Creating Active Play Opportunities During Lunch Break in Secondary School: A mixed methods case study

Patrizio De Rossi

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Faculty of Social Sciences

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Declaration

I declare that I have composed this thesis by myself and that it embodies the results of my own research. Where appropriate, I have acknowledged the nature and extent of work carried out in collaboration with others included in the thesis. This thesis has been proofread by a third party proof-reader.

Patrizio De Rossi

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And last but not least, Ally, la mia compagna di giochi, thank you for your patience. It's time to play again.

Bristol, December 2020.

Abstract

Play and physical activity are fundamental in young people's social, emotional, cognitive, and physical development. Yet research shows a decline in play and physical activity, particularly during adolescence. Programs for promoting adolescents' physical activity have focused on outcomes such as health benefits, often paying only scant attention to young people's own views on key factors. Participation in active play activities increases physical activity levels and supports the development of fundamental motor skills. Young people spend a considerable part of their lives in school. Lunch breaks, the longest period of the school day where they and their friends can take part in active play activities, have been identified as a promising opportunity for physical activity promotion. However, while play is encouraged in primary school, in secondary school, opportunities for free outdoor play continue to be more restricted. In addition, the characteristics of a model of co-creation aimed at involving young people and adults in exploring, suggesting, and creating these opportunities are not completely identified.

This is an interdisciplinary, mixed methods study bringing health and social sciences together in an innovative way. Distinctively, the approach involves early adolescents as co-researchers to explore the diverse factors which affect their participation in physical activities during lunch break. Quantitative findings on play and physical activity levels are drawn upon to support an original model of co-creation of active play opportunities. The study aims at exploring the characteristics of such a model which involved collaboratively young people, relevant adults in the school setting, and the researcher.

The study highlights the importance of adopting a mixed methods approach in exploring the complexities of adolescents' physical activity and active play behaviours. It also emphasises the value of involving adolescents and adults together in designing projects aimed at encouraging participation in physical activities. The study found that an enjoyable and challenging play context supported adolescents in their physical literacy development.

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Chapter 1 Introduction

"El niño que no juega no es niño, pero el

hombre que no juega perdió para siempre al niño que vivía en él y que le hará mucha

falta"[1]

Pablo Neruda (1980, p.121)

The introduction outlines the context of this research project, the reasons that this study is relevant today, and presents the research questions. I finish the introduction with a presentation of the structure of the thesis.

Neruda's line above combines aspects of this research study with my professional career in physical education, sports, and active play. Pablo Neruda wrote this passage in his autobiography "Confieso que he vivido: Memorias" (Memoirs in English translation), while he describes his collection of toys he had as an adult and he inspired me a long time ago as a young physical education teacher and sports coach. His quote has influenced me during my research career as well as in my professional and personal playful journey.

The majority of my professional career has been focused on physical activity. During this time, I have learnt that the physically active experiences we have as a child, adolescents, and adults are important in creating or precluding the conditions for an active lifestyle, and that play might have a significant role in encouraging physically active behaviour at any age. As a researcher, my interests have focused on exploring, from participants' perspectives, the characteristics of positive physical activity experiences and the similarity with the characteristics of active play activity.

[1] The child who doesn't play is not a child, but the man who doesn't play has lost forever the child who lived in him and who he will certainly miss him.

What has inspired me to put this quote at the beginning of this thesis is the way Neruda notes that play is important not just for children, but also for adults. Thrift argues that "play is understood as a perpetual human activity with immense affective significance, by no means confined to just early childhood" (2008, p.7). Furthermore, Erikson, reporting on a thirty-year follow-up of children previously studied, noted that "the ones with the most interesting and fulfilling lives were the ones who had managed to keep a sense of playfulness at the centre of the things" (as cited in Bruner, 1974 p.17). Play scholars argue that human beings continue to play throughout their life (Brown, 2009; Henricks, 2015) and recently scholars investigated the importance of play in adulthood (Dobson and McKendrick, 2018; Van Vleet and Feeney, 2015). Play is recognised as a fundamental right for children (Article 31 of the United Nations Convention on the Rights of the Child, UNCRC 1989), and in the UK anyone under the age of 10 is commonly described as a child. Play is fostered in early years and primary school settings, where breaks from lessons are called playtime. The spaces in which the students spend these times are called playgrounds and the facilities mostly encourage unstructured play activities. In secondary school, the free periods are called break times, the spaces to spend these periods are called school grounds and the facilities are more sport-oriented (Harrison *et al.*, 2016; McKendrick, 2005, 2019a; Rickwood, 2013) and McKendrick argues that in secondary school "play value has been implicitly contested" (2019b, p.7). Yet, article 31 was aimed at adolescents too as the UNCRC defines a child as being anyone under the age of 18. Therefore, play should be considered as a fundamental right for adolescents and opportunities for adolescent play should be encouraged.

