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Parent rated importance of active play and organised physical activity for young children

Casey Murphy

Master of Philosophy Thesis

Signed Declaration

I declare that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university of higher education, and that to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text.

Signature:

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Casey Murphy

Abstract

Background

Children participate in less daily physical activity, both organised and informal, often referred to as active play (AP), than in the past. For young children, parents are primarily responsible for planning their child's day including their engagement in physical activity.

Purpose

As there has been little research in this area, the purpose of this study was to examine how parents rated the importance of their child's level of AP and organised physical activity (OPA), how this affected the amount of time their child participated in these activities, and whether their child's physical activity (PA) related to their own level of (PA).

Method

The data for this pilot study were collected over three-months using a survey methodology. Parents and caregivers of primary school aged children were asked to complete a questionnaire comprising two importance scales, one for AP and the second for OPA, a seven-day physical activity recall questionnaire about their own physical activity and a seven-day activity diary about their child's active play and organised physical activity. Evidence of the validity and reliability of the importance scales developed for this study was gathered using experts in the industry and a target sample audience.

Results

A total of 177 participants from 62 families participated in this pilot study, 41 fathers, 63 mothers, 40 male children and 33 female children aged between 4 and 12 years. All participants, lived in Perth, Western Australia. Parent's responses were compared to the actual level and type of physical activity undertaken by their child each week and their own physical activity level. There was a positive relationship between parents' rating of AP and the time their child spent in AP ($r = .227$). Parents rated both AP and OPA as important, with active play slightly more important, especially

by mothers and the more active parents. There was a strong correlation between age and organised physical activity ($r = .464$) in particular for the boys ($r = .729$) but not for active play ($r = -.051$). There was a weak, significant correlation between the time parents and their children spent engaged in physical activity ($r = .209$). A linear mixed regression model found that only children's age was a significant predictor for participation in OPA ($\beta=1.07$, $p= 0.007$) and no predictors were identified for AP.

Conclusions

The positive relationship between the mother's ratings of AP and children's participation in AP is an interesting new finding. The results of this study provide new information regarding the impact of parent's importance ratings on their child's participation in active play and organised physical activity, and the time their children participated in these activities. It is important to develop effective health promotion strategies and educational initiatives that encourages parents to value the importance of both AP and OPA.

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Chapter One

Is playing outside, getting dirty, making cubby houses and climbing trees less appealing for young children and their parents than playing electronic video games or watching television? Studies this century suggest that children participate in less physical activity particularly active play (AP), and play with more adult supervision and structure than in past centuries (Brockman, Jago, Fox, 2011; Burdette & Whitaker, 2005; Clements, 2004; Veitch, Bagley Ball, & Salmon, 2006). The benefits of physical activity (PA) are well established, it helps develop a child's motor skills, build muscles and bones, increase cardio vascular fitness levels and promotes a healthy lifestyle (Australian Government Department of Health, 2014; Maddison, Dale, Marsh, LeBlanc, & Oliver, 2014).

The decline of time spent in AP means children are missing out on many associated social, educational and physical benefits (Brockman et al., 2011; Burdette & Whitaker, 2005; Fisher, Hirsh-Pasek, Golinkoff, & Gryfe, 2008; Veitch et al., 2006). For example, AP provides opportunities to increase physical fitness, develop gross motor skills, and social skills through interactions with peers (Brockman et al., 2011). Some primary reasons for the decline in time spent in AP may be related to factors associated with the child's parents (Brockman, Fox, & Jago, 2011; Burdette & Whitaker, 2005; Fisher et al., 2008). Potential contributing factors include; parent's choices about safety of play areas, lack of active outdoor play areas such as a large backyard or a nearby park/open space (Veitch et al., 2006), time spent in more organised activities and sports, or the growing time engaged in sedentary screen based activities (Thompson, Rehman, & Humbert, 2005). Parents may also be over-protective of their child (the cotton wool syndrome), and have heightened concerns about their child's safety and the potential risks of engaging in physical activities (Little, 2010; Kontos, 2004; Strong, Malina, Blimkie, Daniels, Dishman, Gutin & Pivarnik, 2005).

Parents are primarily responsible for organising their child's day, determining what they do in their spare time, whether their child engages in physical activity and whether this is unorganised AP or organised physical activity (OPA) (Gustafson & Rhodes 2006; Noonan, Boddy, Fairclough & Knowles, 2016; Veitch et al., 2006). It is possible some parents structure their child's free time solely around organised

activities such as sports-based activities or music lessons at the expense of AP (Clements, 2004). There has been limited research about how parents rate the relative importance of AP and OPA, how this might affect the time their children participate in AP and OPA and whether this is affected by the parent's own physical activity level. Other researchers have suggested that parents are placing less importance on AP and prioritising OPA (Clements, 2004; Gustafson & Rhodes 2006; Veitch et al., 2006).

Purpose

The purpose of this pilot study was to examine the relative importance parents place on AP compared to OPA for primary school aged children. In order to measure to measure the level of importance that parents attribute to their children's AP and OPA two semantic differential scales were developed and piloted.

Parent's responses were compared to the actual level and type of PA undertaken by their child each week and to their own PA level. A survey methodology was used to collect the data. Both parents of child attending primary schools were invited to complete a questionnaire comprising importance scales for AP and OPA, a seven-day physical activity recall questionnaire about their own physical activity (Timperio, Salmon & Crawford 2003) and a seven-day diary about their child's AP and OPA (www.rainestudy.com.au).

The conceptual framework for the study highlights the key relationships that were examined (Figure 1). These were the relationship between parent importance ratings (mother and father) and the level of AP and OPA undertaken by their child; the two-way relationship between parent importance ratings and parent physical activity levels, and, the relationship between parent's own activity levels and the level of AP and OPA participated in by their child (boys and girls) was examined.

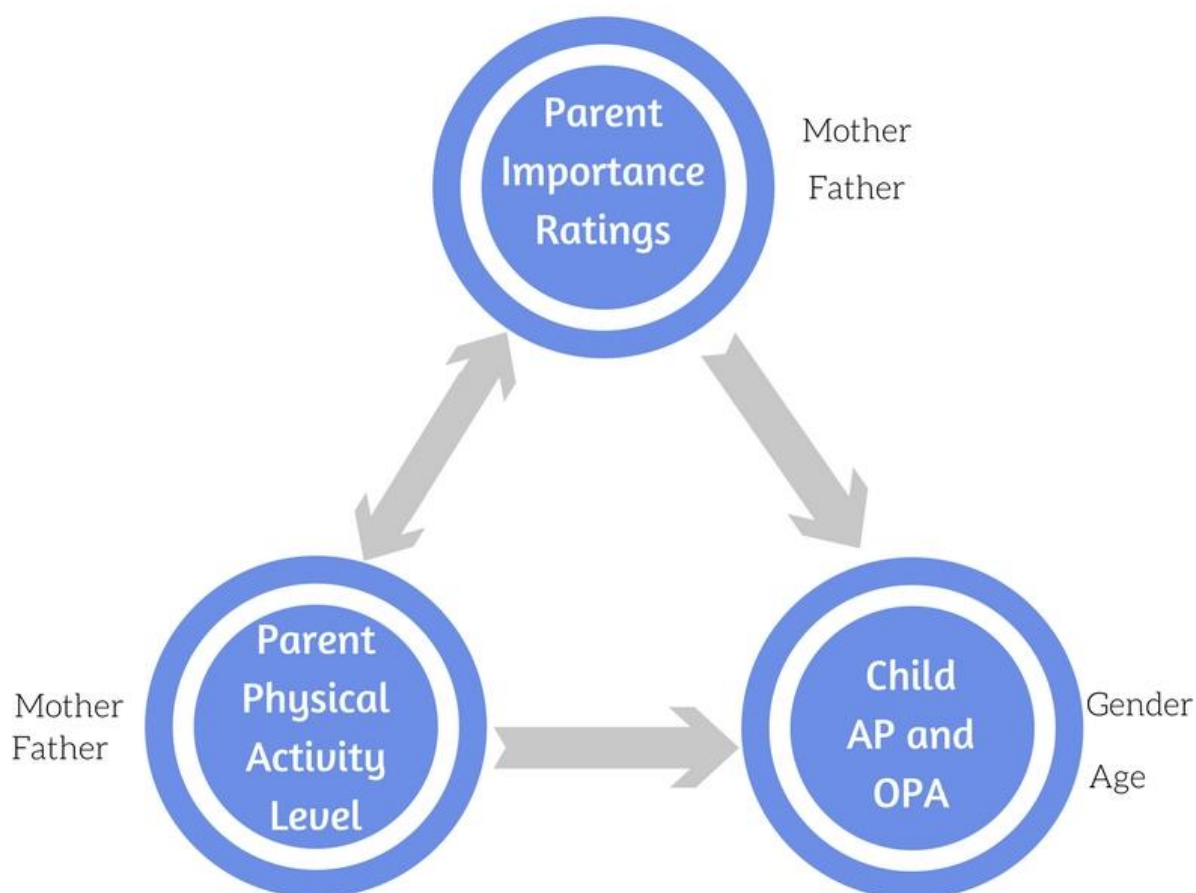


Figure 1. The Conceptual Framework identifies the key relationships that were examined in this study. The relationship between parent importance ratings (mother and father) and the level of and organised physical activity (OPA) undertaken by their child; the relationship between parent's own activity levels and the level of active play (AP) and organised physical activity (OPA) participated in by their child (boys and girls) and the two-way relationship between parent importance ratings and parent physical activity levels.

Significance

The results from this study add to the limited knowledge about how parents rate the importance of AP and OPA of their primary school aged children and to what extent this contributes to their child's level of PA. It is unclear whether parents are unintentionally limiting their child's opportunities to participate in AP or whether they do not rate AP as important as OPA or other more sedentary activities such as,

homework or music lessons. In addition, no research was located that examined whether more active parents rate AP or OPA as more important for their child's and whether this differs between boys, girls and with age. The results of the study may inform the development of effective health promotion strategies and educational initiatives to encourage parents to value AP as well as OPA for their child.

Research Questions

The primary research question was *What is the relationship between the importance parents place on active play and organised physical activity, their child's level and their own level of physical activity?*

Sub questions

1. What is the relationship between the importance parents place on active play and organised physical activity and the time their child spends doing these activities?
2. Is there a difference in time spent in active play and organised physical activity between boys and girls?
3. Is there a difference in time spent in active play and organised physical activity between primary school children aged between 4 and 12 years?
4. Are more active parents more likely to rate active play or organised physical activity as more important?
5. Do the importance ratings differ between the mother or father?

Limitations

A number of uncontrollable factors restricted the methodology, results and conclusions of this study.

- The findings of the study do not generalise to the wider community as only a small sample was recruited from Perth, Western Australia.
- As the study protocol involved a self-report questionnaire, the researcher was relying on the participants to be truthful.
- Recruitment of participants was difficult and resulted in a smaller than planned sample size. (See Figure 3 Recruitment process for further detail).

- Participants were required to fill out a daily activity diary for one week and some parents may have lost interest.
- The data collection period was over the spring/summer period.
- The study was unable to identify the socioeconomic status of the sample as it has been drawn from all over Perth region.

Delimitations

- The selection criteria limited the sample to parents to children living in the metropolitan region of Perth, WA.
- Children were attending primary school and aged between 4 and 12 years old.

Definitions

| | |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Active Commuting | Walking and bicycling as single transportation modes (Merom, Tudor-Locke, Bauman, & Rissel, 2006). |
| Active Play | Playing for fun, and not in an organised way (Maddison, Dale, Marsh, LeBlanc, & Oliver, 2014, p.3). Synonyms for active play include unorganised play, non-organised play and free play. |
| Active Transport | Travel modes that include physical activity (Rosenberg, Miller, French, McCormack, Bull, Giles-Corti, & Pratt, 2008). |
| Child | An individual aged between five and twelve (Australian Government Department of Health 2014, p.2). |
| Gender | While sex is generally conceptualised as a biological construct and gender as a sociological construct, for the purpose of this project gender is used in the very broad sense to encompass the interaction between biological and socio-environmental factors that influence behaviour (Springer, Stellman, & Jordan-Young, 2012). |
| Moderate Intensity Activities | Requires a moderate amount of effort and noticeably accelerates the heart rate (World Health Organisation, 2015). |
| Organised Physical Activity | Physical activity for exercise, recreation or sport that was organised in full or in part by (1) a fitness, leisure or indoor sports centre that required payment for participation, (2) a sport or recreation club or association that required payment |

of membership, fees or registration, (3) a workplace, (4) a school, or (5) any other type of organisation” The Australian Sports Commission, (2010, p. 3).

Play Unplanned activity that children undertake to keep busy and amuse themselves (Burdette & Whitaker, 2005).

Physical Activity Any bodily movement produced by skeletal muscles that result in energy expenditure (Maddison et al., 2014, p.3).

Primary Caregiver The person who is primarily responsible for the infant’s care, from the infant’s point of view, usually the mother (Umemura, Jacobvitz, Messina, & Hazen, 2013).

Secondary Caregiver The person who is secondarily responsible for the infant usually the father (Umemura et al., 2013).

Sedentary Behaviour Characterised by sitting or lying down (except for when sleeping) (Australian Federal Department of Health 2014, p. 2).

Vigorous Intensity Activities Involves a large amount of effort and causes rapid breathing and a substantial increase in heart rate (World Health Organisation, 2015).

Chapter Two

Literature Review

In this chapter, the benefits of being physically active are examined, starting with the broader concept of PA, followed by more specific aspects related to PA. The environmental factors such as parents, risk, safety, available play spaces and the child factors such as their gender, age and relationship with peers are identified.

Physical activity

The World Health Organisation and Australian Federal Government's Department of Health (2014) recommend that children participate in at least one hour of moderate to vigorous PA each day (Australian Government Department of Health, 2014; Ceciliani & Bortolotti, 2013; Strong et al., 2005). PA is an important part of children's lives and many factors have been identified that influence their daily levels.

PA may be informal such as games played alone or with peers and is considered to be AP. PA may also be formal such as Physical Education (PE) class or organised sports and is considered to be OPA (Vilhjalmsson & Kristjansdottir, 2003; Veitch, Ball, & Salmon, 2007). The setting can be indoors, for example, movement based video games, or outdoors, and may be with or without parental supervision. Active transport such as bike riding or walking from one location to another is also classified as PA (Maddison et al., 2014).

Parent, peer and sibling physical activity may also affect a child's PA levels. Some studies have found that a child is likely to be more active if surrounded by other active people (Sallis, Prochaska, & Taylor, 2000; Vilhjalmsson & Kristjansdottir, 2003). Children will also differ in the aspects of PA they enjoy the most. For example, some enjoy the social aspect; whereas others enjoy competition and winning (Brustad, 1993).

Benefits of physical activity.

Childhood is an ideal time to develop physically active habits and these early PA experiences are important for developing sustainable, lifetime physically active patterns of behaviour (Noonan et al., 2016; Thompson et al., 2005; Wheeler, Cooper, Page, & Jago, 2010). Physical self-confidence, associated with proficient motor skills,

heavily influences what organised sports and unstructured physical activities children choose to participate in (Thompson et al., 2005). However, lower levels of motor skills, physical self-confidence, lack of time, limited access and high costs can hinder children's engagement in PA especially OPA (Thompson et al., 2005). Engaging in PA has overall health benefits and can help, lower blood pressure, increase muscle mass and overall mental health (Brockman et al., 2011; Noonan et al., 2016; Sallis et al., 2000).

Trends over time.

