

**WHANAU (FAMILIES) IN SPORT:  
PARENT VOLUNTEERING  
AND YOUNG PEOPLES  
PHYSICAL LITERACY DEVELOPMENT.**

by

Lara Andrews

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Human Development and Family Sciences.

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To all the young people involved in the sport system in NZ, this research is dedicated to improving the youth sport system by empowering families to enhance quality experiences and grow a lifelong love for physical activity and sport for young people.

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## ABSTRACT

Using the Family Systems lens and the physical literacy approach, this dissertation examined the association of parent volunteering in sport and young people's physical literacy development. The Active NZ surveys were nationwide participant surveys on New Zealand (NZ) young people and adults. These surveys collected data from over 77,000 young people and adults across NZ between 2017 and 2019. For these secondary analyses, data will only be analyzing young people (between the ages of 5 - 17 years old) and their parents/guardians. The Active NZ Young People survey was completed by the child with assistance from parents, if needed. Parents completed the Active NZ Adult survey. A total of  $n = 14,074$  parents and young people were matched and linked based on household ID. Parents reported whether they volunteered to support participation in sport, exercise or recreation activity over the last 7 days and/or 12 months, what role/s they played, and how many hours they volunteered. Young people reported on their physical literacy development scores and indicators for each of the physical literacy components. This information was used to examine the association between these variables adjusting for other factors (gender, age, ethnicity, deprivation, and parent physical activity) that might affect parent's volunteering and young people's physical literacy development. Overall, results found that more parent volunteering in sport is associated with higher odds of having higher physically literate young people. This association remains after adjusting for gender, age, ethnicity, deprivation, and parent physical activity.

## Chapter 1

### **BACKGROUND**

Young people's physical literacy development is important to the health and wellbeing of New Zealanders (NZ). NZ families' value being physically active together, as a family unit (Smith et al., 2018). This dissertation explores intergenerational family trends amongst parents and children involved in the youth sport system in NZ. In 2018, an overall estimated 81% of NZ young people aged 5 – 17 years old participated in organized sport (Smith et al., 2018). As young people grow up, participation in sport decreases, such that 81% of young children aged 5 - 7 years old participated in organized sport, 86% among 10 – 14 year old's, with a sharp decline of 66% for young people aged 14 – 17 year old (Smith et al., 2018). Organized sport and activities are described as being physically active in physical education or classes at school, practicing with a coach/instructor, sports competitions/tournaments within the education system, as well as sports played outside of the education system (Nielsen, 2019). Youth organized sport has been recognized as an avenue for young people to learn and develop important developmental skills physically, socially, emotionally, and cognitively.

In particular, participation in physical activity and sport can provide opportunities for young people to develop important skills and attributes, such as: social skills, attitudes, values, and motivation (Schwebel, Smith, & Smoll, 2016);

increased self-esteem and energy levels (Richman & Shaffer, 2000); reduced symptoms of anxiety, depression and suicide ideation (Babiss & Gangwisch, 2009; Brown & Blanton, 2002); and life skills that help to empower young people to effectively manage the child-adolescent transition and contribute positively to society (Dworkin, Larson, & Hansen, 2003; Fraser-Thomas, Cote, & Deakin, 2005; Holt & Sehn, 2008). Participation in physical activity and organized sport can contribute to the development of a range of developmental outcomes among young people. However, participation alone does not guarantee these outcomes. It is essential that participation is coupled with quality experiences to maximize positive developmental outcomes for young people (Sport New Zealand [Sport NZ], 2020).

This dissertation grew from a previous study of research that was disrupted due to the worldwide impact of the COVID-19 pandemic. The original dissertation research studied American families, which aimed to assess the quality of parent involvement in organized sport and its association with children's confidence (See Appendix A). Unfortunately, the original dissertation could not be continued. Although we had 21 U.S. youth participants in the study, it was not possible to continue to collect more data while living in NZ during the COVID -19 pandemic. Therefore, a pivot in direction was necessary. To continue with this research, it was important to explore different ways in which a similar piece of research could be conducted during the COVID-19 worldwide pandemic. Fortunately, opportunities were presented in NZ.

This review was designed to summarize the current literature on participation in physical activity and sport among youth in NZ, young people physical literacy development, Family Systems Theory, and parent volunteering in sport. The Sport NZ physical literacy approach and the Family Systems Theory are useful frameworks to describe and critique what is known about parental volunteering and associated effects on young people's holistic development in organized sport.

### **Physical activity and sport participation**

Physical activity is essential for health and wellbeing in all young people (Smith et al., 2018). To meet the challenge of increased physical inactivity, worsening life expectancy and health outcomes, as well as associated high economic costs, there is an increased focus internationally on enhancing the quality and quantity of physical activity and sport participation (Rudd, Pesce, Stafford, & Davids, 2020). Not only is it important to enhance participants' experiences, but to sustain active and healthy lifestyles across the lifespan (Rudd et al., 2020). World Health Organization (WHO) (2021), recommends young people limit particular sedentary behaviors and the amount of screen time. Higher amounts of sedentary behavior in children and young people are associated with numerous poor outcomes: increased chances of becoming overweight, behavioral disorders, reduced sleep duration, poorer cardio metabolic health and fitness (World Health Organization [WHO], 2021). Thus, the reduction of screen time is needed and the promotion of all dimensions of physical activity is required (Smith et al., 2018).

Physical activity is so important that the WHO (2021) has developed a set of physical activity standards for all children and young people across the world. Physical activity is defined as, “any bodily movement produced by skeletal muscles that requires energy expenditure” (WHO, 2021, para. 1). Strongly recommended physical activity levels for young people aged 5 - 17 years old, should accumulate an average of at least 60 minutes of physical activity daily, at a moderate- to vigorous-intensity level (Smith et al., 2018; WHO, 2021). The Ministry of Health NZ’s (2021) physical activity guidelines for children and young people (aged 5 to 17) recognize the importance of play in ensuring young people are active and helping them develop cognitively, socially, and emotionally. Moderate and vigorous physical activity are known to improve health. According to the Ministry of Health NZ (2021) moderate-intensity activities increase the heartbeat and breathing gets harder. Some of these activities include skating, cycling, fast walking, dancing, performing, games, housework and more. Vigorous-intensity activity occurs when the individual is out of breath and can’t say more than a few words without taking a pause for another breath (Ministry of Health NZ, 2021). Some of these activities include active games (running and chasing), cycling, sport, dancing and more. Activities like running, cycling, sport and dancing can be moderate or vigorous depending on the effort level of the individual (Ministry of Health NZ, 2021). If young people are not meeting these recommendations, doing some sort of physical activity is far better than doing none and will benefit health and wellbeing (World Health Organization [WHO], 2020).

NZ’s physical activity report card for children and young people is a regional and national survey data analyzing physical activity among children and young people (Smith et al., 2018). Findings showed NZ young people have low levels of physical

activity and high levels of screen time (Smith et al., 2018). Although there are support initiatives within schools, communities, and government/policies, it is suggested that future initiatives should consider the existing support system, such as family and peer support to develop effective interventions to inspire physical activity, active play, active transport, and reduce screen time among young people (Smith et al., 2018). Key recommendations from NZ's 2018 report card for children and youth called for nationally representative data surveys capturing standardized measures of physical activity indicators in order to gain high quality evidence to inform NZ's current state of play and to identify meaningful trends (Smith et al., 2018).

There is evidence that physical activity in young people can provide a variety of beneficial developmental outcomes, mentally, physically, socially/emotionally and spiritually. WHO (2021) suggests that young people who are physically active demonstrate higher academic performance and adopt behaviors that are healthier (e.g., avoidance of alcohol, tobacco, and drug use). Other benefits of physical activity participation include the development of movement control and coordination (neuromuscular awareness), healthy lungs and heart (cardiovascular system), healthy bones, joints, and muscles (musculoskeletal tissues), and maintaining healthy body weight (WHO, 2021). Additionally, young people's physical activity participation can support their social development, such as building confidence, self-expression, social integration, and interaction (WHO, 2021). Additionally, physical activity among young people has been found to be linked with psychological benefits by improving their control over symptoms of depression and anxiety (WHO, 2021).

Participating in physical activity is often accompanied by participation in some level of organized sport, whether through family, school, club or community. This is

particularly the case for young people as, “young people are almost 3 times more likely to participate through competitive sports and activities than adults” (Sport New Zealand, 2019, p.7). Participation in organized sport (one kind of physical activity) has been associated with a range of outcomes for young people. Youth sport participation has the ability to promote leadership, goal-setting skills, academic achievement, and initiative (Gould & Carson, 2008), as well as educational and occupational opportunities (Barber, Eccles, & Stone, 2003; Marsh & Kleitman, 2003). Youth sport programs are critical when children are learning motor skills, cooperation, discipline, and self-control (Fraser-Thomas et al., 2005).

Children learn to master the ability to move capably, adapt to changes in the environment, and perform motor skills that require hand-eye coordination (Sigelman, Rider, & George-Walker, 2013). For example, young children typically throw with just the arm, while older children learn to step and throw (utilizing multiple parts of the body simultaneously) (Sigelman et al., 2013). According to Alfano and colleagues (2002) and Perkins and colleagues (2004), some positive outcomes that arise from young people’s participation in youth sport include reduced body fat, increased physical fitness, and a higher likelihood of participating in physical activity and sports in adulthood, compared with individuals who do not participate in youth sport (as cited by Holt, Sehn, Spence, Newton, & Ball, 2012). Furthermore, evidence of higher intrinsic motivation, effort, and concentration exists when young people participate in youth organized sport, compared with children who socialize with friends and watch television (Larson, 1994; Lowe Vandell, Shernoff, Pierce, Bolt, Dadisman, & Brown, 2005).

Additional outcomes are also associated with sport participation for young people, including a reduced probability of engaging in risky sexual behaviors (Miller, Sabo, Farrell, Barnes, & Melnick, 1998), protection against regular cigarette smoking (Audrain-McGovern, Rodriguez, Wileyto, Schmitz, & Shield, 2006), and protection against suicidal behavior (Brown & Blanton, 2002).

Participation in physical activity and organized sport can provide young people with the opportunity for personal growth (physically, socially, emotionally and cognitively) by promoting and providing activities that may positively influence development. The sports context is a significant context worth analyzing, as it provides young people a way in which they are able to explore their emotions and develop their identities (Hansen, Larson, & Dworkin, 2003). Opportunities for young people to participate in sport require the support and coordination of national bodies and organizations. Exploring the role Sport NZ plays in promoting sport, exercise, and active recreation opportunities for young people is important context to unpack.

### **Youth sport in New Zealand**

Sport NZ is charged with the mandate to monitor the NZ population's participation in physical activity (Nielsen, 2019). Sport NZ is committed to its bi-cultural journey to increase their learning of Maori culture and reflect these learnings in its outcomes framework and in the sport system to honor Te Tiriti o Waitangi and the principals of partnership, "we believe a strong bi-cultural foundation is critical to our national identity and wellbeing" (Sport NZ, 2021, Our Commitment section, para. 3). Sport NZ's main purpose is to "promote and advocate the importance of participation in physical activity by all New Zealanders for their health and wellbeing"

(New Zealand Legislation, 2021, Functions section, para. 1). One of the target populations within Sport NZ's mandate is young people aged 5 to 18 years old (Sport NZ, 2021). Consequently, Sport NZ's current strategic (2020-2024) focus is on children (5-11 years) and young people (12-18 years). This is justified by previous research suggesting that improvements in the quality of the experiences for participants in sport leads to a greater likelihood of the individual developing life-long involvement in sport, play, and active recreation (Sport NZ, 2021). Increasing physical activity among young people (especially those who participate less) has been complex and challenging (Sport NZ, 2021). Sport NZ's community sports strategy explores ways to meet these complex challenges faced by young people by putting the participant at the center of its main three approaches. As reported in the national Value of Sport research, to reach the optimal benefits of physical activity for young people, "people need quality experiences that increase their confidence, competence and motivation to value and choose active lifestyles" (Sport NZ, 2021, Three Approaches section, para. 1). In order to create better quality experiences that encourage physical activity participation for young people, Sport NZ has three main approaches: insights approach, locally led approach, and physical literacy approach (See Figure 1, p.9).



Figure 1 Sport NZ. (2021). *Three Approaches* [Report]. [http://sportnz.org.nz/media/4222/three-approaches-9\\_11.pdf](http://sportnz.org.nz/media/4222/three-approaches-9_11.pdf) (sportnz.org.nz)

The insights approach emphasizes the use of multiple sources of information. This includes the voice of the participant, local knowledge, as well as regional and national data to find out the needs of the participant and to influence and guide decision making (Sport NZ, 2021). Along with using multiple sources of information, the insights approach also encourages continuous evaluation and feedback to improve services and ensure participant needs are met.

The locally led approach focuses on empowering communities and sport organizations to lead sport and active recreation in their communities and build on their existing strengths of what is already working well. This approach also reinforces

a targeted approach to support and collaborate with communities towards mutually agreed outcomes.

The physical literacy approach recognizes the effects that physical activity and sport participation has across all elements of wellbeing. It reinforces the importance of quality physical activity and sport experiences in order to gain the best effects of holistic development (physical, social/emotional, cognitive and social development) of young people. This approach considers the different reasons and needs why people choose to participate in physical activity.

The three approaches are used as guidance on what it means to keep participants at the center and quality experiences at the heart of how the sport system is built, delivered, received, and evaluated. Keeping participants and quality of experiences at the heart of sport means that family and peer support need to be considered.

The concept of physical literacy development has gained traction both in academic and co-curricular circles over the past 19 years and is recognized as an increasingly significant component of physical activity and sport participation (Allan, Turnnidge, & Cote, 2017). Given sport participation is an ideal context to foster positive development among young people, physical literacy development is an important concept worth consideration and examination (Allan et al., 2017). Physical literacy is the desired outcome or goal of physical activity and physical education participation (Whitehead, 2010). Physical literacy development should also be the aspiration of sport participation. The Sport NZ's physical literacy approach recognizes the effects that physical activity and sport participation has across all elements of wellbeing.

## **Physical Literacy**

Physical literacy is a relatively new approach to children and young people's development in sport and has been introduced and embraced nationally and internationally. Due to the collective efforts in response to a common issue of declining rates of physical activity among young people, the physical literacy approach is based on a variety of initiatives to reach desired outcomes in individuals and populations (Aspen Institute, 2015). Sport NZ acknowledges, utilizes, and reinforces the physical literacy approach as its holistic youth development framework for promoting quality physical activity and sport experiences (Sport NZ, 2021). The current study focused specifically on young people's participation in physical activity and sport, and the potential for the sport context to play an important role in promoting physical literacy development.

For the purpose of this study, physical literacy development is used to understand holistic development of young people in sport. Whitehead's (2001) physical literacy approach focuses on the idea of embodiment, such that the mind and body are not separate entities, rather the mind and body are an integrated whole (Allan et al., 2017; Young, O'Connor, & Alfrey, 2020). According to Allan, Turnnidge, and Cote (2017), the original concept of physical literacy was primarily developed by Whitehead (2001) in the United Kingdom with an emphasis in literacy development in physical education. The notion of literacy refers to the knowledge or competence in a certain area, particularly literacy in movement and physicality (Allan et al., 2017). The holistic approach is the original conceptualization of physical literacy development (Whitehead, 2001). The original definition proposed by Whitehead (2001) has been refined over time, until reaching its more recent definition,

“As appropriate to each individual’s endowment, physical literacy can be described as a disposition to capitalize on the human embodied capability, wherein the individual has the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for maintaining purposeful physical pursuits/activities throughout the life course” (Whitehead, 2013, p.29).

Physical literacy can be viewed in two perspectives: 1) a holistic approach (Whitehead, 2001), and 2) a performance-driven approach (Higgs, 2010). Whitehead (2001) emphasized the connection between the body and mind. However, in North America the physical literacy concept was adopted with a sports program lens focused on the body and performance (Roetert & Jefferies, 2014). This highlights the versatility of the different ways physical literacy can be viewed and utilized within multiple settings. Furthermore, according to Whitehead (2001, 2010), a broader concept of physical literacy applies to all interactions between an individual and their surroundings, including both the manufactured and natural environments. According to Allan and colleagues (2017), “Sports represents just one context in which embodied capacities are both challenged and celebrated” (p. 2). There is limited evidence research in this area on the relationship between participation in sport and physical literacy development, as well as studies that examine the processes that enable physical literacy development, and exploring which coach/adult roles, responsibilities, and behaviors are most significant for physical literacy development of young people.

Sport NZ adopted the concept of developing physically literate young people and adults. Physical literacy development is a key concept of current discussions about developing young people to choose and value being active (Sport NZ, 2021). Sport NZ’s (2021) physical literacy approach is a holistic concept (cognitively, physically, socially/emotionally, and spiritually) which is based on the philosophy that individuals

who are physically literate are more likely to be physically active for life (See Figure 2).