1.1 Research context

The important role of physical activity in the primary and secondary prevention of numerous chronic diseases is recognised (Biddle *et al.*, 2004; Warburton *et al.*, 2006). I considered physical activity in this study, as "any bodily movement associated with muscular contraction that increases energy expenditure" (Caspersen *et al.*, 1985, p.126). This broad definition of

physical activity includes both light-intensity and MVPA (Moderate and Vigorous Physical Activity) intensities and different contexts such as sports, leisure, and play. There is evidence of the positive effect of physical activity in conditions such as cardiovascular disease, diabetes, cancer, osteoporosis, hypertension, depression, and obesity (Lee *et al.*, 2012; Warburton *et al.*, 2006), while physical inactivity can lead to a range of damaging short- and long-term health complications (Lee *et al.*, 2012). However, despite this evidence, in the Minority World[2] (Punch, 2000 p.60), a large number of young people are still inactive (Guthold *et al.*, 2020). Research suggests that during adolescence physical activity levels decline (Cooper *et al.*, 2015; Cruickshank *et al.*, 2015; Dumith *et al.*, 2011; Guthold *et al.*, 2020; HSCIC, 2017) and, in Scotland, a third of young people are not sufficiently active (Scottish Government, 2014). Active play activities have the potential to encourage young people's participation in physical activities and consequently increase their physical activity levels (Brockman *et al.,* 2010; Ginsburg *et al.,* 2007; Johnstone *et al.,* 2019). Play has been studied by scholars in many fields (Lester and Russell, 2008), and although Fink argues that

> "Play is a phenomenon of life that everyone is acquainted with firsthand. Each person has already played at some point and can speak from experience about it." (2010 [1957], p.15)

play scholars have not settled on a common definition of play (Henricks, 2015). For the purpose of this study, I will provide a definition of active play activities and a playful environment. Various scholars define active play as a process which is fun, spontaneous, self-chosen, personally directed, satisfying (where the pleasure comes from the play itself), uncertain, and intrinsically motivated that actively engages the player (Brown, 2009; Caillois, (2001 [1961]); Eberle, 2014; Else, 2014; Eberle, 2014; Fromberg and Bergen, 2006; Sutton-Smith, 1997; Wood, 2009) in expending energy above resting levels (Pellegrini and Smith, 1998). Although these characteristics are often used to describe young children's active play

[2] Minority World" refers to the "developed countries" or "First World" while the "Majority World" refers to the "developing countries" or "Third World".

activities, I consider them appropriate also for early adolescents' ones. I define "active play" as any unstructured and semi-structured activities that are voluntary, pleasurable, fun, episodic, active, intrinsically rewarding, and engaging. These activities take place in a playful environment. This is a type of environment that fosters a "continuation desire" (Brown, 2009, p.18), and puts emphasis on enjoyment, inclusion, and the process rather than the ends. I also recognise that "the main characteristic of play – child or adult – is not its content, but its mode. Play is an approach to action, not a form of activity" (Bruner, 1976 p.v). Therefore, in this study, particular consideration will be given to the important role of a playful environment in supporting or inhibiting adolescent participation in active play activities.

Bruner's perspective of "play as an approach to action" (1976) highlights the subjective approach in defining an activity and an environment as playful. Brady and co-workers (2008) acknowledge the importance of paying attention to the standpoint of the player which defines when an activity is play and when it is not. Therefore, in the results and discussion, I will consider the early adolescent participants' perceptions and descriptions of active play experiences that emerged in the interviews.

Active play activities include a wide range of activities where the players employ a combination of fine and gross motor skills, and partial or total body movement (De Rossi, 2020). For example, activities such as skateboarding, parkour, tag games, or self-organised sports activities (e.g. football, basketball, netball) generally require total body movements. Active play activities might be also limited to upper body (juggling, spinning a bottle, or throwing at a basket for example) movements. Gross motor skills indicate large muscle movements, such as running, chasing, jumping, or kicking. Fine motor skills are related to skills involving smaller muscles, such as throwing, catching, or spinning small objects.

Research suggests that active play has the potential to support the development of fundamental motor skills (Johnstone *et al.,* 2018, 2019) and to promote physical literacy in children and adolescents (De Rossi, *et al.*, 2012, 2020). In the last few years, physical literacy has become a significant concept in education, sport, and physical activity promotion, policy,

and practice in different countries (Dudley, *et al.*, 2017; Edwards, *et al.*, 2017; Shearer, *et al.*, 2018). Physical literacy is defined as “the motivation, confidence, physical competence, knowledge, and understanding, to value and take responsibility for engagement in physical activities for life.” (IPLA, 2017) and is appropriate to each individual’s capacity for movement. For this reason, everyone can achieve physical literacy since it is considered a potential, that everyone possesses at their own level and it is not related to a defined period of life (Whitehead, 2010a). The physical literacy’s concept is linked with the promotion of the intrinsic value of physical activity and not as a means to other ends (Whitehead, 2013), and with a positive attitude towards participation in physical activities during adolescence and adulthood (Whitehead *et al.*, 2018).

In the UK, physical activity levels decline in late childhood and adolescence (Cruickshank *et al.*, 2015; Farooq *et al.*, 2018, 2020), so it is important to find solutions to change this trend. School settings are in a key position to offer young people opportunities to be active (Dobbins *et al.,* 2013; Parrish *et al.*, 2013; Reilly *et al.,* 2016; Ridgers, *et al.,* 2012). Schools are institutions which have a great influence on every child and adolescent in their first two decades of life, they are the place where adolescents of any social, economic, and ethnic background spend a large amount of their waking time (Dobbins *et al.*, 2013; Harris and Cale, 2019; Hyndman, 2017; Nettlefold *et al.*, 2010; Ramstetter *et al.*, 2010; Rickwood, 2013). Consequently, they are a potential environment for projects aimed at encouraging physically active behaviour in a large number of young people. However, although systematic reviews of school-based physical activity interventions (Dobbins *et al.*, 2013) show some positive evidence in primary school, this was not the case in secondary school. Lunch break is the only period during school time where adolescents can take part in self-organised active play activities. Yet, at the moment, impoverished playgrounds, ingrained social norms, restrictive policies, and shortened school breaks are negatively affecting adolescents’ participation in active play activities (McKendrick, 2019; Robinson, 2014) and the opportunities to be active during lunch break in secondary school are under-utilised (Reilly *et al.,* 2016). To date, school-

based physical activity interventions have been a result of an external top-down intervention (Morgan, *et al*., 2019), and little attention has been paid to the effect of involving the whole school, both students and staff, with external agencies to explore and together create opportunities for engaging students, particularly those who are less active, in physical activities.