Research around the world has identified a concerning trend of PA levels among children declining (Burdette & Whitaker, 2005; Clements, 2004; Veitch et al., 2007). A recent NSW Schools Physical Activity and Nutrition Survey (SPANS) found that only 18% of girls and 28% of boys met the daily recommended PA levels (Hardy, Mihrshahi, Drayton, Bauman, 2016).

Children today have fewer opportunities to participate in AP and less contact with nature (Skar, Wold, Gundersen, & O'Brien, 2016). Some evidence links this lack of AP opportunities to the trend for parents to have more control over what their children do in their spare time (Skar et al., 2016). Children today are spending less time in AP and more time in sedentary activities. The results of the 2011-12 Australian Health Survey: Physical Activity (ABS, 2013) indicate that children are now spending about one and half hours in some form of PA but are spending about two hours in front of a screen each day. The increase in children's screen time often means children are not achieving the recommended daily one hour of recommended PA (Australian Government Department of Health, 2014; Ceciliani & Bortolotti, 2013; Strong et al., 2005). As children become older, they tend to spend less time engaged in PA and more time engaged in screen-based behaviour (ABS, 2013).

Determinants of physical activity.

Environmental and individual factors relating to the child contribute to their level of and participation in PA. Environmental factors include: neighbourhood design, parents' attitude towards PA, parents PA levels, socioeconomic status, PA related risks and time spent indoors and outdoors. The individual child factors include: age, gender, influence of peers and attitude towards PA.

Environmental determinants of physical activity.

The environment in which a child is raised, is an important influence on their PA levels. Specific aspects include the socioeconomic status of their family, the location of parks and playgrounds, the size and design of the backyard and the choices, attitudes, beliefs and values their parents or caregivers place on PA (Sallis et al., 2000; Veitch et al., 2007).

Neighbourhood design.

The design of the neighbourhood such as the amount of green space, road layout, number of busy roads, accessible amenities, the way a child views their neighbourhood and the degree of independent access to their neighbourhood greatly affects children's PA levels and experiences (Holt, Spence, Sehn, & Cutumisu, 2003; Veitch et al., 2007). Some adults only recognise formal play spaces for their children such as ovals, yards, parks and playgrounds whereas many children also consider the street, deserted spaces and alleyways as viable play spaces (Holt et al., 2003; Veitch et al., 2007). Children's access to amenities, programs, friendly neighbourhoods and time spent outside generally results in higher levels of PA (Roberts, Knight, Ray, & Saelens, 2016; Sallis et al., 2000; Veitch et al., 2007).

Children who live closer to a play area are more likely to achieve one hour of the daily recommended physical activity (Roberts et al., 2016). Children are more likely to go to the park if there is interesting and challenging playground equipment such as monkey bars and objects to climb. However, as playground and safety regulations become stricter, less challenging, and less appealing children are less inclined to go to playgrounds (Veitch et al., 2007).

There are also unfavourable associations between children's PA and the absence of crosswalks or sidewalks and busy streets. A parent's perception of neighbourhood safety, equipment structure and aesthetics may have an important impact on children's activity levels (Roberts et al., 2016). The parents of more active children reported that more and easier to access facilities and built surroundings were more likely to encourage AP in their neighbourhoods compared to parents of less active children (Roberts et al., 2016).

The "cool factor", or what is considered trendy in communities also plays an important role on what PA and active transport their children participate in their neighbourhood.

For example, it might be “cool” for a child to play outside or ride a bike in the neighbourhood (Roberts et al., 2016). In other neighbourhoods children playing outside unsupervised is rare and viewed by some residents as socially unacceptable and an example of poor parenting (Noonan et al., 2016). The trend for children not playing outside could normalise indoor play whereas a neighbourhood where children play outside freely makes parents feel more comfortable about outdoor play (Noonan et al., 2016). The way parents and other residents view the safety of neighbourhood plays an important role on how and where children play.

In a study of neighbourhood walkability, Holt et al., (2003) classified high walkability neighbourhoods as those laid out in a grid style; whereas low walkability neighbourhoods have more dead-end roads. Children living in more walkable areas participated in more active transport than children in less walkable neighbourhoods (Holt et al., 2003). Consequently, children in low walkability neighbourhoods were more likely to participate in supervised play at home (Holt et al., 2003). The walkability of a neighbourhood is more important for older children as they gain more independence (Holt et al., 2003). The main parental concerns regarding independence were traffic and strangers particularly for girls and younger children (Soori & Bhopal, 2002).

The greater availability of green spaces, such as ovals or parks also encourages intensive PA, especially for boys (Wheeler et al., 2010). However, most children play outdoors in their neighbourhood and not in green spaces (Wheeler et al., 2010). Today larger houses, on smaller blocks of land, also reduce children’s outdoor play spaces (Dollman, Norton, & Norton, 2005). In comparison, children living in cities or urban areas have less play spaces than those children living in country areas. Most urban children play in gardens or the street, while rural children play more in fields and pastures. Consequently some researchers have found that Australian children living in rural areas have higher fitness levels than those living in urban areas (Dollman et al., 2005; Wheeler et al., 2010).

Parents’ attitude towards physical activity.

Parents’ attitudes towards PA have a crucial impact on the time their children spend participating in PA, either AP or OPA (Little, 2010). The three most effective forms of parental support for promoting PA are encouragement, facilitation, (which involves

taking their children to a park or sports practice) and involvement or playing with their children (Gustafson & Rhodes 2006).

A child's primary caregiver is usually the mother as they are the main person who plans their child's activities, makes their food and understands the child's physical activity habits (Gattshall, Shoup, Marshall, Crane, & Estabrooks, 2008). Usually the mother is twice more likely to be the primary caregiver than the father (Kalenkoski, Ribar, & Stratton, 2005). On the weekends, mothers usually spend less time in the primary caregiver role and fathers tend to take over (Kalenkoski, et al., 2005). Mothers usually try to structure their child's activities the way they think their child will learn best. This includes deciding whether OPA or AP is more beneficial for their child (Fisher et al., 2008). In addition a parent's instrumental behaviour can be a positive influence on children's PA levels. Instrumental behaviours include providing their children with play equipment around the home (inside and outside) or transporting them to a park or an organised activity (Mitchell, Skouteris, McCabe, Ricciardelli, Milgrom, Baur, & Dwyer, 2012). Children are more likely to achieve the required 60 minutes of PA if their parents provided an environment encouraging PA (Roberts et al., 2016).

Parents' physical activity levels.

Parents are the gatekeepers of their children's PA levels and their own physical activity levels are considered to be a predictor of their children's PA levels (Gustafson & Rhodes, 2006; Rhodes, & Lim, 2017; VanDerworp, & Ryan, 2016). Parents actively participating alongside their children and promoting an active lifestyle appear to be a primary motivator for out of school physical activity and an effective way to increase PA levels (Noonan et al., 2016). VanDerworp and Ryan (2016) suggested that children are more inspired to partake in PA when their parents participate with them.

Many studies have reported that children with two active parents are six times more likely to be physically active than children who have one or two inactive parents (Brustad, 1993; Gustafson & Rhodes 2006; Irwin, He, Bouck, Tucker, & Pollet, 2005; Thompson et al., 2005). This influence appears to be particularly effective with younger children and girls (Gustafson & Rhodes 2006; Jago, Fox, Page, Brockman, & Thompson 2010). For boys, it appears that those from a two-parent family tend to be less active than boys who have a single parent, which could be because they have to

use active transport to get around rather than be driven (Sallis et al., 2000). Overall, parents participating in PA with their children is an effective way to boost family PA levels (Rhodes & Lim., 2016).

The evidence regarding parents being active role models varies and is inconsistent throughout the literature. Some research suggests that the influence of parents as PA role models has declined (Dollman et al., 2005). While parents can be an important PA role model for their child they do not necessarily have to be active themselves to have active children (Solomon-Moore, Sebire, Thompson, Zahra, Lawlor, & Jago, 2017). Parent's attitude towards their children's participation in PA is more important to support and encourage these behaviours (Mitchell et al., 2012).

Some studies have found the mother to be more influential as a PA role model than fathers (Bois; Sarrazin and Brustad, 2005; VanDerworp, & Ryan, 2016). Children of active fathers are three to five times more likely to be more active than are children with non-active fathers (Gustafson & Rhodes 2006), whereas children of active mothers are only two times more active than children with non-active mothers. Fathers who are more educated are more likely to encourage their children to engage OPA compared to fathers with lower levels of education. A common finding is a relationship between fathers and sons for PA and especially OPA and between mothers influencing their own and daughters PA levels (Gustafson & Rhodes 2006; Yang, Telama, & Laakso, 1996).

However other evidence suggests that parental role modelling and children's PA levels are unrelated and have neither a positive or negative effect on their children's PA levels (Bauman, Reis, Sallis, Wells, Loos, Martin, & Lancet Physical Activity Series Working Group, 2012; McGuire, Hannan, Neumark-Sztainer, Cossrow , & Story, 2002; Edwardson & Gorely, 2010; Trost, Sallis, Pate., Freedson, Taylor, & Dowda, 2002; VanDerworp, & Ryan, 2016). What appears to be missing is an examination as to whether parental importance ratings influence the type of physical activity their child are engaging in.

Socioeconomic status.

Children from lower socioeconomic backgrounds often play more actively without supervision than children from higher socioeconomic backgrounds (Brockman, Jago, Fox, Thompson, Cartwright, & Page, 2009; Moussa, Hamid, Elaheh, & Reza, 2013;

Soori & Bhopal, 2002). This could be because the parents are working and it could be harder and more expensive to enrol their children in OPA activities. Parents from lower socio-economic backgrounds are more likely to let their children cross-busy roads go to the park autonomously or ride their bikes without a helmet (Soori & Bhopal 2002). In contrast, children from high to middle socioeconomic schools usually participate in more organised, rule based and adult controlled PA after school and on weekends. Children attending middle to high socioeconomic schools tend to participate in more family orientated PA (Brockman et al., 2009). For example, children from middle to high socioeconomic backgrounds are more likely to go on family outings to the beach or park than those children from lower socio-economic backgrounds.

Parents with children in middle to high socioeconomic schools are more likely to support their children in nonverbal ways to partake in OPA by providing financial support or driving them to the activity. Parental support and finances also influence the physical activity in which, children engage in (Brockman et al., 2009). Parents with children attending low socioeconomic schools tend to use verbal means to encourage their children to participate in OPA such as simply telling their children to go to sports training rather than buying them equipment or taking them (Brockman et al., 2009).

Physical activity related risks.

Occasionally children get injured when engaging in PA (Soori & Bhopal, 2002; Strong et al., 2005) and these are the primary reason for hospital emergency visits (Morrongiello & Hogg, 2004). Some parents are overly concerned about their children's safety and in some instances may try to deter their children from engaging in certain activities because they could get hurt (Little, 2010). For example, some parents may feel it safer for their children to participate in more OPA than AP because it tends to be more structured and supervised (Noonan et al., 2016). Soori & Bhopal (2002) used a cross sectional questionnaire and collected data on what children thought they were allowed to do and compared this to what their parents allowed them to do. The number of injuries experienced by children is considered to be associated with the amount of parental supervision as children are more likely to engage in activities they are not allowed to while they are unsupervised (Soori & Bhopal, 2002). Children are more likely to be injured when their parents are not supervising them (Morrongiello & Hogg, 2004). Injuries can occur both during AP such as falling off a

bike or out of a tree or when participating in OPA, for example being hit by a ball or having a collision with another player.

Time spent indoors and outside.

The time children spend outside usually relates positively with the energy they expend being active (Brockman et al., 2010; Dollman et al., 2005; Wheeler et al., 2010). PA levels are higher outside of school hours and weekends as children have more control over what they participate in. School days tend to be more structured and children engage in more OPA (Brockman et al., 210). There is a high correlation between low overall PA and minimal PA at home (Holt et al., 2003), indicating children are spending less time outdoors involved in AP and OPA activities.

Many of today's children prefer to engage in sedentary/passive behaviours given the rapid advances in technology (Veitch et al., 2006), these include the many screen based activities such as computers, video games and television. This has contributed to lower levels of physical activity and AP (Thompson et al., 2005). During unstructured time many children are engaging in these activities rather than playing outside (Burdette & Whitaker, 2005; Clements, 2004; Noonan et al., 2016; Veitch et al., 2007).

While it is recommended that children limit their screen time to two hours a day, studies indicate that children are spending up to 38 hours a week in front of a screen (Thompson et al., 2005). According to the 2008 Western Australian Child and Adolescent Physical Activity and Nutrition Survey (CAPANS) report, 71 % of boys and 75 % of girls spent more than two hours per day in front of screens (Rosenberg et al., 2008). The 2008 CAPANS collected information from children in years 3, 5, 7, from 19 primary schools across the Perth region about their physical activity behaviours.

One possible reason for this increased sedentary behaviour could be that parents consider inside sedentary activities safer and easier to supervise than outside activities. Busy parents may also use screen-based technologies as a way to entertain their children, especially after school and on weekends, rather than encourage more active play (Sallis et al., 2000; Thompson et al., 2005). Yet it is difficult to motivate children who like sedentary activities to participate in physical activity (Irwin et al., 2005). Ultimately, parents determine whether their children play inside or outside the home (Sallis et al., 2000; VanDerworp, & Ryan, 2016).

Child factors.

A variety of individual factors relating to the child can influence PA levels, including age, gender, the influence of peers and their attitudes towards PA.

Age.

As children grow and mature, their fundamental movements develop into specialised and complex movements that are important for active play, games, and sports (Strong et al., 2005). The type of physical activity changes with maturity. Six- to nine- year-olds tend to participate in more active play type games such as tag whereas older children engage in more individual activities, group activities and organised physical activities (Strong et al., 2005). Unfortunately, after the ages of 10 to 12 years, PA levels begin to decline, especially in girls, and sedentary behaviours increase (Brockman et al., 2009; Vilhjalmsson & Kristjansdottir, 2003).

Gender.

Boys are reported to participate in more PA than girls in both AP and OPA (Hardy et al., 2016; Gustafson & Rhodes 2006; Jago, Fox, Page & Brockman, 2010; Kunesh, Hasbrook, & Lewthwaite, 1992; Noordstar, van der Net, Jak, Helders, & Jongmans, 2016; Telford et al., 2016; Thompson et al., 2005; Trost, et al., 2002; Sallis et al., 2000). Boys also participate in more moderate to vigorous activity whereas girls participate in more light to moderate activity (Brustad, 1993; Brustad, 1996 & Ridgers, Saint-Muarice, Welk, Siahpush & Huberty, 2011). Girls enjoy more passive, creative and less intense activities and depend less on sports participation as a means of socialising (Brustad, 1993; Brustad, 1996 & Ridgers et al., 2011; Harten, Olds & Dollman, 2008). While boys prefer to engage in more intense competitive PA that are usually sports based (Brustad, 1993).

Significant PA differences exist particularly relating to risky behaviour, the role of parents and this might be due to varying behaviour expectations (Morrongiello & Hogg, 2004; Roberts et al., 2016). Morrongiello & Hogg (2004) suggest that risky behaviours are either naturally compelled and stem from characteristics such as thrill seeking, or are attributed to socialisation. While boys and girls often participate in similar activities, boys are more likely to partake in dangerous behaviours while being watched and are more likely to touch dangerous objects that girls would avoid (Morrongiello & Hogg, 2004).

Mothers are more understanding and expect boys to participate in risky behaviours more than girls (Morrongiello & Hogg, 2004). Boys are permitted to wander further from home, and thereby receive less supervision than girls (Soori & Bhopal, 2002). Parents also tend to allow boys and older children more independence at a younger age when playing outside compared to what they allow their daughters and younger children to do (Noonan et al., 2016; Soori & Bhopal, 2002).