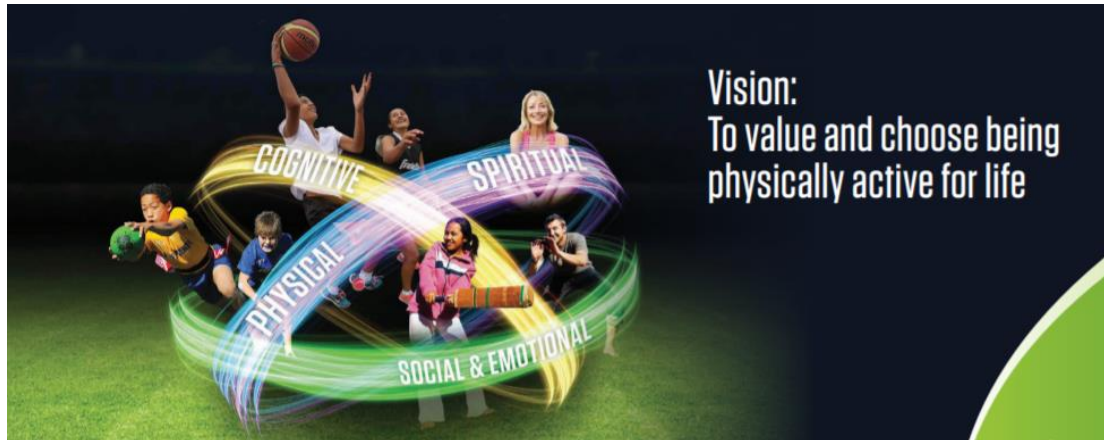


Figure 2 Sport New Zealand. (2015). *Sport New Zealand's Physical Literacy Approach*. [Booklet].  
<https://www.sporttaranaki.org.nz/assets/Uploads/2015-SportNZ-Physical-Literacy-Approach2.pdf>

Sport NZ (2021) ultimately believe that by investing in physical literacy this contributes to the overall wellbeing of NZ people, such that "Physical literacy is the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life" (International Physical Literacy Association, 2021, para. 1). To gain the best effect on a person's physical literacy development in general, the impact needs to represent value to the individual, be of high quality, and be a positive experience. This means that participants are more likely to have fun, and to continue to participate in the future (Sport NZ, 2021). Additionally, Higgs (2010) also proposed that, "The physically

literate person will move with poise and grace, with economy of movements, and with confidence” (p. 2).

Large scale physical literacy initiatives in physical activity, sport participation, education, and community have been pioneered recently in Australia, Canada, New Zealand, USA, and the United Kingdom (Giblin, Collins, & Button, 2014). For example, in 2019 Sport Australia released the Australian Physical Literacy Framework (APLF). The purpose of APLF was, “to advance a national agenda for physical literacy and specifically, clarify and promote the development of physical literacy in Australian sport and education” (Scott, Hill, Barwood, & Penney, 2021, p.328).

More recently, in Canada physical literacy is a key approach within sport policy, sport practice, and within physical education (Nesdoly, Gleddie, McHugh, 2021). Although the physical literacy literature has suggested benefits for the general population, “the experiences of Indigenous people are noticeably absent in the physical literacy literature” (Nesdoly et al., 2021, p.295). Nesdoly et al. (2021) believed that in order to facilitate inclusive and meaningful sports programs and policies in Canada, the voices of indigenous people are necessary.

In 2013, the American Aspen Institute’s Sports and Society Program introduced the concept of physical literacy as a promising concept worth exploring at the program’s launch summit for Project Play (Aspen Institute, 2015). This multi-stage initiative was to provide sports leaders with the tools to build healthy communities through sports, “the first phase of which focused on reimagining youth sports in a form that serves the needs of all children” (Aspen Institute, 2015, p.3). The Sports and Society Program identified sport as just one avenue to foster physical literacy. Additionally, Aspen Institute (2015) recognizes sport as one of the many sectors that

has the potential to embrace the benefits from meaningful, society-wide physical literacy principles and programs that encourage and motivate children to continue their development through physical activity.

Sport NZ adopted the physical literacy approach for a variety of reasons. However, a major reason is that overall, physical activity among young people is declining while sedentary behavior and screen time is increasing (Smith et al., 2018). This approach to encouraging and promoting lifelong participation in physical activity is critical for health and wellbeing of our nation. Culturally appropriate and targeted strategies are needed to increase participation in physical activity in all NZ young people.

According to Whitehead and Murdoch (2006) physical literacy development throughout the life span is influenced by significant others (as cited by Whitehead, 2010). Significant others, such as, parents and guardians, enable and provide opportunities for physical activity both in the home environment and beyond. Parents attitudes and reactions to the efforts of participation also play significant roles in affecting how young people experience participation, and indirectly contribute to their ability to become physically literate (Whitehead, 2010). To enable and provide opportunities for young people to participate is crucial, however encouraging, and supportive attitudes towards young people is even more vital. Whitehead and Murdoch (2006) expressed,

“opportunities may change as individuals move from childhood, through to adulthood to old age; however, the need for sympathetic encouragement is critical at all ages” (as cited by Whitehead, 2010, p. 159).

From childhood, through to adulthood and into old age, negative insensitive experiences can easily be taken personally and result in a decrease in motivation and

participation. The outcome of negative experiences can lead to less involvement in physical activity and physical literacy development not being attained (Whitehead, 2010). Even younger children can be aware of the attitude's adults display, such that, if they sense their nervousness, they can lose confidence, be apprehensive, and be less inquisitive/adventurous (Whitehead, 2010).

Other significant contributors to young people's development can be coaches, officials, and helpers running the exercise sessions. It is vital that all practitioners offer a wide range of opportunities, respond to effort and progress with excitement, and provide positive feedback (Whitehead, 2010). It is important to note that parents who volunteer in sport may possibly play one or more role, for example: parent coach or parent coach and official. All individuals, especially parent volunteers in contact with young people in sport need to provide environments that are safe and that offer opportunities for exploration. Establishing a safe space for young people to enjoy physical movement is important for the development of physical literacy. Thus, unpacking the personal and family relationships (i.e., parent coach volunteer) is essential to understanding the impact on young people's physical literacy development journey through sport.

### **Family Systems Theory**

Family Systems Theory is underpinned by the basic assumption that the family is not just a group of individuals who are related and live together; rather, an individual can be largely understood only by the context of the whole family unit (Smith & Hamon, 2012). Instead of analyzing an individual as its own system or part, Family Systems Theory focuses on the integration of multiple parts (Smith & Hamon, 2012). This theory views the family as a natural social system, as it contains its own

rules, power structures, communicative patterns, roles, and characteristics. In order to understand and unravel the parent-child relationship in organized sport, this requires a theoretical framework that incorporates the understanding of both family systems and sports psychology together as one unit. A notable contributor to this area of research was Hellstedt (1987, 1990, 2000, & 2005). Hellstedt developed a way to adapt the Family Systems Theory to include the surrounding impacts of the sports environment. Hellstedt (1990) believed that for many families with children participating in organized sport, their family social system is centered on the youth sport environment. For example, the family system devotes a significant amount of the family's time, finances, and emotional energy towards participation in sport for their children (Hellstedt, 1990). Hellstedt believed that the sport environment was complex, thus the Family System lens needed to be considered.

Hellstedt (1987) constructed a descriptive model to accurately analyze these families and the sport environment using three levels of parental behaviors; the first being under-involved parents. Hellstedt (1987) defined under-involved as, "a relative lack of emotional, financial, or functional investment on the part of parents" (p.153). In the sports environment, this would be described as: a lack of attendance at games or events, minimal financing towards equipment, limited or no assistance in transportation or carpooling, little or no assistance in providing support for child's performance goals and outcomes, and little interest in communicating with coach or skill development (Hellstedt, 1987).

The second level of Hellstedt's (1987) model is moderately involved parents. Moderately involved parents are described as providing "firm parental direction, with enough flexibility so that the young athlete is allowed significant involvement in

decision making” (Hellstedt, 1987, p.153). These types of parents are supportive, but also allow their child athlete to make decisions about participation, as well as the levels of competition in which they want to compete (Hellstedt, 1987). Moderately involved parents provide a portion of financial support, help the child set goals, and volunteer their time to support the team in a variety of ways (i.e., carpooling teammates, or attending games and events).

In contrast, over-involved parents can have “excessive amounts of involvement in the athletic success of their children” (Hellstedt, 1987, p.154). Over-involved parents are characterized as excessive in the sport environment by attending all practices and games, yelling, disagreeing frequently with officials, and constantly trying to ‘coach’ their child. These parents often have trouble separating their wishes, needs and fantasies from their children’s wishes, and often hope that their child’s success in sport will provide opportunities of financial or educational success in their future (Hellstedt, 1987). Over-involved parents can have unrealistic expectations and disapprove when goals are not met and get angry and negative when the child does not do well (Hellstedt, 1987).

Family Systems Theory is important when analyzing the integration of family members, such as parents and children. In this study, this theory provides a framework which specifically focuses on the parent-child dynamic and the everyday experiences parents and children face as a family unit, when participating in physical activity and sport. Children who are involved in organized sport cannot be fully understood as independent entities but can be understood further by unpacking physical activity trends, physical literacy development, and volunteer roles among families in sport. Thus, by using Family Systems Theory as a lens on the various parent volunteer roles,

levels, and duration in youth organized sport, this approach can help assess the parent-child influences on young people's physical literacy development.

### **Volunteering in NZ**

A recent report on volunteering in NZ found that “approximately 21.5% of New Zealanders undertake formal volunteering work” (Volunteering NZ [Volunteer NZ], 2020, p 9). Some of these volunteers choose to volunteer their time to coaching, managing, and supporting youth sport teams. Volunteering in NZ plays a significant role in society as “volunteering builds strong, sustainable, and connected communities” (Volunteering NZ, 2020, p.4). According to Volunteering NZ (2020), “By caring for others and contributing to change, volunteers improve the lives of other people while at the same time enhancing their own lives” (p.4). The contribution and impact from volunteers in NZ have been acknowledged in recent years. In general, volunteers come from ‘all walks of life’ – representing various age groups, cultures, demographics, and reasons for volunteering. According to Sport and Recreation NZ (2008), “In New Zealand, it is widely recognized that volunteers are the backbone of sport” (as cited by Walters, Payne, Schluter, and Thomson, 2010, p. 106).

Gemba (2015) conducted a Sport NZ national volunteering insights report between August 2014 and July 2015. The purpose of this report was to increase understanding of the sport volunteer landscape and to make better informed and fact-based decisions. The total number of participants was  $n=12,326$  aged between 16 – 64 years old. This was a 40-minute online survey that was disseminated across 20 regions in NZ. According to the Volunteering insights report (2015), 20% of NZ adults volunteer in sport. Of the 20% who reported that they volunteered, 50% were female and 50% were male. Volunteering tended to be more common among high income

earners and those of Indian, Maori, Pacific, and NZ European descent. The overall highest rates of volunteering were in football, swimming, netball, cricket, and rugby. There were higher rates of male volunteers in football, cricket, and rugby. Higher rates of women volunteered in netball, swimming, gymnastics and equestrian. Fifty-four percent of those who volunteered, did so in the sport in which they participated.

There are many different reasons why people choose to volunteer in their roles in sport. According to the Gemba (2015) report, the top 4 most popular volunteer roles are coaching, refereeing, parent helper and administrator. Those aged between 25-44 years were most likely to be volunteering for their children (11 years old and younger). Volunteered “because their children participate” is a key driving factor for those within this age bracket. Households with income of \$50,000+ were also more likely to be motivated “because their children participate”. Other key factors for volunteers, overall, were to have fun, for enjoyment, and to do something worthwhile.

One feature of the sport environment is that it acts as its own system. Critical to this system are the volunteers that invest time, commitment, dedication, and passion to keep the youth sport system alive. In NZ, volunteers are known as the heart of our sporting communities. Volunteering in youth sport can range from low involvement to high involvement. Acknowledging all volunteers are significant contributors to the youth sport system in which young people participate, this research particularly focused on the role of the parent volunteer in sport, as parents and guardians are typically considered as the most consistent influence both in and out of the sport scene. This aligns with Family Systems Theory and helped target this research towards understanding parent volunteers in sport and young people’s physical literacy development.

## **Parent volunteering in youth sport**

The role of significant others in organized sport is important in generating a positive environment to foster quality experiences in sports (Sport NZ, 2021), which is vital to children's psychosocial development in sports (Bronfenbrenner, 1999; Fraser-Thomas et al., 2005; Harwood & Knight, 2015). In researching the role of significant others, coaches, teachers, and parents are the three main adult figures identified and much of the literature is devoted to their experiences, behaviors, and roles. While acknowledging the role of the coach and teacher as significant others, this study will focus on the role and influence of the parents and guardians using Family Systems Theory (Cote, 1999; Harwood & Knight, 2015; Wolfenden & Holt, 2005). This dissertation used aspects of Family Systems Theory developed by Hellstedt (1990) to understand parents' volunteering by days/months, by roles, by levels, and duration in sport to explore any associations with young people's development from a family lens.

Parents play significant roles in sport participation as they typically provide financial and emotional support (Hellstedt, 1990), encourage and initiate children's and young people's sport involvement (Brustad, 1996; Fredrick & Eccles, 2005; Howard & Madrigal, 1989; Wuerth, Lee, & Alfermann, 2004), and often provide transportation to/from young people's sports activities (Hellstedt, 1990). Although parents play an important part in children's and young people's participation and enjoyment in organized sport, there have been some notable concerns pertaining to their expectations and behaviors towards their child-athlete and how these can influence their children's psychological development (Weiss & Fretwell, 2005).

It is a challenging and complex endeavor to be a parent and guardian of a young person participating in sport (Knight & Holt, 2014). Adults, particularly parents, play a pivotal role in supporting the development of young people, as well as

reaching their full potential in sport and in life (Knight & Holt, 2014). Parents can enhance young people's enjoyment and experiences in sports; however, in contrast, parents could also have negative influences (i.e., adding pressure or being overbearing) on young people's experiences and development in organized sport, leading to negative results (i.e., low confidence, anxiety and burnout).

In general, parents are typically known to be the central source of socializing influence on their children, and parent influence can have a lasting impact on their overall psychological development (Pomerantz & Thompson, 2008). A study conducted by Kocayoruk, Altintas and Icbay (2015) investigated perceived parental support levels (high, moderate and low) in general and adolescent wellbeing. Levels of warmth and autonomous support were used to measure parental involvement. Results showed that higher perceived levels of support were associated with higher levels of wellbeing and autonomy among participants in this study. Trost et al. (2003) conducted a study on 380 students (12-17 years) and their parents. Parents completed a questionnaire assessing physical activity habits, beliefs, and support behavior. Students also completed a questionnaire. Trost et al. (2003) found that parent support was a critical correlate of child physical activity. These findings suggest that physical activity interventions that are targeted at young people should include strategies to increase parent support for their children's physical activity (Trost et al., 2003). The physical activity and sport opportunities that parents provide continue to be significant, as are their attitudes towards physical activity (Whitehead, 2010). Parents who volunteer have a key role to play. All those involved in youth sport must try to promote positive attitudes towards being active. Thus, the climate parents create in

general, whether it's positive or negative, could have a major influence on young people's physical activity and physical literacy development.

The NZ youth sport system would struggle to exist without parent volunteers. For example, parents control entry into youth sport by registering children into teams, paying participation fees, transporting their children to practices and games, supporting and encouraging at competitions, filling coaching and administrative roles, and partaking in organizing and fundraising. However, the sport landscape in NZ is shifting. To address some of these challenges we need to think about things differently. Emphasis should be on the needs of the participant (Sport NZ, 2021). To turn this around, young people's voices were elevated to ensure the NZ youth sport system supports young people to develop their physical literacy. This supported working with parent volunteers to provide positive sporting environments, and enjoyable participation that can maximize quality experiences and therefore positive developmental opportunities for young people. Better quality experiences for all youth in sport is essential. Currently, the evidence investigating the sport environment and any association between parent engagement and young people's development in sport is still emerging. This study will add to this growing body of literature investigating the association of the different parent volunteer variables (days, months, roles, levels, and duration) in sport in NZ and young people's physical literacy development.

The aim of this dissertation was to inform future sport programs and initiatives for parents, children, and families. Guided by Family Systems theory and considering previous research, the following research questions are posed:

## **Research Questions**

1. How is parent volunteering (in the last 7 days) in sport associated with young people's physical literacy development, and each of its components (encourage, competence, opportunity, motivation, knowledge, and confidence)?
2. How is parent volunteering (in the last 12 months) in sport associated with young people's physical literacy development, and each of its components?
3. How is parent volunteering (by roles in the last 12 months) in sport associated with young people's physical literacy development, and each of its components?
4. How is parent volunteering (by levels in the last 12 months) in sport associated with young people's physical literacy development, and each of its components?
5. How is parent volunteering (by duration in the last 7 days) in sport associated with young people's physical literacy development, and each of its components?

## **Hypotheses**

There are two feasible hypotheses for how parent volunteering is associated with young people's overall physical literacy development and each of the physical literacy components.

1. Firstly, more parent volunteering overall will be associated with higher young people's physical literacy development scores. This hypothesis is based on research conducted by Kocayoruk, Altintas, and Icbay (2015)

showing evidence of a higher perceived level of parent support were associated with higher levels of wellbeing among adolescents. A positive association was also found by Stein et al., (1999) between high levels of parent involvement and positive sport experiences, however, young people's perceptions of too much involvement was associated with stress.

2. Secondly, each of the different parent volunteering variables will have different effects for the different components of physical literacy: encourage, competence, opportunity, motivation, and knowledge. This hypothesis is based on research conducted by Hamstra, Cherubini, and Swanik (2002) which emphasized the parent as a key determinant of enjoyment, physical competence, and self-worth (as cited by Walters et al., 2010). Additionally, Woogler and Power (2000) found a positive association between mother's high-performance goals and children's intrinsic motivation. However, it is also proposed that over-involved parent volunteering in sport will be associated with lower confidence scores. This hypothesis is based on research conducted by Hellstedt's (1987) and Stein and colleagues (1999), which suggest that under-involved and over-involved parents may cause stress and lowered self-esteem among children. Wolfenden and Holt (2005) found that over-involved parents were perceived as a source of stress for their children, which in turn may undermine children's confidence.

