Physical Activity among Females and Males

Similar to Ironside et al. (2021), it was found that Métis females who did not meet MVPA guidelines reported higher community support. Métis males had similar SSI scores between those who met CSEP PA guidelines and those who did not meet CSEP PA guidelines. Furthermore, Métis males and females had similar MS and MVPA participation regardless of family/friend encouragement/support for PA. Among First Nations Peoples, Ironside et al. (2021) did not find social variables associated with weekly MS or MVPA activity. Like Ironside et al. (2021), First Nations males and females reported similarly on SSI measures between those who met CSEP MS and MVPA guidelines and those who did not.

In their study, Richmond et al. (2007) reported that Indigenous females who reported high levels of positive interaction, emotional support and tangible support were significantly more likely to report thriving health. Among Indigenous males, only emotional support was significantly related to thriving health (Richmond et al., 2007). As determined in this study, Métis and First Nations-status males and females may respond differently to different kinds of

social support. Among Métis females, community support is not associated with meeting MVPA guidelines; in this study, most Métis females lived in urban areas, where they may rely more on social support from their communities, such as at the university or in Saskatoon, but still unable to meet the physical activity guidelines. First Nations males and females did not show any differences in social support based on whether they met PA activity guidelines or not.

Among non-Indigenous Peoples, it has been shown that social support helps people overcome obstacles to physical activity (Allender et al., 2006). A study among American Indian women reported a lack of support with household chores and childcare, balancing roles between wage earner, parent, and homemaker, and perceived decreased time and energy for physical activity as barriers to physical activity (J. L. Thompson et al., 2002). Lack of trained personnel, limited facilities, and inadequate equipment further hinder American Indian children's physical activity (J. L. Thompson et al., 2001). Lack of empowerment, trust, and dependence on others are some of the psychosocial challenges identified by First Nations people living on reserves (Skinner et al., 2006). Each Indigenous community has distinct characteristics that impact physical activity and health (Skinner et al., 2006). First Nations University students reported unique barriers to physical activity on campus, including misguided stereotypes and racism, lack of empowerment, and lack of opportunity to participate in traditional activities (Ferguson & Philipenko, 2016). Some of the barriers identified in the study by Ferguson and Philipenko (2016) among university students have also been reported among Indigenous Peoples living in reserve communities by Schinke et al. (2010) and Skinner et al. (2006). As determined in the current study, Métis females who did not meet MVPA guidelines reported higher community support; these findings are inconsistent with past research, as support from community members can help an individual overcome many barriers to PA noted above. The findings from this study

may apply to males and females from Métis and First Nations communities; however, further research is required to determine the influences of social support on physical activity.

4.1.2.1 Family Influences on PA

In contrast to Ironside et al. (2021), significant differences were observed in MS activity or MVPA if Métis males or females were encouraged by family/friends, watched by family/friends or where family/friends involved themselves in physical activity with the participant. Like Ironside et al. (2021), in this study, First Nations females had the highest MS activity when they were encouraged or watched by their family/friends or when their family/friends were involved in PA. Also, First Nations females had the highest MVPA if they were watched or encouraged by family/friends. First Nations males had no significant differences in their PA based on support for PA from family/friends. It is evident that social support from family/friends for PA can result in higher MVPA among First Nations females but may not be as strongly associated with First Nations males.

In the current study sample, most First Nations females reported their home community as off-reserve, rural, and southern. First Nations females from rural or off-reserve home communities may have a higher opportunity to be close to their families and friends; the rural area can positively influence females to engage in physical activity with family members due to safety concerns (e.g. encounters with bears) (Kirby et al., 2007). Similar to First Nations females from rural home communities, First Nations Females from off-reserve home communities may have more social connections through work, school, or community, leading to more physical activity opportunities. Even though First Nations Peoples living in rural areas face challenges such as wildlife encounters, mosquitos, and extreme cold, which tend to hinder physical activity

engagement (Kirby et al., 2007), as evidenced by the results among First Nations females in this study, those challenges may serve as a positive influence for families to engage in physical activity together or have family members spectate while an individual engages in physical activity. Furthermore, First Nations females may also be motivated to be physically active by the availability of land; First Nations females can participate in more land-based activities, dances, ceremonies, and gardening that may not be available to First Nations females living in urban environments (Ahmed et al., 2021; Macdougall, 2017). Moreover, participating in land-based activities with other community members allows for developing more culturally relevant physical activity interventions (Ahmed et al., 2021; H. J. A. Foulds et al., 2011; Kirby et al., 2007; Macdougall, 2017). Additionally, First Nations females may have access to support systems on the university campus that are more suited to them than Métis females. Furthermore, past research has highlighted the importance of understanding and supporting Métis females' identity and access to natural environments, traditional subsistence methods and foods, and Métis cultural spaces to improve Métis females' health (H. Foulds et al., 2021). Métis females and other Indigenous females who live off-reserve or in urban areas may live far away from their families or have increased access to physical activity facilities where they are engaging in physical activity by themselves more often than females living on-reserve or in rural areas. These findings are consistent with past research showing that First Nations Peoples perform more MS or MVPA activity with more support and encouragement for physical activity from family/friends (A. Ironside et al., 2021). The influences of family or friends' social support for physical activity, specifically among First Nations females, have not been determined in the past. However, the results of this study show that social support for physical activity from family and friends in the forms of encouragement, watching, or involvement can result in higher MS activity

and MVPA among First Nations females. Given the advancements in communication, First Nations females at the University of Saskatchewan may be encouraged by family and friends to participate in physical activity even though these individuals may live far away from their families.

Unlike their female counterparts, Métis and First Nations, males did not show significant differences in weekly MS activity frequency or the total number of minutes spent doing MVPA based on the frequency of social support for physical activity from family or friends. Regardless of the frequency of encouragement, watching, or involvement by family and friends, males in all groups had similar MS and MVPA activity. These findings are consistent with past research that showed no positive associations between family encouragement and physical activity among Indigenous Peoples (A. Ironside et al., 2021). Métis and First Nations males may not place as much significance on social support from family, friends, and community due to different social relationships among males; males may be less likely and less interested than females in building emotional and supportive relationships with others (S. K. McKenzie et al., 2018). Furthermore, the feelings of being independent and not seeking social support may be perpetuated by the European patriarchal ways of life that took over the Indigenous matrilineal ways of life (Arvin et al., 2013; Guerrero, 2003).