Furthermore, parents also point out more dangers to daughters (Morrongiello & Hogg, 2004). For example, Morrongiello & Hogg (2004) found that mothers viewed the same scenario as more dangerous for daughters than sons. When a daughter acted inappropriately, parents were disappointed and thought their daughters should have known better (Morrongiello & Hogg, 2004). Whereas if a son did the same thing, the parents tended to be angry yet expected their sons to act that way (Morrongiello & Hogg, 2004). This study examined 50 mothers who had both a daughter and a son and the mothers completed questionnaires about scenarios both related to injury and non-injury scenarios.

Boys who take more risks blame getting hurt on bad luck rather than their own behaviour and consider themselves less prone to getting hurt than their friends (Morrongiello & Hogg, 2004). In comparison, girls, who take less risks thought they were more prone to getting hurt than their friends (Morrongiello & Hogg, 2004).

Influence of peers.

PA provides an opportunity for children to play and interact with their peers (Thompson et al., 2005; Veitch et al., 2007). As they mature, their social awareness moves away from the family and towards peers (Isenberg & Quisenberry, 2002). Peers become a more important influence, as older children are more likely to be involved in a new sport if their friends are involved or go to the park if they have a friend to play with (Brockman et al., 2009; Thompson et al., 2005; Veitch et al., 2007). Socialising with peers and classmates during PA is important and will either encourage or discourage children to participate. Children who experience peer acceptance and positive interactions enjoy PA, whereas children who experience negative interactions with peers begin to avoid PA, especially during school hours (Kunesh et al., 1992).

Negative treatment from peers often occurs during school hours, in structured settings such as sports and on the playground. Negative behaviours from children during

school hours differs from negative behaviours while playing with peers at home as it does not stop them from playing (Kunesh et al., 1992). In summary, parents control what their children are allowed to do, not do, where their children play and what PA behaviours to encourage. A child's gender, age and friends can also influence how much and what type of PA occurs.

Attitude towards physical activity.

MacDougall, Schiller, and Darbyshire, (2004) conducted focus groups with four to 12-year-old children to investigate their perceptions of PA. The children in this study viewed PA as an adult word that had little meaning to them. Children did however differentiate between AP and OPA. They viewed OPA as managed and regulated by adults, whereas AP was not. Children viewed AP as an activity dominated by children and characterised as spontaneous, amusing, a chance to socialise with peers and free from rivalries or aggression (MacDougall et al., 2004).

In the next section of the literature review, an examination of the environmental and individual determinants specific to AP and OPA for a child will be investigated. In Table 1 the similarities and differences between the benefits of AP and OPA are summarised (see Table 1).

Table 1.
Differences and Benefits of Active Play and Organised Physical Activity

| | Active Play | Organised Physical Activity |
|-------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Differences | Child directed | Adult directed |
| | Little structure | More structure |
| | No set rules | Set rules |
| Benefits | Encourages creative and free thinking, problem solving. | Learns sportsmanship and about winning and losing |
| | Stimulates intellectual development such as organising, arranging and decision making | |
| | Promotes physical, cognitive, and social/emotional development | Promotes physical, cognitive, and social/emotional development |
| | Enhances cardiovascular fitness Intense cardiovascular activity and high-energy expenditure | Enhances cardiovascular fitness Intense cardiovascular activity and high-energy expenditure |
| | Encourages peer interaction Develops social skills | Encourages peer interaction Develops social skills |
| | Opportunity to develop motor skills | Opportunity to develop motor skills |

Active play.

Play is defined in many ways in the literature and also differs to individual perceptions (Fisher et al., 2008). There are also many different types of play, which such as active, passive, fantasy, independent and coemptive (Ceciliani & Bortolotti, 2013). For example, play can be passive, such as playing with dolls or race cars, or it can be active such as playing chasey or climbing trees. Play helps children learn, heighten problem-solving skills and encourages creative thoughts (Brockman et al., 2011).

AP, of primary interest to this study, is defined as playing for fun, and not in an organised way (Maddison et al., 2014 p.3). Synonyms for active play include unorganised play, non-organised play and free play. Similar terms include

unstructured play and unorganised play. AP can be a primary contributor to a child's level of physical activity (Brockman et al., 2010; Skar et al., 2016). It encourages all children to get involved, as some children do not excel at or enjoy sports (Pellegrini & Bohn, 2005).

Brockman et al., (2011a) conducted focus groups with children aged between 10 and 11 year olds in order to identify the enablers and constraints to participation in AP. The researchers found that children see AP as an enjoyable opportunity to have more freedom to play with fewer rules, socialise, and minimise boredom (Brockman et al., 2011a). Limiting factors were parental constraints, social uneasiness and the introduction of rules. Children pointed out that mobile phones made engagement in AP easier as parents have a better idea of where their children are and can easily check in on them (Brockman et al., 2011a).

Children often enjoy PA more when it is less structured and not competitive (Allender, Cowburn, & Foster, 2006). Generic factors affecting overall physical activity identified above including socioeconomic status, age and gender also influence a child's active play choices (Veitch et al., 2007).

Benefits of active play.

AP promotes children's physical, educational/cognitive, and social/emotional development (Brockman et al., 2011; Burdette & Whitaker, 2005; Fisher et al., 2008; Skar et al., 2016; Veitch et al., 2006). Active play aids in developing gross motor skills, enhances cardiovascular fitness and encourages energy expenditure (Pellegrini & Bohn, 2005). Intense cardiovascular activity and high-energy expenditure do not always occur during OPA and some argue it is more likely during AP (Burdette & Whitaker, 2005; Skar et al., 2016).

Playing actively outside is an important part of children's development (Brockman, et al., 2011) and provides many benefits different from OPA. Outside settings allow opportunities to use natural materials such as water, mud, sand and dirt (Isenberg & Quisenberry, 2002). Besides increased performance in school, playing outside promotes freethinking, brain development, a deeper connection for places and increases environmental learning (Pellegrini & Bohn, 2005). AP encourages creative

and, problem solving and stimulates other intellectual behaviours such as organising, arranging and decision-making (Burdette & Whitaker, 2005).

Children, particularly boys, use invented games to help adapt to school early on, and gain social capacity (Pellegrini & Bohn, 2005). Engaging in these informal games with friends encourages social skills, increases coordination, physical talents, and forms ideas like cooperation and rivalry. AP gives children a chance to exhibit skills, talents and expertise to peers and themselves (Isenberg & Quisenberry, 2002). Playing and interacting with peers can help with self-esteem and lower social anxiety (Lieberman, Chamberlin, Medina, Franklin, Sanner, & Vafiadis, 2011).

Children could also be participating in less AP after school and on the weekends because they are engaging in family activities, homework, other organised activities and OPA (Brockman, Jago, & Fox, 2010 Fisher et al., 2008; Thompson et al., 2005; Veitch et al., 2007). There is increasing parental and educational pressure on children to do better in school and on standardised tests (Pellegrini & Bohn, 2005). As children get older, they may lean more towards playing with electronic devices and less towards playing outside (Brockman et al., 2011; Hardy et al., 2016).

Trends over time.

As children get older they tend to gain more independence, make more decisions and venture further from home to play (Holt et al., 2003; Little, 2010). However, children's autonomous mobility has reduced over the last 20 years as has unsupervised outdoor AP and active transport (Soori & Bhopal 2002; Thompson et al., 2005; Skar et al., 2016; Veitch et al., 2007). Since the 1980's, children's contact with nature has decreased as parents decide more what their children do than in the past decades, this is referred to as the denatured child (Skar et al., 2016).

Two recent Western Australian studies the 2003 and 2008 CAPANS reports examined PA levels in children (Hands et al., 2004; Rosenberg et al., 2008). The two reports highlighted a decreasing number of children participating in AP. In 2003, 30 % of primary school students did not participate in AP (Hands et al., 2004). Furthermore, the 70 % of primary school children who participated in AP tended to participate in moderate AP rather than more vigorous AP (Hands et al., 2004). The results showed a 20 % reduction in AP, as children got older. In the 2008 survey, the majority of

primary school students participated in at least one hour of active play per week, which is less than in 2003 (Rosenberg et al., 2008).

Determinants of active play.

A number of environmental and individual factors contribute to children's level of AP. The environmental determinants include: parents, parents' attitude towards AP, and socioeconomic status. The individual child factors include: age, gender, and influence of peers.

Environmental factors.

Environmental factors that influence AP include factors relating to parents such as their attitude towards AP and the family's socioeconomic status.

Parents.

Parents determine the amount of time their young child spends outside in AP and whether they play unsupervised (Moussa et al., 2013; Veitch et al., 2006; Veitch et al., 2007). Recently, some evidence indicates that parents have reduced their children's ability to independently play in open spaces such as streets or parks (Moussa et al., 2013) due to rising or perceived safety concerns (Brockman et al., 2011; Veitch et al., 2007). Many parents consider their children, especially girls, are not safe playing independently outside, at night, or after school, and therefore should be supervised (Thompson et al., 2005; Veitch et al., 2007). Children now have fewer opportunities than previous generations to play in outdoor public spaces and therefore must rely on parents to take them to the park (Veitch et al., 2007). Younger children mostly play in the front or back yard where they have more adult supervision (Holt et al., 2003). Soori and Bhopal (2002) found that only some parents allowed their children aged seven or eight years to play in the street alone or with friends, cycle and cross residential roads alone. While children aged between 10-12 years were given more freedom and allowed to go to playgrounds and school alone, and crossing busy roads (Noonan et al., 2016; Soori & Bhopal, 2002). The parents of more active children pointed out that it was easier to access facilities and built surroundings that encourage AP in their neighbourhoods compared to those parents of less active children, who may lack access to facilities such as parks or playgrounds in their neighbourhoods (Roberts et al., 2016). Groups of teenagers, traffic and stranger danger (Brockman et al., 2011)

also intimidate younger children. Clements (2004) found that 82 % of mothers identified safety matters and crime as the main reason not to let their children play outside.

Parent attitude towards active play.

The amount of AP children participate in may also depend on the attitude of parents (Brustad, 1993). Some parents place more of an emphasis on spending time in adult initiated activities such as music lessons, organised play dates, and OPA (Clements, 2004). They feel it is safer for their children to play actively near the home where they can be supervised. The way children and their parents perceive the safety of the neighbourhood also greatly affects the children's ability to travel around and play unsupervised (Brockman et al., 2011; Veitch et al., 2007). Children's OPA is more inhibited, privatised, regulated and with more adult instruction than AP (Holt et al., 2003). There is increased parental and educational pressure on today's youth to improve academically, which has reduced time available for AP (Fisher et al., 2008).

Socioeconomic status.

Houses are being built on smaller blocks which has resulted in reduced play spaces and therefore potentially limits the active playtime around the home (Dollman et al., 2005). Some children, particularly those in low to middle socio-economic areas, feel vulnerable and frightened by teenage gangs in parks which could limit the possibility of playing in nearby parks (Veitch et al., 2007).

Children attending lower socioeconomic schools usually have less parental supervision and therefore participate in more AP (Brockman et al., 2009; Moussa, et al., 2013; Soori & Bhopal, 2002). This is usually because participating in OPA is more expensive and children also have to rely on parents to drive them to games or practice.

Child factors.

Individual factors relating to the child also influence active play and include gender, age and the influence of peers.

Gender and age.

Many previous studies have found that younger children and boys engage in more AP than girls and older children (Gustafson & Rhodes 2006; Jago et al., 2010; Kunesh et

al., 1992; Thompson et al., 2005; Trost, et al., 2002; Sallis et al., 2000). However, these trends may change with time because children are spending more time in sedentary behaviours. Boys tend to engage in more vigorous activities than girls do (Thompson et al., 2005; Trost et al., 2002; Vilhjalmsson & Kristjansdottir, 2003). Girls who participate in more AP have overall higher PA levels than those girls who participate in less AP (Brockman et al., 2010). While boys who participate in more AP on average have higher weekly PA levels over those boys who participate in less AP (Brockman et al., 2010).

Parents usually supervise and watch their daughters more despite there being no difference in ability to complete the task in an AP situation (Morrongiello & Dawber, 2000). For example, boys and girls are both perfectly capable of climbing a tree but a mother is more likely to be more worried about their daughter's than their son's safety and ability to climb the tree.

Ridgers et al., (2011) observed children's AP and OPA during recess over a school year. Their results suggested that girls engage in more socialisation behaviour than boys who engaged in sports that are more competitive and games. Girls are more inclusive and play in more passive games such as shooting hoops and hide and seek. Girls also tend to play more inventive and creative games while boys play more classic games with existing rules such as (Harten et al., 2008). Some boys' scrutinised girls' physical abilities during school play periods, and considered their skills were better than the girls. Such scrutinisation discouraged some girls from playing OPA games during recess; and so would rather play with friends at home where there is less scrutiny (Kunesh et al., 1992). Children's playground behaviours differ from AP activities at home, as they engage more with their peers (Ridgers et al., 2011). Girls like to participate and engage more in AP at home and in the neighbourhood than at school (Kunesh et al., 1992).

The 2003 CAPANS report noted that boys and girls aged between 5 and 9 years differed in the most popular AP activities outside of school (Hands et al., 2004). Bike riding was the most popular activity for boys (80 % participation rate), whereas the most popular activity for females was playing with pets (75 % participation rate). The frequency of AP sessions for boys and girls were similar with the boys being slightly more active. In the follow up CAPANS 2008 report, the PA activities were reported

according to light, moderate and vigorous intensity. Movement based video games were the most popular activity for boys 71 % participation rate, while for girls it was still playing with pets 75 % participation rate (Rosenberg et al., 2008).

Influence of peers.

Ridgers, Saint-Maurice, Welk, Siahpush, and Huberty, (2011) suggest that children get more PA when they engage with their peers in a non-organised environment than when they participate in organised activities with more adult control. AP allows spontaneous social interactions that do not happen in a classroom and encourages everyone to be involved (Brockman, et al., 2011; Pellegrini & Bohn, 2005). Children recognise that AP is a good chance to socialise with peers more than at an organised sporting club, which is focused on playing the sport (Brockman et al., 2009). Table 2 highlights the similarities and differences between environmental determinants and child characteristics in AP and OPA.

Organised physical activity.

OPA is sports orientated, more adult directed, has more rules, and structure than AP. Activities with more rules and structure such as OPA become more appealing to children as they get older (Brustad, 1993; Isenberg & Quisenberry, 2002; Rhodes & Lim., 2016).