Young people's own knowledge and expertise are needed to support the fulfilment of the lunch break's potential for encouraging wider participation in active play activities (Baines and Blatchford, 2019; Blatchford and Sharp, 1994; PHE, 2020). But not all schools ensure every young person is listened to and engaged as a participant in decision-making, despite evidence that this approach supports increased achievement and attainment (Mannion, *et al.*, 2015). There is a call for engaging students' voices (PHE, 2020) and to consider them as experts when working together with adults, to co-create physical activity opportunities in school. Taking into account this perspective, physical activity promotion in school among adolescents should consider their interests as well as the local physical and social environments. Research has shown that supportive environments are significant in health behaviour change (Bauman et al., 2012). In light of this, it seems essential to involve the adolescents, as target group, and the significant adults (teachers, members of school staff) as experts in their settings (Cargo & Mercer, 2008) to propose meaningful opportunities for encouraging participation in physical activity. In this respect, this study employs elements of co-creation, when understood as "collaborative public health intervention development by academics working alongside other stakeholders" (Leask *et al*., 2019, p. 2), "involving the target audience in both the design and implementation stages of an intervention" (Morgan, *et al*., 2019, p.2). This approach has already shown its potential in generating tailored physical activity interventions (Morgan et al, 2019; Popp *et al*., 2021; Verloigne *et al*., 2017) but it has not been tried in lower secondary schools. In this study, the target group, the adolescents who were not involved in physical activities during lunch break, participate in the planning and proposal of the opportunities for enhancing participation in active play activities. As a result of these elements of co-creation,

one of the opportunities for active play that the students proposed in the intergenerational focus group was adopted by the school during lunch break.

Sanders and Stapper argue that in the process of co-creation, “the person who will eventually be served through the design process is given the position of ‘expert of his/her experience’, and plays a large role in knowledge development, idea generation and concept development” (2008 p.12). For Goodare and Lockwood (1999), during the process of co-creation, the voices and the experiences of the participants have an equal say of those of the researchers and both types of knowledge complement each other. Involving different adolescents and adults in co-creative strategies has the promise to systematically address practical problems (Popp *et al*., 2021), to develop local, meaningful, and tailored interventions (Leask *et.al*, 2019), and to realise sustainable outputs and impact (Durose *et al.*, 2012; Greenhalgh *et al*., 2016). Some authors utilise ‘co-production’ as a term alongside ‘co-creation’; the latter term is adopted herein. For this research, co-production is avoided as a description since this study does not fully adhere to the principles of co-produced research throughout every phase and element of the project. For example, the participants were not involved in every aspect of the research process: research design, analysis, and output creation. However, some participatory elements of the study, e.g. the peer-led session during the second group interview and the two intergenerational focus groups where the participants collaborated with the researcher in creating opportunities for increasing physical activity participation through active play, had the characteristics of a co-produced study (Leask *et al*., 2019; Pohl *et al.*, 2010). With this debate in mind, instead I explore when and how the project took co-creativity as a guiding principle.

Importantly, one of the aims of this study was to make an original contribution by uncovering and exploring the characteristics of a co-creative model for designing and implementing opportunities for active play. Such a model is needed to generate effective impacts on local and wider provision. Delineating, uncovering, and specifying these characteristics is seen as critical to enhancing a more participatory approach to provisions for active play in schools and beyond. In this research, drawing on Mannion (2007, 2012) and Ventura-Merkel and Lidoff

(1983), we wondered if, when, and how an intergenerational dialogic approach might be important as a co-creative strategy for producing tailored and meaningful active play opportunities. As part of the research strategy, early adolescents, teachers, and I as a facilitator, were involved in intergenerational focus group sessions which allowed for an exploration of the processes needed to facilitate a collaborative construction of knowledge (Pohl *et al.*, 2010) on the characteristics of a playful environment which might encourage participation in physical activities during lunch break. To my knowledge, there are no studies that have purposefully explored the impact and role of an intergenerational dialogical approach in creating opportunities for increasing participation in physical activity in secondary schools through active play.

There has been little research into how young people and adults (including teachers and other adults from the school community, third sector facilitators, and local authority staff) can work collaboratively through intergenerational dialogue (Mannion, 2007, 2012; Ventura-Merkel and Lidoff, 1983) to devise effective responses to enhancing play cultures and improving physical activity levels as part of school life (McLaughlin, 2006; Robinson, 2014). For the purpose of this study intergenerational practice is intended as any "activity or program that increases cooperation, interaction or exchange between any two generations." (Ventura-Merkel and Lidoff,1983, p. 3).

I considered intergenerational activities in an educational setting as:

> “(a) involving people from two or more generations participating in a common practice that happens in some place; (b) involving different interests across the generations and can be employed to address the betterment of individual, community, and ecological well-being through tackling some problem or challenge; (c) requiring a willingness to reciprocally communicate across generational divides (through activities involving consensus, conflict, or cooperation) with the hope of generating and sharing new intergenerational meanings, practices, and places that are to some degree held in common, and

(d) requiring a willingness to be responsive to places and one another in an ongoing manner" (Mannion, 2012, p. 397)

The school environment provides a viable context and opportunity for adolescents and adults to work together to explore the characteristics of a playful environment and co-create play opportunities. Despite evidence that participatory approaches to play provision can be a part of the solution to enhance participation in active play activities during lunch break in secondary school, there is a paucity of research on how school-based play cultures can be enhanced especially for adolescents.