Before European colonizers altered Indigenous ways of life, Indigenous males and females had complimenting roles and were free to perform any task within their household or community, play games together and participate in cultural ceremonies (Hanson, 2009b). The divide created by the patriarchal society in which males are assigned specific tasks such as hunting and gathering while females are assigned tasks such as beading or taking care of children may result in Indigenous males being less able to appreciate the support from their family,

friends, and community (Arvin et al., 2013; Guerrero, 2003; Hanson, 2009b). Additionally, as outlined in the *Indian Act*, First Nations females lost their status if they married a non-Status First Nations male (Deschambault, 2020; Hanson, 2009b). With the loss of status, First Nations females also lost their treaty benefits, health benefits, the right to live on their reserve, the right to inherit their family property, and the right to be buried on the reserve with their ancestors (Hanson, 2009b). Even though some of the discriminatory policies of the Indian Act have been amended through Bill C-31, the original discriminatory policies continue to influence First Nations females to seek support outside their community or move to a city where they find support from other females who may have had similar experiences (Hanson & Karmen, 2009). When First Nations females are forced to leave their communities, they may face financial hardship in their new community. Even though CSEP MS and MVPA guidelines are identical for males and females, society expects males to be muscular while females are expected to burn fat to become lean and toned (Crossley et al., 2012; Dittmar et al., 2000; Voges et al., 2019). Furthermore, many females find others, primarily males, looking at them while engaging in physical activity to be uncomfortable (A. Clark, 2018). Societal expectations of how males and females must look and the uncomfortable feeling lone females may experience may result in females working out with their friends/family, joining spin/aerobic classes where they are surrounded by other females and avoiding more male-dominated activities such as weightlifting exercises (Salvatore & Marecek, 2010). Among non-Indigenous males, it has also been suggested that encouraging males to make physical activity part of their routine may be beneficial. While males do not find lectures on health and lifestyle choices beneficial, encouraging the development of a more individualized programme may be advantageous (Department of Health and Ageing, 2010; George et al., 2012).

Overall, the findings from the current study highlight the benefits of social support specific to physical activity for First Nations females. First Nations females may be more likely to participate in physical activity if their family or friends encourage them regularly, which might help females overcome the physical activity barriers (Ferguson & Philipenko, 2016). Females may be more likely to join team sports or perform more physical activity if their family and friends watch them and cheer on them regularly. Lastly, family and friends' involvement with the participants may make physical activity more enjoyable and result in overall higher physical activity (Kirby et al., 2007; Rebold et al., 2016). These findings emphasize the significance of evaluating data by sex to discover trends and establish how social support influences physical activity among Métis and First Nations males and females. Overall, the current study shows that family and friends who encourage and watch First Nations females as they engage in physical activity result in those females meeting CSEP MS activity and MVPA guidelines. Métis and First Nations sex-specific results have shown that males and females from each group may perceive social support differently. Social support may be more important for influencing physical activity behaviour among First Nations females than among First Nations males or Métis males and females.

4.1.3 Discriminatory Experiences Among Females and Males

Like Ironside et al. (2021), First Nations females who met MS activity guidelines reported higher discriminatory experiences than those who did not. In contrast to Ironside et al. (2021), no significant differences were found in discrimination scores based on MS or MVPA activity among Métis females and Métis and First Nations males.

The findings among First Nations females agree with current literature; a study found that First Nations students at a university report higher discriminatory experiences when they engage in physical activity (Ferguson & Philipenko, 2016). Like the findings from other studies, participants in this study who met physical activity guidelines were the ones who reported higher discriminatory experiences (Barr-Anderson et al., 2017; Chen & Yang, 2014; Edwards & Cunningham, 2013; L. H. McNeill et al., 2006). First Nations females may use physical activity to overcome discrimination, as a study with African Americans found that those who experienced discrimination were more active (Borrell et al., 2013). One of the possible ways these groups may deal with this discrimination stressor may be to participate in physical activity (Williams & Mohammed, 2009). Furthermore, First Nations females may experience discrimination while participating in PA, as identified in a study among teenage Indigenous Peoples in Alberta, Canada, which reported that most females faced gender-based exclusion in Indigenous and non-Indigenous physical activity environments (C. Mason & Koehli, 2012). Lastly, Indigenous Peoples in Canada were more likely to perceive discrimination or unfair treatment due to their physical appearance (14%), physical or mental disability (7%), and religion (5%) than were non-Indigenous, non-visible minority people (5%, 2%, and 2%, respectively) (Cotter, 2022). Therefore, it is a double-edged sword. PA may help participants overcome discrimination, but it can also expose them to more discrimination when they spend time outside their homes and interact with others in public.

Indigenous females were also not encouraged to engage in physical activity after a certain age and expected to stay at home and take care of their families, whereas Indigenous males did not have such experiences (C. Mason & Koehli, 2012). Therefore, First Nations females face more discrimination when they go out of their homes to meet their PA goals than First Nations

males. A qualitative study design involving interviews may help understand First Nations females' specific discriminatory experiences when participating in PA. Furthermore, these differences could be due to the colonial policies that discriminated explicitly against First Nations females (Hanson, 2009b, 2009e). Due to European patriarchal social codes and beliefs, Métis and First Nations females lost their positions of power and leadership in their communities, as European settlers expected females to work in the house and raise children (Hanson, 2009b, 2009e). First Nations females who worked on the farms or performed hard labour were considered inferior to First Nations males (Hanson, 2009b, 2009e). The Indian Act reinforced discrimination against First Nations females through family regulation, the reserve system and geographic exclusion, and political exclusion (Hanson, 2009b, 2009e). Due to the ideologies that positioned Indigenous females inferior to males, Indigenous females continue to experience dramatically higher rates of violence than non-Indigenous females (Boyce, 2016; Hanson, 2009b). Sexual assault self-reported by Indigenous females was more than triple that of non-Indigenous females. A more significant proportion of Indigenous girls (14%) self-reported experiencing both physical and sexual maltreatment before the age of 15 than Indigenous boys (5%) (Boyce, 2016). Additionally, Indigenous females face higher racism and discrimination than non-Indigenous females, as evidenced by the high number of missing and murdered Indigenous females than other members of society (Gibson, 2018). Although Indigenous males and females have reported experiencing racism and discrimination in past research (Ferguson & Philipenko, 2016; C. Mason & Koehli, 2012), in this study, First Nations females reported higher discriminatory experiences than First Nations males in this study. The finding of this study continues to highlight the importance of presenting research that is sex-specific.