## Chapter 2

### **METHODS**

#### **Data**

This project is a secondary analysis of data from Sport NZ's Active NZ Adult and Active Young People surveys (Nielsen, 2018, 2019). These surveys aimed to measure national perspectives on adults and young people's participation factors in play, active recreation, and sport. The purpose of the Active NZ surveys was to collect timely and robust data enabling evidence-based-and-led decision making and investments, tracking trends, and setting baseline and success indicators, all of which inform Sport NZ's strategic purpose (Nielsen, 2019). Active NZ population participation datasets provide researchers with the opportunity to put the participant front and center, as well as to identify families by household. The adult's dataset was a combination of online and paper questionnaires however the young people's dataset was collected online only. The goal of this dissertation was to utilize these extremely valuable national datasets to explore NZ families in youth sport and young people's holistic development. Active NZ survey data were used to explore parent volunteering roles, levels, and duration in sport and young people's physical literacy development.

## **Sample**

The Active NZ survey data has been collected from over 77,000 adults and young people across NZ between 2017 and 2019. The sample frame was based on the 2013 Census data from Statistics New Zealand (Statistics New Zealand [Stats NZ], 2021). The young people participants ranged in age (5 to 18 years old), in ethnicity, and were drawn from those who had an adult in the same household. The target population for young people in Active NZ was New Zealanders aged five to seventeen years of age who were located across all fourteen Regional Sports Trusts (RST) (See Table 1, p. 28)

Using the electoral roll, a random selection of adults was contacted and invited each month to participate in the adult online survey. As a continuous survey, new participants were contacted each month and recruitment occurred throughout the year. Adults included in the sample were asked if there were any young people in their household and if yes, they were also recruited into the sample for the young people's survey. According to Stats NZ, the definition of household is, "either one person who usually resides alone, or two or more people who usually reside together and share facilities in a private dwelling" (as cited by Nielson, 2019, p. 8).

Table 1 Active NZ survey sample target population per year ( $n=25,566$ )

<i>Regional Sports Trust (RST)</i>	<i>Active NZ (Adults 18+)</i>	<i>Active NZ Young people (Aged 5-17)</i>
Sport Northland	714	207
Aktive	5,297	1,499
Harbour Sport	1,218	345
Sport Auckland	1,642	465
Counties Manukau Sport	1,695	480
Sport Waitakere	742	210
Sport Waikato	1,819	530
Sport Bay of Plenty	1,287	375
Sport Gisbourne	608	200
Sport Taranaki	724	200
Sport Whanganui	703	200
Sport Hawkes Bay	709	206
Sport Manawatu	756	211
Sport Wellington	2,183	586
Sport Tasman	779	200
Sport Canterbury	2,699	698
Sport Otago	988	254
Sport Southland	735	200
<b>Total</b>	<b>20,000</b>	<b>5,566</b>

Nielson (2019) Active NZ Young People and Adult Survey (p. 10).

Recruitment comprised communication on four different occasions to maximize response rate. The first and second set of communication was by mail, which included: an introduction, instructions, and a passcode to the adult and young people's online surveys. The third communication was an adult paper-based self-completion questionnaire. The final communication was a reminder to return the paper-based questionnaire, as well as instructions to complete the adults, and young people's online survey (if the paper-based survey was not completed already). The average time required to complete the online surveys was 27 minutes for adults and 18 minutes for young people (Nielsen, 2019).

## Procedures

The request for Sport NZ's data use and non-disclosure agreement form was completed and signed (See Appendix E). Both datasets were saved separately, such as, 'Adults dataset' and 'Young people's dataset' in Excel format and shared on a USB with private access codes. To identify the family as a unit, the Active NZ adult's dataset was copied and saved into a new merged working document. Then, the young people's household ID number was matched with the adult household ID number. Adult household IDs with no match of young people's household IDs were dropped from the working document and analyses. Adult household IDs with one or more young people household IDs matches were also linked.

Of all families (adults who matched with young people household ID) descriptive statistics were run to identify parent volunteer by days, months, levels, roles, and duration (See Measures below). Parent volunteering was operationalized in several forms to categorize parents as different "intensities" of involvement. This was guided by Hellstedt's (1987) descriptive model of parental behaviors: under involved, moderately involved, and over involved parenting in sport. Although, we couldn't specifically identify 'over-involved' parents due to the data we possess, it is important to acknowledge that there could be 'over-involved' parents amongst our high parent volunteers. The *amount and type* of volunteering was used to categorize the parents.

## Measures

### Independent variables

**A. Parent volunteered (days/months)** was measured using the Active NZ adults survey which asked parents, “Have you volunteered in any of the following ways for a sport, exercise, or recreation activity in the last 7 days or 12 months?” (Nielsen, 2019, p.47). The response options are presented in Table 2.

Table 2 Q43. Have you volunteered in any of the following ways for a sport, exercise, or recreation activity in the last 7 days or 12 months?

	<i>Please tick <b>all</b> that apply</i>	
	<i>7 days</i>	<i>12 months</i>
Coached or instructed a team or group	<input type="checkbox"/>	<input type="checkbox"/>
Coached or instructed an individual	<input type="checkbox"/>	<input type="checkbox"/>
Official (e.g., referee, umpire, scorer)	<input type="checkbox"/>	<input type="checkbox"/>
Team manager	<input type="checkbox"/>	<input type="checkbox"/>
Club administration	<input type="checkbox"/>	<input type="checkbox"/>
Governance role at a club or association (e.g., board member)	<input type="checkbox"/>	<input type="checkbox"/>
Helper for a team, club or group (on call contact, group leader, guide)	<input type="checkbox"/>	<input type="checkbox"/>
Activity helper	<input type="checkbox"/>	<input type="checkbox"/>
Lifeguard	<input type="checkbox"/>	<input type="checkbox"/>
Team Captain or activity leader	<input type="checkbox"/>	<input type="checkbox"/>
<b>OR I have not done any of the above in 12 months.</b>	<input type="checkbox"/>	

*Note:* Nielsen (2019) Active NZ adult survey question 43 (p.47).

Adults with children who reported that they have volunteered in any of the volunteer options in table 2 (excluding ‘I have not done any of the above’) were reported as 1= parent volunteered (days and months). If parents responded, ‘I have not done any of the above’ or ‘\_NA\_’ they were recorded as 0 = nonparent volunteer. To

explore any differences between parents who volunteered in the last 7 days and parents who have volunteered in the last 12 months these variables were analyzed separately. This resulted in two measures, such as parent volunteered in the last 7 days dichotomized as, 0 = no and 1 = yes; and parent volunteered in the last 12 months dichotomized as, 0 = no and 1 = yes.

**B. Parent volunteered (by roles)** was measured by parents who reported they volunteered in no parent volunteer roles, one parent volunteer role, or multiple parent volunteer roles in the last 12 months. Parents that did not volunteer were coded as 0 = non parent volunteer; parents who volunteered in one role were coded as 1 = one parent volunteer role; and parents who reported that they undertook multiple volunteer roles were coded as 2 = more than one parent volunteer role.

**C. Parent volunteered (by levels)** was measured by parent volunteer roles in the last 12 months. The eleven volunteer roles reported by parents were collapsed into three parent volunteer levels: nonparent volunteer, moderate parent volunteer, and high parent volunteer. Parents who reported that they volunteered in a governance role, coached, or assistant coached a team/individual were categorized as high parent volunteer levels. Those who reported: official, manager, club admin, activity helper, lifeguard, team captain or activity leader were categorized as moderate volunteer levels. This resulted in a three-point scale ranging from 0 = nonparent volunteer, 1 = moderate parent volunteer, and 2 = high parent volunteer.

**D. Parent volunteered (by duration)** was measured using the Active NZ adults survey which asked parents, “Thinking about the volunteering you have done in the last 7 days, how many hours have you spent volunteering?” (Nielsen, 2019, p.48) (See Appendix B). Adults were asked to reflect only on volunteering that was done for

at least 10 minutes at a time. Parent volunteer duration (in hours) was recoded as 0 = zero minutes of parent volunteering; 1 = less than sixty minutes (1 – 60 minutes) of parent volunteering; and 2 = more than sixty minutes (61 minutes plus) of parent volunteering.

#### Dependent variable

**Physical Literacy Development** was measured utilizing the Active Young People survey. Physical literacy development was measured by attitudes towards physical activity and was measured using the six contributing variables:

1. **Encourage:** People in my life encourage me to take part in physical activity
2. **Competence:** I'm good at lots of different physical activity
3. **Opportunity:** I have the chance to do physical activity
4. **Motivation:** I want to take part in physical activity
5. **Knowledge:** I understand why taking part in physical activity is good for me
6. **Confidence:** I feel confident to take part in lots of different activities

These contributing variables were measured on a 5-point scale with (1) disagree a lot, (2) disagree a little, (3) neither disagree or agree, (4) agree a little; and (5) agree a lot (See Appendix C for survey questions). Young people who had a total of 23 points or less were categorized as lower physical literacy development. Young people who had a total of 24 to 30 points were categorized as higher physical literacy development. For each individual physical literacy variable, a score of 4 or above was classified as higher physical literacy and 3 or less classified as lower physical literacy.

### Sociodemographic variables

Young people gender was coded as 0 = male, 1 = female, and 2 = gender diverse. Young people age was coded as a continuous variable indicating age in years and months. Young people age ranged from 5 years old to 17 years old. Young people ethnicity was coded as 0 = European, 1 = Maori, 2 = Pasifika, 3 = Asian and 4 = other. Young people deprivation scores were categorized into three groups: (1) low deprivation (1-3 decile group); (2) medium deprivation (4-7 decile group); and (3) high deprivation (7-10 decile group). Deprivation is “an area-based measure of socioeconomic deprivation in NZ. It measures the level of deprivation for people in each small area” (Environmental Health Intelligence NZ, 2021, NZ Index of Deprivation section, para. 1). Nine census variables were used to measure NZ deprivation (NZDep). NZDep used deciles to represent areas with the least and most deprived scores. For example, areas that are decile 1 represents the least deprived scores; and areas that are decile 10 represent the most deprived scores.

### Other variables

**Parent physical activity** was measured using the Active NZ adults survey, which asked parents to think about the physical activities they have done in the last 7 days, “In total how many hours did you spend being physically active for sport, exercise or recreation?” (Nielsen, 2019, p.42) (See Appendix B). Parents who reported 0 – 29 minutes of physical activity were coded as 0 = inactive. Those who reported being physically active for 30 – 149 minutes were coded as 1 = insufficiently active; physically active for 150 – 299 minutes were coded as 2 = sufficiently active; and physically active for 300+ minutes were coded as 3 = highly active.

Parent gender was coded as 0 = male, 1 = female, and 2 = gender diverse. Parent age was coded as a continuous variable indicating age in years and months. Parent age ranged from 18 years old to 85 years and older. Parents' ethnicity was coded as 0 = European, 1 = Maori, 2 = Pasifika, 3 = Asian and 4 = other. Parent household income was recorded in ranges from, \$30,000 or less; \$30,001-\$40,000; \$40,001-\$60,000; \$60,001-\$80,000; \$80,001-\$100,000; \$100,001-\$120,000; \$120,001-\$160,000; \$160,001-\$200,000; and over \$200,001.

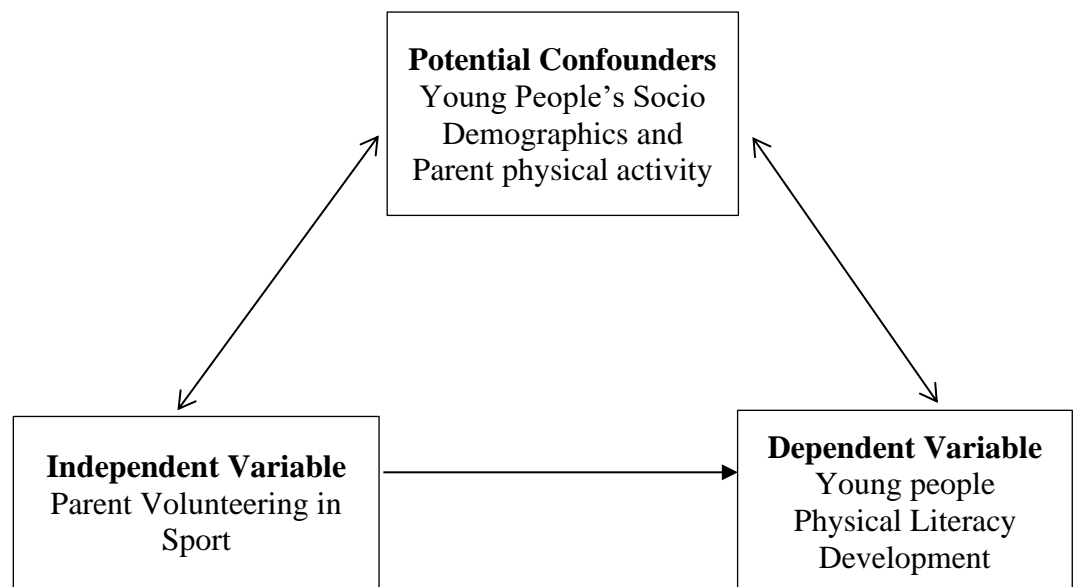
### **Statistical Analyses**

After cleaning and merging both the adult and young people datasets, young people and parent household ID matches were identified. A small number of adult responses who completed the paper questionnaire skipped questions that were set as compulsory online. These questions were coded missing and their other responses were retained in the analysis. To test our hypotheses, four sets of logistic regression models were run testing the associations between parent volunteering in sport and young people's physical literacy development; including each of the six physical literacy components: encourage, competence, opportunity, motivation, knowledge, and confidence.

The first set of models examined the odds ratio between parent volunteered in the last 7 days and overall physical literacy scores and each of the physical literacy outcomes, as well as, parent volunteered in the last 12 months and the physical literacy outcomes (See Table 6). The second set of models tested the odds ratio between parent volunteered (by roles) in the last 12 months and the physical literacy outcomes (See Table 7). The third set of models tested the odds ratio between parent volunteered (by

levels) in the last 12 months and the physical literacy outcomes (See Table 8). Lastly, the fourth set of models examined the odd ratio between parent volunteered (by duration) in the last 7 days and the physical literacy outcomes.

We first established crude odds ratios for each of these analyses and subsequently incrementally added the following sociodemographic covariates to the model: child gender, child age, child ethnicity, and child deprivation (See Figure 3 for the conceptual model, p. 35). The models were also adjusted for parent physical activity levels, which had previously been found to be associated with both parent volunteering and their child's physical literacy (unpublished data).



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Figure 3 Conceptual model

## Chapter 3

### **RESULTS**

#### **Descriptive Statistics**

This dissertation study used a sample size of  $n = 14,074$  family household ID matches, which consists of adults who live in the same home as the young person, referred to as ‘parents’ (includes guardians). Young people’s gender in this study were 50% female; 49.8% male; and 2% gender diverse. Young people in this study were on average 9.6 years old ( $SD = 3.3$ ) and ranged in age from 5 – 17 years old. The sample of young people consisted of European (69.1%), Maori (14.9%), Asian (10.3%), Pacific Island (3.3%), and other (2.4%). Parents in this study were 58.5% female; 41.3% male; and 1% gender diverse. Parents in this study were on average 42.0 years old ( $SD = 1.8$ ) and ranged in age from 18 – 85+ years old. The sample of parents consisted of European (84%), Maori (11.9%), Asian (8.8%), Pacific Island (2.4%), and other (2.3%).

Descriptive analyses also showed that parents household income levels varied as follows: 4% reported \$30,000 or less; 10.8% reported \$30,001-60,000; 11.4% reported \$60,001-\$80,000; 13.8% reported \$80,001-\$100,000; 12.3% reported \$100,001-\$120,000; 14.9% reported \$120,001-\$160,000; 8.7% reported \$160,001-\$200,000; 10.3% reported \$200,001 or more; 13.8% reported that they prefer not to say. Of those who did report their household income, the median was in the \$100,000-\$120,000 NZD range.

Table 3 Descriptive statistics of sociodemographic by analytic sample ( $n=14,074$ )

	<i>M (SD)/%</i>	<i>Range</i>
<i>Covariates</i>		
Child Gender		
Female	50.0%	
Male	49.8%	
Gender Diverse	0.2%	
Child age (years)	9.6 (3.3)	(5 – 17 years)
Child ethnicity		
European	69.1%	
Maori	14.9%	
Asian	10.3%	
Pasifika	3.3%	
Other	2.4%	
Parent Gender		
Female	58.5%	
Male	41.3%	
Gender Diverse	0.1%	
Parent age (years)	42.0 (1.8)	(18 – 85+ years)
Parent ethnicity		
European	84.0%	
Maori	11.9%	
Asian	8.8%	
Pasifika	2.4%	
Other	2.3%	
Household income (median)	\$100k – \$120k	(\$30k – \$200k+)
Deprivation		(Groups 1 – 10)
Low deprivation	36.5%	(Decile 1-3)
Medium deprivation	36.0%	(Decile 4-7)
High deprivation	16.0%	(Decile 8-10)
Parent physical activity participation		
Inactive	27.8%	(0-29 minutes)
Insufficiently	19.9%	(30-149 minutes)
Sufficiently Active	23.2%	(150-299 minutes)
Highly Active	29.0%	(300+ minutes)

The largest proportion of families in this study were categorized as low deprivation (36.5%), such that 13.5% reported as deprivation group 1; 12.3% reported as deprivation group 2; and 10.7% reported as deprivation group 3. The medium deprivation group comprised 36% of the sample, with 10.1% reported as deprivation group 4; 8.9% reported as deprivation group 5; 8% reported as deprivation group 6; and 7% reported as deprivation group 7. The proportion of the sample in high deprivation groups was lower with 16%, with a breakdown of 6.5% of parents reported as deprivation group 8; 4.8% reported as deprivation group 9; and 4.7% reported as deprivation group 10. There were 13.3% of the total sample with missing data for deprivation measures due to new housing development in areas not classified when developing the 2013 social deprivation index.