Table 2.
Environmental determinants and child characteristics of Active Play and Organised Physical Activity

| | Active Play | Organised Physical Activity |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmental Determinants | | |
| Parent Attitude | <p>Young children and girls are unsafe playing outside unsupervised</p> <p>No control if they play unsupervised</p> <p>Not socially acceptable to let kids play outside in some areas</p> <p>Control the amount of time their child spends in AP</p> <p>Important for their child's socialisation</p> <p>Safer to play near home where they can be watched</p> <p>Less AP due to homework and organised activities</p> | <p>Some OPA activities can support aggressive behaviours</p> <p>Must take them to OPA games or training</p> <p>Control the amount of time their child spends in OPA</p> <p>Important for their child's socialisation</p> |
| Parents activity levels | <p>More active children are more likely to have more active parents</p> <p>Parents activity levels influence their children's</p> <p>The literature is mixed on what level parents PA levels influence their children's</p> | <p>Parent encouragement means more levels of OPA especially for boys</p> <p>Parents activity levels influence their children's</p> <p>The literature is mixed on what level parents PA levels influence their children's</p> |
| Socioeconomic status | <p>Houses on small blocks limits play spaces around the home</p> <p>Low SES communities have fewer play spaces</p> <p>Parents perceive some parks, roads, and neighbourhood spaces as unsafe</p> | <p>Registration fees and uniforms can restrict participation for those in lower SES areas</p> |
| Child Characteristics | | |
| Age | Younger children engage in more AP | Older children engage in more OPA |
| Gender | <p>Boys engage in more vigorous AP</p> <p>Girls participate in more moderate activity</p> <p>Girls supervised by parents more than boys</p> | <p>Boys participate in more vigorous team sports</p> <p>Girls participate in more individual less vigorous sports</p> <p>Boys get more support from parents than girls for OPA activities</p> |

| | Active Play | Organised Physical Activity |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Influence of peers | <p>Allows spontaneous social interactions with peers</p> <p>Encourages everyone to be involved</p> <p>More PA occurs when children engage with their peers than when they participate in OPA</p> <p>Opportunity to socialise with peers</p> | <p>Older children are more likely to be involved in a new sport if their friends are involved</p> <p>Negative experience from peers can cause withdrawal from OPA</p> <p>Opportunity to socialise with peers</p> |
| Motor skills | <p>Allows all children to participate and level of motor skills is not a determining factor</p> | <p>Children with higher motor skills participate in more OPA</p> |

Benefits of organised physical activity.

Following and playing by the rules can mean winning, which becomes important especially as children get older (Isenberg & Quisenberry, 2002; Rhodes & Lim., 2016). OPA teaches sportsmanship the importance of competition, winning or losing and also encourages team building (Rhodes & Lim., 2016). In addition, teaching and coaching styles associate positively or negatively with OPA and self-esteem, which may affect a child's willingness to participate or withdraw (Vilhjalmsson & Kristjansdottir, 2003). For example, if a child has a coach who supports and encourages them they are more likely to want to continue playing as this was a positive experience. Whereas if a child is ignored or told they are not very good, they are less likely to want to participate in OPA as they have had a negative experience negative.

Trends over time.

The type and amount of OPA children that participate in depends on socioeconomic status, and parental attitude towards OPA. Clements, (2004) compared the activities that mothers engaged in when they were young children and what activities their children engaged in. Children participated in less outdoor activities such as exploring nature and climbing trees and participated more in organised sports similar to those their mothers did at the same age (Clements, 2004). The Australian Sports Commission (2016) report noted that children began participation in OPA between the

ages of 5 to 8 year olds for fun and building on basic skills and started to refine skills during the ages of 9 to 11 year olds.

A recent ABS report on children's participation levels in sport (ABS, 2012) revealed an overall participation rate of 66 % in dance and OPA. The nine to 11 year-old age group was the most active with a participation rate of 73% and a slightly higher percentage for boys. Participation in dance and tennis has declined by about 10 % since 2003 while soccer has increased by 17% since 2003. The most popular organised physical activity was swimming and this was unchanged from the 2003 report.

Determinants of organised physical activity.

Environmental and individual factors contribute to children's level of participation in OPA. The environmental determinants include: parents, parents' attitude towards OPA, parent activity levels and socioeconomic status. The individual child factors include: age, gender, and motor skills.

Environmental factors.

Environmental factors that influence OPA include parents, parent attitude, parent activity levels and socioeconomic status.

Parents.

The level of children's engagement in OPA suggests the degree parents consider this important for their child's socialisation (Brustad, 1993). Some parents believe that OPA, for example hockey, encourages aggressive behaviours which can change their children's behaviours. Other parents are happy as long as their children are engaged in some form of OPA (Irwin et al., 2005). Many parents also plan their children's free time more around structured activities such as homework, music lessons and OPA.

Parent attitude.

Research suggests that parental backing is the biggest predictor of child's physical activity behaviour (Kwon, Janz, Letuchy, Burns, & Levy, 2016). Parents who encourage their children's OPA register them into the sport, transport them to training and the game, and watch them play (Thompson et al., 2005; Sallis et al., 2000). The more support boys get from parents the more likely they are to be active whereas there

is no relationship between PA levels and parental support for girls (Telford, Telford, Olive, Cochrane, & Davey, 2016).

Parent activity levels.

Children with inactive parents or those who participated in low to moderate PA were more likely to stop participating in sporting activities. The children of physically active fathers were more likely to participate in OPA and less likely to drop out than those with inactive fathers (Yang et al., 1996). A father's level of physical activity heavily influences boys' and girls' participation in organised physical activity. While the mother's usually only influences their daughters (Yang et al., 1996). Parents telling their children they are doing a good job and who watch their children engage in OPA are more encouraging and supportive than parents just telling their children to participate in OPA (Brockman et al., 2009).

Socioeconomic status.

Many families especially those from lower socioeconomic areas find it expensive to enrol their children into an organised physical activity such as swimming lessons, dance classes, or team games, such as basketball, that require registration fees and uniforms (Brockman et al., 2009; Dollman et al., 2005). Parents stated cost was a main barrier to their children participating in OPA (Brockman et al., 2009; Noonan et al., 2016). Girls with fathers from higher socioeconomic backgrounds were more likely to participate in OPA than those girls with fathers from low to middle socioeconomic backgrounds. This is because these fathers are more likely have the time and financial means to support their child's OPA (Yang et al., 1996).

Child factors.

Individual factors relating to the child also influence OPA and include gender, age, the influence of peers and motor skills.

Gender and age.

The National Junior Sport Policy recommends that the ideal age for children to start to compete in modified organised sports is between 5 and 12 years (Australian Sports Commission, 2016). Some sports have developed modified versions for younger

children, encouraging OPA participation at a younger age (Australian Sports Commission, 2016).

Boys often get more backing from parents to participate in OPA than girls (Telford et al., 2016; Sallis et al., 2000). Some evidence suggests boys have more confidence in their sporting ability than girls (Brustad, 1993; Noordstar et al., 2016). Boys often communicate to their parents that succeeding and competing in sports is important to them (Brustad, 1993) whereas girls are less inclined to value winning and competition. Consequently, many girls engage in less OPA, and get less social support from families (Telford et al., 2016).

These factors support the activity differential hypothesis, which proposes that boys who participate in OPA engage in more vigorous PA than girls (Vilhjalmsson & Kristjansdottir, 2003). Boys use more space and play more competitive games that are centred on winning, such as soccer, as players with higher skills prevail (Brustad, 1993). Whereas more girls participate in less vigorous, competitive and individual sports such as dance and gym (ABS, 2012; Vilhjalmsson & Kristjansdottir, 2003). Boys get more support and participate in more PA than girls and tend to have more active friends (Brustad, 1993).

Relative to boys, girls are less likely to take part in and sign up for OPA at the club level. Girls are also more likely than boys to quit if they have a bad experience (Vilhjalmsson & Kristjansdottir, 2003). Girls' tend to participate more in physical activity that they think will enhance their body image or gain health benefits as opposed to boys who just enjoy the competitiveness that shows off their skills (Vilhjalmsson & Kristjansdottir, 2003). Older children can be discouraged to start a new sport if they feel they are too old and the competition can be off putting (Thompson et al., 2005). Decreased importance in sport participation for girls occurs as they get older whereas for boys the opposite occurs. This decreased importance could be due to fewer options and support for girls to continue participating (Telford et al., 2016).

Motor skill.

A child's level of motor competence also impacts their level of engagement in OPA. Parents and friends are also more likely to encourage children who demonstrate a high level of sporting ability to pursue further organised physical activity. Those not as skilled may be discouraged or may choose not to participate (Telford et al., 2016;

Thompson et al., 2005). Boys with more advanced motor skills are more active than boys with poorer motor skills who were often ignored by their peers, coaches and even teachers (Harten et al., 2008). Unlike boys, there seems to be less difference in physical activity levels between girls with high and low motor skills (Harten et al., 2008; Wheeler et al., 2010).

Summary

In conclusion, a child's level of AP and OPA is influenced by both environmental and individual factors. What may be of paramount importance, yet to date largely unexplored is the relative importance their parents place on AP compared to OPA. After the examination of the literature, no studies were identified that addressed this issue.

Little is known about how the importance a parent (mother and/or father) places on their child's AP time compared to OPA, how this may differ between boys and girls and with age. Further, it is unclear whether a more active parent may rate one type of PA more highly than the other and if a relationship exists between the parents PA level and their child's PA. This research study was designed to examine these relationships.

Chapter Three

Methods

Study Design

The study used survey methodology to examine the relative importance that parents (both the mother and father) placed on active play compared to organised physical activity. The parents' own physical activity level and how these importance ratings related to their child/children's levels of active play and organised physical activity were examined. In this chapter, the methods and results of a pilot study undertaken to establish the validity and reliability of two semantic differential scales to measure the importance ratings are reported. The measures used to determine parent and children's weekly physical activity are also described. Finally, an outline of the main study including the sample, setting, recruitment, data analysis and ethics are outlined.

Measures

The following section describes the measures used in the study including the development and validation of the importance scales, the parent physical activity questionnaire and the child physical activity diary.

The development and evaluation of the importance scales.

In order to measure the level of importance that parents attribute to their children's AP and OPA, two semantic differential scales were developed. The scales have bi-polar endpoints from one (not important) to ten (important) (Brace, 2013; Hair, Wolfinbarger, Money, Samouel, & Page, 2003). The participants completed the survey and then again seven days later, only one participant was unable to complete the test re-test.

How do you rate the importance of active play for your child? Please circle your response.

| | | | | | | | | | | |
|---------------|---|---|---|---|---|---|---|---|----|-----------|
| Not important | | | | | | | | | | Important |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |

How do you rate the importance of organised physical activity for your child? Please circle your response.

| | | | | | | | | | | |
|---------------|---|---|---|---|---|---|---|---|----|-----------|
| Not important | | | | | | | | | | Important |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |

Figure 2. The semantic differential scales for parent importance ratings of active play (AP) and organised physical activity (OPA) that aided in validation and reliability in order to be used in the main study.

Before using these measures in the main study, the validity and reliability of the scales were evaluated. A small study was undertaken with experts in the field and representatives of the target audience to determine the face and content validity and reliability of the two semantic differential scales (Babbie, 1999). Content validity is the degree that a measurement tool is measuring what it is designed to measure (Kimberlin & Winterstein, 2008). Face validity is established when the survey "looks valid" to experts, the researchers who decide to use it, and the survey's target participants (Brace, 2013). If the respondents agree that the survey will measure what it is intended to, evidence of the face validity of the measure is established (Brace, 2013; Hair et al., 2003). The reliability of the measurement tool was determined by using a seven-day test-retest of the survey.

A definition of each construct was supplied (see Appendix A). To establish content validity, the participants rated on a scale of one (not a valid form of measurement) to 10 (a valid form of measurement) to what extent they thought each scale was a valid measure of the importance ratings. Second, the reliability of the measurement tool was determined by using a seven-day test-retest protocol. Seven days is considered sufficient for participant responses on the first survey not to alter responses on the second survey (Burton et al., 2011; Kimberlin & Winterstein, 2008).

Sample.

The sample of 20 comprised 14 experts (five females and nine males) and six parents (four females and two males); the latter had children aged between 5 and 11 years old living in Perth, Western Australia. The 14 experts had a Masters or PhD degree in the Education or Health Science related fields. Participant parents provided the age of their child/children, and their highest level of their education.

As the results were skewed towards the higher end, the mean (M), standard deviation (SD), range and median are reported. The mean and median for occasion one and two were similar. The test-retest correlations between responses on Occasion One and Occasion Two were moderate (Table 3). As the data were skewed, the nonparametric Spearman's rho correlation coefficients are reported.

Table 3.
Mean (SD) and median of ratings for AP and OPA importance scale on Occasion 1 and 2.

| | Occasion One | | | Occasion Two | | | Correlation |
|-----|--------------|-------|--------|--------------|-------|--------|----------------|
| | M (SD) | Range | Median | M (SD) | Range | Median | Spearman's Rho |
| AP | 9.2 (1.1) | 7-10 | 10.00 | 9.2 (1.0) | 7-10 | 10.00 | .55 |
| OPA | 8.7 (1.1) | 6-10 | 9.00 | 9.0 (0.9) | 7-10 | 9.00 | .65 |

The results from this small study provide evidence that the two importance scales (Figure 2) are valid and reliable.

Parent physical activity questionnaire.

Parent physical activity levels were determined using a seven-day physical activity recall questionnaire (Timperio, et al., 2003). In that 2003 study, evidence for validity and reliability of the questionnaire was gathered using a sample of 144 Australian adults. This study measured the importance parents placed on their child's physical activity, on a scale of one to five (Timperio, et al., 2003). The questionnaire was administered twice, three days apart, to establish reliability and with high agreement (>90%). Evidence of concurrent criterion validity was established when participants wore accelerometers for a week and then completed the questionnaire, rho=0.39 [p>0.01] (Timperio, et al., 2003).

Child seven-day physical activity diary.

The parents in this study recorded each child's weekly physical activity levels using a daily physical activity diary. This diary tool was used in the world-renowned Western Australian Pregnancy Cohort Study (www.rainestudy.org.au). The seven-day diary requires parents to document the organised physical activity and active play undertaken by their child each day and the time involved. The original physical activity diary measured children's weekly physical activity levels. This research study measured children's weekly AP and OPA levels. Parent report activity diaries are more reliable and valid tools with this age group, as young children are unable to accurately and reliably record their own activities (Baranowski, Dworkin, Cieslik, Hooks, Clearman, Ray, & Nader, 1984; Sirard & Pate, 2001).

Main Study.

The next section describes the recruitment process, sample, data analysis, data treatment process and ethics requirements for the main study.

Recruitment of participants.

A number of strategies were used to recruit participants in order to reach an adequate sample size. Initially, 463 students attending a primary school in a western suburb of Perth, Western Australia, with a potential pool of 900 parents were invited to complete the questionnaire. Consideration was given to the timing and implementation with experts and school principal. However, due to a low response rate, the recruitment proceeded using a snowball technique and students attending another primary school were invited to participate. The final sample is described in Chapter Four.

As no prior information was available regarding the effect size a formal sample size power calculation was not possible; hence the study was designed as a pilot study with a required sample size of 50.

Data analysis.

Descriptive statistics were generated for all variables after data cleaning. The data set was tested for normality. Where the data met the required assumptions, parametric tests were used; where appropriate the study used the non-parametric equivalent. For research questions examining relationships, the test statistic was

Spearman's Rho for non-parametric data and Pearson's r for parametric data. For tests of differences between groups, the analyses were t-tests for parametric data and the Mann-Whitney U test for non-parametric data. The testing used one-tail or two tailed tests depending on the question. A mixed linear regression model was used to identify what factors influenced children's participation in AP or OPA. The significance level was set at $p < .05$.

Data treatment.

The data were cleaned and checked for any errors in the data entry process. There were numerous surveys with missing information such as the child's birthday (five), parent's employment level (four) or parent's education level (two) were still used. When the child's sex was left blank (three), the researcher allocated the child's sex based on the activities reported. Some surveys also had a missing start date for the physical activity diary, where possible this was determined based on the postage stamp of the returned survey. Parents entered some activities in the physical activity diary that were considered AP rather than OPA were relocated such as playing at the park, or omitted if inappropriate, such as baking a cake or a sport undertaken during school hours. The activities the children participated in were categorised into light and moderate to vigorous physical activity. Experts in the industry (see Appendix A) validated these groupings. Variables for the child's total time in minutes spent in AP and OPA were derived for whole week, weekday and weekend for each type of activity. The total physical activity time was calculated for both parents and children. In order to run a linear mixed regression, model the data were entered in two ways. The parent and child information was separated into two databases. The parent information was combined and the child's data were merged for the family descriptive analyses but used separately for the mixed linear regression model.