4.1.4 Historical Trauma Influences on Physical Activity among Females and Males

In contrast to Ironside et al. (2021), First Nations females with personal/family foster care experience had significantly lower MVPA participation than those without foster care experience. Among Métis males and females, MS and MVPA activity participation was similar between those who had personal/family residential school or foster care experiences and those who did not have these experiences. In this study, almost half of Métis and the majority of First Nations participants reported personal/family member residential school experiences or personal/family member foster care experiences. The higher scores on CCS and MEIM among Métis and First Nations males and females who reported personal/family residential or foster care experiences in previous literature may indicate that Métis and First Nations Peoples may be relying more on their community and cultural ceremonies to learn more about themselves and their culture and identity, which colonial policies have disrupted (A. Ironside et al., 2020; Schiff & Moore, 2006). Traditional activities offer excellent opportunities for knowledge transmission, a sense of belonging, connections to the land, and the development of relationships with other community members who may have had similar life experiences because of unjust colonial policies (Schiff & Moore, 2006).

It has been established that historical trauma manifests as PTSD, guilt, anxiety, and depression in individuals who have suffered historical trauma (Fast & Collin-Vézina, 2010). The loss of traditional rites of passage, high rates of alcoholism, physical illness (obesity), exclusion from participation, and internalized racism can all harm the entire community and limit an individual's involvement in their community (Duran & Duran, 1995; Evans-Campbell, 2008;

Fast & Collin-Vézina, 2010; C. Mason & Koehli, 2012; Mohatt et al., 2014). Forced residential school attendance and separation from family and community have long-term consequences for Indigenous Peoples, including increased exposure to sexual violence (Pearce et al., 2008), an increased risk of incarceration and intravenous drug use (Lemstra et al., 2013; Sinclair, 2007, 2017), higher rates of stress and suicide (Bombay et al., 2014), and higher rates of depression (Bombay et al., 2013, 2014). Foster care experiences are associated with lower MVPA activity among First Nations females as they are separated from their family and community support systems. However, more research is needed among other Indigenous groups to understand the effects of historical trauma on First Nations and Métis males and females' PA and health.

The Holocaust has been used to draw parallels with policies against Indigenous Peoples in Canada, the United States of America, and Australia that were genocidal in intent and effect (Brave Heart & deBruyn, 1998, Elizabeth Fast). Most of the literature on intergenerational trauma is devoted to working with Holocaust survivors and their descendants. In their study of 25-second generation, Holocaust survivors and 24 control subjects who were also Jewish but had no direct experience of the Holocaust, Felsen and Erlich (1990) discovered that survivors' descendants exhibit certain character organization traits, including a diminished sense of self-worth and an unwanted identification with their mothers. The authors attribute the latter characteristic to the mother's increased responsibility for meeting emotional needs and the mother's difficulty meeting the children's needs because of her excessive self-criticism as a survivor (survivor's guilt). Bar-On, Eland, Kleber, Krell, Moore, Sagi, and Soriano et al. (1998) conducted three studies in the Netherlands, Canada, and Israel with children of Holocaust survivors. They discovered that children of Holocaust survivors in the Netherlands felt greater responsibility toward their parents than children in the control group. The Vancouver, Canada

study analyzed the responses of 57 adult children of Holocaust survivors and discovered that, on average, children were preoccupied with their parent's sadness and attempted to appease them by bringing home only good grades or avoiding questions about the Holocaust. Additionally, these respondents did not feel entitled to happiness because of their parents' inability to be happy. According to the Israeli case study, it was difficult for a man to tell a coherent story that connected his past and their present because he felt obligated to move beyond his parents' experiences as a symbol of the future but was so entangled in the past due to untold secrets and memories that he always felt were present for his parents. Again, parallels can be drawn between the experiences of second-generation Holocaust survivors and those of numerous Indigenous Peoples who are either residential school survivors or the children of those who went to residential schools. Residential school survivors were frequently separated from their parents for years (Bombay et al., 2013; Eshet, 2015; MacDonald & Hudson, 2012). They likely felt abandoned by their parents and questioned why they did not come and rescue them from those who were stealing them from their communities (Bombay et al., 2013; Eshet, 2015; MacDonald & Hudson, 2012). Similar traumatic experiences can be seen among Indigenous children who were and continue to be in the foster care system in Canada and elsewhere, who were taken away from their families and communities without their knowledge into foreign families who knew nothing about Indigenous culture, therefore, depriving these children of their parental role models, cultural and community ties (Gypen et al., 2017; Somos, 2021). When these children became parents, they were almost certainly preoccupied with memories of their traumatic childhoods (of being abandoned or abused or taken away into unknown homes) (Bombay et al., 2013; Eshet, 2015; MacDonald & Hudson, 2012; Wilk et al., 2017). They expected their children to provide them with the comfort and security they lacked growing up institutionalized (Bombay

et al., 2013; Eshet, 2015; MacDonald & Hudson, 2012). Additionally, this pattern of parenting will endure for several generations – until children have caregivers who model healthy and nurturing care, they will be forever deprived of the opportunity to break this cycle (Fast & Collin-Vézina, 2010). Cultural connectedness may act as a protective factor, allowing Indigenous Peoples to learn more about their culture, identity, and history which European colonizers’ unjust policies have disrupted. This study found that historical trauma can similarly harm physical activity among males and females. Future studies can utilize qualitative research methods: interviews can be utilized to learn more about the experiences of Métis and First Nations Peoples in residential schools and foster care to determine how those experiences can impact their physical activity.

4.1.5 Home Community and Physical Activity influences Among Females and Males

In contrast to Ironside et al. (2021), Métis females and males had similar MS and MVPA activity across home communities. Like Ironside et al. (2021) findings, First Nations females and males from southern home communities reported higher MVPA than those from northern home communities. In contrast to Ironside et al. (2021) findings of higher MS activity among First Nations from southern home communities, no significant differences were found in MS activity among First Nations males and females. Also, First Nations females from off-reserve or both (on and off-reserve) home communities have higher MS and MVPA activity than First Nations females from on-reserve home communities.