1.2 Research aims

This research project aims to investigate how the assemblages (Fox and Alldred, 2017) of physical (playground areas), social (gender, adult, and peer influence support or discourage active play), and the political (curriculum, pedagogical and normative influences) factors affect active play opportunities during lunch break in secondary schools. This research project explores, adopting a mixed-method approach, the factors which positively or negatively affect lower-secondary aged adolescents' physical activity opportunities, and in particular active play, in secondary school during lunch break. Adopting a participatory mixed methods approach, the integration of quantitative and qualitative data better captures the complexity of active play behaviour. The study also aims to explore how young people and adults working collaboratively through intergenerational dialogue (Mannion, 2007, 2012; Ventura-Merkel and Lidoff, 1983) might co-create (Cottam and Leadbeater, 2004; Sanders and Stapper, 2008) tailored opportunities for active play activities during lunch break. These opportunities than might support enhanced participation in active play activities which may lead to higher physical activity levels and supporting an adolescent's physical literacy journey.

1.3 Research questions

This research project explores three issues which are interconnected: the inactivity levels among adolescents; the barriers and facilitators to participation in active play activities that the early adolescents experience in their first year of secondary school; and the lack of active involvement of young people in the design and implementation of initiatives to improve their physical activity levels, in school settings. The following research questions guided the study:

Research question 1 **When and how does active play in secondary school support increased levels of physical activity and the promotion of physical literacy?**
Research question 2 **Which factors can support or hinder the enhancement of active play opportunities for younger adolescents of secondary school age in the UK?**
Research question 3 **What are the characteristics of effective models of co-creation of play provisions? How can these be utilised in schools settings?**

1.4 Structure of the Thesis

Chapter 2 is a review of the literature where I discuss on the different approaches to physical activity promotion and the importance of supporting the intrinsic value of physical literacy and active play. In Chapter 3, I present my theoretical framework, my *ethico-onto-epistem-ology*

(Barad, 2007, p.185 original italics) position, the methodology, the research design, and the methods I adopted in this study. Chapter 4 presents the results of the quantitative study on adolescents' physically active behaviour. The findings that emerged are then integrated with the analysis of the adolescents' experiences and perceptions to answer research question one. In Chapter 5 I present the findings related to research questions two and three, then the last chapter presents the discussion of the findings in relation to previous studies and highlights the strengths and limitations of the study. It also addresses practical recommendations and future research.

Chapter 2 Literature review

Introduction

Physical activity has been considered as a means to achieve diverse outcomes (Whitehead *et al.*, 2018), these can vary from health enhancement to improvement of socially accepted behaviours. The "obesity crisis" (Kirk, 2006, p.121) and the utilitarian perspective on physical activity considered as a solution for health issues have influenced academic research and school curricula and shaped national and international policies and strategies aimed at improving physical activity participation. For example, in Scotland, concerns about the health behaviour of children and young people have influenced the development of the Curriculum for Excellence (CfE) (Scottish Government, 2004) and the role of physical education (PE) in CfE (Thornburn *et al.*, 2011). Physical Education (PE), together with physical activity and sport, occupies a central role in the curriculum area of "Health and Wellbeing"; it is the only subject within CfE which has a specified timetable requirement (two hours per week). In fact, it has been claimed that the CfE framework for physical education may assign too much attention to the development of children and young people's health and wellbeing (Gray *et al.*, 2012; Thornburn *et al.*, 2011). However, adolescents are not inactive because of a lack of knowledge. They know about the consequences of being inactive (Symons *et al.*, 2013); what they want are more opportunities to be active in a way that is closer to their interests (Dollman *et al.*, 2005). In this chapter, I will examine the utilitarian and the intrinsic approaches to physical activity promotion and engage critically with them. Many arguments in the literature suggest that there is a need for research that moves beyond the utilitarian perspective (Kretchmar, 2005). An alternative to this current approach is to place emphasis on the joy of movement, promoting the idea that movement is important for its own sake, it is a source of pleasure and enjoyment, and supports intrinsic motivation (Kretchmar, 2008). Active play encourages enjoyment, creativity, and autonomy in a non-judgemental playful environment supporting movement skills, self-esteem, resilience, problem-solving, managing stress, and

social, emotional, and cognitive well-being (Brockman *et al.*, 2010; Ginsburg *et al.*, 2007; Johnstone *et al.,* 2019; Kentel and Dobson, 2007; Matthews *et al.*, 2011). The playful environment might motivate the less active students in taking part in physical activities.

Furthermore, this chapter shows how there is a need for a better understanding of the important value of a more participatory approach to physical activity promotion which may engender wider benefits for school communities. The literature review shows that further research is needed to understand the impact of enhanced play opportunities in secondary schools on supporting the less active students to become more active. It also indicates the relevance of a mixed methods approach to acquire a better understanding of the potential influence of the features of the physical and social school environment on young people's break time physical activity levels.

The literature review is organised into different sections. The first section includes the literature on different approaches to physical activity promotion. In the second section, I explore the literature on adolescents' perceived barriers and facilitators to participation in physical activities. In the third and fourth sections, I present the literature on physical literacy and active play.

2.1 Perspectives on physical activity promotion

The acknowledgement of the value of physical activity and the importance of acquiring a physically active lifestyle has gained significance in international and national government policies because of rising concerns about young people's health behaviour (WHO, 2016). Society, natural and human environments have been subjected to rapid and intense changes in the last forty years. Increased urban expansion, greater volumes of traffic, digital technologies, families' lifestyle choices, and perception of children and young people through child-care, education, and healthcare have been affecting almost every element of human life.