Ethics.

This research follows the procedures set out by the University of Notre Dame Australia's Human Research Ethics Committee (HREC) (see Appendix C) and the Department of Education (see Appendix C) and has received low risk ethics clearance from both institutions.

Chapter Four

Results

This chapter reports the results of the study. The first section describes the recruitment process, the sample, and data collection. The relative importance placed by parents on AP compared to OPA, their own PA levels and how these related to their child/children's levels of AP and OPA activity are then presented. A summary of the study's key findings is provided at the end of the chapter.

Recruitment and data collection

The recruitment process was difficult (Figure 3). Initially, several large primary schools were approached to participate but they declined. A new independent public school in the western suburbs of Perth agreed to participate; consequently, 463 surveys were delivered to the primary school principal on the first day of term four, the 12th of October 2016, for distribution to the family representative (the youngest child). This was the process followed by the school in order to keep all the family information together. Where older children attended the school, additional diaries were provided. Multiple notices were put in the fortnightly school newsletter to encourage the completion and return of the surveys. Despite ongoing notices in the school's fortnightly newsletter, there was a low response rate (6.05%). The surveys were returned in a prepaid, self-addressed envelope included in the survey packet (see Appendix B and C).

Recruitment then continued using a snowball technique through friends, family and colleagues. Another independent private primary school in an urban location in Fremantle, Western Australia agreed to participate and these surveys were returned in a box in the classroom. Overall, approximately 600 questionnaires were distributed with a low overall response rate of 10.4%. Previous studies have reported that school based recruitment is difficult and response rates are low therefore often the findings are not generalisable to the population (Schilpzand, Sciberras, Efron, Anderson, & Nicholson, 2015).

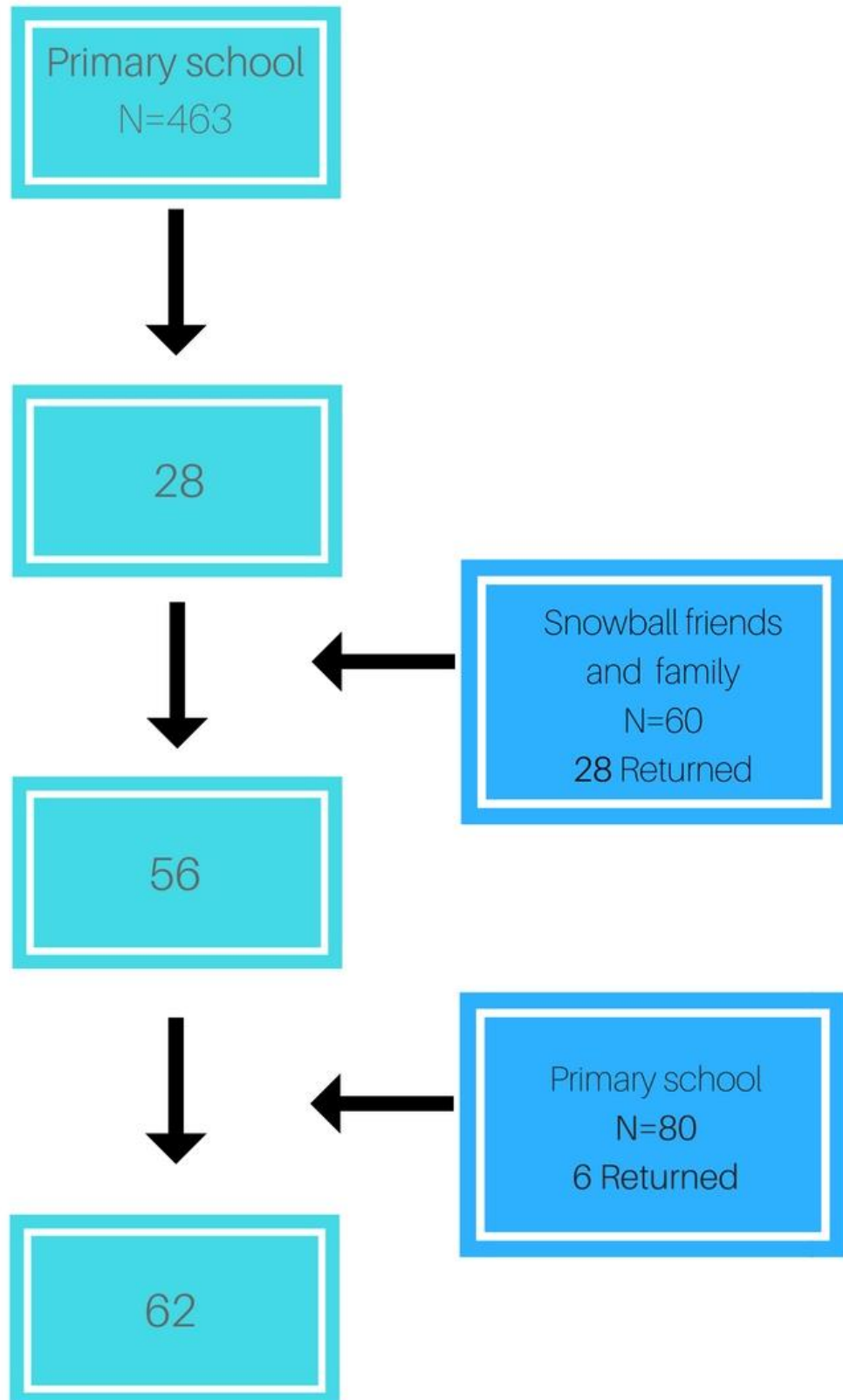


Figure 3. The recruitment numbers and response rate for the sample

Description of the sample.

The final sample consisted of 104 parents (see Table 4) and 77 children (boys =40, girls =33) aged between four and 12 years, and living in Perth, Western Australia (see Table 4). Of the parents, 63 were mothers and 41 were fathers. In this study 6.6 percent same sex couples completed the survey, who are entered in the data as two mothers or two fathers. The majority of the parents had completed an undergraduate degree or higher. Most of the fathers, the secondary caregivers, worked fulltime (92%), whereas the majority of the mothers, the primary caregivers, worked part time or undertook home duties.

Table 4.
Key demographic characteristics for the total sample, mothers and fathers

| | Total N =104 | Father n = 41 | Mother n = 63 |
|---------------------------------------|-----------------|------------------|------------------|
| | N (%) | n (%) | n (%) |
| Level of Education | | | |
| Incomplete Secondary Education | 2 (1.9) | 0 | 2 (3.2) |
| Complete Secondary Education | 10 (8.7) | 4 (9.8) | 5 (8.1) |
| Trade certification or apprenticeship | 11 (10.6) | 3 (7.3) | 8 (12.9) |
| Diploma | 2 (1.9) | 0(0.0) | 2 (3.2) |
| Undergrad Degree | 31 (28.9) | 10 (24.4) | 21 (33.9) |
| Postgrad Degree | 49 (47.1) | 24 (58.5) | 24 (38.7) |
| Employment Status | | | |
| Full time employment | 43 (43.0) | 35 (92.1) | 7 (11.5) |
| Part-time employment | 36 (36.0) | 2 (5.3) | 34 (55.7) |
| Parental Leave | 2 (2.0) | 0 | 2 (3.3) |
| Home Duties | 13 (13.0) | 0 | 13 (21.3) |
| Student | 5 (5.0) | 0 | 5 (8.2) |
| Unemployment | 1 (1.0) | 1(2.6) | 0 |

Parent importance ratings.

Overall, both mothers and fathers provided similar importance ratings for AP and OPA (see Table 5). Most parents rated AP slightly higher than OPA. There was a wide range between the minimum and maximum importance ratings of both AP and OPA. Some fathers rated the importance of AP as low as three, whereas the lowest score for mothers was six. For OPA the father's lowest importance rating was six

whereas for mothers it was two. The mean rating for AP was slightly higher than the mean rating of OPA, although it was not a statistically significant difference.

Table 5.
Parent importance ratings of active play and organised physical activity

| | Total N=104 | | | Fathers n=41 | | | Mothers n=63 | | | U |
|-------------------|----------------|--------|-------------|-----------------|------------|-------------|-----------------|--------|-------------|-----|
| | M (SD) | Median | Min- Max | M (SD) | Media n | Min- Max | M (SD) | Median | Min- Max | |
| Importance of AP | 9.38 (1.17) | 10.00 | 3-10 | 9.21 (1.40) | 10.00 | 3-10 | 9.49 (.99) | 10.00 | 6-10 | .82 |
| Importance of OPA | 8.46 (1.53) | 8.00 | 2-10 | 8.79 (1.24) | 9.00 | 6-10 | 8.22 (1.68) | 8.00 | 2-10 | .45 |

Parent physical activity.

The number of occasions and time in minutes parents spent each week participating in walking, moderate and vigorous activity are reported in Table 6. There were no significant differences between mothers and fathers for any measure, however some trends were apparent. The mothers reported a marginally higher number of weekly mean walking minutes (U=.438), slightly more moderate physical activity (U=.733) and spent a longer time engaged in this activity than the fathers. The fathers participated in slightly more vigorous activity (U=.171) occasions and time than mothers. When the moderate and vigorous minutes were combined (MVPA), the results were similar for mothers and fathers (U=.543).

Table 6.

Weekly physical activity patterns times per week and total minutes for all parents, mothers and fathers

| | Total N=104 | | | Fathers n=41 | | | Mothers n=63 | | |
|--------------------------|--------------------|--------|-------------|--------------------|--------|-------------|--------------------|--------|-------------|
| | M (SD) | Median | Min- Max | M (SD) | Median | Min- Max | M (SD) | Median | Min- Max |
| Walk times/wk | 6.03 (4.96) | 5 | 0-25 | 6.09 (4.96) | 5 | 0-20 | 6.03 (5.04) | 5 | 0-25 |
| Minutes | 95.33 (88.44) | 95 | 0- 600 | 93.95 (105.44) | 70 | 0- 600 | 96.54 (76.17) | 95 | 0- 300 |
| Mod times/wk | 4.34 (3.95) | 3 | 0-28 | 4.73 (5.25) | 3 | 0-28 | 4.07 (2.83) | 3 | 0-14 |
| Minutes | 123.00 (151.02) | 85 | 0- 1260 | 107.59 (90.56) | 85 | 0- 300 | 133.33 (181.47) | 70 | 0- 1260 |
| Vigorous times | 2.55 (2.35) | 2 | 0-12 | 2.85 (2.68) | 2 | 0-12 | 2.38 (2.12) | 2 | 0-9 |
| Minutes | 110.76 (134.1) | 60 | 0- 600 | 131.70 (148.73) | 60 | 0- 600 | 98.38 (123.76) | 60 | 0- 600 |
| Total MVPA wk mins | 228.82 (218.82) | 160 | 0- 1320 | 233.22 188.87 | 185 | 0- 900 | 227.41 (237.75) | 155 | 0- 1320 |

Relationship between parent importance ratings and physical activity.

The relationships between the parents' weekly minutes engaged in walking, moderate and vigorous activities were compared to the importance ratings for their child's participation in AP or OPA (see Table 7).

Table 7.
Correlations between parent importance rating and type of physical activity

| Time | Total N=104 | | Fathers n=41 | | Mothers n=63 | |
|--------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|
| | Importance of OPA | Importance of AP | Importance of OPA | Importance of AP | Importance of OPA | Importance of AP |
| Walk (mins) | -.041 | .436* | -.096 | .297* | .108 | .037 |
| Mod (mins) | -.005 | .419* | .114 | .305* | .089 | .211* |
| Vigorous (mins) | -.086 | .311** | .049 | .316* | .161 | .381** |
| MVPA (mins) | .175 | .303* | .152 | .320* | .168 | .297* |

*Bold= significant correlation *p<.05 **p<.01*

For the total sample, there were weak positive significant relationships between parent's walk, moderate, vigorous, MVPA activity times, and importance ratings for AP but not OPA. When the times mothers and fathers were considered separately, the significant relationships between the importance ratings of AP and physical activity remained, except for walk times for the mothers. There were also significant relationships between importance of AP and time spent in vigorous activity per week for the mothers.

Children's physical activity.

In the following section the amount and type of PA participated over a week, differences between boys and girls, age, and intensity of physical activity are explored. Common AP and OPA activities and the relationships between parent importance rating and children's physical activity are also reported.

A total of 77 children, 40 boys and 33 girls, participated in the survey. They were aged between four and 12 years. The average age for children participating in the survey was 8.2 years, with the boys being slightly younger (8.00 years) than the girls (8.4 years). The results for the children's weekly AP and OPA levels are reported in Table 8.

Table 8.

Total minutes for children's active play and organised physical activity for week and weekends.

| | Total N=77 | | | Boys n=40 | | | Girls n=33 | | |
|-----------------|--------------------|--------|-------------|--------------------|------------|-------------|--------------------|--------|-------------|
| | M (SD) | Median | Min- Max | M (SD) | Media n | Min- Max | M (SD) | Median | Min- Max |
| AP | | | | | | | | | |
| Avg mins wk day | 200.16 (119.43) | 180 | 15-580 | 195.26 (120.86) | 180 | 15-580 | 209.91 (120.20) | 180 | 70-485 |
| Avg mins wkend | 195.83 (147.38) | 175 | 20-645 | 214.44 (175.74) | 175 | 30-645 | 177.68 (103.65) | 180 | 20-420 |
| Total AP | 377.21 (227.12) | 345 | 45-875 | 393.20 (238.59) | 390 | 45-875 | 365.37 (238.39) | 321 | 80-870 |
| OPA | | | | | | | | | |
| Avg mins wk day | 144.14 (113.66) | 120 | 30-660 | 164.06 (128.73) | 135 | 60-660 | 122.90 (95.44) | 120 | 30-525 |
| Avg mins wkend | 107.37 (74.82) | 85 | 30-270 | 105.00 (80.31) | 60 | 30-270 | 106.05 (70.88) | 90 | 30-40 |
| Total OPA | 201.19 (144.86) | 150 | 30-720 | 216.17 (162.51) | 155 | 45-875 | 187.90 (128.91) | 187 | 30-525 |
| Total PA | 427.50 (201.52) | 427.50 | 285-570 | 567.12 (313.84) | 557 | 55-1410 | 530.81 (227.64) | 505 | 120-1155 |

Children's weekday and weekend participation in AP and OPA are reported in Table 8. There were no significant differences between the girls and boys for total AP ($U = .599$), weekday AP ($U = .637$) or weekend (850), total OPA ($.532$), weekday ($.076$) or weekend ($.923$). Finally, there was no significant difference in total PA between boys and girls. Overall boys participated in more PA ($U=.727$) than girls did.

Children's physical activity and age.

There was a significant positive correlation between the time children spent engaged in OPA and age in months, for the overall sample and the boys (see Table 9). The time spent engaged in AP reduced with age, particularly among the girls. The data

for the children were also divided into two age categories; four to seven years and eight to 12 years, to further explore age-related differences for AP and OPA, however none were identified

Table 9.
Correlations between age and time spent in active play and organised physical activity for total sample, male and female

| Time (min) | Age | | |
|------------|-----------------|----------------|-----------------|
| | Total N = 77 | Boys n = 40 | Girls n = 33 |
| OPA | .464** | .729** | .105 |
| AP | -.051 | .082 | -.293 |

Bold= significant correlation **<.01

Children's physical activity intensity levels.

The reported physical activities were coded as either light or moderate to vigorous (MVPA) (see Appendix D). The percentage of instances boys and girls reported doing light and MVPA in both in AP and OPA on each day are shown in Figures 4 and 5. Overall boys and girls participated in more AP than OPA and more moderate to vigorous physical activity than light physical activities.