Due to colonization and the creation of reserves, First Nations Peoples were forced to relocate to new and unfamiliar territories. This move severely affected their hunting, fishing, and

farming methods (Forsyth et al., 2012). Additionally, assimilation efforts to “take the Indian out” of children by forcing them to attend residential schools prohibited all Indigenous ways of expression, such as sports, physical activity, dance, and play (Forsyth et al., 2012). For instance, potlatch and powwow ceremonies involved the coming together of communities to share stories, and food, celebrate, dance, and play sports like lacrosse and games of chance and dexterity (Forsyth et al., 2012). However, these ceremonies were banned from 1884 to 1951 in an amendment to the *Indian Act* (Bartlett, 1977; Forsyth et al., 2012; Hanson, 2009e). Therefore, findings from this study are consistent with other research, illustrating that First Nations females living on reserves may be engaging in lower amounts of physical activity than First Nations females living off-reserve, which leads to a greater risk of poor health status (H. J. Foulds et al., 2012a). Previous research has shown that Indigenous Peoples who live on reserves engage in less physical activity than those who live off-reserve, as seen among the First Nations females in the current study (Findlay, 2011; H. J. A. Foulds et al., 2018). Most reserves are in rural, northern communities; however, reserves can also be in urban areas near cities such as Saskatoon and Regina (Mccue & Parrott, 2011). It has also been established that those who live on-reserve are more likely to live in overcrowded housing in need of repair, have limited access to healthcare and other essential services, many Indigenous reserves are still under drinking water advisories, and being physically active may not be one of the top priorities when their basic needs are not met (Bailie & Wayte, 2006; M. Clark et al., 2002; Martin et al., 1987; Shapiro et al., 2021). These obstacles, among others, may contribute to First Nations Peoples’ lower levels of physical activity on-reserve or in northern communities. Physical activity interventions may be required to support physical activity for First Nations males and females of on-reserve and northern communities.

The findings among First Nations females and males being more active in southern home communities contradict the findings of Irvine et al. (2011), who reported that Indigenous Peoples raised in northern communities in Saskatchewan were more physically active than those from southern communities; however, it should be noted that on-reserve First Nations Peoples were excluded from their analysis. Findings from this study were expected because northern communities, like on-reserve communities, face many barriers and challenges that make it difficult for residents to be physically active (H. J. A. Foulds et al., 2018). Some northern communities are remote, with little or no access to urban centres, where exercise gyms are typically located (Anand et al., 2019; Skinner et al., 2006). They also face harsh cold weather, which prevents people from leaving their homes for much of the year (H. J. A. Foulds et al., 2018). People in northern communities must travel long distances to access essential services, resulting in a more sedentary lifestyle (H. J. A. Foulds et al., 2018; A. K. Ironside, 2019). In this study, more First Nations females reported urban home communities than First Nations males. Urbanization of Indigenous Peoples has been increasing over the years. In 2016, 44% of the Indigenous population reported living in urban areas across Canada. Of these, 51% were First Nations, and 45% were Métis (T. Anderson, 2019). From 2006 to 2016, the number of Indigenous Peoples living in urban areas increased by 59.7% (S. C. Government of Canada, 2017d). In 2011, 10% of the total female population in both Saskatoon and Regina was Indigenous (S. C. Government of Canada, 2016a). Indigenous females continue to be overrepresented in urban areas compared to Indigenous males (Statistics Canada, 2018). In 2016, 6225 Métis females, 6025 Métis males, 7715 First Nations females, and 6720 First Nations males reported living in Saskatoon (Statistics Canada, 2018). More Métis and First Nations females may live in urban areas for education, employment opportunities, and to escape violence

(Carli, 2012; Norris & Clatworthy, 2011; Senese & Wilson, 2013; K. Wilson & Colleen Hodgson (MNBC), 2018). First Nations females living in urban areas have more access to physical activity facilities than First Nations females or males living in rural areas (Button et al., 2020; C. Mason & Koehli, 2012; Pelletier et al., 2021). The higher representation of Métis and First Nations females could serve as one of many explanations for the findings of higher MVPA among First Nations females who live off-reserve and in southern home communities.

Métis females and males did not report differences in MS activity or MVPA based on their home community; these findings agree with past research, which did not find differences in activity levels based on urban/rural geography (C. J. Ryan et al., 2018). Furthermore, as recorded in past and current research studies, most Métis People were generally from urban, off-reserve and southern home communities (Findlay, 2011; C. J. Ryan et al., 2018). Conversely, in the current study and past studies, First Nations Peoples were primarily from rural, northern, or on-reserve communities where a lack of infrastructure to meet physical activity goals may limit abilities to be physically active (Anand et al., 2019; First Nations Information Governance Centre et al., 2015; C. Mason & Koehli, 2012).

4.1.6 Differences in Indigenous Identity

Due to the ongoing colonization, the *Indian Act*, residential schools, and Sixties Scoop, there can be differences in cultural connectedness among Métis and First Nations males and females. The *Indian Act* primarily applied to First Nations-Status Peoples; First Nations-Status Peoples were forced to live on reserves, most children in residential schools were First Nations, and traditional ceremonies of First Nations were banned (Bartlett, 1977; Hanson, 2009e; K. Wilson, 2018). Due to the disruption in family structure and residential school attendance, many

First Nations Peoples lack the cultural and social support from their grandparents and parents. Over the past 150 years, many Métis have hidden their culture from their children to survive (Richardson, 2004). Many families have more recently acknowledged their Métis heritage (Richardson, 2004; Shore, 2001). This self-acknowledgement brings a range of emotional, mental, and spiritual experiences, from relief to alienation and uncertainty (Richardson, 2004). Resources and community greatly influence these experiences (Richardson, 2004). Each person's self-formation journey is unique (Richardson, 2004). Many Métis are experiencing a resurgence of their Métis identity and cultural connectedness, and any links between their culture and health behaviours, such as physical activity, may be fluid. This study shows the importance of evaluating Indigenous identities separately and the need for Métis-specific research. Cultural connectedness and social support may be more important factors in physical activity among First Nations males and females than for Métis males and females. More research is needed to determine how cultural connectedness and social support affect physical activity among males and females of Métis and First Nations communities.