The different lifestyle which has been shaped by these changes has had consequences. Some adolescents have fewer opportunities to play outdoors outside school. Another consequence is the increasing number of children, young people, and adults in the "Minority World" (Punch, 2000 p.60) who are overweight or obese, which has reached epidemic dimensions (WHO, 2004; 2016). Overweightness and obesity are considered, in the "Minority World", as one of the main public health concerns (WHO, 2004) and they are also associated with wider psychological and social consequences and huge economic impacts on society and health systems (Wyatt *et al.*,2006). According to the WHO (2009), changes in diet and increasing levels of physical inactivity are the reasons behind the number of overweight and obese people worldwide. Physical inactivity is considered the fourth leading risk factor for global mortality (WHO, 2010). There is a strong link between physical inactivity and increased risk of developing diseases including cancer (specifically breast and colon cancer (Lee *et al.*, 2012; Monnikhof *et al.*, 2007; Sallis *et al.*, 2006; Warburton *et al.*, 2006), coronary heart disease and type 2 diabetes; and the risk factors associated with these diseases such as high blood pressure, high cholesterol levels (Lee *et al.*, 2012) as well as overweightness and obesity. However, the important role of physical activity goes beyond the primary prevention of overweight, obesity, cancer, and other health issues.

The "obesity crisis" (Kirk, 2006) and prevailing utilitarian discourse around physical activity for health characterises physical activity as a duty (Kretchmar, 2005), as an element of a weight-loss programme. Yet, the results of this approach are not positive, most notably for adolescents, and especially for adolescent girls (Dumith, *et al.*, 2011, Pearson, *et al.*, 2015). An alternative to this current approach is to place emphasis on the joy of movement (Kretchmar, 2005; 2008), on fun and enjoyment (Wellard, 2014) promoting the idea that movement is important for its own sake, and it is a source of pleasure and enjoyment. Promoting movement for its own sake will support intrinsic motivation (Deci and Ryan, 1985) which is linked with higher levels of physical activity in adolescents (Owen, *et al.*, 2014) and adults (Teixeira, *et al.*, 2012). Intrinsic motivation is the drive to do something because "it is

inherently interesting or enjoyable" (Ryan and Deci, 2000 p.55), whereas extrinsic motivation indicates the drive to do something because "it leads to a separable outcome" (Ryan and Deci, 2000 p.55). However, the solution from adults' perspectives has been focused on emphasising the links between health behaviours, wellbeing, and the benefits of a physically active lifestyle in governmental strategies, policies, and educational curricula and providing more opportunities for organised sports (NHS, 2019). Yet, as it will be explored in some depth in this study from young people's own perspectives, it is the intrinsic motivation (Deci and Ryan, 1985) – "the drive to feel motivated to engage in new activity or something because it is interesting, challenging and absorbing" (Pink, 2009 p.84), the involvement of young people in creating spaces and opportunities for a wide choice of different activities (structured and unstructured), and the promotion of physical activity for its own sake through active play, that may have the greatest opportunity of changing adolescents' behaviour. At the moment, school-based intervention for promoting physical activity seems ineffective (Love *et al*., 2019) and research suggests that there is a decline of physical activity levels from childhood to adolescence (Cruickshank *et al.*, 2015; Guthold *et al*., 2020) so it is important to involve adolescents in research studies to uncover the factors that hinder young people's participation in physical activities.

In the UK, there is an emerging culture of involving children and adolescents in decision-making process (Kirby, 2003). The active involvement of young people in the planning and delivery stages of physical activity interventions in school ensures that the activities are tailored to their needs (PHE, 2020). School settings, where adolescents and adults share and shape the same environment, hold the potential to engage them in intergenerational processes for both generating new knowledge and practices (Mannion, 2012; Ventura-Merkel and Lidoff,1983) related to increased participation in physical activities.

Adolescents want to be more active; they need activities which are closer to their interests and physical and social environments which encourage these activities (Dollman *et al*., 2005). This claim is confirmed by a survey by the Women's Sport and Fitness Foundation (WSFF,2012)

that examined the perspectives of adolescent girls about their physical activity experiences. The study found out that in England, while only 12% of girls aged 14/15 are physically active (NHS, 2008), 76% of the participants wanted to be more active but they were discouraged, amongst other perceived barriers, by a high level of competition in traditional sports or limited choice of activities during physical education lessons.

It is important, then to listen to young people's voices and understand the barriers to participation in physical activities they experience and the factors that facilitate their involvement in physical activities. In the next section, I present a review of literature on adolescents' perceived barriers and facilitators to participation in physical activities.

2.2 Facilitators and barriers to participation in physical activity

In this section, facilitators and barriers to participation in physical activity from adolescents' perspectives are presented. While correlates of participation in physical activity in adolescents have been extensively studied and summarised in systematic review of reviews (Sterdt, et al., 2014) and systematic review of qualitative studies (Martins et al., 2015), there is little research exploring the influences on activity during break time in secondary schools (Ridgers *et al.*, 2012). As it was noted in the previous section, the current utilitarian message which promotes physical activity as work, as an instrument to get health benefits, has not been successful in motivating children and young people in adopting a physically active lifestyle. Kretchmar outlines two weaknesses relating to this approach (2005). The first one relates to the fact that physical activity for health supports extrinsic behaviour, while it is intrinsic motivation that is associated with participation in physical activity. Extrinsic motivation may produce positive results, but these results often only have short-term effects. In contrast, intrinsic motivation seems a stronger facilitator for long-term effective behaviour change (Ryan and Deci, 2000).