Lastly, in terms of parent physical activity, of all the parents in this study, 27.8% reported they were inactive (0-29 minutes of physical activity) in the last 7 days; 19.9% reported being insufficiently active (30 - 149 minutes); 23.2% reported being sufficiently active (150 – 299 minutes); and 29% reported being highly active (300+ minutes) (See Table 3 for full descriptive statistics).

Descriptive analyses were conducted to determine the mean level of overall physical literacy development (mean = 25.3, SD = 3.9) in young people participants, and the means of each of the physical literacy components: encourage (mean = 4.50, SD = 0.8), competence (mean = 3.98, SD = 1.1), opportunity (mean = 4.20, SD = 0.9), motivation (mean = 4.31, SD = 0.9), knowledge (mean = 4.38, SD = 0.8) and confidence (mean = 3.93, SD = 1.1). The descriptive statistics for physical literacy development were presented in table 4. Of note, encourage scored the highest and confidence scored the lowest (See Table 4). Among the young people in this study,

over half (57.9%) were categorized as higher physical literacy based on their total physical literacy score.

Table 4 Physical Literacy Development by analytic sample ( $n=14,074$ )

	<i>M (SD)</i>	<i>Range</i>	<i>Higher %</i>
<i>Outcome variables</i>			
Physical Literacy	25.3 (3.9)	(6-30)	57.9
Encourage	4.50 (0.8)	(1-5)	74.3
Competence	3.98 (1.1)	(1-5)	59.2
Opportunity	4.20 (0.9)	(1-5)	67.7
Motivation	4.31 (0.9)	(1-5)	69.0
Knowledge	4.38 (0.8)	(1-5)	71.5
Confidence	3.93 (1.1)	(1-5)	58.6

There were 2,508 (17.8%) of parents in this study that reported they volunteered in sport in the last 7 days. With 11,566 (82.2%) of parents reporting that they did not volunteer in the last 7 days. Nearly half of all parents in this study 6,173 (43.9%) reported they volunteered in sport in the last 12 months. The remaining 7,901 (56.1%) of parents did not volunteer in the last 12 months. Of the proportion of parents who volunteered in sport in the last 12 months, 2,863 (20.3%) only volunteered in sport once, while 3,247 (23.1%) volunteered in more than one volunteer role. Additionally, parents who reported that they volunteered in the last 12 months engaged in the following ways: 814 (5.8%) reported they served on the board in a governance role; 2,838 (20.2%) reported they coached a team; 1,069 (7.6%) reported they coached an individual; 1,615 (11.5%) reported they were an official; 1,621 (11.5%) reported that they were a team manager; 1,025 (7.5%) reported that

they were club administrators; 2,320 (16.5%) reported that they were a helper, 1,425 (10.1%) reported that they were an event assistant, 828 (5.9%) reported that they were activity helpers, 384 (2.7%) reported that they were a team captain, and 97 (0.7%) reported that they were a lifeguard (see Table 5). Furthermore, parents were also collapsed into three parent volunteer levels according to role, such as: 2,678 (19.0%) of parents categorized as moderate parent volunteers, and 3,495 (24.8%) of the parents were classified as higher levels of parent volunteering in sport according to role. In addition, of the proportion of parents who reported volunteering in the last 7 days, 664 (4.7%) volunteered between 1-60 minutes, while 1,844 (13.1%) parents reported more than 61 minutes of volunteering in the last 7 days (see Table 5).

Table 5 Descriptive statistics of the different parent volunteer variables by analytic sample ( $n=14,074$ )

	%
<i>Primary Predictors</i>	
Parent volunteered in the last 7 days	17.8%
Nonparent volunteer in the last 7 days	82.2%
Parent volunteered in the last 12 months	43.9%
Nonparent volunteer in the last 12 months	56.1%
By roles (in the last 12 months)	
One volunteer role	20.3%
More than one volunteer role	23.6%
Governance role	5.8%
Coached team	20.2%
Coached individual	7.6%
Official	11.5%
Team manager	11.5%
Club Administrator	7.5%
Helper	16.5%
Event assistant	10.1%
Activity helper	5.9%
Team Captain	2.7%
Lifeguard	0.7%
By levels (in the last 12 months)	
Moderate volunteer	19.0%
High volunteer	24.8%
By duration (in the last 7 days)	
Parent volunteered 1- 60 minutes	4.7%
Parent volunteered more than 61 minutes	13.1%

Additionally, the most popular volunteer role was 20.2% of parents who opted to coach a team. The second most popular volunteer role was a helper at 16.5%, followed by an official and team manager with 11.5% each. Parent volunteers that coached an individual ranked fifth and the roles that were reported the least were governance role with, activity helper, team captain, and lifeguard.

### **Regression Analyses**

The crude and adjusted odds ratios of the association of the different parent volunteering variables and young people's physical literacy development presented in tables 6 through to 9 (See Tables 6 – 9, p. 43-46). Refer to Appendix G for full results (See Tables 10-17, p. 79-86).

Table 6 Odds ratio testing associations between parent volunteered (days/months) and physical literacy development ( $n=14,074$ )

<i>Outcome</i>	MODEL 1		MODEL 2	
	Parent volunteered in the last 7 days (reference: nonparent volunteer)		Parent volunteered in the last 12 months (reference: nonparent volunteer)	
	<i>Crude OR</i> (95% CI)	<i>*Adjusted OR</i> (95% CI)	<i>Crude OR</i> (95% CI)	<i>*Adjusted OR</i> (95% CI)
Physical Literacy (total)	<b>1.578 (1.407-1.770)</b>	<b>1.456 (1.295-1.636)</b>	<b>1.977 (1.835-2.173)</b>	<b>1.852 (1.696-2.022)</b>
Encourage	<b>1.592 (1.314-1.929)</b>	<b>1.441 (1.159-1.793)</b>	<b>2.191 (1.904-2.522)</b>	<b>1.990 (1.692-2.339)</b>
Competence	<b>1.561 (1.389-1.755)</b>	<b>1.451 (1.272-1.655)</b>	<b>1.812 (1.663-1.973)</b>	<b>1.692 (1.538-1.869)</b>
Opportunity	<b>1.505 (1.307-1.733)</b>	<b>1.358 (1.161-1.588)</b>	<b>1.751 (1.581-1.940)</b>	<b>1.590 (1.415-1.786)</b>
Motivation	<b>1.510 (1.302-1.750)</b>	<b>1.514 (1.284-1.785)</b>	<b>1.734 (1.558-1.928)</b>	<b>1.662 (1.474-1.874)</b>
Knowledge	<b>1.163 (1.001-1.353)</b>	1.028 (.864-1.224)	<b>1.481 (1.321-1.660)</b>	<b>1.279 (1.118-1.463)</b>
Confidence	<b>1.470 (1.311-1.648)</b>	<b>1.358 (1.195-1.542)</b>	<b>1.702 (1.565-1.852)</b>	<b>1.633 (1.484-1.798)</b>

Note: \*Adjusted for child's gender, age, ethnicity, deprivation, and parent's physical activity. **Bold** numbers represent statistical significance  $p < .05$ .

Table 7 Odds ratio testing associations between parent volunteered (by roles) in the last 12 months and physical literacy development ( $n=14,074$ )

	MODEL 3		MODEL 4	
	Parent volunteered in one role (reference: nonparent volunteer)		Parent volunteered in more than one role (reference: nonparent volunteer)	
	<i>Crude OR</i> (95% CI)	<i>*Adjusted OR</i> (95% CI)	<i>Crude OR</i> (95% CI)	<i>*Adjusted OR</i> (95% CI)
<i>Outcome</i>				
Physical Literacy (total)	<b>1.730 (1.554-1.926)</b>	<b>1.596 (1.415-1.800)</b>	<b>2.377 (2.128-2.656)</b>	<b>2.190 (1.931-2.484)</b>
Encourage	<b>2.235 (1.846-2.705)</b>	<b>1.996 (1.609-2.476)</b>	<b>2.170 (1.811-2.599)</b>	<b>1.953 (1.587-2.403)</b>
Competence	<b>1.653 (1.482-1.845)</b>	<b>1.549 (1.369-1.752)</b>	<b>2.042 (1.828-2.280)</b>	<b>1.925 (1.696-2.184)</b>
Opportunity	<b>1.625 (1.424-1.855)</b>	<b>1.489 (1.284-1.728)</b>	<b>1.891 (1.657-2.159)</b>	<b>1.695 (1.459-1.968)</b>
Motivation	<b>1.571 (1.371-1.801)</b>	<b>1.487 (1.279-1.729)</b>	<b>1.966 (1.709-2.261)</b>	<b>1.951 (1.665-2.286)</b>
Knowledge	<b>1.372 (1.185-1.588)</b>	<b>1.281 (1.081-1.519)</b>	<b>1.629 (1.405-1.889)</b>	<b>1.311 (1.104-1.557)</b>
Confidence	<b>1.539 (1.382-1.714)</b>	<b>1.475 (1.307-1.665)</b>	<b>1.908 (1.712-2.216)</b>	<b>1.855 (1.639-2.100)</b>

Note: \*Adjusted for child's gender, age, ethnicity, deprivation, and parent's physical activity. **Bold** numbers represent statistical significance  $p < .05$ .

Table 8 Odds ratio testing associations between parent volunteered (by level) in the last 12 months and physical literacy development ( $n=14,074$ )

	MODEL 5		MODEL 6	
	Moderate parent volunteer (reference: nonparent volunteer)		High parent volunteer (reference: nonparent volunteer)	
	<i>Crude OR</i> (95% CI)	<i>*Adjusted OR</i> (95% CI)	<i>Crude OR</i> (95% CI)	<i>*Adjusted OR</i> (95% CI)
<i>Outcome</i>				
Physical Literacy (total)	<b>1.762 (1.577-1.969)</b>	<b>1.677 (1.480-1.902)</b>	<b>2.216 (1.993-2.464)</b>	<b>1.985 (1.761-2.237)</b>
Encourage	<b>1.967 (1.631-2.371)</b>	<b>1.925 (1.552-2.387)</b>	<b>2.404 (2.005-2.883)</b>	<b>2.039 (1.659-2.505)</b>
Competence	<b>1.628 (1.455-1.821)</b>	<b>1.571 (1.383-1.784)</b>	<b>1.979 (1.779-2.202)</b>	<b>1.825 (1.616-2.060)</b>
Opportunity	<b>1.545 (1.352-1.766)</b>	<b>1.468 (1.261-1.709)</b>	<b>1.948 (1.711-2.218)</b>	<b>1.718 (1.485-1.986)</b>
Motivation	<b>1.540 (1.340-1.770)</b>	<b>1.451 (1.244-1.694)</b>	<b>1.917 (1.675-2.195)</b>	<b>1.899 (1.631-2.211)</b>
Knowledge	<b>1.443 (1.238-1.681)</b>	<b>1.300 (1.087-1.556)</b>	<b>1.512 (1.313-1.740)</b>	<b>1.286 (1.093-1.513)</b>
Confidence	<b>1.626 (1.454-1.819)</b>	<b>1.664 (1.465-1.889)</b>	<b>1.765 (1.591-1.958)</b>	<b>1.628 (1.448-1.831)</b>

Note: \*Adjusted for child's gender, age, ethnicity, deprivation, and parent's physical activity. **Bold** numbers represent statistical significance  $p < .05$ .

Table 9 Odds ratio testing associations between parent volunteered (by duration) in the last 7 days and physical literacy development ( $n=14,074$ )

	MODEL 7 1 - 60 minutes (reference: 0 minutes)		MODEL 8 More than 61 minutes (reference: 0 minutes)	
	<i>Crude OR</i> (95% CI)	<i>*Adjusted OR</i> (95% CI)	<i>Crude OR</i> (95% CI)	<i>*Adjusted OR</i> (95% CI)
<i>Outcome</i>				
Physical Literacy (total)	<b>1.440 (1.176-1.762)</b>	<b>1.295 (1.037-1.618)</b>	<b>1.636 (1.432-1.869)</b>	<b>1.472 (1.269-1.708)</b>
Encourage	<b>1.935 (1.323-2.830)</b>	<b>1.635 (1.078-2.480)</b>	<b>1.491 (1.201-1.850)</b>	<b>1.370 (1.069-1.754)</b>
Competence	<b>1.571 (1.272-1.942)</b>	<b>1.525 (1.203-1.953)</b>	<b>1.557 (1.361-1.781)</b>	<b>1.423 (1.223-1.655)</b>
Opportunity	1.111 (.882-1.400)	.923 (.720-1.183)	<b>1.722 (1.452-2.042)</b>	<b>1.627 (1.344-1.970)</b>
Motivation	<b>1.797 (1.350-2.393)</b>	<b>1.778 (1.300-2.432)</b>	<b>1.421 (1.203-1.679)</b>	<b>1.430 (1.187-1.723)</b>
Knowledge	1.164 (.887-1.526)	1.124 (.822-1.538)	1.163 (.978-1.383)	.994 (.814-1.213)
Confidence	<b>1.432 (1.167-1.758)</b>	<b>1.370 (1.092-1.718)</b>	<b>1.484 (1.301-1.693)</b>	<b>1.360 (1.174-1.575)</b>

Note: \*Adjusted for child's gender, age, ethnicity, deprivation, and parent's physical activity. **Bold** numbers represent statistical significance  $p < .05$

The crude associations between young people's overall physical literacy and the different parent volunteer variables were significant for all eight models. The crude associations between each variable for young people's physical literacy and the different parent volunteer variables were significant for all eight models, with three exceptions (See Table 9). Specifically, the 'opportunity' and 'knowledge' crude and adjusted associations were not significant among parents who volunteered for less than 60 minutes in the last 7 days. Furthermore, among parents who have volunteered for more than 61 minutes, only 'knowledge' crude [OR = 1.163 (.978-1.383)] and fully adjusted [Adjusted OR = .994 (.814-1.213)] associations were not significant (See Table 9, Model 8).

After adjusting the models for young people's sociodemographic factors (gender, age, ethnicity, and deprivation) and parent's physical activity levels, there was no change to the significance of the crude associations between parent volunteering in sport and young people's overall physical literacy development. Although the majority of the crude and adjusted associations were significant for the different parent volunteer variables and each of the physical literacy components, there was one occasion where the crude analysis was statistically significant, but this association disappeared in the fully adjusted model (See Table 6, p. 43). Specifically, the crude association for parent volunteered in the last 7 days and the physical literacy component of 'knowledge' [OR = 1.163 (1.001-1.353)] was significant, however, the fully adjusted association was not significant [Adjusted OR = 1.028 (.864-1.224)].

The adjusted results indicate that parent who have volunteered in the last 12 months, have 85.2% higher odds of having a high physically literate young person. Whereas, a parent who volunteered in the last 7 days, have 45.6% higher odds of

having a high physically literate young person. Even more so, if a parent volunteered in the one role, they have 59.6% higher odds of having a high physically literate young person. In comparison to a parent who volunteered in more than one role, has 2.19 times the odds of having a high physically literate young person. Parents who volunteer in high level roles, have 98.5% higher odds of having a high physically literate young person. While, parents who volunteer in moderate level roles, have 67.7% higher odds of having high physically literate young person. Lastly, parents who volunteer for more than 61 minutes in the last 7 days, have 47.2% higher odds of having a high physically literate young person, compared to 29.5% higher odds for parents who volunteered for less than 60 minutes.

Of all the physical literacy components, ‘encouraged’ appeared to have the strongest association with parent volunteering across the majority of the adjusted models. This also appears to be a “dose-response” relationship between overall child physical literacy and parent volunteering, according to ‘role’, ‘level’ and ‘duration’ (i.e., higher *intensity* parent volunteering associated with higher child physical literacy). This also appeared to be the case for the majority of the physical literacy components and parent volunteering according to ‘role’ and ‘level’. However, the “dose response” relationship appears to be reversed for several of the physical literacy components according to parent volunteering ‘duration’ (i.e., more than 61 minutes of parent volunteering had a reduced odds of high child ‘encourage’, ‘competence’, and ‘motivation’ when compared to only 1 – 60 minutes of parent volunteering). Similarly, although child physical literacy was positively associated with parent volunteering in the past 7 days, the odds were greater for parent volunteering in the last 12 months.

This also provides some indication of a reverse “dose-relationship” as parent volunteering *intensity* increases.

## Chapter 4

### **DISCUSSION AND CONCLUSION**

The current study presents information from the Sport NZ Active NZ adult and young people surveys. The purpose of this study was to examine the association between different parent volunteer variables (days, months, roles, levels, and duration) in sport and overall physical literacy outcomes of their children, including each of the physical literacy components. Findings from this study indicate that increasing measures of parent volunteering in general is associated with higher overall physical literacy scores among young people. This means that parent volunteering is mostly good for young people and their growth of physical literacy development within the sport system. All young people's overall physical literacy scores were significant for all eight (crude and adjusted) models. As parent volunteering increased from one role to multiple roles, moderate to high volunteer levels, or less than sixty minutes to more than sixty minutes, young people have higher odds of having a higher overall physical literacy score.