4.1.7 Differences between Indigenous Males and Females

This study found different associations of cultural connectedness and social support with physical activity among males and females. More culturally connected First Nations males participated in more MVPA, but similar results were not observed among First Nations females. First Nations females were more likely to do PA if family/friends encouraged or watched them or were involved in PA with the participant, whereas First Nations males' PA was not affected by family/friend support for PA. Additionally, First Nations females who met MS activity guidelines reported higher discrimination scores than those who did not meet these guidelines. In

contrast, First Nations males reported similar discriminatory experience scores between those who met versus those who did not meet MS or MVPA guidelines. Métis males and females reported similar cultural connectedness and social support between those who met CSEP's PA guidelines and those who did not. The differences between First Nations males' and females' results highlight the differences in how cultural connectedness and social support influence PA among males and females. In the future, research studies need to continue to evaluate experiences separately for Métis and First Nations males and females to present more meaningful results and provide better guide PA programming.

4.1.8 Limitations and Strengths

The study's potential limitations include using a questionnaire for self-reporting of variables. Due to the self-reporting nature, the study is susceptible to recall bias due to exaggeration or general false statements (Fan et al., 2006; Prince et al., 2008; Sallis & Saelens, 2000). Future studies can record physical activity more accurately using accelerometers or smartwatches rather than having participants self-report their physical activity over seven days. Additionally, participants were given the option of not responding to specific questions if they did not wish to divulge certain information. While this practice is culturally acceptable and minimally invasive, it results in non-reporting (A. Ironside et al., 2020, 2021). Another limitation of this study is the lack of questions on the questionnaire focusing on provincial and church-run day schools attended by Métis and First Nations Peoples all over Canada. The questions about historical trauma were focused on residential schools, which First Nations Peoples primarily attended. The Métis Scrip was implemented in Manitoba to carry out the terms of the Manitoba Act and to extinguish Métis Indigenous title by awarding a certificate redeemable for land or

money, much like treaties did for First Nations (Augustus, 2005, 2008). Furthermore, after the defeat of the Métis in 1885 (North-West Resistance) and the effects of the Scrip system, Métis families established communities on crown land designated for road construction. They were given the title of Road Allowance People (Préfontaine, 2007). As a result of the preceding events, Métis began to migrate to urban areas, and many Métis families started to distance themselves from their culture and heritage. Therefore, the true impact of colonial policies and assimilation efforts on Métis Peoples' and First Nations People's cultural connectedness and social support may not have been captured through the questionnaire administered in the current study. Future studies can include questions based on these colonial policies to understand the impact of colonization and ongoing colonization on Métis and First Nations People's lives.

While the quantitative measures used in this study are reliable and valid, they may not be as effective as other methods, such as interviews. Participants' cultural experiences, social ties, and trauma caused by colonization may not be accurately quantified. Furthermore, because religion and spirituality are aspects of a person's culture, it is difficult to quantify them. Many people who identify as Indigenous may practice Christianity and Indigenous culture on the land. Furthermore, it is difficult to isolate the Christian influence of residential schools on the lives and Indigenous culture of those forced to give up their culture and language while attending residential schools. Future research can use interviews or photovoice to capture these experiences more accurately by allowing participants to describe their cultural experiences, social ties, and trauma caused by colonization in their own words.

Given the limited research among Indigenous Peoples focusing on cultural connectedness and social support and PA, this study is the first of its kind to determine the sex-specific associations of cultural connectedness and social support with physical activity participation

among Métis and First Nations Peoples in Saskatchewan (Findlay, 2011; A. Ironside et al., 2020, 2021). The study's population, which included University of Saskatchewan students, staff, and faculty, was exclusive yet diverse, with participants from diverse Indigenous communities, varying levels of engagement with their home communities and cultures, diverse education levels, and life experiences. This population's diversity is a strength in evaluating cultural and social measures. Some participants may have had little exposure to their culture, while others may live their lives immersed in their culture. Some participants may still live at home and spend time with family members regularly, leading to a more robust social support network than those who have moved away from their families to attend school in the city, leading to limited access to their social support network. Given the diversity in the current sample, the results from this study may still be different from those from other communities. In the future, similar studies among other Indigenous communities will expand the understanding of how cultural connectedness and social support influence physical activity among Indigenous males and females.

Along with its limitations, this study has several strengths that will benefit the Indigenous community. This study's strength is presenting results for Métis and First Nations groups separately by sex. The results show that males' and females' physical activity differed based on cultural connectedness and social support. Moreover, because each Indigenous culture is distinct and has a distinct history, it is critical to present the findings separately for Métis and First Nations participants so that PA programming can be tailored to each group appropriately. Avoiding the pan Indigenization approach contributes to the validity of this study's findings. It increases the value of the knowledge to the previously mentioned Indigenous groups. Nonetheless, a broader Indigenous group analysis for both sexes may benefit the Indigenous

community at the University of Saskatchewan, where diverse identities of Indigenous Peoples are served.

Another strength of this study is the collaboration with the Indigenous community in Saskatoon, who influenced and informed the research questions that guided the study design. Working alongside the ICAC made it possible to adhere to the recommendations of Chapter 9 of the TCPS. Furthermore, the ICAC was essential in filling critical knowledge gaps in this study's methodology. Lastly, having an ICAC fostered a sense of respect, trust, honesty, and transparency. It helped us work with Indigenous participants to provide results that Indigenous communities can use to tailor PA programming for Indigenous males and females (Guillemín et al., 2016).

Traditionally, most research has grouped males and females into a single group, making it difficult to ascertain how well the research findings apply to males and females because each group experiences unique challenges related to physical activity participation, cultural connectedness, and social support. Data were analyzed separately for males and females in this study to determine whether certain cultural and social factors influenced the physical activity of these participants. Even though not enough data was available to analyze by gender, appropriate language was employed when discussing sex and gender, contributing to the study's clarity. The study's methodologies for examining sex in isolation from gender and vice versa are a significant strength. This study will serve as a start to provide knowledge and understanding focused on Métis and First Nations males' and females' cultural connectedness, social support, and physical activity participation by each sex.