The second weakness is that the message of considering movement as work in order to be a healthier adult or as a weight-loss programme is not a convincing one for children or young people for whom health at the moment is not considered at risk (Wellard, 2015). Rather, the following factors: fun, intrinsic motivation, perception of competence, the impact of friends, adults (parents, physical education teacher, and sports coaches), and environment might facilitate adolescents' participation in physical activities (Martins *et al.*, 2015).

In this section, I present how a multitude of factors may influence adolescents' physical activity patterns: physiological, physical, social, and psychological factors, the role of intrinsic motivation, and the importance of taking part in activities that are fun and interesting. The literature will reveal the positive role on participation in physical activities of a physical environment which encourages a variety of movements and activities, and the negative role of an overly competitive social environment created by the adults. The role of the school playground as a potentially important setting to promote adolescents' physical activity levels is highlighted as well as the little research which exists on active play activities during lunch break in secondary school. To plan and create tailored and evidence-based interventions to promote adolescents' physical activity participation, it is essential to understand why young people are physically active or inactive.

Many studies do suggest that physical activity is a complex behaviour influenced by various factors (Armstrong, 2019; Armstrong and Welsman, 2002; Draper and Stratton, 2019; Ridgers *et al.*, 2012; Sallis *et al.*, 2000). Those factors might be personal (for example attitudes to physical activity, or belief in one's ability to be active) or relate to the physical, social, and cultural environment. In the past twenty years, a large amount of research into correlates associated with participation in physical activity has focused mostly on individual levels factors (Bauman *et al.*, 2012). However, recently the important effect of the physical and social environment on participation in physical activity has been also recognised (Bauman *et al.*, 2012), which has led to the adoption of socioecological models to understand physical activity participation (Sallis *et al*., 2006; Sallis and Owen, 2015). The socioecological models (which

will be further explored in the Methodology chapter), were inspired by the ecological system theory of child development (Bronfenbrenner, 1979) which noted the role of social and environmental influences on child development. Socioecological models are based on the idea that behaviour has diverse levels of influences, such as intrapersonal (biological and psychological), interpersonal (cultural and social), natural and built environment, and political factors (Sallis and Owen, 2015). The way these factors influence adolescents' physical activity participation will be presented in the rest of this section.

The physiological determinants of daily physical activity among adolescents include age, gender, and ethnicity (Sallis 2000). Girls have been found to be less active than boys, and older children and adolescents are less active than younger children (Sterdt *et al*., 2014). Peers, parents, and significant adults all make a potential difference to participation in physical activities. Among the social and cultural variables, parental support was linked positively with PA (Edwardson and Gorely, 2009; Martins *et al.*, 2015; Sterdt *et al*., 2014) while lack of time was linked negatively (Biddle *et al.*, 2005; Martins *et al.*, 2015). Social and peer pressure has been reported as having an important impact on participation in physical activity (Martins *et al.*, 2015; NICE, 2007). For adolescent girls the stereotypes, fuelled by media and supported by parents, which consider physical activity and sport as "manly" activities and the lack of female role models act as a barrier to participation in physical activity (Martins *et al.*, 2015; WSFF,2012). Furthermore, adults, like teachers or coaches, have an influence on adolescents' participation in PA. Supportive and caring teachers and coaches have a positive effect, whilst teachers who praise and follow only the more skilled students are perceived as a barrier to participation (Martins *et al.*, 2015; WSFF,2012).

Life transition periods have an influence on adolescents' physical activity participation (Martins et al., 2015; Pearson *et al.*, 2017). The transition from primary to secondary school is one of these periods (West et al., 2010). The periods during the transition from primary to secondary school and the first year of secondary school are marked by a significant drop in physical activity participation, especially in girls (Cruickshank *et al*., 2015; Guthold *et al*., 2020). When

the physical activity levels of girls aged between 13 and 15 years old are compared with the levels of girls aged between 11 and 13 years old, the percentage of less active subjects increases considerably, by 20% (Cruickshank *et al*., 2015; Scottish Government, 2015). Adolescents with low physical activity levels suggested the main barriers they perceived in secondary school were related to various social and cultural factors, such as the role of friends and group acceptance, and that the opportunities to be active were fewer and more competitive (Martins *et al*., 2015).

The physical environment, where adolescents live, has an impact on their participation in physical activity. The time spent outdoors and access to facilities and programmes have a positive correlation with physical activity (Sterdt *et al*., 2014), while crime incidence and factors related to school facilities (such as poor quality of changing rooms, equipment, or sports halls) have a negative influence on participation in physical activity (Biddle *et al.*, 2004; Martins *et al.*, 2015; NICE, 2007). School playgrounds are settings that show potential for promoting adolescents' physical activity. They provide opportunities for physical activities in a safe and supervised setting. School playgrounds are, for adolescents of any economic, ethnic, and social background, a place for taking part in physical activities with their friends (Baines and Blatchford, 2019; Baines, *et al.*, 2020; Dobbins *et al.*, 2013; Harris and Cale, 2019; Hyndman, 2017; Nettlefold *et al.*, 2010; Ramstetter, *et al.*, 2010; Rickwood, 2013). Therefore, it is important that school playgrounds provide adolescents' many opportunities to move and experience the enjoyment of being active (Willenberg *et al.*, 2009). Furthermore, school playgrounds are a setting that requires no teacher planning to potentially increase physical activity levels (Hyndman, 2017). However, school playground research has been focused on primary schools. While there is little research on the school playground in secondary schools (Ridgers *et al.*, 2012), inconclusive evidence has been found on secondary school-based physical activity interventions (Dobbins *et al.*, 2013). Increases in physical activity level have been noted when adolescents can take sports equipment into the playground during break

time (Ridgers *et al.*, 2013) and in Norwegian secondary schools which had obstacle courses, fixed playground equipment, and open fields (Haug *et al.*, 2008).