This trend was visible through all models, except for parent volunteered in the last seven days or twelve months. The data showed that parents who reported volunteering in the last twelve months had higher odds of having high physically literate children when compared to parents who reported volunteering in the last seven days. This may be due to the lower sample size of just less than eighteen percent of adults who have volunteered in the last seven days compared to almost half of the sample size reported volunteered in the last twelve months. It could be proposed that parents volunteer at least once each year (whether it is within the week or within the year) is enough to support improved growth of physical literacy outcomes for young

people through sport. Although parent volunteering in the past seven days was still positively associated with physical literacy of the child it was weaker than just volunteering in the past twelve months. This suggests higher *frequency* of parent volunteering may be a critical factor in ‘over-involvement’. Weekly volunteering is still considered good, however there is a downward trajectory with more *frequent* volunteering (Hellstedt, 1987; Stein et al., 1999; Wolfenden & Holt, 2005).

Overall, parents that volunteer their time in sport appeared to have children with higher physical literacy development. However, it is critical to identify the point when some parent volunteers become ‘over-involved’, as these parents can show signs of excessive involvement in ones sporting experience and often causing negative experiences (Hellstedt, 1987). The measures used in this study may have been too broad to assess the ‘over-involved’ group of parents or the way we grouped the large dataset may have “drowned out” the ‘over-involved’ parents. But there were signs of the negative effect of ‘over-involved’ according to *frequency* of volunteering, but more importantly within certain components of physical literacy for ‘duration’ of volunteering, such as ‘encourage’, ‘competence’, ‘motivation’, and ‘confidence’. There were also signs of negative effects found in physical literacy for ‘high levels’ of volunteering, such as ‘knowledge’ and ‘confidence’. ‘Duration’ and ‘high levels’ were the only volunteer types to show signs of decrease in child physical literacy as parent volunteering increased. This suggests that the ‘duration’ and ‘high levels’ of volunteering may be the critical factors in becoming ‘over involved’. More mixed method research is needed to identify genuinely ‘over-involved’ parents in sport and the holistic development outcomes of young people. My previous dissertation proposal

was designed to explore this more using a mixed methods approach. Refer to Appendix A.

Additionally, young people's physical literacy component scores for 'encourage', 'competence', 'opportunity', 'motivation', 'knowledge', and 'confidence' were significant for the majority of the eight (crude and adjusted) models. Of all physical literacy components, 'encourage: people in my life encourage me to take part in physical activity' appeared to have the highest odds ratios in adjusted analyzes for models 2 through 6 (months, by roles, and by levels) (See Tables 6-8). This finding was supported through previous research which suggests that parents are key influencers as the primary socializing agent as they encourage and initiate children's and young people's sport participation (Brustad, 1996; Fredrick & Eccles, 2005; Howard & Madrigal, 1989; Walters et al., 2010; Wuerth et al., 2004). However, this trend was not the case for model 7 or 8 measuring parent volunteered 'duration' which suggests that, relative to other components of physical literacy, other volunteering factors (e.g., volunteer role) are more important for a child feeling 'encouraged', such as 'motivation' and 'opportunity'. Similarly, model 1 indicates that volunteering in the past seven days is less important for a child feeling 'encouraged' than it is for other components of child physical literacy development (e.g., motivation).

Additionally, 'opportunity' had no association with parents who have volunteered less than sixty minutes per week but as parent volunteering increased to more than sixty minutes young people scores moved from scoring highest on 'motivation' to highest in 'opportunity'. This may be that individuals whose parents volunteer weekly for more than sixty minutes provide young people with more

opportunities to participate in physical activity and sport and the flow on effects to physical literacy. Furthermore, we found ‘knowledge: I understand why taking part in physical activity is good for me’ had no association with ‘duration’ or ‘volunteered in the last seven days’. This is interesting because as volunteering increased, ‘knowledge’ remained not significant. Further research exploring physical literacy development and each of its components (particularly young people’s ‘confidence’ and ‘knowledge’) will be useful for future research program planning targeted at young people’s holistic development.

A unique aspect of this research is the exploration of families in sport, such as parent volunteering and young people’s development. The intergenerational lens on youth development in sport should be more widely used in future research, especially when the sport system is partially run by parent volunteers. It is recommended that more family approaches are used when developing, delivering, and evaluating youth programs, parent education programs and volunteer workshops/certificates.

Some methodological limitations regarding the present study should be considered. Firstly, this research is cross-sectional in design, as this study provided data from adults and young people at a single point in time. Although, cross sectional design benefits allowed this research to compare many different variables at the same time, there are limitations as this design may not provide definite information about cause-and-effect relationships. This study only allows a snapshot of a single moment in time. Therefore, we cannot know for sure if young people with high physical literacy were more likely to have parents who volunteer, or if parents who volunteer are more likely to have high physical literate children (i.e., the direction of causation cannot be determined from this analysis alone). Longitudinal data would be beneficial

to detect changes in parent influence over time and capture young people's different developmental needs as they move through different age stages in the sport environment.

Secondly, although this research was able to measure different parent volunteer variables, these surveys did not have measures indicating the quality (attitudes and behaviors) of parent volunteering. It would have been interesting to gather more specific information on parent volunteer behaviors and attitudes towards young people and their quality experiences. Particularly, examining what behavior and attitudes are associated with decreased participation and physical literacy. Conducting a qualitative study with interviews of both parents and their children may provide us with more information about their different experiences and perspectives. For example, parents' perspectives of their child's experience in sport versus child's perspective of their parents' involvement in sport; or young people's perspectives on whether they want their parents to volunteer in their sport experience. Initially we planned to explore this more in my previous piece of research analyzing U.S. children's perspectives of their parent's involvement levels and behaviors related to their participation in sport and children's confidence. However, due to the disruption of the COVID-19 global pandemic I couldn't answer some of these questions.

Thirdly, the sum score indicating high and low physical literacy development has not been validated in previous research. However, the concept of physical literacy development and each of its components is well known internationally (International Physical Literacy Association, 2021) and the component questions have all been face validated with cognitive testing for each of the individual sub-constructs. The validation of the physical literacy score is currently underway and the initial results are

positive (unpublished data). Furthermore, despite statistically significant results, it is difficult to estimate the full holistic development findings of physical literacy development. Greater understanding of physical literacy is needed and it is recommended that Sport NZ develop a more comprehensive set of physical literacy questions in future young people surveys to gain greater insights for future youth development research. Sport NZ is already reacting to this recommendation and developing a more comprehensive physical literacy tracking tool.

It should also be noted that almost seventy percent of the sample in this study reported being European and almost half of the parents in this study reported earning a household income of over \$100,000 per year (i.e., likely to be classified as middle to upper class). This limits the diversity in the responses from the participants in this study. Neskola et al. (2021) acknowledged the lack of physical literacy development literature of Indigenous/native people. This dissertation highlights the importance of volunteering in general for all young people, however it is recommended that further research is conducted to explore the experiences of Maori (indigenous people of NZ) young people, parents, and families to determine whether or not parenting volunteering is even more important for indigenous young people, as well as, a similar piece of work for Pacific Islander families. More research on the associations of social economic status, gender, and ethnicity in young people's sport participation and subsequently physical literacy development could provide greater insights for future family research in youth sport. For example, who are the families playing sport, what type of parents/families are involved, at what level are they involved, and how does this influence young people's experiences and physical literacy development through sport.

Another limitation of this study may be that the majority of parents in this study were not parent volunteers in the last seven days. It may be that parents actually have volunteered recently but did not specifically in the last week (i.e., if parents completed the survey in winter and it was raining that week, their training and games may have been cancelled).

Despite these limitations noted, the present study has a number of strengths that further the current body of literature on research on young people's physical literacy development in sport. Recently, most of the studies that exists on this topic are qualitative studies of small teams, individual sports, or the focus is on elite athletes (as cited by Fraser-Thomas et al., 2005; Knight & Holt, 2014; Wolfenden & Holt, 2005). The findings from this study is from a large national sample of young people and their parents from across the country of NZ, who participate in a variety of sport contexts (in school, in physical education, in sport clubs etc.). Thus, these results can be more generalizable than previous work and can provide an important baseline understanding about family members involved in the youth sport system. This dissertation provides critical information and data on the relationship between parent volunteering in sport and physical literacy development of young people. The linking of such a large data set relative to national population at the household level is internationally unique and provided the opportunity for this robust analysis between parent behavior and child development.

Additionally, a notable strength of this research was the range of parent volunteer measures utilized to explore parent volunteering in different ways. Acknowledging that parent volunteering can look different in different sport codes and in different positions/roles, this study explored the multiple layers of parent

volunteering in sport. Although the majority of findings appeared to be significant across all parent volunteer variables, the nuanced results in relation to dose-responses for different variables revealed the importance of understanding parent volunteering in more depth and how it is associated with young people's participation and development through sport. The concept that parents contribute to young people's development of physical literacy is supported by Whitehead (2010), such that opportunities that parents/family members provide and the attitudes towards physical activity continue to be important in developing activity patterns and shaping young people's views on the value of participation. Overall volunteering is good and should be encouraged. Although it is important to note that high volunteering and 'over-involved' parents are different to each other. This research also contributes to current parent volunteer trends in sport and association with young people's physical literacy development.

More research and interventions that value and support family involvement in physical activity are warranted (Smith et al., 2018). This research was conducted to help inform decision-makers develop, deliver, and evaluate family focused program development, parent education modules, and possibly future family policy in sport for young people.

### **Conclusion**

In conclusion, parent volunteering is valuable in multiple ways. These results demonstrate for the first time that young people's physical literacy development is associated with parent volunteering in sport in NZ. More parent volunteering in general is better for young people within the same household, however we believe this does not capture the risks associated with over-involved parents. Secondly, we have

captured a group of parent-child dyads involved in the NZ sport system which provides a baseline of understanding the parent and young people interactions, as well as the different types of volunteering in the sport environment. It is important to consider the family 'as a whole unit' to support and provide better quality experiences for their child involved in sport. Better quality experiences can lead to developing a lifelong love for being active (Sport NZ, 2021). Research on the role of parenting in youth sport continues to expand, I have identified several areas of research that requires further attention from scholars. This study adds a different perspective towards promoting a family approach to increasing physical activity and positive developmental outcomes for young people involved in the youth sport system. More investment in family focused research to prioritize youth development in sport is needed. The challenge for many policy makers, sport organizations, parents, and volunteers is to provide a positive environment for all young people to gain a quality experiences rather than negative experiences in sport. This is particularly challenging for parent volunteers. Parents need to play an active role in supportive volunteer levels and influence in sport and in life. Sport is a context worth exploring more to encourage empowering young people, parents, and families to positively influence child development and experiences through sport.

## REFERENCES

- Allan, V., Turnnidge, J., & Cote, J. (2017). Evaluating approaches to physical literacy through the lens of positive youth development. *Quest*, *69*(4), 515-530. doi: 10.1080/00336297.2017.1320294
- Aspen Institute. (2015). Physical Literacy in the United States. Society of Health and Physical Educators. [https://www.shapeamerica.org/uploads/pdfs/PhysicalLiteracy\\_AspenInstitute-FINAL.pdf](https://www.shapeamerica.org/uploads/pdfs/PhysicalLiteracy_AspenInstitute-FINAL.pdf)
- Audrain-McGovern, J., Rodriquez, D., Wileyto, P., Schmitz, K. H., & Shields, P. G. (2006). Effect of team sport participation on genetic predisposition to adolescent smoking progression. *Archives of General Psychiatry*, *63*, 433–41. doi: 10.1001/archpsyc.63.4.433
- Babiss, L. A., & Gangwisch, J. E. (2009). Sports participation as a protective factor against depression and suicidal ideation in adolescents as mediated by self-esteem and social support. *Journal of Developmental & Behavioral Pediatrics*, *30*(5), 376-384. doi: 10.1097/DBP.0b013e3181b33659
- Barber, B. L., Eccles, J. S., & Stone, M. R. (2003). What happened to the Jock, the Brain, and the Princess? Young adult pathways link to adolescent activity involvement and social identity, *Journal of Adolescent Research*, *16*, 429–55. <https://doi.org/10.1177/0743558401165002>
- Bronfenbrenner, U. (1999). Environments in developmental perspective: Theoretical and operational models. In S. L. Friedman & T. D. Wachs (Eds.), *Measuring environment across the life span: Emerging methods and concepts* (pp. 3–28). American Psychological Association. <https://doi.org/10.1037/10317-001>
- Brown, D. R., & Blanton, C. J. (2002). Physical activity, sports participation, and suicidal behavior among college students. *Medicine and Science in Sports and Exercise*, *34*, 1087–96. doi: 10.1097/00005768-200207000-00006
- Brustad, R. J. (1996). Attraction to physical activity in urban schoolchildren: Parental socialization and gender influences. *Research quarterly for exercise and sport*, *67*(3), 316-323. doi: 10.1080/02701367.1996.10607959
- Cote, J. (1999). The influence of the family in the development of talent in sport. *Sport Psychologist*, *13*, 395 – 417. <https://doi.org/10.1123/tsp.13.4.395>

- Dworkin, J. B., Larson, R., & Hansen, D. (2003). Adolescents' accounts of growth experiences in youth activities. *Journal of Youth and Adolescence*, 32(1), 17-26. <https://doi.org/10.1023/A:1021076222321>
- Environmental Health Intelligence NZ. (2021). [www.ehinz.ac.nz/indicators/population-vulnerability/socioeconomic-deprivation-profile/#Ref1](http://www.ehinz.ac.nz/indicators/population-vulnerability/socioeconomic-deprivation-profile/#Ref1)
- Fraser-Thomas, J.L., Cote, J., & Deakin, J. (2005). Youth sports programs: An avenue to foster positive youth development. *Physical Education and Sport Pedagogy*, 10, 19-40. <https://doi.org/10.1080/1740898042000334890>
- Gemba. (2015). *Sport New Zealand Volunteering insights report*. Sport New Zealand. [https://www.srknowledge.org.nz/wp-content/uploads/2016/09/Gemba\\_Sport-NZ-Volunteer-Report\\_260916\\_vUPDATEDFINAL.pdf](https://www.srknowledge.org.nz/wp-content/uploads/2016/09/Gemba_Sport-NZ-Volunteer-Report_260916_vUPDATEDFINAL.pdf)
- Giblin, S., Collins, D., & Button, C. (2014). Physical literacy: Importance, assessment and future directions. *Sports Medicine*, 44(9), 1177-1184. doi: 10.1007/s40279-014-0205-7
- Gould, D., & Carson, S. (2008). Life skills development through sport: Current status and future directions. *International Review of Sport and Exercise Psychology*, 1, 58 – 78. <https://doi.org/10.1080/17509840701834573>
- Hansen, D. M., Larson, R. W., and Dworkin, J. B. (2003). What adolescents learn in organized youth activities: A survey of self-reported developmental experiences, *Journal of Research on Adolescence*, 13, 25–55. <https://doi.org/10.1111/1532-7795.1301006>
- Harwood, C. G., & Knight, C. J. (2015). Parenting in youth sport: A position paper on parenting expertise. *Psychology of sport and exercise*, 16(1), 24-35. <https://doi.org/10.1016/j.psychsport.2014.03.001>
- Hellstedt, J. C. (1987). The coach/parent/athlete relationship. *The Sport Psychologist*, 1, 151-160.
- Hellstedt, J. C. (1990). Early adolescent perceptions of parental pressure in the sport environment. *Journal of Sport Behavior*, 13, 135 – 144.
- Hellstedt, J. C. (2000). Family systems–based treatment of the athlete family. In D. Begel & R. Burton (Eds.), *Sport psychiatry: Theory and practice* (pp. 206 – 228). New York: Norton.

- Hellstedt, J. C. (2005). Invisible players: A family systems model. *Clinics in Sports Medicine*, 24, 899 – 928. <https://doi.org/10.1016/j.csm.2005.06.001>
- Higgs, C. (2010). Physical literacy: Two approaches, one concept. *Physical & Health Education Journal*, 76(1), 1-3.
- Holt, N. L., & Sehn, Z. L. (2008). Processes associated with positive youth development and participation in competitive youth sport. In Holt, N. L. (Eds), *Positive Youth Development Through Sports* (pp. 24-33). New York: NY
- Holt, N. L., Sehn, Z. L., Spence, J. C., Newton, A., & Ball, G. D. C. (2012). Possibilities for positive youth development through physical education and sport programs at an inner city school. *Physical Education and Sport Pedagogy*, 17, 97-113.
- Howard, D. R., & Madrigal, R. (1989). Who makes the decision: The parent or the child? The perceived influence of parents and children on the purchase of recreation services. *Journal of Leisure Research*, 22(3), 244-258. <https://doi.org/10.1080/00222216.1990.11969828>
- International Physical Literacy Association. (2021 July). <https://www.physical-literacy.org.uk>
- Knight, C. J., & Holt, N. L. (2014). Parenting in youth tennis: Understanding and enhancing children's experiences. *Psychology of Sport and exercise*, 15(2), 155-164. <https://doi.org/10.1016/j.psychsport.2013.10.010>
- Kocayörük, E., Altıntaş, E., & İçbay, M. A. (2015). The perceived parental support, autonomous-self and well-being of adolescents: A cluster-analysis approach. *Journal of Child and Family Studies*, 24(6), 1819-1828. <https://doi.org/10.1007/s10826-014-9985-5>
- Larson, R. W. (1994). Youth organizations, hobbies, and sports as developmental contexts. In R. K. Silbereisen, & E. Todt (Eds.), *Adolescence in context: The interplay of family, school, peers, and work in adjustment* (pp. 46–65). New York: Springer.
- Lowe Vandell, D., Shernoff, D. J., Pierce, K. M., Bolt, D. M., Dadisman, K., & Brown, B. B. (2005). Activities, engagement, and emotion in after-school programs. *New Directions for Youth Development* (pp. 121-129). San Francisco: Jossey-Bass.
- Marsh, H. W., & Kleitman, S. (2003). School athletic participation: Mostly gain with little pain. *Journal of Sport and Exercise Psychology*, 25(2), 205-228.