4.1.9 Implications for Future Research

Future research could build on the findings of this study to investigate the gender-specific influence of cultural and social factors on physical activity among people who identify as man, woman, trans male/man, trans female/woman, genderqueer/gender nonconforming, and two-spirit, or evaluate additional dimensions of gender such as social roles. In this study, for example, it was discovered that different cultural and social factors are associated with the amount of physical activity among males and females. As a result, future research can focus on how cultural and social factors influence physical activity across genders and gender role relationships with physical activity assessments.

In the future, researchers can conduct longitudinal studies that track participants to see how cultural connectedness and social support change and how these changes influence physical activity. An individual's priorities, community connections, friendship groups, and participation in community activities and sports change over time (Farrington, 1991). Longitudinal studies can reveal changes in physical activity, fitness, a participant's overall health, and traditional activity participation as the individual ages.

Qualitative research methods allow participants to discuss their experiences in their own words. The specific questions on a questionnaire may limit how much information a participant can share with the researchers. Furthermore, qualitative research can be combined with quantitative research to provide more insight into quantitative data interpretation and test hypotheses raised by qualitative findings in subsequent interviews (Wenger, 1999). Similarly, conducting follow-up interviews with participants after the questionnaire or intervention can provide valuable insight into what worked best for the participants and their feedback on the questionnaire questions, and this information can be applied to future research studies (S. M. Davis et al., 2003; Saini & Quinn, 2013). Indigenous methodologies based on tribal knowledge

can produce significant results (Kovach, 2010). Indigenous methodologies include decolonizing theory, narrative as a method, self-location, Indigenous research methods, cultural protocol, meaning-making, and ethical responsibility (Kovach, 2010). Using narrative to describe how residential location affects physical activity may benefit Indigenous communities and researchers by capturing the unique challenges that Indigenous Peoples face in their voices rather than having participants answer specific questions.

The physical activity survey design of this study precluded the ability to measure cardiorespiratory (VO₂ max), body composition (body mass index), muscular strength (hand grip dynamometer), muscular endurance (push-ups and pull-ups) and flexibility (sit and reach test). Furthermore, this study quantified physical activity by asking participants about their weekly physical activity rather than using heart rate monitors, accelerometers, or pedometers to measure physical activity without the risk of recall bias (Caspersen et al., 1985). Future research studies can capture physical activity using heart rate monitors, accelerometers, and pedometers and evaluate physical fitness by measuring cardiorespiratory (VO₂ max), body composition (body mass index), muscular strength (hand grip dynamometer), muscular endurance (push-ups and pull-ups) and flexibility (sit and reach test). These methods of measuring physical activity and fitness can help avoid recall bias among participants. Future research may wish to combine Indigenous and Western inquiry methods, as both have potential benefits for this type of research. Specific determinants for males and females could be defined using Western technology, such as smartphones and smartwatches, to measure and record physical activity accurately. Accelerometers, anthropometric measurements, and fitness testing may be helpful in the future if the Indigenous community deems them culturally appropriate. Accelerometers could provide a more objective measure of the relationships between different Indigenous-specific

determinants of physical activity behaviour. Anthropometric and fitness measures such as waist circumference, body mass index, grip strength, pulse wave velocity, and maximum aerobic capacity may assist Indigenous communities in better understanding the relationships between cultural and social factors, physical activity, fitness, and health. A synthesis of Indigenous and Western research methodologies may benefit future research.

Finally, future studies can collect data from a larger Indigenous population outside of a university campus or focus on a single Indigenous community, collecting data separately for the Indigenous communities in southern Saskatchewan and northern Saskatchewan to understand the associations between residence and physical activity among males and females. The results of this study can serve as a foundation for future research into the cultural and social factors that influence physical activity among Métis and First Nations Peoples and will contribute to the reduction of physical inactivity and health disparities that Métis and First Nations Peoples continue to face across Canada.

CHAPTER 5

5.1 CONCLUSION

Cultural connectedness among Métis females does not influence PA, though First Nations females reported lower cultural spirituality among those who met MVPA guidelines than those who did not. Amongst First Nations females, social support from family/friends for PA resulted in higher PA, whereas social support in other forms did not influence PA. Cultural connectedness, social support, social support for PA, historical trauma, discriminatory experiences or home community among Métis males does not influence their PA. First Nations males reported higher cultural identity and overall cultural connectedness scores among those who met MVPA guidelines than those who did not. Among First Nations females, greater discrimination was reported among those who met CSEP MS activity guidelines. First Nations females from on-reserve home communities reported lower MS activity than those from off-reserve communities.

Additionally, First Nations females from on-reserve or northern home communities reported lower MVPA than those from off-reserve or southern home communities. Similarly, First Nations males from northern home communities reported lower MVPA than First Nations males from southern home communities. Due to the differences among males, females, and Métis and First Nations Peoples, it is crucial to present sex-specific results separately for Métis and First Nations Peoples.

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APPENDICES

Appendix A: Ethics Certificate



Behavioural Research Ethics Board (Beh-REB) 01-Oct-2021

Certificate of Approval Amendment

Application ID: 200

Principal Investigator: Heather Foulds

Department: College of Kinesiology

Locations Where Research

Activities are Conducted: Physical Activity Complex, University of Saskatchewan Campus, Canada

Student(s): Avery Ironside
Varinder Brar
Yara Al Horoub

Funder(s):

Sponsor:

Title: Social and Cultural Determinants of Indigenous Peoples of Canada's Physical Activity Levels

Approved On: 01-Oct-2021

Expiry Date: 08-Jul-2022

Approval Of: Behavioural Amendment Form: 27-Sept-2021

Personnel changes

Consent form (online) version 9

Electronic Recruitment notice version 13

Acknowledgment Of:

Review Type: Delegated Review

CERTIFICATION

The University of Saskatchewan Behavioural Research Ethics Board (Beh-REB) is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TPCS 2 2018). The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this project, and for ensuring that the authorized project is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS

In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month prior to the current expiry date each year the project remains open, and upon project completion. Please refer to the following website for further instructions: <https://vpresearch.usask.ca/researchers/forms.php>.