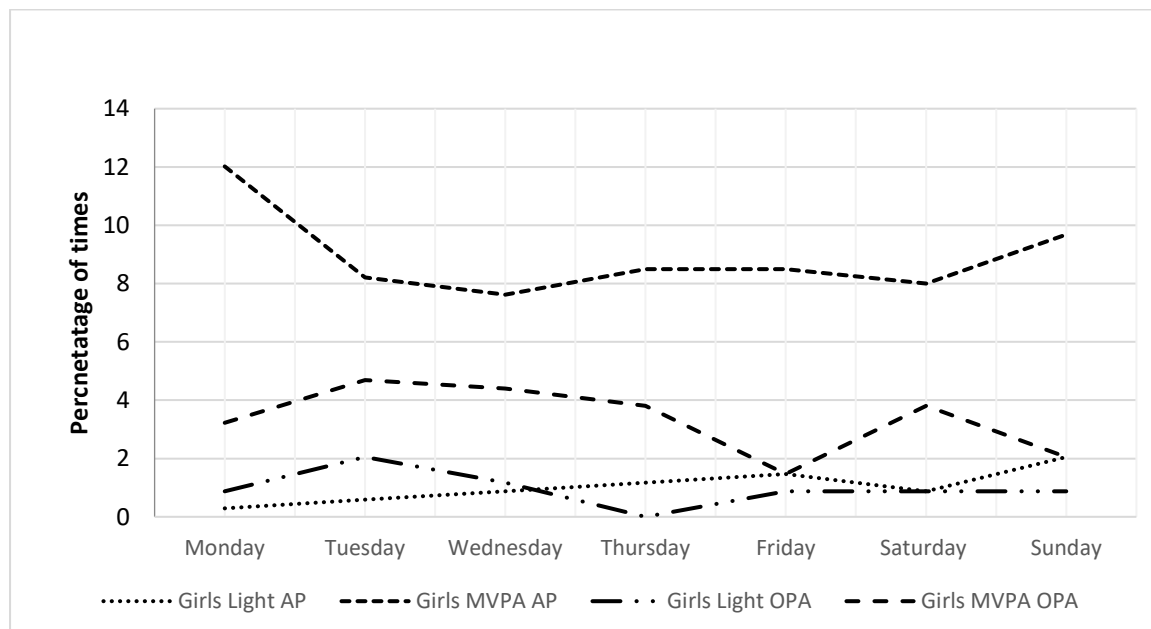


Figure 4. Girls' participation in the weekly AP and OPA in light and moderate to vigorous activity (*MVPA = moderate to vigorous physical activity)

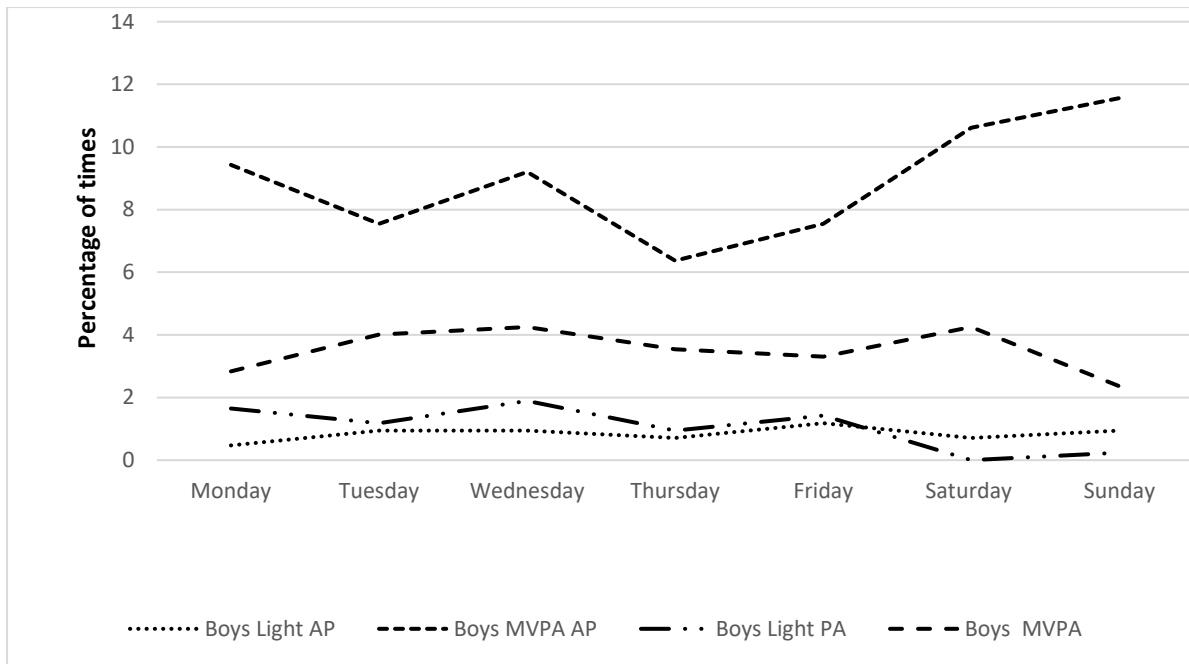


Figure 5. Boys' participation in the weekly AP and OPA in light and moderate and vigorous activity (*MVPA = moderate to vigorous physical activity)

The girls reported higher levels of participation in both AP and OPA in both MVPA and light intensity levels. The girls participated in slightly more weekly AP and OPA than the boys. Monday was the most active day for girls with 12.02 % participating in AP (MVPA), whereas 11.56% of the boys participated in AP on Sunday. The most active day for OPA was Tuesday for girls (4.96%), Saturday, and Sunday for boys (4.25 %).

Children's common activities.

The most common physical activities for the boys and girls are shown in Table 10.

Table 10.
Common children's activities reported by parents

| | Males | Times | Females | Times |
|-----|---------------------------------------------------|-------|-------------------------------|-------|
| OPA | Swimming (lessons or squad) | 31 | Swimming (lessons or squad) | 25 |
| | Active Commuting | 26 | Active Commuting | 15 |
| | Tennis | 14 | Dancing | 13 |
| AP | Play (backyard, park, garden) | 114 | Play (backyard, park, garden) | 107 |
| | Active Transport Bike riding, scooter, skateboard | 38 | Playing in the pool | 30 |
| | Trampoline | 32 | Trampoline | 27 |

Males and females participated in similar activities. Swimming was the most popular OPA for both boys and girls. More boys participated in tennis whereas many girls participated in dancing.

Unstructured play was the most popular AP activity for all children. The most common activity for the girls was playing in the pool whereas for boys it was active transport, such as riding or walking to school. It is important to note that some activities were reported by parents as AP and were not included in the data analyses. These included reading, chess, baking a cake, paper mache and music lessons.

Parent importance ratings and children's time spent in physical activity type.

The correlations between the amount of AP and OPA undertaken by children and the parent's importance ratings of these activities were examined (Table 11).

Table 11.
Correlations between parent's importance rating and children's physical activity time

| PA type | Total N=104 | | Fathers n=41 | | Mothers n=63 | |
|------------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|
| | Importance OPA | Importance AP | Importance OPA | Importance AP | Importance OPA | Importance AP |
| OPA (mins/wk) | .278 | .021 | .255 | -.151 | .317 | .091 |
| AP (mins/wk) | .243* | .227* | .455* | -.034 | .263* | .287* |

Bold= significant correlation * $p < .05$

There was a positive and significant relationship between the importance parents placed on AP and the time their child/children spent doing these activities. There was a significant but weak positive correlation between weekly AP time and mothers' importance ratings of AP.

Parents and children's overall physical activity levels.

The relationship between parents' and children's activity total physical activity times was examined. There was a weak, significant correlation between the time parents and children spent engaged in overall physical activity ($r = .290^*$, $p = .022$). There was a weak negative correlation between PA time for girls with mothers ($r = -.030$, $p = .906$) and fathers ($r = -.236$, $p = .528$). A weak significant correlation was found between boys' and mothers' PA time ($r = .485^*$, $p = .014$) but not for fathers ($r = .427$, $p = .252$).

Predictors of children physical activity levels.

An exploratory analysis using a linear mixed regression model to account for family clusters was used to examine factors related to the time children were engaged in AP and OPA. Age, gender, parent's role (mother or father) and importance rating were entered as controlling predictors of children's participation of AP and OPA. Children's age was the only significant predictor for participation in OPA ($\beta = 1.07$, $p = 0.007$). There were no significant predictors of children's time spent participating in AP.

Summary

Despite the difficult recruitment process and low sample number, some trends emerged. The relationships between the key variables are presented for AP (Figure 6) and OPA (Figure 7). For AP, there was a relationship between parent importance ratings, parent total weekly PA and child's weekly AP, particularly for the mothers. More active parents rated AP as more important. The children of more active parents were more likely to have higher levels of AP. For OPA, there were no significant relationships between parent importance ratings, parent total weekly PA and child's weekly OPA (Figure 7). There was a difference in time spent in AP and OPA between boys and girls. Boys were more active than girls for both AP, OPA and overall weekly PA. There were positive correlations between children's age and OPA, but not for AP, Older children participated in more OPA, especially the boys. In Chapter 5, these key findings and the identified emerging trends are discussed.

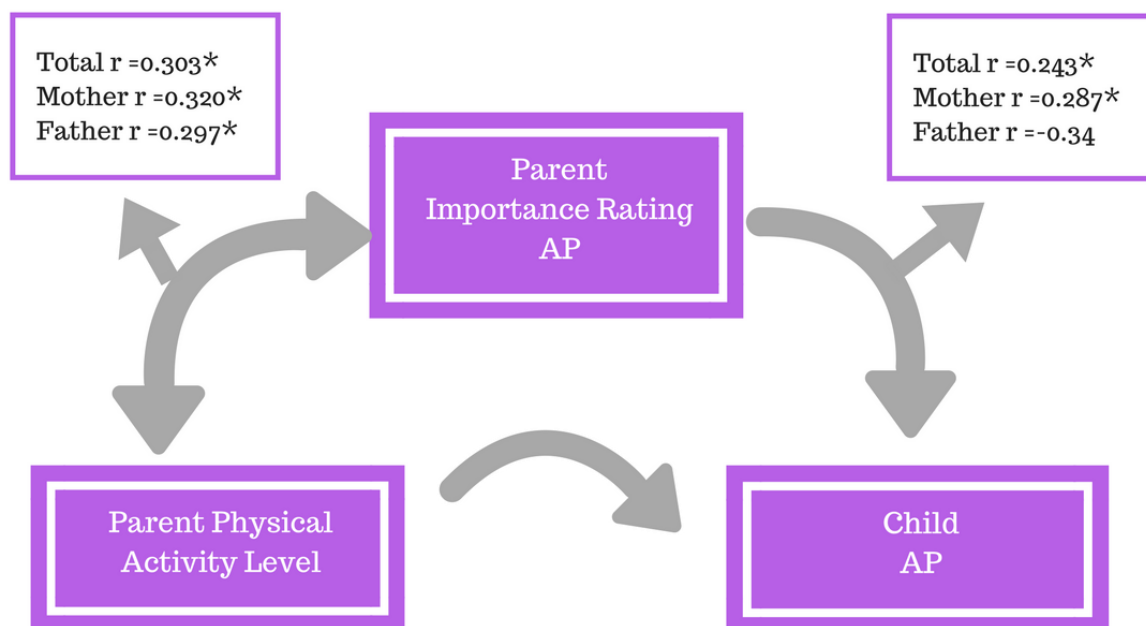


Figure 6. The relationships between parent physical activity levels (PA) levels, parent active play (AP) importance ratings and the child active play (AP).

Significant correlation *p<.05

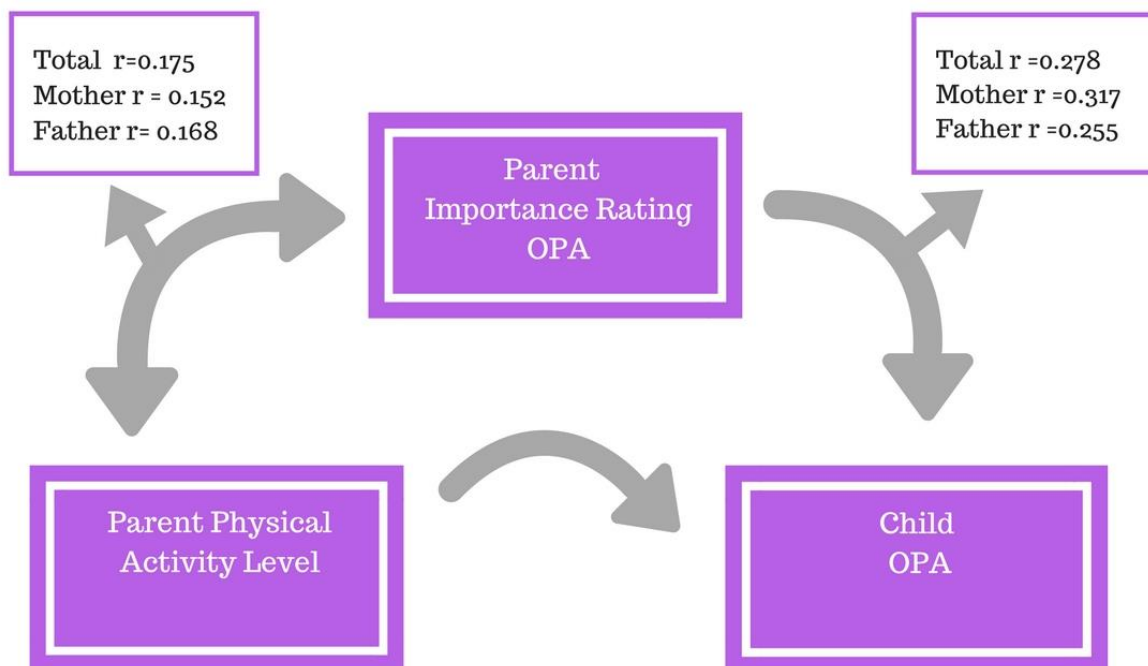


Figure 7. The relationships between parent physical activity levels (PA), parent organised physical activity (OPA) importance ratings and the child organised physical activity (OPA).

Chapter Five

Discussion

This study examined the relationships among parent's PA activity levels, their importance ratings of AP and OPA for their child and their child's actual PA level. The aim was to address the research gap in understanding how parent's importance ratings of AP and OPA relate to both their child's and their own PA levels. Parents especially the mothers, placed more importance on AP compared OPA. The children of the more active parents had higher levels of AP. Boys were more active than girls in both AP, OPA and overall weekly PA and older children participated in more OPA especially the boys.

The demographics of the parent sample were similar to those in the 2011 Australian Institute of Families, *Parents working out work report* (Baxter, 2013) therefore these results may be generalisable. Where possible, information was collected from both parents however as mothers in this study spent the most time with their child, it could have resulted in them completing more questionnaires and reporting what the child did day to day more than the fathers, who mostly worked full time. In most western families, the mother is the primary person to plan their child's physical activities and decide which activities are most valuable and therefore prioritised (Fisher et al., 2008; Gattshall, et al., 2008). Fathers are usually more difficult to recruit into studies (Mitchell et al., 2012), so it is more difficult to gauge their influence on their children. Questionnaires in other children's physical activity studies have generally been completed by the mother (Mitchell et al., 2012).

Parent importance ratings.