- Miller, K. E., Sabo, D. F., Farrell, M. P., Barnes, G. M., & Melnick, M. J. (1998). Athletic participation and sexual behavior in adolescents: the different worlds of girls and boys. *Journal of Health and Social Behavior*, 39(2), 108–23.
- Ministry of Health NZ. (2021, January). *Physical Activity*.  
<https://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity#kids>
- Nesdoly, A., Gleddie, D., & McHugh, T. F. (2021). An exploration of indigenous peoples' perspectives of physical literacy. *Sport, Education and Society*, 26(3), 295-308. <https://doi.org/10.1080/13573322.2020.1731793>
- New Zealand Legislation. (2021, September). *Sport and Recreation New Zealand Act 2002, section 8(c)*.  
<https://www.legislation.govt.nz/act/public/2002/0038/latest/whole.html>
- Nielsen. (2018). *Active NZ 2017 Participation Report*. Sport New Zealand.  
<https://sportnz.org.nz/media/1512/active-nz-2017-technical-report.pdf>
- Nielsen. (2019). *Active NZ and Active NZ Young People: Technical report for data collection in 2018*. Sport New Zealand.  
<https://sportnz.org.nz/media/1468/active-nz-technical-report-2018.pdf>
- Physical Literacy. (2021, June 22). What is physical literacy? *Physical Literacy*.  
<https://physicalliteracy.ca/physical-literacy>
- Pomerantz, E. M., & Thompson, R. A. (2008). Parents' role in children's personality development: The psychological resource principle. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 351–374). The Guilford Press.
- Richman, E. L., & Shaffer, D. R. (2000). “If you let me play sports”: how might sport participation influence the self-esteem of female adolescents? *Psychology of Women Quarterly*, 24, 189-99. doi: 10.1111/j.1471-6402.2000.tb00200.x
- Roetert, E. P., & Jefferies, S. C. (2014). Embracing physical literacy. *Journal of Physical Education, Recreation and Dance*, 85(8), 38-40. doi: 10.1080/07303084.2014.948353
- Rudd, J. R., Pesce, C., Strafford, B. W., & Davids, K. (2020). Physical literacy – A journey of individual enrichment: An ecological dynamics rationale for enhancing performance and physical activity in all. *Frontiers in Psychology*, 11(1904), 1-13. <https://doi.org/10.3389/fpsyg.2020.01904>

- Schwebel, F. J., Smith, R. E., & Smoll, F. L. (2016). Measurement of perceived parental success standards in sport and relations with athletes' self-esteem, performance anxiety, and achievement goal orientation: Comparing parental and coach influences. *Child Development Research*, 2016, 1-13.  
<https://doi.org/10.1155/2016/7056075>
- Scott, J. J., Hill, S., Barwood, D., & Penney, D. (2021). Physical literacy and policy alignment in sport and education in Australia. *European Physical Education Review*, 27(2), 328-347. <https://doi.org/10.1177/1356336X20947434>
- Sigelman, C. A., Rider, E. A., & De George-Walker, L. (2013). Life span human development (Australia and New Zealand ed.). South Melbourne, Vic.: Cengage Learning.
- Smith, S. R., & Hamon, R. R. (2012). *Exploring family theories* (3rdEd.). New York: Oxford University Press.
- Smith, M., Ikeda, E., Hinckson, E., Duncan, S., Maddison, R., Meredith-Jones, K., Walker, C., & Mandic, S. (2018). *New Zealand's 2018 Report Card on Physical Activity for Children and Youth*. Auckland, New Zealand: The University of Auckland. doi: 10.17608/k6.auckland.7295882
- Sport New Zealand (2019). *Active NZ 2018 Participation Report*. Wellington: New Zealand. <https://sportnz.org.nz/media/1440/published-final-active-nz-main-report-the-new-zealand-participation-survey-2018-12-august-2019.pdf>
- Sport New Zealand. (2020, November). *Physical Literacy approach*. [https://sportnz.org.nz/media/4232/physical-literacy-1\\_5.pdf](https://sportnz.org.nz/media/4232/physical-literacy-1_5.pdf)
- Sport New Zealand. (2015). *Sport New Zealand's Physical Literacy Approach*. [Booklet]. <https://www.sporttaranaki.org.nz/assets/Uploads/2015-SportNZ-Physical-Literacy-Approach2.pdf>
- Sport New Zealand. (2021, September) *Te Tiriti o Waitangi: Treaty of Waitangi*. <https://sportnz.org.nz/kaupapa-maori/te-tiriti-o-waitangi>
- Sport New Zealand. (2021, January) *The three approaches: a guide to creating a better quality experiences for participants*. [http://sportnz.org.nz/media/4222/three-approaches-9\\_11.pdf](http://sportnz.org.nz/media/4222/three-approaches-9_11.pdf) (sportnz.org.nz)
- Sport New Zealand. (2021, January). *The Value of Sport report*. <https://sportnz.org.nz/resources/the-value-of-sport>

- Sport New Zealand (2021, January). *Young People Plan*.  
<https://sportnz.org.nz/resources/young-people-plan>
- Statistics New Zealand. (2021, January). *Estimated population of NZ*.  
<https://www.stats.govt.nz/indicators/population-of-nz>
- Stein, G. L., Raedeke, T. D., & Glenn, S. D. (1999). Children's perceptions of parent sport involvement: It's not how much, but to what degree that's important. *Journal of Sport Behavior*, 22, 591 – 601.
- Trost, S. G., Sallis, J. F., Pate, R. R., Freedson, P. S., Taylor, W. C., & Dowda, M. (2003). Evaluating a model of parental influence on youth physical activity. *American Journal of Preventive Medicine*, 25(4), 277–282.  
[https://doi.org/10.1016/s0749-3797\(03\)00217-4](https://doi.org/10.1016/s0749-3797(03)00217-4)
- Volunteering New Zealand. (2020). *State of Volunteering Report 2020*. Volunteering New Zealand. [https://www.volunteeringnz.org.nz/wp-content/uploads/F\\_SOV-Report2020\\_Single-Pages\\_1July.pdf](https://www.volunteeringnz.org.nz/wp-content/uploads/F_SOV-Report2020_Single-Pages_1July.pdf)
- Walters, S. R., Payne, D., Schluter, P. J., Thomson. (2010). It's all about winning, isn't it? Competing discourses in children's sport in New Zealand. *European Journal for Sport and Society*, 7(2), 105-116.  
<https://doi.org/10.1080/16138171.2010.11687849>
- Weiss, M. R., & Fretwell, S. D. (2005). The parent-coach/child-athlete relationship in youth sport: Cordial, contentious, or conundrum? *Research Quarterly for Exercise and Sport*, 76(3), 286-305. doi: 10.1080/02701367.2005.10599300
- Whitehead, M. (2001). The concept of physical literacy, *European Journal of Physical Education*, 6(2), 127-138. <https://doi.org/10.1080/1740898010060205>
- Whitehead, M. (2010). Promoting physical literacy within and beyond the school curriculum. In M, Whitehead (Eds.), *Physical literacy: Throughout the lifecourse* (pp. 157-174). New York, NY: Routledge.
- Whitehead, M. (2013). Definition of physical literacy and clarification of related issues. *ICSSPE Bulletin*, 65, 29-33.
- Wolfenden, L. E., & Holt, N. L. (2005). Talent development in elite junior tennis: Perceptions of players, parents, and coaches. *Journal of Applied Sport Psychology*, 17, 108-126. <https://doi.org/10.1080/10413200590932416>
- World Health Organization. (2021, July 13). *Physical Activity*.  
<https://www.who.int/news-room/fact-sheets/detail/physical-activity>

- World Health Organization. (2020). *WHO Guidelines on Physical Activity and Sedentary Behavior*.  
<https://apps.who.int/iris/bitstream/handle/10665/336656/9789240015128-eng.pdf>
- Wuerth, S., Lee, M. J., & Alfermann, D. (2004). Parental involvement and athletes' career in youth sport. *Psychology of Sport and Exercise*, 5, 21-33.  
[https://doi.org/10.1016/S1469-0292\(02\)00047-X](https://doi.org/10.1016/S1469-0292(02)00047-X)
- Young, L., O'Connor, J., & Alfrey, L. (2020). Physical literacy: a concept analysis. *Sport, Education and Society*, 25(8), 946-959.  
<https://doi.org/10.1080/13573322.2019.1677586>

## **Appendix A**

### **EXPLANATION OF PREVIOUS RESEARCH**

Initial research used a convenience sample of American young people (aged 8 – 14 years old) who were participating in organized sport in 2018 and in 2020. Coaches and organizations were sent a recruitment flyer to distribute to their team. If parents were interested in their child participating, the confidential survey link was sent electronically. Data was collected through the use of confidential online Qualtrics surveys. Youth participants were asked to give information about their age, gender and ethnicity. They also responded to a qualitative item asking, “What organized sport do you play?” Participants were asked to circle their response on, “Who is most involved in your organized sport participation?” (For example: mom, dad, stepmom, stepdad, guardian, or other). Participants were also asked to respond to a qualitative item asking, “What role does this person play in your sport participation?” Each participant was asked to think about the person who is most involved in their sport when answering the questions from the Perceived Parental Influence Scale developed by Babkes & Weiss (1999). These items specifically focused on children’s perceptions of their parents’ involvement levels and behaviors related to their participation in organized sport, such as, parent involvement levels (low to high), perceived contingent responses (positive and negative) and pressure (low to high).

To measure children’s confidence, they were assessed using a measure that was created by the 4-H Study of Positive Youth Development (Lerner et al, 2005). This measure assessed participants’ self-ratings of two constructs: 1) an overall internal sense of self-efficacy (Benson et al., 1998; Theokas et al., 2005); and 2) an

overall internal sense of self-worth (Harter, 1983). These two scales were to be combined to create a confidence score by adding scores from each scale together.

The aim was to examine parental involvement levels in sport and children's confidence outcomes, as well as what factors moderate these associations (e.g., pressure, positive contingent responses, and negative contingent responses). A total of 34 participants completed the survey, however, 13 surveys were ruled as incomplete due to missing data. Therefore, a total of 21 participants completed the survey and assent form (along with parental consent signed). Unfortunately, recruitment for more participants came to a pause due to COVID 19. Also, the number of participants was not enough to continue with the analysis piece of this research. Therefore, this original piece of research was put aside to complete at another stage. Results from this original research were intended to provide a more comprehensive understanding of how the quality of parental involvement influences children's confidence and provide much needed information about the wellbeing and needs of children involved in sport in America.

## Appendix B

### ADULT VOLUNTEER SURVEY QUESTION

#### Section F: Volunteering

*This section is about any volunteering you have done for a sport, exercise or recreation activity.*

**Q43** Have you **volunteered** in any of the following ways for a **sport, exercise or recreation activity** in the last **7 days or 12 months**?

	<i>Please tick <u>all</u> that apply</i>	
	7 days	12 months
Coached or instructed a team or group	<input type="checkbox"/>	<input type="checkbox"/>
Coached or instructed an individual	<input type="checkbox"/>	<input type="checkbox"/>
Official (e.g. referee, umpire, scorer)	<input type="checkbox"/>	<input type="checkbox"/>
Team manager	<input type="checkbox"/>	<input type="checkbox"/>
Club administration	<input type="checkbox"/>	<input type="checkbox"/>
Governance role at a club or association (e.g. board member)	<input type="checkbox"/>	<input type="checkbox"/>
Helper for a team, club or group (e.g. on call contact, group leader, guide)	<input type="checkbox"/>	<input type="checkbox"/>
Event assistance (e.g. race marshal)	<input type="checkbox"/>	<input type="checkbox"/>
Activity helper (e.g. building / maintenance of a location)	<input type="checkbox"/>	<input type="checkbox"/>
Lifeguard	<input type="checkbox"/>	<input type="checkbox"/>
Team captain or activity leader (e.g. kapa haka leader)	<input type="checkbox"/>	<input type="checkbox"/>
OR I have not done any of the above in the last 12 months <input type="checkbox"/>		

Figure 4 Question 43b. Volunteering in the last 12 months (Nielson, 2019).

**Q46** Please answer this question if you have volunteered in the last 7 days. Otherwise go to Q100.

Thinking about the volunteering you have done in the last **7 days**, how many hours have you spent volunteering? *Please think only about volunteering done for at least 10 minutes at a time. Please make your best estimate.*

hours

Figure 5 Question 46. Volunteering duration in the last 7 days (Nielson, 2019).

**Q19** Still thinking about the physical activities you have done in the last **7 days** (as listed on the previous page), **in total** how many hours did you spend being **physically active** for **sport, exercise or recreation**?

  
hours

*Please think only about those physical activities done for at least 10 minutes at a time.  
Please make your best estimate.*

Figure 6 Question 19. Parent Physical activity in the last 7 days (Nielson, 2019).

## Appendix C

### YOUNG PEOPLE PHYSICAL LITERACY SURVEY QUESTION

#### YOUR ATTITUDES TOWARDS PHYSICAL ACTIVITY

The next few questions are about what **you think or feel**. Some people enjoy being physically active for sport, PE, exercise or fun, while others like doing different things. Please tell us how **you** feel and what you think. There are no wrong answers.

Q39a Please select a box on each line to show how much you agree or disagree with each statement. [Single answer]

	Disagree a lot	Disagree a little	Neither disagree or agree	Agree a little	Agree a lot
(R1) <b>(ALL)</b> I <like/liked> PE or fitness classes at school	1	2	3	4	5
(R2) <b>(ALL)</b> People in my life encourage me to take part in physical activities.....	1	2	3	4	5
(R3) <b>(12 plus)</b> I like to do the physical activities that my friends do .....	1	2	3	4	5
(R4) <b>(12 plus)</b> Exercise is an important part of my regular routine.....	1	2	3	4	5
(R5) <b>(12 plus)</b> I love challenging myself and trying to win .....	1	2	3	4	5
(R6) <b>(ALL)</b> I like being physically active .....	1	2	3	4	5
(R7) <b>(12 plus)</b> I enjoy tough physical activity.....	1	2	3	4	5
(R8) <b>(12 plus)</b> I like my parents/family to be involved in my sport and physical activities.....	1	2	3	4	5
(R9) <b>(12 plus)</b> I find electronic games more exciting to play than the real life ones .....	1	2	3	4	5
(R10) <b>(ALL)</b> I like school .....	1	2	3	4	5
(R11) <b>(15-17)</b> I prefer physical activities that allow me to follow my own schedule rather than someone else's	1	2	3	4	5
(R12) <b>(15-17)</b> I prefer to do physical activity that is more flexible and less structured.....	1	2	3	4	5
(R14) <b>(ALL)</b> Sport and other physical activities give me confidence	1	2	3	4	5
(R15) <b>(ALL)</b> I am good at lots of different physical activities	1	2	3	4	5
(R16) <b>(ALL)</b> I have the chance to do the physical activities I want.....	1	2	3	4	5
(R17) <b>(ALL)</b> I want to take part in physical activities.....	1	2	3	4	5
(R18) <b>(ALL)</b> I understand why taking part in physical activity is good for me.....	1	2	3	4	5
(R19) <b>(ALL)</b> I feel confident to take part in lots of different activities .....	1	2	3	4	5

Figure 7 Question 39a. Young people attitudes towards physical activity (Nielson, 2019).

## Appendix D

### IRB EXEMPTION NOTIFICATION

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**Institutional Review Board**  
2108H Hallsboro Hall  
Newark, DE 19716  
Phone: 302-831-2137  
Fax: 302-831-2828

DATE: April 13, 2021

TO: Lara Andrews  
FROM: University of Delaware IRB

STUDY TITLE: [1741100-1] Whanau (Families) in sports: Parent volunteering in sports and children's physical activity participation and physical literacy development.

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS  
EFFECTIVE DATE: April 13, 2021

REVIEW CATEGORY: Exemption category # (4)

Thank you for your New Project submission to the University of Delaware Institutional Review Board (UD IRB). According to the pertinent regulations, the UD IRB has determined this project is EXEMPT from most federal policy requirements for the protection of human subjects. The privacy of subjects and the confidentiality of participants must be safeguarded as prescribed in the reviewed protocol form.

This exempt determination is valid for the research study as described by the documents in this submission. Proposed revisions to previously approved procedures and documents that may affect this exempt determination must be reviewed and approved by this office prior to initiation. The UD amendment form must be used to request the review of changes that may substantially change the study design or data collected.

Unanticipated problems and serious adverse events involving risk to participants must be reported to this office in a timely fashion according with the UD requirements for reportable events.

A copy of this correspondence will be kept on file by our office. If you have any questions, please contact the UD IRB Office at (302) 831-2137 or via email at [hsrb-research@udel.edu](mailto:hsrb-research@udel.edu). Please include the study title and reference number in all correspondence with this office.