***Digitally Approved by Joni Aschim OBO Diane Martz, Chair, Behavioural Research Ethics Board
University of Saskatchewan***

Appendix B: Consent Form

PARTICIPANT INFORMATION AND CONSENT FORM

Social and Cultural Determinants of Indigenous Peoples of Canada's Physical Activity Levels

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INTRODUCTION

You are being invited to take part in a research study because you are a member of the University of Saskatchewan campus community, you are 18 years of age or older and self-identify as Indigenous. Your participation is voluntary. It is up to you to decide whether or not you wish to take part. If you wish to participate, you will be asked to click the consent box at the bottom of this consent form. If you decide not to take part, you do not have to provide a reason and it will not affect your relationship with any of the investigators or your standing in the College of Kinesiology or the University of Saskatchewan. You are under no obligation to answer any question(s) that you are not comfortable answering. As data is collected anonymously, please note that we are not able to remove your survey data once it is submitted. If you start the survey and then decide to withdraw from participating, you can close your online browser window without submitting your survey and your data will not be saved or included in the survey (as according to Article 3.2 of the Tri-Council Policy Agreement 2nd Ed.).

Please take time to read the following information carefully. You can contact the researcher to explain any words or information that you do not clearly understand and ask as many questions as you need.

STUDY PURPOSE

Improved physical activity (PA) levels have been shown to lower the risk of many chronic diseases. It is recognized that certain social and cultural factors play key roles in determining a person's PA level, including family income, education, social support, and community involvement. Once known, these social and cultural determinants can be used to increase the effectiveness of PA interventions, thus decreasing the risk of chronic diseases. With Indigenous populations experiencing the highest risks for chronic diseases, PA may be an ideal target for Indigenous health related interventions. To date, little research is available on the social and cultural determinants of physical activity in Indigenous peoples, as most measurements are based on non-Indigenous populations. As such, these interventions may not be reaching their peak effectiveness. More research is needed to evaluate the sociocultural determinants of PA, unique to Indigenous populations.

PARTICIPANTS

You are eligible to participate in this study if you are 18 years old or older. You must also self-identify as Indigenous. A planned target of 300 participants will complete the online survey. You will be ineligible to participate if you are unable to consent to participate in this study.

TIME REQUIRED

This study will be open to participants' enrollment for one year, with a results sharing community presentation and gathering to share study results hosted two months following the closure of enrollment. You will be asked to complete an online questionnaire. The online self-administered questionnaire is expected to take 20- 30 minutes. You will also be invited to attend an optional results sharing gathering (~120min) after the data has been analyzed.

If you decide to participate in this study, you will be asked to read and review the consent form and click a check box to indicate your consent. You will also be provided with contact information for the researchers. You are welcome to contact the researchers to ask questions or further clarify the consent form before providing consent.

STUDY PROCEDURES

1. Online Questionnaire (20-30min)

You will be asked to complete an anonymous online self-administered questionnaire. This questionnaire will ask questions about social and cultural factors and physical activity levels. You are free to leave any questions unanswered.

This survey includes questions about your physical activity and time in sedentary (seated or laying down) activities, including how your activities have changed due to the ongoing Covid-19 pandemic. Questions relating to cultural connectedness will include questions about your connection to spirituality, traditions, identity and ethnicity as well as your participation in traditional and cultural activities. The questions about your social support and social experiences will ask you about your social network and the support you may receive through your social network and community. Questions about your sex and personality attributes are included to understand how western concepts of sex, and more culturally relevant indicators of gender influence your experience of physical activity and how physical activity is related to your cultural and social connections. In order to fully appreciate the influence of

social experiences and colonization, questions about your experiences of racism and discrimination and your personal and family attendance at residential schools or in foster care are also included. These questions of residential school, foster care, and racism and discrimination ask broadly if you/your family experience or have experienced these colonization realities, with responses of yes/no/unsure, and do not ask for further details of your specific experiences. You are welcome to leave any questions blank as you feel comfortable answering.

2. Study Results Sharing Gathering (~120 min-Optional)

You have the option of attending a virtual gathering to share the results of the study. This session allows the researchers to share the results of the data collection with the participants, Indigenous people and allies at the University of Saskatchewan Indigenous. Invitations to attend the virtual gathering will be sent to participants who leave their email address for an invitation after the survey and through the Aboriginal Students' Center newsletter. You and other community members will have the opportunity to review and discuss the results and interpretations. The discussion will address if the data's conclusions represent the Indigenous community's views before potential publication occurs. This discussion will also allow you, other participants and community members to share any other experiences you deem relevant to the study. The gathering will give you other participants and community members the opportunity to discuss the significance of the results and opportunities to benefit the community. Once the findings are published, a copy will be sent to you if you would like to receive study results regardless if you attended the study results sharing virtual gathering.

Please note: This session will be held via online video conferencing through WebEx in consideration of the ongoing pandemic and protect everyone's health and safety. More information about video conferencing software is provided below.

Please feel free to ask any questions regarding this study's procedures and goals or your role as a participant in this study.

BENEFITS

If you choose to participate in this study, there may not be direct benefits to you. It is hoped the information gained from this study can be used in the future to benefit Indigenous populations through making physical interventions more effective; however, you will be provided with overall study results, giving you information about study findings and how gender and sex-specific social and cultural factors may influence physical activity.

RISKS AND DISCOMFORTS

If you choose to participate in this study, you may feel emotional discomfort in relation to answering questions on certain social factors, cultural factors, and physical activity levels to the researcher. For example, some questions will ask you about your personal and community experiences of racism and if you or a family member attended residential school or was in the foster care system. However, you are not obligated to answer all of the questions, you may leave any questions unanswered, and you may leave the survey at any time by closing your browser. You will be provided with contact information for health resources available at the University of Saskatchewan.

Support Services available include:

1. Student Wellness Centre

Link: <https://students.usask.ca/health/centres/wellness-centre.php>

Phone: (306) 966 5768

Email: student.wellness@usask.ca

2. Mental and Physical Health

Link: <https://students.usask.ca/health/be-well.php>

3. Student Affairs and Outreach

Link: <https://students.usask.ca/health/centres/student-affairs-and-outreach.php>

Phone: Contact - (306) 966 5757 Manager- (306) 966 6079

4. Employee and Family Assistance Program

Link: <https://wellness.usask.ca/help/efap.php>

Phone: 306-966-4300 or 1844-448-7275

5. Saskatoon Crisis Intervention Service

Link: <http://www.saskatooncrisis.ca/>

Phone: (306) 933 6200

6. Royal University Hospital Emergency Department

Address: 103 Hospital Drive. Saskatoon, SK.