Based on the mean score of the importance ratings, most parents, particularly the mothers, considered AP more important than OPA for their child/children. The higher rating by the mothers may be because they could observe how it provided children with an opportunity to participate in spontaneous games with peers, enhance their coordination, develop social skills and gave them a chance to display a range of skills (Isenberg & Quisenberry, 2002). The opportunity to see the many positive sides of AP was not possible for most fathers as they were not home to see their children engaged in AP such as playing at the park. Many probably only had an opportunity to attend a

sports game on the weekend and may not have seen how much their children enjoyed AP.

The wide range of ratings between AP and OPA reported by some fathers was interesting. For example, one father rated AP a three and OPA at 10 whereas the mother in the same family rated OPA an eight and AP a seven. Their 10-year-old child participated in OPA and AP throughout the week and weekend. The range could also be accounted by the age of their child. In this study, the mothers of younger children were more likely rate AP as important and their child more likely to participate in AP. For example, one mother rated OPA a two and AP a 10. Her child did not participate in any OPA during the week as the child was only five years of age.

Parent physical activity level.

The parents' physical activity levels ranged from zero (sedentary) to 1320 minutes (22 hours; highly active) per week. Some parents met the daily-recommended PA levels, 150 minutes of weekly moderate-intensity aerobic PA or 75 minutes of weekly vigorous-intensity PA (Australian Government Department of Health, 2014), while others engaged in no weekly PA. The activity levels for mothers and fathers were similar for the number of times and total weekly minutes of PA. However, the fathers reported more vigorous activities whereas the mothers spent more time walking and undertaking light to moderate exercise. This is similar to previous studies that found males participate in more moderate to vigorous activity while females participate in more light to moderate activity (Hands, Parker, Larkin, Cantell, & Rose, 2016; Thompson et al., 2005; Trost et al., 2002; Vilhjalmsson & Kristjansdottir, 2003).

There was a positive relationship between the importance parents placed on AP, and their own weekly PA, in particular for weekly walk times, moderate and vigorous activity. This could be due to the greater encouragement by these parents for their children to play actively rather than engage in sedentary activities, often associated with indoor screen time, between time spent outdoors and children's physical activity level. For example numbers of families in this project took their children to the park or the beach encouraging AP. In other studies, parents have reported their PA levels decline once they have children, as their priorities shift to caring for their children.

They report less time for daily PA or being too tired to find time for PA (Rhodes and Lim., 2016; Solomon-Moore et al., 2017).

Parent and child physical activity.

In general, active parents have active children. This finding was similar to other studies (Rhodes and Lim., 2016; Solomon-Moore et al., 2017) that found when families participate in PA together everyone's PA increases. Interestingly, in this study, a relationship was found between parents' PA levels and their importance ratings for AP and their child's weekly AP participation. This indicates that parents play an important role in encouraging active informal lifestyles in their children. There was not a similar relationship for OPA, which could be due to it being harder for parents to participate in OPA activities with their children. Parents usually watch their children partake in OPA rather than participate alongside them.

In the present study, most mothers worked part time or were at home full time in unpaid work, only a few worked fulltime. However all the children, regardless of how much the mother worked in this study participated in daily AP and OPA. Not all mothers in the current study participated in daily PA themselves. This is similar to Mitchell et al. (2012) who found that young children with a mother working part time participated in less daily PA.

Forty-five % of the children had two active parents that participated on average about four hours or more of physical activity each week and these children participated in slightly more combined AP (6.2 hours) and OPA (3.3 hours). The positive relationship between high levels of parent and child PA is similar to other studies (Gustafson & Rhodes 2006; Jago, et al., 2010; Noonan et al., 2016; VanDerworp, & Ryan, 2016). It appears that young children are more likely to engage in PA alongside their parents, by going to for a bike ride or the beach (Gustafson & Rhodes 2006; VanDerworp, & Ryan, 2016).

When considering the influence of mothers and fathers independently, there was a relationship between the physical activity levels of mothers and their sons but not with daughters. There was no relationship between the child and father's PA. This could be due to the nature of the sample as most of the mothers were able to spend more time with the child as many did not participate in paid work or worked part time.

This could also mean they had more time to be physically active. In most previous studies, mixed findings have been reported as to which parent, if any, is an influential PA role model for their child (Bauman et al., 2012, McGuire, Hannan, Neumark-Sztainer, Cossrow., & Story, 2002; Edwardson & Gorely, 2010; Trost, Sallis, Pate., Freedson, Taylor, & Dowda, 2003; VanDerworp, & Ryan, 2016). A longitudinal study involving 152 French children and their parent's role modelling behaviour reported that overall mothers were more influential than fathers (Bois, Sarrazin, Fisher & Brustad, 2005). While Davison, Cutting & Birch (2003) and Raudsepp, (2006) found that fathers had more of an impact on their daughters' and sons' PA levels. Studies have found strong links between mothers and daughters' and between fathers and sons' PA, especially for OPA (Gustafson & Rhodes 2006; Yang et al., 1996).

Nonetheless, most parents in this study encouraged some level of AP and OPA in their children as all children participated in some form of daily PA. In previous studies, busy parents reported they used screen-based technologies as a way to entertain their children, particularly on weekends and after school (Sallis et al., 2000; Thompson et al., 2005). The next section explores the findings relating to the children in this study.

Children.

All the children in this study participated in some form of daily AP and OPA. On average, the amount of weekly time spent by the children in this study was just under 377.21 minutes (6.2 hours) for AP and 201.19 (3.3 hours) for OPA. Every child in this study participated in some form of daily AP (100 %) and OPA (100 %) and this result is encouraging given that the activity levels of children in Australia appears to be reducing (ABS, 2012; Hands et al., 2004; Hardy et al., 2016; Rosenberg et al., 2008; Veitch et al., 2006). The 2003 CAPANS, a survey of 2,274 Western Australian children found that 30 % of primary school students did not participate in any AP (Hands et al., 2004). It is important to note that in this current study children's out of school PA activity only was recorded, which is under parent control.

Active play.

Children in this study spent between 45 minutes and 14.5 hours engaged in AP for the week. Given this is parent reported time outside school hours, the result is encouraging. In 2008, the majority of primary school students, 98.8 % of boys and

99.6 of girls participated in about one hour of AP per week (Rosenberg et al., 2008). In the 2008 CAPANS study, the parents completed a survey recording their daily PA, the activities and a pedometer was used to record the children's steps and the AP was recorded using an activity diary.

The identified increase in AP by the children in this study could have been influenced by the recent focus in the media on the importance of children playing outside. For example, Nature Play WA (<https://www.natureplaywa.org.au/>) is a Western Australian organisation that encourages parents and primary schools to get children playing outside by creating the Passport to an Amazing Childhood program and organising events for families to participate in outdoors. This program is designed to motivate children to do activities outside, such as making a mud pie or climbing a tree. Further initiatives promoting AP activities would be beneficial as some parents in this study were unclear about what activities were classified as AP. For example, music lessons, reading Harry Potter and baking a cake were recorded in the PA diary.

The three most common AP activities were playing, active transport, playing on the trampoline and in the pool. Two of these activities, playing and active transport are similar to the 2003 CAPANS report (Hands et al., 2004). The most popular AP activity in this study was simply playing in the backyard, park or the beach, by themselves or with friends and siblings. The third most popular activity for both the boys and girls was jumping on the trampoline. The popular AP activities have not changed much since 2003 and it is encouraging to see children in WA still enjoy playing outside.

Organised physical activity.

Children in this study spent between 30 minutes and 12 hours engaged in OPA. This appears similar to the minimum time spent engaged in weekly OPA similar to the 2008 CAPANS report, the majority of primary school students (boys = 98.5 %; girls = 96.1%) participated in about one hour of general PA per week, (Rosenberg et al., 2008). Even though the data were only recorded for out of school hours it is similar to the CAPANS 2008 report with the majority of children participating in daily PA and the children in this study participated in more daily PA.

The OPA activities reported by the children in this study have not changed a lot over the years, as they are similar to those in the 2003 and 2012 ABS report (ABS, 2012). Swimming the most popular activity for children to participate in since 2003, was also the most popular OPA activity in this study for both boys and girls. For girls, dance was a popular activity in this study as well as both the 2003 and 2012 ABS reports (ABS, 2012). Active commuting was also a common activity for both boys and girls but more common for boys. It is positive that parents are encouraging their children to commute to school rather than being driven.

Of interest, particularly are the differing OPA patterns between weekdays and weekends for the boys and girls. The girls in this study could have other activities during the week such as, music lessons. Some researchers have reported fewer OPA options being available during the week for girls (Noordstar et al., 2016; Telford et al., 2016). As girls can show less interest in participating in OPA activities because they can be too serious or competitive, this may lead to fewer options available for girls. For example in this study, the girls participated in more OPA on the weekend and this could result in the higher AP among the girls observed in the current study.

The activity differential hypothesis proposes that boys and girls who participate in OPA activities at a club level are not equally active; this means that the boys are participating in activities that are more vigorous more often (Vilhjalmsson & Kristjansdottir, 2003). Participation in OPA provides a chance to compete, learn new skills, participate alongside peers, and further develop motor skills and coordination, all outcomes boys enjoy (Brustad, 1993). In most settings, boys use more space and play more competitive high intensity games that are more OPA based, and those participants with higher skills and motor skills usually succeed (Brustad, 1993).

Gender.

The boys engaged in higher intensity activity than the girls for both AP and OPA. For example, the boys played team games and vigorous sports such as soccer or tennis whereas the girls engaged more in less vigorous less competitive activities such as dance and gym. Girls depend less on sports participation as a means of socialising and prefer playing more passive, less vigorous and inventive games (Harten et al., 2008). The boys appeared to have more freedom as active transport was a more

common AP activity reported for them. Girls tend to be more supervised and allowed less freedom than boys when playing around the home (Morrongiello & Dawber, 2000; Thompson et al., 2005; Veitch et al., 2007).

This overall higher PA levels found for the boys is similar to many other studies (Thompson et al., 2005; Trost et al., 2002; Vilhjalmsson & Kristjansdottir, 2003). Regardless of measure, whether activity diary, pedometer, accelerometer, or parent reports, boys are reported to participate in more PA than girls (Hands et al., 2004; Hardy et al., 2016; Gustafson & Rhodes 2006; Jago et al., 2010; Kunesh et al., 1992; Noordstar et al., 2016; Rosenberg et al., 2008; Telford et al., 2016; Thompson et al., 2005; Trost, et al., 2002; Sallis et al., 2000).

Overall, the girls participated in more daily AP during the week than boys, who participated in more weekly OPA. The girls participated in slightly more OPA on the weekends whereas the boys participated in more OPA during the week. This higher participation for girls in weekday AP could be for a variety of reasons. AP has no rules and more freedom than OPA. Thus, relative to OPA, AP could be less intimidating and easier to be involved in and therefore more appealing to girls. It has been observed that girls aged 10 to 11 years who participate in more AP have overall higher PA levels than those girls who participate in less AP (Brockman et al., 2010).

Findings from previous studies indicate many girls have negative experiences during PE or OPA, which may cause them to lose interest in participation or quit (Vilhjalmsson & Kristjansdottir, 2003). While boys engage in more competitive sports with existing rules that centre on winning, and usually the boys with higher motor skills prevail. Boys get more support from their parents to participate in OPA and many have more confidence in their sporting ability than girls and some parents thought boys were more naturally sporty than girls (Brustad, 1993; Hesketh, Hinkley, and Campbell 2012; Sallis et al., 2000). Girls do not value winning and competing in sports to the same extent as boys. Boys make it very clear to their parents that succeeding and competing in OPA is important to them (Brustad, 1993; Telford et al., 2016; Vilhjalmsson & Kristjansdottir, 2003). These factors encourage boys to participate in older while it can become unappealing for girls to participate in OPA.

Age.

The older children participated in more OPA, particularly the boys. This is similar to other studies (Sallis et al., 2000, Strong et al., 2005; Telford et al., 2016). As children, get older, activities with rules and structure such as OPA become more appealing and available (Sallis et al., 2000). In addition, with age, children may have less time for AP because they are engaging in more structured family activities, have more homework and have started to participate in more OPA (Brockman et al., 2011). Older children, especially girls, can be discouraged from starting a new OPA activity as they feel they are too old, do not have peers to do the sport with, and the higher level of competitiveness can be off putting (Thompson et al., 2005).

Predictors of children's physical activity.

Age was the only significant predictor of children's participation in OPA. Given the recommended age for beginning competitive sports, this is understandable. The inability to identify factors or predictors of AP may have been due to the small sample size. Other studies have found that younger children were also an important predictor of participation in AP (Gustafson & Rhodes 2006; Jago et al., 2010; Kunesh et al., 1992; Thompson et al., 2005; Trost, et al., 2002; Sallis et al., 2000).

Strengths and limitations.

This pilot study is the first to investigate the relationship between the importance parents place on AP and OPA and how this compares to their child's levels as well as their own level of PA. A major limitation in this study was that the findings were limited by the low response rate of 10% and the subsequent small sample size. The low response rate is a common theme when collecting data from schools (Schilpzand et al., 2015). Despite ongoing contact with the school community, friends, family and colleagues, the response rate was 6%. A further complication was the short time frame available for data collection due to the looming summer holidays. A bigger sample may have revealed stronger findings and confirmed the identified trends.

Another limitation of the study was the limited information sought about the parents and children. For example, the questionnaire did not seek clarification about whether the parent had a physically demanding job or information to determine their SES. Collecting SES information could see if there is a difference in the amount and type

of OPA and AP children participate in. Usually children in higher SES areas partake in more OPA while those children in lower SES areas participate in more AP. However, it is not possible for parents to accurately and reliably report what their child does during this time. It is therefore possible that the reported data does not reflect all the PA the parents or children in this study participated in. Further, the weekly sedentary screen time that both parents and children engaged in was not collected. This information would be useful to determine how much PA families participate in together.

One strength of this study was the development and validation of two new survey tools to measure the importance of AP and OPA. Only one other measure has been used in previous research however it measured the importance of their child's physical activity, not AP or OPA on a scale of one to five (Trost et al., 2003). The two scales developed in this study independently measured the importance of AP and OPA on a scale from one to 10.

Conclusion

This pilot study complements and adds to previous research regarding children's and parent's PA patterns and provides an interesting observation of the influence of parent's importance ratings on the child's activity level.

Although it is not possible to generalise these results to the broader community, the results provide a small insight to the importance of how parents value their child's participation in AP and OPA and how this is related to the family's PA levels. The participation of children in AP and the rating of the importance of their children's participation in AP is an encouraging result.

Chapter Six

Summary

In this pilot study, the relationships between the parent's PA, their rated importance of both AP and OPA and the AP and OPA levels of their children were explored. After reviewing the literature, it was established that little was known about the effect parental importance ratings had on their child's AP time compared to OPA and whether these activities differed between boys and girls or with age.

To measure parental importance ratings of AP and OPA, a survey tool using a semantic differential scale was developed and tested for reliability and validity. Parents' PA levels were recorded using a seven-day physical activity recall questionnaire, which had been previously validated with Australian adults (Timperio, et al., 2003). The parents in this study also completed a physical activity diary for their child's weekly participation in AP and OPA outside of school hours. This activity diary tool was used in the Western Australian Pregnancy Cohort Study (www.rainestudy.org.au).

A total of 177 participants from 62 families participated in this pilot study, 41 fathers, 63 mothers, 40 male children and 33 female children aged between four and 12 years. All participants, lived in Perth, Western Australia. This data was collected over three months during the spring/summer of 2016. The purpose of the study was to compare the importance parents placed on AP and OPA with their children's weekly PA and OPA and their own weekly PA. It was hypothesised that the more active parents would place a greater importance on AP and OPA for their children, as also their children would engage in more AP and OPA.