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**INSTITUTIONAL REVIEW BOARD**

[www.udel.edu](http://www.udel.edu)

## Appendix E

### CITI PROGRAM CERTIFICATE



Completion Date 15-Nov-2018  
Expiration Date 14-Nov-2021  
Record ID 24251263

This is to certify that:

**Lara Andrews**

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

**Course In The Protection Human Subjects**

(Curriculum Group)

**Human Subjects Protections - Social-Behavioral-Educational Focus - All UD Researchers/Faculty/Staff**

(Course Learner Group)

**1 - Basic Course**

(Stage)

Under requirements set by:

**University of Delaware**



Verify at [www.citiprogram.org/verify/?wd7f64aba-589c-41e2-bef1-a7ba5f8d299e-24251263](http://www.citiprogram.org/verify/?wd7f64aba-589c-41e2-bef1-a7ba5f8d299e-24251263)

## Appendix F

### DATA SHARING AGREEMENT



#### Sport NZ Data use and non-disclosure agreement

##### Purpose

Sport New Zealand (Sport NZ) and the Data User (together the parties) agree to enter into this agreement setting out the terms on which Sport NZ allows the Data User access to and use of certain data.

##### 1. Agreement

1.1 Sport NZ agrees to provide the Data User access to certain Data to enable the Data User to undertake research and analysis in accordance with the provisions set out in this Agreement.

1.2 The Data User agrees to use and access to the Data in accordance with the provisions set out in this Agreement.

1.3 Where there is more than one individual using the Data, they must all sign and agree to the provisions set out in this Agreement.

##### 2 Agreed analyses

2.1 Only analyses related to the information provided as set out in this agreement can be conducted.

2.2 Additional analyses related to the research covered by this Agreement or subsequent analyses for other research projects would require the Data User to seek a Variation of Agreement or submit another application form, as deemed appropriate by Sport NZ.

2.3 The Data User must ensure that any weighting schemes applied to the Data take account of the data collection process (for example, the design of complex surveys).

##### 3. Term

3.1 The term of this Agreement shall commence on the Commencement Date and expire on the Expiry Date, unless terminated in writing by one or both of the parties.

#### **4. Data access**

4.1 The Data will be provided in one of two ways:

1. Electronically, in a format agreed by the parties (this could be excel, csv and covers email transfer, USB drive, dropbox, OneDrive or any other file transfer system)
2. Access to the Sport NZ data warehouse (the data warehouse)

#### **5. Use of the Sport NZ data warehouse**

5.1 The Data User will not change, alter or delete any Data or tables within the data warehouse without express written permission to do so.

5.2 The Data User will not upload any new data or tables to the data warehouse without notifying Sport NZ and receiving agreement to proceed.

5.3 The Data User will only access the data warehouse on a secure environment.

5.4 The Data User will not permit or grant access to the data warehouse, or share their login credentials with other users.

#### **6. Security and confidentiality of the data**

6.1 The Data User will treat all Data and associated Documentation supplied by Sport NZ in the strictest confidence.

6.2 The Data User will ensure appropriate measures are in place for the confidentiality and secure storage of the data and any associated Documentation from theft, loss, damage or unauthorised access or use.

6.3 The Data User will not disclose any of the Data or associated Documentation to any person, except as permitted by this Agreement.

6.4 The Data User agrees that the Data and associated Documentation will be destroyed immediately upon the Expiry Date, or when the project is completed, or at the request of Sport NZ, whichever occurs first.

6.5 The Data User must not make any attempt to identify any individual persons to which the Data refers.

6.6 The Data User must not attempt to match or link, with or without using identifiers, the Data with any other data sources without explicit approval in writing from Sport NZ.

6.7 The Data User will not transfer the Data or associated Documentation to any third party.

6.8 The Data User will not use the Data or associated Documentation or the Output from analysis for any commercial purpose.

- 6.9 The Data User will not make copies or allow copies to be made of the Data for use outside the permitted use of this Agreement.
- 6.10 The Data User will immediately advise Sport NZ of any breach in confidentiality or security or any other related issue.
- 7. Outputs resulting from the data**
- 7.1 The Data User must notify Sport NZ in writing at least 10 working days prior to the public release of any Output.
- 7.2 The Data User must provide Sport NZ an advance copy of any Output at least 10 working days prior to public release of any Output.
- 7.3 All outputs published by the Data User must contain a suitably worded acknowledgement that Sport NZ owns the intellectual property in the source data and Sport NZ funded the original survey or data collection.
- 7.4 Acknowledgements will be provided to Sport NZ at least 10 working days before the public release of any Output.
- 7.5 The Data User must not state or imply in any Output to be Sport NZ's agent or representative or that any Output has been produced for or on Sport NZ's behalf, unless specifically agreed upon.
- 7.6 If the Output contains potentially protectable intellectual property, content that compromises the reputation of Sport NZ or any other confidential information in which Sport NZ has an interest, the Data User must notify Sport NZ and provide an advance copy of the Output at least 20 working days prior to intended public release. Sport NZ may, within 20 working days of such delivery, object in writing to the public release of the Output. Upon written objection regarding intellectual property or compromised reputation for Sport NZ, the Data User will, for up to 60 working days from initial delivery, delay disclosing the content in question to enable Sport NZ to file for the protection of any intellectual property and/or mitigate the reputational risk. Upon written objection regarding disclosure of any other confidential information, the data user will refrain from disclosing this content for an agreed period negotiated between the parties in good faith.
- 7.7 If the Output is an academic publication (e.g. peer-reviewed journal article, editorial, conference abstract), the Data User will ensure relevant Sport NZ personnel are provided with the opportunity to be included in the authorship team. Criteria for authorship of any academic publication arising from the data provided by Sport NZ will be determined in accordance with prevailing academic standards, based upon substantial contribution to the study design, analyses, interpretation of results, drafting and/or materially revising draft manuscript(s).
- 7.8 Clauses 7.1 to 7.7 survive the expiry or termination of this agreement.

## **8. Intellectual Property**

- 8.1 All intellectual property in the Data is owned by Sport NZ.
- 8.2 Sport NZ grants to the Data User a non-exclusive, royalty-free licence to use the Data to produce the Output as anticipated by this Agreement.
- 8.3 All intellectual property in any Output produced by the Data User is the property of the Data User.
- 8.4 The Data User grants to Sport NZ a non-exclusive, royalty free licence to use in relation to its statutory functions, any Output created by the Data User.
- 8.5 Clauses 8.1 to 8.4 will survive expiry or termination of this Agreement.

## **9. Termination**

- 9.1 Sport NZ may terminate this Agreement immediately in writing where the Data User breaches any aspect of this Agreement, and the breach remains un-remedied for a period of 7 days after Sport NZ gives written notice to the Data User to remedy the breach.

## **10. Audit**

- 10.1 Sport NZ may audit the Data User's management, access to and use of the Data and Documentation at any time upon reasonable notice.
- 10.2 Clause 10.1 survives expiry or termination of this Agreement.

## **11. Entire Agreement**

- 11.1 This Agreement contains the entire agreement between the parties and supersedes all prior oral and/or written representations, understandings, agreements or arrangements in relation to the Data and Documentation.

## Appendix 1: Definitions

**Agreement** means this agreement governing the use of the Data from Sport NZ.

**Commencement Date** means the date when the Agreement will begin and the Data User can start using or accessing the Data.

**Confidential Information** means any information of a confidential nature in respect of the business, property, employees, contractors, members, clients and agents of Sport NZ or its Affiliates ("Disclosing Party"), which is disclosed to or otherwise made available to another Party ("Receiving Party") in connection with this Agreement. Confidential Information does not include information that is:

- (a) public through no act or omission of the Receiving Party;
- (b) already known by the Receiving Party or is in its lawful possession prior to disclosure;
- (c) received by the Receiving Party from a third party without similar duties of confidentiality;
- (d) agreed by the Disclosing Party in writing to be information which is not regarded as confidential; or
- (e) required to be disclosed by law.

**Data** means any material provided to the Data User from Sport NZ, including access to datasets via the data warehouse, copies of the datasets in electronic or hard-copy formats and any metadata.

**Data Documentation** means any computer files, questionnaires, data dictionaries, technical reports, other papers, maps, plans, designs, drawings, diagrams, tables, charts, processes and techniques, and all research, operation, financing, management or other documents or any processing, technical or scientific know-how or other things supplied or made available by Sport NZ to the Data User.

**Data User** means the person or persons who will receive and use the Data, named as a party to this Agreement.

**Expiry Date** means the date when the Agreement will end and the Data User will stop using or accessing the Data.

**Output** means any tables /reports and/or journal articles and/or conference proceedings which are produced by the Data User as a result of use of the Data provided by Sport NZ.

**Appendix 2: Project proposal, declaration and data information**

Completing this form does not guarantee access to the requested data and Sport NZ may request further information before deciding whether to share data with any potential Data User.

Project proposal (to be filled out by Data User):

Project Title	Whanau (Families) in sports: Parent volunteering in sports and children's physical activity participation and physical literacy development.
Aim / Purpose	This research examines the association of parent volunteering in sports and young people's physical activity participation and physical literacy development.
Intended use of data (include description of data required and brief outline of intended analyses)	<p><b>Young People Demographics</b>            Q2 Age            Q8 Gender            Q5 Ethnicity            Ds Deprivation</p> <p><b>Young People Physical Activity</b>            Q63 How many hours of PA in the last 7 days?</p> <p><b>Young People Sports involvement</b>            Q12 Have you done any physical activity in last 7 days? Y or N            Q16 Played sport in the last 7 days?</p> <p><b>Young People Physical Literacy</b>            Q39a Physical literacy            R2 People in my life encourage me to take part in PA            R15 I am good at lots of different PA            R16 I have the chance to do PA            R17 I want to take part in PA            R18 I understand why taking part in PA is good for me            R19 I feel confident to take part in lots of different activities</p> <p><b>Parent Demographics</b>            Q3 Age            Q2 Gender            Q75 Ethnicity            Q5 How many children            Q69 Qualification            Q70 Household income            Ds Deprivation</p> <p><b>Parent Volunteering</b>            Have you volunteered in the last 7 days or 12 months?            How did you get involved in volunteering?</p> <p><b>Parent Physical Activity</b>            In total, how many hours did you spend doing PA?</p>

	<p><b>Q48 Parent Physical literacy</b></p> <p>7 People in my life encourage me to take part in PA  8 I am good at lots of different PA  9 I have the chance to do PA  10 I want to take part in PA  11 I understand why taking part in PA is good for me  12 I feel confident to take part in lots of different activities</p> <p><b>Intended analyses</b></p> <p>The data will be used to answer the following research questions:</p> <ol style="list-style-type: none"> <li>1. How is parent volunteering (in the last 7 days) in sport associated with young people's physical literacy development?</li> <li>2. How is parent volunteering (in the last 12 months) in sport associated with young people's physical literacy development?</li> <li>3. How is parent volunteering (by roles) in sport associated with young people's physical literacy development?</li> <li>4. How is parent volunteering (by levels) in sport associated with young people's physical literacy development?</li> <li>5. How is parent volunteering (by duration) in sport associated with young people's physical literacy development?</li> </ol> <p>The sample for these analyses will be limited to households with both young people and parent data. Logistic regression will be used for the analyses for all research questions, controlling for socio-demographic covariates.</p>
Intended Outputs	Thesis and Academic paper
Commencement Date	March 2021
Expiry Date	March 2022
Budget Required	N/A

Declaration (to be filled out by all Data Users):

I undertake, that as a data user, I agree to the provisions set out in this agreement

Applicant name	Lara Andrews		
Position	PhD Student		
Organisation/institution	University of Delaware, USA and Victoria University of Wellington, NZ		
Phone number	022 399 7002		

Signature	<i>Rene Andrew</i>		
Date	26/03/2021		

Data provided (to be filled out by Sport NZ):

Dataset name (include survey name and/or DW table name if appropriate)	Format used (e.g., excel tables, DW tables)	Method of transfer (email, USB, DW access)
Active NZ Adult Survey	Excel & SPSS	USB
Active NZ Young people survey	Excel & SPSS	USB

## Appendix G

### RECOMMENDATIONS

**Recommendations**

To ensure young people's experiences and physical literacy development is nurtured in sport and in life.

- SPORT NZ**  
Parent volunteering is valuable in multiple ways and should be encouraged more. Parents are an important factor in young people's experience in sport and in life. Family approaches are needed.
- ACTIVE NZ**  
Increase Maori and Pacific Island participant numbers. Develop a more comprehensive set of physical literacy questions in future young people surveys to gain greater insights for future youth development research.
- PARENTS**  
Parents need to play an active role in supportive volunteer levels and influence in sport and in life. As parent volunteering *intensity* increases young people's physical literacy is likely to be impacted. More research exploring over-involved parent volunteering is needed.

By encouraging **families** to be actively involved in youth sport, **young people's development** is likely to benefit.

## Appendix H

### FULL REGRESSION MODELS

Table 10 Odds ratio testing associations between parent volunteered in the last 7 days and physical literacy development (n=14,074)

	<i>Crude</i> (95% CI)	<i>Model 1</i> (95% CI)	<i>Model 2</i> (95% CI)	<i>Model 3</i> (95% CI)	<i>Model 4</i> (95% CI)	<i>Model 5</i> (95% CI)
<i>Outcome</i>						
Physical Literacy	<b>1.578 (1.407-1.770)</b>	<b>1.570 (1.400-1.761)</b>	<b>1.550 (1.331-1.740)</b>	<b>1.551 (1.382-1.741)</b>	<b>1.503 (1.338-1.689)</b>	<b>1.456 (1.295-1.636)</b>
Encourage	<b>1.592 (1.314-1.929)</b>	<b>1.581 (1.305-1.916)</b>	<b>1.573 (1.295-1.910)</b>	<b>1.476 (1.214-1.794)</b>	<b>1.540 (1.241-1.911)</b>	<b>1.441 (1.159-1.793)</b>
Competence	<b>1.561 (1.389-1.755)</b>	<b>1.552 (1.381-1.745)</b>	<b>1.544 (1.372-1.737)</b>	<b>1.488 (1.322-1.675)</b>	<b>1.527 (1.340-1.740)</b>	<b>1.451 (1.272-1.655)</b>
Opportunity	<b>1.505 (1.307-1.733)</b>	<b>1.449 (1.301-1.726)</b>	<b>1.513 (1.313-1.744)</b>	<b>1.476 (1.279-1.702)</b>	<b>1.443 (1.235-1.685)</b>	<b>1.358 (1.161-1.588)</b>
Motivation	<b>1.510 (1.302-1.750)</b>	<b>1.512 (1.304-1.752)</b>	<b>1.560 (1.344-1.809)</b>	<b>1.528 (1.316-1.774)</b>	<b>1.564 (1.328-1.842)</b>	<b>1.514 (1.284-1.785)</b>
Knowledge	<b>1.163 (1.001-1.353)</b>	<b>1.178 (1.013-1.370)</b>	1.051 (.899-1.229)	1.037 (.866-1.213)	1.052 (.885-1.251)	1.028 (.864-1.224)
Confidence	<b>1.470 (1.311-1.648)</b>	<b>1.459 (1.302-1.637)</b>	<b>1.452 (1.294-1.630)</b>	<b>1.433 (1.276-1.609)</b>	<b>1.409 (1.241-1.599)</b>	<b>1.358 (1.195-1.542)</b>

Table 11 Odds ratio testing associations between parent volunteered in the last 12 months and physical literacy development ( $n=14,074$ )

	<i>Crude</i> (95% CI)	<i>Model 1</i> (95% CI)	<i>Model 2</i> (95% CI)	<i>Model 3</i> (95% CI)	<i>Model 4</i> (95% CI)	<i>Model 5</i> (95% CI)
<i>Outcome</i>						
Physical Literacy	<b>1.977 (1.835-2.173)</b>	<b>1.989 (1.827-2.164)</b>	<b>1.986 (1.823-2.164)</b>	<b>1.960 (1.798-2.136)</b>	<b>1.907 (1.748-2.081)</b>	<b>1.852 (1.696-2.022)</b>
Encourage	<b>2.191 (1.904-2.522)</b>	<b>2.180 (1.893-2.509)</b>	<b>2.214 (1.918-2.554)</b>	<b>2.068 (1.789-2.391)</b>	<b>2.132 (1.818-2.500)</b>	<b>1.990 (1.692-2.339)</b>
Competence	<b>1.812 (1.663-1.973)</b>	<b>1.805 (1.657-1.966)</b>	<b>1.818 (1.667-1.983)</b>	<b>1.757 (1.609-1.918)</b>	<b>1.780 (1.616-1.960)</b>	<b>1.692 (1.538-1.869)</b>
Opportunity	<b>1.751 (1.581-1.940)</b>	<b>1.745 (1.575-1.933)</b>	<b>1.789 (1.612-1.984)</b>	<b>1.735 (1.562-1.927)</b>	<b>1.689 (1.506-1.894)</b>	<b>1.590 (1.415-1.786)</b>
Motivation	<b>1.734 (1.558-1.928)</b>	<b>1.734 (1.558-1.929)</b>	<b>1.822 (1.636-2.030)</b>	<b>1.791 (1.605-1.998)</b>	<b>1.712 (1.520-1.928)</b>	<b>1.662 (1.474-1.874)</b>
Knowledge	<b>1.481 (1.321-1.660)</b>	<b>1.494 (1.332-1.675)</b>	<b>1.296 (1.150-1.460)</b>	<b>1.282 (1.135-1.447)</b>	<b>1.306 (1.144-1.491)</b>	<b>1.279 (1.118-1.463)</b>
Confidence	<b>1.702 (1.565-1.852)</b>	<b>1.693 (1.556-1.842)</b>	<b>1.708 (1.567-1.860)</b>	<b>1.694 (1.554-1.848)</b>	<b>1.696 (1.542-1.864)</b>	<b>1.633 (1.484-1.798)</b>

*Note:* **Bold** numbers represent statistical significance  $p < .05$ .