7. Campus Protective Services

Phone: (306) 966-5555

8. Saskatoon Police Services

Phone: 911 (or 9-911 on campus)

9. Saskatchewan HealthLine

Phone: 811 (or 9-811 on campus)

COST AND REIMBURSEMENT

You will not be charged for any research-related procedures. You will not be paid for participating in this study. You will not receive any compensation. You will have the opportunity to be entered into a draw for 1 of 6 \$50 gift cards to Wanuskewin gifts. Due to the ongoing pandemic, we will host the results sharing session via Webex video conference. If you choose to participate in this result sharing session, you will be asked to provide your email at the end of the survey. You will not receive any financial benefits for being in this study or because of data obtained from research conducted under this study.

VIDEO CONFERENCE SOFTWARE

Webex will be used as the primary video conferencing platform to share knowledge and results of this study with participants and the larger community of Indigenous peoples at the University of Saskatchewan after this study has completed.

Webex is a campus-wide, centrally supported web conferencing solution that enhances productivity by providing rich online environments for collaboration. With web conferencing, you can use your computer to interact with others in video or audio-only meetings. WebEx can be used to record

web conferences, share desktops and applications, conduct polling and live-chat messaging. Participants can use a browser, desktop application or a mobile device application with audio and video in a highly secure environment. Webex privacy policy can be found at <https://www.cisco.com/c/en/us/about/legal/privacy-full.html>. More information about Webex can be found at <https://training.usask.ca/webex.php#lamaparticipant>. We cannot make any guarantee of privacy of data on this platform.

We, the researchers, will host all Webex meetings/video conferences in our homes' or offices private area. Any Webex sessions will be hosted on a university computer and saved on the local computer with encryptions enabled. Any recordings will not be saved on cloud drives. We ask that you attend any Webex knowledge sharing events in a private location to preserve your privacy and the privacy of everyone involved in this study and please do not record the session. As this is a group presentation, the investigators cannot guarantee other attendees will not record the session.

To ensure our participants' privacy, we will not be gathering any data over the phone or Webex. Participants will be taking the survey online through SurveyMonkey to record their responses. Webex will only be used to share aggregate findings from this study with the Indigenous community and will not identify participants or present individual data.

CONFIDENTIALITY AND LEGAL RIGHTS

In Saskatchewan, the *Health Information Protection Act (HIPA)* defines how the privacy of your personal health information must be maintained so that your privacy will be respected.

The survey will be completed anonymously. If you choose to provide an email address, your email address will be stored separately from your questionnaire responses and your confidentiality will be respected. No information that discloses your identity will be released or published without your specific consent to the disclosure. The investigators will keep your personal information confidential and your name will not be used in the study records. Your information will be identified by a special number that will not include identifiable information such as birth date, initials or address. SurveyMonkey privacy policy can be found at https://www.surveymonkey.com/mp/legal/privacy/?ut_source=footer.

Your information and the study results will be collected on a password-protected SurveyMonkey account and then transferred to a password-protected, encrypted computer database. Only the investigators will have access to your study records. No other people or groups will have access to the data or information, except for the representative of the University of Saskatchewan Research Ethics Board to monitor the research, which will be done in Dr. Foulds' presence. However, no records, which identify you by name or initials, will be collected. This study's results may be presented in a scientific meeting and published in a scientific journal, but your identity will never be disclosed.

At the end of the data survey, you will be given the opportunity to link to a separate survey to enter your email address if you would like to be entered into a draw for one of the gift certificates, or to have study results shared with you, be invited to the knowledge sharing session or be contacted for future studies. This separate study will not be connected to the questionnaire responses and will maintain anonymity of the data provided.

By clicking to consent on this form, you do not waive any of your legal rights.

VOLUNTARY WITHDRAWAL FROM THE STUDY

Participation in this survey is voluntary. You can decide not to participate at any time by closing your browser or choose not to answer any questions you do not feel comfortable with. Survey responses will remain anonymous. Since the survey is anonymous, once it is submitted, it cannot be removed.

We want you to know that you are under no obligation to answer any question(s) that you do not feel comfortable answering. You are free to stop participating in the survey before submitting your survey results at any time for no reason with no penalties or consequences by closing your online browser window prior to submitting your survey and your data will not be saved or included in the survey (as according to Article 3.2 of the Tri-Council Policy Agreement 2nd Ed.). Please note that we are not able to remove your survey data once it is submitted as all survey responses are submitted anonymously.

AFTER COMPLETION OF THE STUDY

Overall results of the study will be available to you, both at the results sharing gathering and forwarded to you if you provide an email address to forward results. The overall study results will be disseminated through journal articles, expected to take at least one year to be published. Interested participants, if they wish, will be provided with a copy of any publications arising from this study when they become available via email.

CONTACT INFORMATION

If you have any questions about this study or your care/treatment or desire further information about this study before or during participation, you can contact Dr. Heather Foulds by emailing heather.foulds@usask.ca or calling 306-966-1067.

This research project has been approved on ethical grounds by the University of Saskatchewan Behavioural Research Ethics Board. Any questions regarding your rights as a participant may be addressed to that committee through the Research Ethics Office: ethics.office@usask.ca; 306-966-2975; out of town participants may call toll free 1-888-966-2975.

CONSENT TO PARTICIPATE

Study Title: Cultural Identity and Physical Activity Levels in Indigenous Adults

- I have read the information in this consent form.
- I understand the purpose and procedures and the possible risks and benefits of the study.
- I was given sufficient time to think about it.
- I had the opportunity to ask questions and have received satisfactory answers.
- I understand that I am free to withdraw from this study at any time for any reason, and the decision to stop taking part will not affect my future relationships.
- I give permission to the use and disclosure of my de-identified information collected for the research purposes described in this form.
- I understand that by signing this document, I do not waive any of my legal rights.

Please retain a copy of this consent form for your records

I agree to participate in this study:

* Click to Consent