Key Findings

A number of key findings resulted from the study.

1. Positive relationships existed between parents' rating of AP, the time their child spent in AP and the parents' own physical activity levels.

2. Parents rated both AP and OPA as important. Relative to OPA, parents rated AP slightly higher, especially among the mothers.
3. A positive relationship existed between the importance parents placed on AP, and their own weekly PA, in particular for weekly walk times, moderate and vigorous activity emerged.
4. Boys tended to be more active than girls for AP, OPA and overall weekly PA.
5. Older children participated in more OPA and less AP, especially the boys.

Recommendations

As a result of these findings, some recommendations for both practice and future research and practice can be made.

For practice.

1. Further support and resources could be provided for parents to understand the importance of AP and to encourage more outdoor activities for their children.
2. These findings support the importance of community and government organisations, such as Nature Play WA (www.natureplaywa.org.au/) and health promotions such as Outdoors October (<http://www.outdoorsoctober.com.au/>) in supporting and educating parents on the positive effect they can have on their children's PA levels, especially AP.
3. Encourage classroom and PE teachers to value and include more AP opportunities. Outdoor play time does not always need to be organised.

For future research.

The findings from this small sample of Western Australian families highlights the significance of parent's importance ratings on their child's overall physical activity levels.

The positive relationship between parents' rating of AP, parents' PA levels and children's AP levels is an encouraging finding and opens a promising future research stream. This pilot study investigated an unexplored area and future research could investigate the following topics.

1. Given the small sample, this study should be replicated with a larger sample involving participants representing a broad range of SES as well as regions, for example country and metropolitan. This would enable the generalisation of the study findings.
2. A data collection period longer than one week, for example one month, would provide a greater overview of parent and child activity levels as well as the children's AP and OPA activities.
3. The importance scales could be used in future research in other countries in order to compare similarities and differences regarding the importance parents place on AP and OPA for their child.
4. Measure weekly screen time -- *i.e.*, in front of a television, mobile phone, computer, game boy or other device – for both parents and children to determine if there was a relationship with parent importance ratings of AP and OPA.
5. Explore AP and OPA importance ratings in older children aged eight years and above. This could illuminate if children develop similar importance ratings to their parents and whether this similarity relates to their activity level.

Conclusion

The observed decreasing trends in the level and type of PA undertaken by Western Australian children motivated this study. The results, although non-generalisable, contribute to previous research regarding children's and parents' PA patterns and trigger ideas for further study. It is important that parents appreciate that both AP and OPA are important opportunities for PA in their children, and that they have a powerful influence on what PA their child undertakes. We need to encourage future initiatives for helping families enjoy, and participate in, more non-organised, creative PA.

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Appendices

Appendix A Questionnaire Physical Activity Validation Survey

Name: _____

Are you a

- Parent*
- Academic
- Both

***With children currently aged 5 to 11**

How old are/is your child/children?

Highest Level of Education

- Incomplete Secondary Education
- Completed Secondary Education
- Trade certificate/ apprenticeship
- Undergrad Degree
- Master Degree
- Phd

I want to validate 2 questions to measure how important parents rate active play and organised physical activity.

Active play is defined as playing games or just being active for fun, and not in an organised way. Synonyms include play, free play, unorganised play, and unstructured play.

Organised physical activity is defined as physical activity for exercise, recreation or sport that was organised for example, tee ball, tennis lessons, swimming lessons, ballet or gymnastics.

Could you please rate on a scale of 1 (not a valid form of measurement) to 10 (a valid form of measurement) to what extent you think these scales are valid measures of the importance ratings?

The two questions are shown on the next page.

How do you rate the importance of active play for your child? Please circle your response.

| | | | | | | | | | | |
|---------------|---|---|---|---|---|---|---|---|----|-----------|
| Not important | | | | | | | | | | Important |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |

Validity rating (1-10)

How do you rate the importance of organised physical activity for your child? Please circle your response.

| | | | | | | | | | | |
|---------------|---|---|---|---|---|---|---|---|----|-----------|
| Not important | | | | | | | | | | Important |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |

Validity rating (1-10)

Are you happy to take this survey again in 7 days?

Yes/No

Thank you for participating

Appendix A Questionnaire

Child Physical Activity Questionnaire

Part 1

Please complete a **Part 1** of the survey for each caregiver in the household (2 provided). Please complete **Part 2** for each child in your family aged 5 to 11 years.

1. What is your relationship to the child?

2. Highest Level of Education

- Incomplete Secondary Education
- Completed Secondary Education
- Trade certificate/ apprenticeship
- Undergrad Degree

- Postgrad Degree

3. Employment Status

- Full time Employment
- Part-time Employment
- Parental Leave
- Home Duties
- Student
- Unemployed

4. How do you rate the importance of active play for your child? Please circle your response.

Active play is defined as playing games or just being active for fun, and not in an organised way. Synonyms include play, free play, unorganised play, and unstructured play.

| | | | | | | | | | | |
|---------------|---|---|---|---|---|---|---|---|----|-----------|
| Not important | | | | | | | | | | Important |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |

5. How do you rate the importance of organised physical activity for your child?

Organised physical activity is physical activity for exercise, recreation or sport that was organised for example, tee ball, tennis lessons, swimming lessons, ballet or gymnastics.

| | | | | | | | | | | |
|---------------|---|---|---|---|---|---|---|---|----|-----------|
| Not important | | | | | | | | | | Important |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |

6. In the past week, how many times have you WALKED for recreation or exercise and/or to get to and from places for at least 10 minutes continuously?

Please estimate the **total number of** times (and minutes) you spent walking in the past week.

7. In the past week, how many times did you do MODERATE exercise or other physical activity (around the house or at work), which DID NOT make you breathe harder or puff and pant? (e.g. digging in the garden, moderate cycling, raking leaves, dancing).

Please estimate the **total number of** times (and minutes) you spent doing moderate exercise or physical activity in the past week.

8. In the past week, how many times did you do VIGOROUS exercise or other physical activity (around the house or at work) which made you breathe harder or puff and pant? (e.g jogging or running, heavy gardening, netball, chopping wood, vigorous swimming, heavy labouring).

Please estimate the **total number of** times (and minutes) you spent doing vigorous exercise or physical activity in the past week.

Part 2

Child's Physical Activity Diary

Start date: (D)____ / (M)____ /2016

Sex: M/ F Child's birthday? (D)____ / (M)____ / (Y)_____

Does your child participate in any regular organised physical activity or active play before school, after school or during the weekend? Follow the examples below.

You can start any day of the week. Please complete at the end of each day

| Day | Organised Activity | Duration (Mins) | Active Play | Duration (Mins) |
|-------------------|--------------------|-----------------|------------------------|-----------------|
| Tuesday | Swimming Training | 60 | Playing in the yard | 30 |
| | Soccer Practice | 75 | | |
| Wednesday | Netball Game | 65 | Climbing a tree | 15 |
| Saturday | Netball Training | 30 | Building a cubby house | 40 |
| | | | Kicking the footy | 20 |
| Monday Date | | | | |
| | | | | |
| | | | | |
| Tuesday Date | | | | |
| | | | | |
| | | | | |
| Wednesday Date | | | | |
| | | | | |
| | | | | |
| Thursday Date | | | | |
| | | | | |
| | | | | |
| Friday Date | | | | |
| | | | | |
| | | | | |
| Saturday Date | | | | |
| | | | | |
| | | | | |
| Sunday Date | | | | |
| | | | | |
| | | | | |

Adapted from the Raine study www.rainestudy.org.au, Thank-you for participating!

Appendix B Information Letter



THE UNIVERSITY OF
NOTRE DAME
A U S T R A L I A

PROJECT TITLE: The importance of active play and organised physical activity for young children: The parents' perspective

CHIEF INVESTIGATOR: Professor Beth Hands

STUDENT INVESTIGATOR: Casey Murphy

STUDENT'S DEGREE: Master of Philosophy

Dear Parents and Guardians,

You are invited to participate in the research project described below.

What is the project about?

Research around the world has identified a concerning trend; physical activity levels among children are declining. Children may be physically active in a number of ways. For example, they may play in an informal setting either alone or with their peers or in an organised setting such as a physical education class, or a sport such as tee ball, or swimming lessons. In this study, information will be gathered about the type and length of time children spend being physically active and how this relates to the physical activity level of their parents and the relative importance they attach to different types of physical activity.

Who is conducting undertaking the project?

This pilot study is being conducted by Casey Murphy and will form the basis for a Master of Philosophy at The University of Notre Dame Australia, under the supervision of Professor Beth Hands and Duncan Picknoll.

Participation in this project involves completing the attached surveys about you and your child/children's physical activity behaviour. Each parent is asked to complete a questionnaire about their own level of physical activity over a typical week. In addition, please complete one survey per child attending Rosalie Primary School aged between 5 and 11 years. This comprises a seven-day diary documenting the type and time spent in organised physical activity and active play each day. In total, this survey should take no longer than 10 minutes to complete, although the seven-day diary requires a few minutes each day to complete. Please return the surveys to me in the provided pre-paid and addressed envelope without any identifying information.

Are there any risks associated with participating in this project?

Completing the survey is voluntary, anonymous and has no foreseeable risks. If you have any questions or hesitations please don't hesitate to contact me at casey.murphy1@my.nd.edu.au.

What are the benefits of the research project?

The results from this study will add to the limited knowledge about how parents rate the importance of different types of physical activity for their primary school aged children and to what extent this contributes to their child's level of physical activity. This information may inform the development of more effective educational and community focused promotional strategies to support children getting more physically active.

Will anyone else know the results of the project?

The collected data will be non-identifiable and stored securely for at least five years in the School of Health Sciences at The University of Notre Dame Australia. Only aggregated data will be published. All information gathered will be held in strict confidence except in instances of legal requirements such as court subpoenas, freedom of information requests, or mandated reporting by some professionals. This study may be published in academic journals.

Will I be able to find out the results of the project?

The School Principal will receive a copy of the findings on completion of the project.

Who do I contact if I have questions about the project?

If you have any questions or enquires about the project please contact:

Casey Murphy- casey.murphy1@my.nd.edu.au

Professor Beth Hands- beth.hands@nd.edu.au or

Duncan Picknoll- duncan.picknoll@nd.edu.au.

What if I have a complaint or any concerns?

The Human Research Ethics Committee at The University of Notre Dame Australia (approval number 016032F) and the Department of Education (approval number D160480034) have approved the study. If you wish to make a complaint regarding the manner in which this research project is conducted, please direct the complaint to the Executive Officer of the Human Research Ethics Committee, Research Office, The University of Notre Dame Australia, PO Box 1225 Fremantle WA 6959, phone (08) 9433 0943 research@nd.edu.au.

Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

Yours sincerely,
Casey Murphy

Appendix C

18 March 2016

Professor Beth Hands & Ms Casey Murphy
School of Health Sciences
The University of Notre Dame Australia
Fremantle Campus

Dear Beth and Casey,

Reference Number: 016032F

Project Title: "The Importance of Active Play compared to Organised Physical Activity for Young Children: The Parents' Perspective."

Your response to the conditions imposed by a sub-committee of the university's Human Research Ethics Committee, has been reviewed and assessed as meeting all the requirements as outlined in the *National Statement on Ethical Conduct in Human Research* (2014). I am pleased to advise that ethical clearance has been granted for this proposed study.

All research projects are approved subject to standard conditions of approval. Please read the attached document for details of these conditions.

On behalf of the Human Research Ethics Committee, I wish you well with your study.

Yours sincerely,



Dr Natalie Giles
Research Ethics Officer
Research Office

cc: Prof Naomi Trengove, Dean, School of Health Sciences;
Prof Gerard Hoyne, SRC Chair, School of Health Sciences.



Government of **Western Australia**
Department of **Education**

Your ref :
Our ref : D16/0480034
Enquiries :

Appendix C

Professor Beth Hands
C/o Institute for Health Research
University of Notre Dame
PO Box 1225
FREMANTLE WA 6959

Dear Professor Hands,

Thank you for your application received 4 April 2016 to conduct research on Department of Education sites.

The focus and outcomes of your research project, *The importance of active play compared to organised physical activity for young children: The parents' perspective*, are of interest to the Department. I give permission for you and Ms Casey Murphy to approach Ms. Hallen, the Principal of North Beach Primary School, to invite her participation in the project as outlined in your application. It is a condition of approval that upon conclusion the results of this study are forwarded to the Department at the email address below.

Consistent with Department policy, participation in your research project will be the decision of Ms. Hallen and parents of the children attending this school. A copy of this letter must be provided to the principal when requesting her participation in the research. Researchers are required to sign a confidential declaration upon arrival at North Beach Primary School.

Responsibility for quality control of ethics and methodology of the proposed research resides with the institution supervising the research. The Department notes a copy of a letter confirming that you have received ethical approval of your research protocol from the University of Notre Dame Human Research Ethics Committee.

Any proposed changes to the research project will need to be submitted for Department approval prior to implementation.

Please contact Dr Adriaan Wolvaardt, Coordinator Research Applications, on (08) 9264 5512 or researchandpolicy@education.wa.edu.au if you have further enquiries.

Very best wishes for the successful completion of your project.

Yours sincerely

ALAN DODSON
DIRECTOR
EVALUATION AND ACCOUNTABILITY

4 August 2016

Appendix D
AP and OPA Intensity Classification

| Light Activity | Moderate and Vigorous Activity |
|---------------------------------------------------------|---------------------------------------|
| Active transport to from school (scooter, bike or walk) | Tennis Practice |
| Drama | Tennis lesson |
| Sailing | Tennis Game |
| Horse riding | Swimming Practice |
| | Swimming Trials |
| | Swimming Lessons |
| | Water polo practice |
| | Water polo game |
| | Nippers |
| | Triathlon training |
| | Basketball practice |
| | Basketball game |
| | Ballet |
| | Gymnastics |
| | Netball Practice |
| | Netball Game |
| | Karate |
| | Soccer Practice |
| | Soccer game |
| | Sport |
| | Athletics training |
| | Cheerleading |
| | Dancing class |

| | |
|--|-------------------|
| | Jujitsu |
| | Kidzinsport |
| | Martial arts |
| | Theatrical dance |
| | Kindergym |
| | Acro dance |
| | Tee-ball training |
| | Boxing |
| | Afl |
| | Squash |
| | Sprint training |
| | Hockey game |

Active Play

| Light Activity | Moderate and Vigorous Activity |
|-----------------------|---------------------------------------|
| Gardening | Backyard Cricket |
| Trick or treating | Beach play |
| Walk the dog | Play date at park, oval |
| Playing wii tennis | Play sports with friends |
| Dress up | Swimming/playing in the pool |
| Just dance video game | Playing with friends/siblings |
| Build a cubby | Playground |
| Walk to the shops | Running races |
| Climbing a tree | Footy with friends |
| Hide and seek | Playing at campsite |
| Indoor play | Mountain biking |
| Walking | Chasey |

| | |
|------------------------|-----------------------------------|
| Scouts | Cut wood |
| Woodwork | Playing backyard, yard and garden |
| Walking around the zoo | Playing at park |
| Visiting an exhibition | Bike ride, scooter |
| Pokémon at the park | Dancing |
| Scitech | Trampoline |
| | Riding scooter |
| | Ripstick |
| | Skateboarding |
| | Kicking the footy/ball |
| | Playing park/yard games |
| | Badminton |
| | Indoor basketball |
| | Swing |
| | Running around |
| | School disco |
| | Dodge ball |
| | Kids in nature |
| | Mow lawn |
| | Jungle gym party |
| | Bouncy castle |
| | Ice skating |
| | Paddling |
| | Bush walking |
| | Shooting hoops |