Among the psychological variables, physical activity is related positively to enjoyment. Reports have found that enjoyment is the main motivation for taking part in physical activity for young people in Europe (European Commission, 2014). Fun was the factor which was most frequently indicated by adolescents in several studies and systematic reviews (Allender *et al.*, 2006; Martins *et al.*, 2015; NICE, 2007; Rees *et al.*, 2006). Podilchak's qualitative analysis of young people's (mean age of 22 years old) interviews offers one of the most cited descriptions of fun. He defined fun as "active involvement in an activity which the individual is doing" (Podilchak, 1991, p.140) together with others. This definition considers the interactive participation of the physical, mental, cognitive, social, and emotional capacities of the individual. He also found that the same respondents considered the activity *per se* less important when they were considering enjoyment. Enjoyment seems to link more with emotional and internal aspects rather than external (type of activity) aspects. It seems that in order to foster the joy of movement, it is not the activity which matters, but the emotional environment which the participants (and the adult facilitator) create.

Other facilitators are positive self-perception, intrinsic motivation, and perceived competence (especially in a non-competitive environment) (Biddle and Mutrie, 2008; Martins *et al.*, 2015; Van der Horst *et al.*, 2007). Studies (Barnett *et al.*, 2009; Stodden *et al.*, 2009) have found a positive and significant correlation between motor competencies and physical activity participation. While negative factors are competition in traditional team sports, being too tired, a perceived lack of confidence, not being able to perform as well as their peers, and dislike of physical activities that become more technique and performance rather than fun orientated (Biddle *et al.*, 2005; Martins *et al.*, 2015; NICE, 2007).

In Scotland, during adolescence, there is a drop in physical activity levels, especially in girls. However, young people want to be active and it is important to give them more opportunities to be active. In designing effective physical activity promotion, it is important to consider

multiple environments: physical (school grounds, physical activity opportunities), social (peers, family, and school staff), and political (curriculum, norms), as well as the individual level (perception, motivation). Secondary schools, and school playgrounds, can be a significant arena for physical activity promotion for adolescents.

Physical activities for the less active students should take place in a fun and non-threatening environment that allows the adolescent to demonstrate and improve competencies supporting their self-efficacy, self-perception, and self-esteem. They are “mastery” climate environments (as opposed to a “performance” climate, where the importance is on the results and comparison with others), where the emphasis is on the process of learning (Ommundsen and Roberts, 1999), the individual capabilities are respected and valued not against a generalised outcome, but against personal and individual potentiality. Such climates, also foster intrinsic motivation which is needed when the target is changing behaviour.

2.3 Physical literacy

Physical literacy has become, in the last few years a significant concept in education, sport, physical activity policy, and practice in different countries (Edwards *et al.*, 2017). In this section the definition of physical literacy and an explanation of the attributes of a physically literate individual, will be presented, followed by the exploration of the links between active play and physical literacy, and the role of physical literacy in promoting the joy of movement. Physical literacy, which is a prominent concept in the promotion of an active lifestyle throughout life, rejects the cartesian body/mind dualism and asserts a monist perspective, where body and mind cannot be separated. It is aimed to realise fully one’s own capabilities through an active embodiment not just related to the physical development but in a holistic dimension of the individual, including the social, cognitive, and emotional aspects. (Edwards *et al.*, 2017; Whitehead, 2010a).

The United Nations (2001) consider literacy as “crucial to the acquisition, by every child, youth and adult, of essential life skills that enable them to address the challenges they can face in life, and represents an essential step in basic education, which is an indispensable means for effective participation in the societies and economies of the twenty-first century” (p.1). Physical literacy is linked to approaches to physical activity and education in which the individual is at the centre of the learning process in a lifelong process.

Whitehead describes physical literacy as:

> “the ability and motivation to capitalise on our motile potential to make a significant contribution to the quality of life. As humans, we all exhibit this potential; however, its specific expression will be particular to the culture in which we live and the motile capacities with which we are endowed.” (Whitehead, 2010b, p. 34).

A physically literate individual possesses a series of attributes (Whitehead, 2010a). A fundamental attribute is a positive attitude towards physical activities that motivates the individual to engage in them for the pleasure of the movement. Motivation is an essential attribute that allows the individual to fulfil their own potential. A physically literate individual will exhibit coordination and control of the body as well as an understanding of their embodiment (Edwards *et al.*, 2017; Jurbala, 2015; Whitehead, 2010a). This is demonstrated in gross motor as well as fine motor activities. They can show their body management in a variety of environments. They perceive and read stimuli from both the physical and social environments, and react to them with movements that are coordinated, controlled, intelligent, emphatic, creative, and appropriate for the individual in the different conditions. A physically literate individual is competent in considering and evaluating critically their movement experiences, they are also able to understand the importance of physical activity, to involve and promote participation and talk about these topics (Edwards *et al.*, 2017; Whitehead, 2010a). Through positive experiences and from a “well-established sense of self as embodied in the world” (Whitehead, 2010c, p. 11-12), they will enhance self-esteem and self-confidence. All these attributes are interrelated and the improvement of one of these leads to the advancement of

all the others. Physical literacy is a lifelong process aimed at expressing and realising their own physical capabilities. Positive self-perceptions, intrinsic motivation, and perceived competence, which are key predictors of lifelong participation in physical activities (Cairney, *et al.*, 2012; NICE, 2007) are also the attributes of a 'physically literate' individual (De Rossi, *et al.*, 2012; Whitehead, 2010a).