\*Model 1 adjusted for child gender

\*Model 2 adjusted for child age

\*Model 3 adjusted for child ethnicity

\*Model 4 adjusted for child deprivation

\*Model 5 adjusted for parent physical activity

Table 12 Odds ratio testing associations between parent volunteered (one role) in the last 12 months and physical literacy development ( $n=14,074$ )

	<i>Crude</i> (95% CI)	<i>Model 1</i> (95% CI)	<i>Model 2</i> (95% CI)	<i>Model 3</i> (95% CI)	<i>Model 4</i> (95% CI)	<i>Model 5</i> (95% CI)
<i>Outcome</i>						
Physical Literacy	<b>1.730 (1.554-1.926)</b>	<b>1.723 (1.547-1.919)</b>	<b>1.724 (1.546-1.922)</b>	<b>1.693 (1.517-1.888)</b>	<b>1.674 (1.485-1.886)</b>	<b>1.596 (1.415-1.800)</b>
Encourage	<b>2.235 (1.846-2.705)</b>	<b>2.224 (1.837-2.692)</b>	<b>2.215 (1.826-2.687)</b>	<b>2.079 (1.711-2.525)</b>	<b>2.123 (1.715-2.628)</b>	<b>1.996 (1.609-2.476)</b>
Competence	<b>1.653 (1.482-1.845)</b>	<b>1.647 (1.475-1.837)</b>	<b>1.647 (1.474-1.840)</b>	<b>1.600 (1.431-1.789)</b>	<b>1.621 (1.435-1.832)</b>	<b>1.549 (1.369-1.752)</b>
Opportunity	<b>1.625 (1.424-1.855)</b>	<b>1.618 (1.418-1.847)</b>	<b>1.646 (1.441-1.881)</b>	<b>1.593 (1.393-1.822)</b>	<b>1.576 (1.360-1.826)</b>	<b>1.489 (1.284-1.728)</b>
Motivation	<b>1.571 (1.371-1.801)</b>	<b>1.573 (1.372-1.803)</b>	<b>1.655 (1.442-1.899)</b>	<b>1.624 (1.413-1.865)</b>	<b>1.532 (1.319-1.779)</b>	<b>1.487 (1.279-1.729)</b>
Knowledge	<b>1.372 (1.185-1.588)</b>	<b>1.384 (1.195-1.603)</b>	<b>1.263 (1.085-1.469)</b>	<b>1.245 (1.069-1.450)</b>	<b>1.304 (1.101-1.544)</b>	<b>1.281 (1.081-1.519)</b>
Confidence	<b>1.539 (1.382-1.714)</b>	<b>1.531 (1.375-1.706)</b>	<b>1.531 (1.373-1.707)</b>	<b>1.522 (1.364-1.699)</b>	<b>1.526 (1.354-1.721)</b>	<b>1.475 (1.307-1.665)</b>

*Note:* **Bold** numbers represent statistical significance  $p < .05$ .

\*Model 1 adjusted for child gender

\*Model 2 adjusted for child age

\*Model 3 adjusted for child ethnicity

\*Model 4 adjusted for child deprivation

\*Model 5 adjusted for parent physical activity

Table 13 Odds ratio testing associations between parent volunteered (more than one role) in the last 12 months and physical literacy development ( $n=14,074$ )

	<i>Crude</i> (95% CI)	<i>Model 1</i> (95% CI)	<i>Model 2</i> (95% CI)	<i>Model 3</i> (95% CI)	<i>Model 4</i> (95% CI)	<i>Model 5</i> (95% CI)
<i>Outcome</i>						
Physical Literacy	<b>2.377 (2.128-2.656)</b>	<b>2.365 (2.116-2.642)</b>	<b>2.383 (2.130-2.667)</b>	<b>2.340 (2.089-2.621)</b>	<b>2.313 (2.042-2.619)</b>	<b>2.190 (1.931-2.484)</b>
Encourage	<b>2.170 (1.811-2.599)</b>	<b>2.154 (1.798-2.581)</b>	<b>2.224 (1.851-2.672)</b>	<b>2.068 (1.718-2.489)</b>	<b>2.121 (1.728-2.603)</b>	<b>1.953 (1.587-2.403)</b>
Competence	<b>2.042 (1.828-2.280)</b>	<b>2.033 (1.821-2.271)</b>	<b>2.088 (1.866-2.336)</b>	<b>2.019 (1.802-2.261)</b>	<b>2.029 (1.791-2.299)</b>	<b>1.925 (1.696-2.184)</b>
Opportunity	<b>1.891 (1.657-2.159)</b>	<b>1.883 (1.650-2.150)</b>	<b>1.965 (1.718-2.247)</b>	<b>1.917 (1.673-2.196)</b>	<b>1.816 (1.567-2.104)</b>	<b>1.695 (1.459-1.968)</b>
Motivation	<b>1.966 (1.709-2.261)</b>	<b>1.966 (1.709-2.261)</b>	<b>2.112 (1.832-2.434)</b>	<b>2.085 (1.806-2.407)</b>	<b>2.018 (1.726-2.360)</b>	<b>1.951 (1.665-2.286)</b>
Knowledge	<b>1.629 (1.405-1.889)</b>	<b>1.643 (1.416-1.906)</b>	<b>1.369 (1.174-1.598)</b>	<b>1.360 (1.163-1.590)</b>	<b>1.340 (1.131-1.588)</b>	<b>1.311 (1.104-1.557)</b>
Confidence	<b>1.908 (1.712-2.216)</b>	<b>1.896 (1.702-2.113)</b>	<b>1.945 (1.742-2.172)</b>	<b>1.934 (1.730-2.162)</b>	<b>1.929 (1.707-2.180)</b>	<b>1.855 (1.639-2.100)</b>

*Note:* **Bold** numbers represent statistical significance  $p < .05$ .

\*Model 1 adjusted for child gender

\*Model 2 adjusted for child age

\*Model 3 adjusted for child ethnicity

\*Model 4 adjusted for child deprivation

\*Model 5 adjusted for parent physical activity

Table 14 Odds ratio testing associations between parent volunteered (moderate levels) in the last 12 months and physical literacy development ( $n=14,074$ )

	<i>Crude</i> (95% CI)	<i>Model 1</i> (95% CI)	<i>Model 2</i> (95% CI)	<i>Model 3</i> (95% CI)	<i>Model 4</i> (95% CI)	<i>Model 5</i> (95% CI)
<i>Outcome</i>						
Physical Literacy	<b>1.762 (1.577-1.969)</b>	<b>1.758 (1.573-1.965)</b>	<b>1.771 (1.583-1.981)</b>	<b>1.741 (1.555-1.949)</b>	<b>1.759 (1.553-1.992)</b>	<b>1.677 (1.480-1.902)</b>
Encourage	<b>1.967 (1.631-2.371)</b>	<b>1.959 (1.624-2.362)</b>	<b>2.076 (1.718-2.510)</b>	<b>1.940(1.603-2.349)</b>	<b>2.061 (1.664-2.551)</b>	<b>1.925 (1.552-2.387)</b>
Competence	<b>1.628 (1.455-1.821)</b>	<b>1.620 (1.448-1.812)</b>	<b>1.667 (1.487-1.868)</b>	<b>1.623 (1.447-1.820)</b>	<b>1.646 (1.451-1.867)</b>	<b>1.571 (1.383-1.784)</b>
Opportunity	<b>1.545 (1.352-1.766)</b>	<b>1.540 (1.347-1.760)</b>	<b>1.608 (1.404-1.840)</b>	<b>1.553 (1.359-1.780)</b>	<b>1.557 (1.339-1.810)</b>	<b>1.468 (1.261-1.709)</b>
Motivation	<b>1.540 (1.340-1.770)</b>	<b>1.546 (1.345-1.778)</b>	<b>1.627 (1.413-1.873)</b>	<b>1.592 (1.381-1.834)</b>	<b>1.498 (1.285-1.746)</b>	<b>1.451 (1.244-1.694)</b>
Knowledge	<b>1.443 (1.238-1.681)</b>	<b>1.462 (1.255-1.704)</b>	<b>1.240 (1.058-1.452)</b>	<b>1.222 (1.042-1.434)</b>	<b>1.320 (1.105-1.578)</b>	<b>1.300 (1.087-1.556)</b>
Confidence	<b>1.626 (1.454-1.819)</b>	<b>1.618 (1.447-1.810)</b>	<b>1.666 (1.487-1.867)</b>	<b>1.659 (1.480-1.860)</b>	<b>1.724 (1.519-1.956)</b>	<b>1.664 (1.465-1.889)</b>

*Note:* **Bold** numbers represent statistical significance  $p < .05$ .

\*Model 1 adjusted for child gender

\*Model 2 adjusted for child age

\*Model 3 adjusted for child ethnicity

\*Model 4 adjusted for child deprivation

\*Model 5 adjusted for parent physical activity

Table 15 Odds ratio testing associations between parent volunteered (high levels) in the last 12 months and physical literacy development ( $n=14,074$ )

	<i>Crude</i> (95% CI)	<i>Model 1</i> (95% CI)	<i>Model 2</i> (95% CI)	<i>Model 3</i> (95% CI)	<i>Model 4</i> (95% CI)	<i>Model 5</i> (95% CI)
<i>Outcome</i>						
Physical Literacy	<b>2.216 (1.993-2.464)</b>	<b>2.209 (1.984-2.452)</b>	<b>2.210 (1.985-2.461)</b>	<b>2.159 (1.937-2.407)</b>	<b>2.091 (1.858-2.353)</b>	<b>1.985 (1.761-2.237)</b>
Encourage	<b>2.404 (2.005-2.883)</b>	<b>2.388 (1.991-2.865)</b>	<b>2.352 (1.956-2.828)</b>	<b>2.191 (1.819-2.641)</b>	<b>2.196 (1.792-2.689)</b>	<b>2.039 (1.659-2.505)</b>
Competence	<b>1.979 (1.779-2.202)</b>	<b>1.974 (1.774-2.196)</b>	<b>1.975 (1.773-2.201)</b>	<b>1.899 (1.702-2.118)</b>	<b>1.915 (1.698-2.159)</b>	<b>1.825 (1.616-2.060)</b>
Opportunity	<b>1.948 (1.711-2.218)</b>	<b>1.941 (1.705-2.210)</b>	<b>1.990 (1.745-2.269)</b>	<b>1.939 (1.698-2.216)</b>	<b>1.828 (1.584-2.110)</b>	<b>1.718 (1.485-1.986)</b>
Motivation	<b>1.917 (1.675-2.195)</b>	<b>1.916 (1.674-2.194)</b>	<b>2.046 (1.784-2.347)</b>	<b>2.021 (1.760-2.322)</b>	<b>1.955 (1.682-2.273)</b>	<b>1.899 (1.631-2.211)</b>
Knowledge	<b>1.512 (1.313-1.740)</b>	<b>1.519 (1.319-1.749)</b>	<b>1.363 (1.178-1.578)</b>	<b>1.349 (1.163-1.565)</b>	<b>1.316 (1.121-1.545)</b>	<b>1.286 (1.093-1.513)</b>
Confidence	<b>1.765 (1.591-1.958)</b>	<b>1.757 (1.584-1.949)</b>	<b>1.756 (1.581-1.951)</b>	<b>1.739 (1.564-1.935)</b>	<b>1.691 (1.506-1.898)</b>	<b>1.628 (1.448-1.831)</b>

*Note:* **Bold** numbers represent statistical significance  $p < .05$ .

\*Model 1 adjusted for child gender

\*Model 2 adjusted for child age

\*Model 3 adjusted for child ethnicity

\*Model 4 adjusted for child deprivation

\*Model 5 adjusted for parent physical activity

Table 16 Odds ratio testing associations between parent volunteered less than 60 minutes in the last 7 days and physical literacy development ( $n=14,074$ )

	<i>Crude</i> (95% CI)	<i>Model 1</i> (95% CI)	<i>Model 2</i> (95% CI)	<i>Model 3</i> (95% CI)	<i>Model 4</i> (95% CI)	<i>Model 5</i> (95% CI)
<i>Outcome</i>						
Physical Literacy	<b>1.440 (1.176-1.762)</b>	<b>1.439 (1.175-1.763)</b>	<b>1.422 (1.161-1.743)</b>	<b>1.395 (1.138-1.711)</b>	<b>1.372 (1.099-1.712)</b>	<b>1.295 (1.037-1.618)</b>
Encourage	<b>1.935 (1.323-2.830)</b>	<b>1.929 (1.319-2.821)</b>	<b>1.886 (1.286-2.766)</b>	<b>1.803 (1.228-2.647)</b>	<b>1.796 (1.186-2.720)</b>	<b>1.635 (1.078-2.480)</b>
Competence	<b>1.571 (1.272-1.942)</b>	<b>1.564 (1.265-1.933)</b>	<b>1.545 (1.249-1.912)</b>	<b>1.501 (1.213-1.859)</b>	<b>1.619 (1.278-2.051)</b>	<b>1.525 (1.203-1.953)</b>
Opportunity	1.111 (.882-1.400)	1.109 (.880-1.397)	1.110 (.880-1.400)	1.094 (.866-1.381)	.992 (.775-1.270)	.923 (.720-1.183)
Motivation	<b>1.797 (1.350-2.393)</b>	<b>1.811 (1.360-2.412)</b>	<b>1.856 (1.393-2.474)</b>	<b>1.825 (1.369-2.432)</b>	<b>1.836 (1.344-2.509)</b>	<b>1.778 (1.300-2.432)</b>
Knowledge	1.164 (.887-1.526)	1.183 (.902-1.552)	1.122 (.848-1.484)	1.115 (.842-1.476)	1.159 (.848-1.584)	1.124 (.822-1.538)
Confidence	<b>1.432 (1.167-1.758)</b>	<b>1.427 (1.162-1.753)</b>	<b>1.411 (1.148-1.734)</b>	<b>1.400 (1.139-1.722)</b>	<b>1.427 (1.138-1.788)</b>	<b>1.370 (1.092-1.718)</b>

*Note:* **Bold** numbers represent statistical significance  $p < .05$ .

\*Model 1 adjusted for child gender

\*Model 2 adjusted for child age

\*Model 3 adjusted for child ethnicity

\*Model 4 adjusted for child deprivation

\*Model 5 adjusted for parent physical activity

Table 17 Odds ratio testing associations between parents who volunteered more than 61 minutes in the last 7 days and physical literacy development ( $n=14,074$ )

	<i>Crude</i> (95% CI)	<i>Model 1</i> (95% CI)	<i>Model 2</i> (95% CI)	<i>Model 3</i> (95% CI)	<i>Model 4</i> (95% CI)	<i>Model 5</i> (95% CI)
<i>Outcome</i>						
Physical Literacy	<b>1.636 (1.432-1.869)</b>	<b>1.625 (1.422-1.856)</b>	<b>1.606 (1.405-1.836)</b>	<b>1.563 (1.367-1.788)</b>	<b>1.548 (1.336-1.794)</b>	<b>1.472 (1.269-1.708)</b>
Encourage	<b>1.491 (1.201-1.850)</b>	<b>1.478 (1.191-1.835)</b>	<b>1.480 (1.190-1.841)</b>	<b>1.379 (1.107-1.718)</b>	<b>1.455 (1.140-1.858)</b>	<b>1.370 (1.069-1.754)</b>
Competence	<b>1.557 (1.361-1.781)</b>	<b>1.548 (1.353-1.771)</b>	<b>1.548 (1.352-1.773)</b>	<b>1.487 (1.298-1.705)</b>	<b>1.492 (1.285-1.734)</b>	<b>1.423 (1.223-1.655)</b>
Opportunity	<b>1.722 (1.452-2.042)</b>	<b>1.714 (1.445-2.032)</b>	<b>1.739 (1.465-2.063)</b>	<b>1.689 (1.422-2.006)</b>	<b>1.721 (1.424-2.081)</b>	<b>1.627 (1.344-1.970)</b>
Motivation	<b>1.421 (1.203-1.679)</b>	<b>1.421 (1.203-1.679)</b>	<b>1.472 (1.245-1.741)</b>	<b>1.440 (1.217-1.705)</b>	<b>1.476 (1.226-1.777)</b>	<b>1.430 (1.187-1.723)</b>
Knowledge	1.163 (.978-1.383)	1.175 (.988-1.398)	1.027 (.858-1.228)	1.009 (.842-1.208)	1.012 (.830-1.234)	.994 (.814-1.213)
Confidence	<b>1.484 (1.301-1.693)</b>	<b>1.473 (1.291-1.680)</b>	<b>1.471 (1.288-1.681)</b>	<b>1.450(1.268-1.657)</b>	<b>1.407 (1.216-1.628)</b>	<b>1.360 (1.174-1.575)</b>

*Note:* **Bold** numbers represent statistical significance  $p < .05$ .

\*Model 1 adjusted for child gender

\*Model 2 adjusted for child age

\*Model 3 adjusted for child ethnicity

\*Model 4 adjusted for child deprivation

\*Model 5 adjusted for parent physical activity