Physical literacy, as conceived, considers the individual in their holistic form, and marks a difference from a pedagogy of physical education where the individual is seen as an aggregate of parts which are continuously dis- and re-connected in some improved form (Whitehead, 2010a). It supports active participation in a variety of movement forms, where the individual is physically, emotionally, and intellectually engaged. It is an approach where the individual is at the centre of the learning process. This approach is linked with the meaning of the word “education” itself. “Educe” means bring out (The Concise Oxford Dictionary of English Etymology) implying that the student should not be considered as a “sponge” - an object to fill with notions and knowledge, but an individual that can bring out their potential and capacity. This perspective challenges the current discourses on the pedagogy of PE focused on high-level performance and elitism (Brown, 2008) which is also one of the main barriers in participating in physical activities that young women reported in the WSFF (2012) report.

In this study, the proposal is to explore how physical literacy supports adolescents in enjoying positive experiences of physical activity which might lead to adopting a physically active lifestyle. The concept of physical literacy as a life skill supports the intrinsic value of physical activity and defends the importance of physical activity for all. In the next section, I illustrate the importance of active play in adolescents' lives and its role in encouraging participation in physical activities.

2.4 Active play

In this section, I explore perspectives of diverse studies of play and argue for the need to research how active play in secondary school might encourage physical activity levels in less active students.

Active play will be the focus of this section; a brief historical overview of the different theories of play will introduce an initial exploration of the characteristics of play from young people's perspectives. This section will conclude with a rationale on the reasons active play should be promoted in secondary school to enhance adolescents' participation in physical activities and in promoting physical literacy. Play is a process where all the different dimensions of an individual (physical, social, cognitive, and emotional) are actively involved in a simultaneous intra-dependent relationship. Active play supports an approach which emphasises the value of physical activity that is "innately rewarding and self-affirming" (Whitehead,2010b, p.39), focused on the expression of the potential of the individual.

Play can be considered both a socially and personally constructed concept (Henricks, 2015), The mode is a fundamental characteristic of play (Bruner, 1977), when the participants decide to see an activity as play, then it can be realistically considered as play. Therefore, play is better described by a set of attributes than a precise definition. In this study, I regard "active play" as any voluntary, pleasurable, episodic, active (Fromberg and Bergen, 2006; Pellegrini and Smith, 1998; Sutton-Smith, 1997), engaging and fun unstructured and semi-structured activities (Eberle, 2014; Else, 2014) that take place in a joyful, inclusive and playful environment. Play is a process (Wood, 2009) and it is characterised by a "continuation desire" (Brown, 2009, p.18). Active play is considered as a process which is fun, spontaneous, self-chosen, personally directed, satisfying (where the pleasure comes from the play itself), uncertain, and intrinsically motivated that actively engages the adolescent (Brown, 2009;

Caillois, (2001 [1961]), Else, 2014; Pellegrini and Smith, 1998; Sutton-Smith, 1997) in expending energy above resting levels.

Play has long been the subject of academic research emphasising the important and fundamental role that play has in the life of children and young people. Different theories have an important part in recognising the fundamental role of play in children and young people's physical, emotional, social, and cognitive development, and well-being (Stagnitti, 2004) and the effect on society as a whole (Henricks, 2015). However, the idea and notion of play in children and young people's development has been influenced by the different theoretical orientations of the researchers and their research methods.

The classical theories of play (Surplus energy theory, Recreation theory, and Recapitulation theory), originate in the 19th century and have tried to explain why play exists and what its function is (Mellou, 1994). These theories were influenced by Darwin's theory of evolution in which children's play was considered as a reflection of the course of human evolution (Takhvar, 1988). Classical theories of play have contributed to positioning play as an important area of research for theorists and scholars of different disciplines and they had a strong impact on the developmental theories of play in the 20th century (Takhvar, 1988). The developmental theories of play follow a different conceptual perspective from the classical theories. These theories (Psychoanalytic theory, Cognitive theories, and Bateson's Metacommunicative Theory), influenced by biological and psychological theories, studied the role of play for the development of the emotional (Erikson, Freud), cognitive (Piaget, Vygotsky), and communicative skills (Bateson) in children (Mellou, 1994; Takhvar, 1988; Stagnitti, 2004). The third group of play theories are the recent theories of play (Takhvar, 1988). These theories studied play from a different perspective. Researchers in history, anthropology, folklore, social philosophy, and sociology studied the meanings of play and the implication of play on communities and societies (Henricks, 2015). These theories affirm that play behaviour and development are determined culturally and influenced by several different variables, such as gender, geography, class, culture, and race, (Else, 2014; Henricks, 2015). Therefore, they

challenged the methodologies of the developmental studies which used quantitative and experimental methods to observe the play behaviour of children (and animals) in laboratories or fixed environments, which are contexts that are far removed from the everyday experience (Woodhead and Faulkner, 2008). These theories also criticised the concept of development, supported mainly by developmental studies, as a linear process through which every individual must progress towards adulthood, which is considered the state of completion (Woodhead and Faulkner, 2008). This idea of development has also been challenged by a different perspective, the sociology of childhood. This perspective recognises children and young people as individuals in their own right and as active agents in the construction of their social lives, both within the lives of the people around them and the society in which they live (Boyden and Ennew, 1997; Prout and James, 1997). In this research project, development is considered as a "heterogeneous and complex mix of interacting entities and influences that produces the life cycle of an organism" (Oyama, 2000 p.1). Development in this perspective involves interconnections between genes and the physical, social, and cultural environment. These interconnections are multi-layered and as a rhizome not always visible (Deleuze and Guattari, 1987). They act through a continuous process of intra-action (Barad, 2007) with the agency of both human and nonhuman. Play, according to this view, always takes place in an intra-active process between body and matter, where new bodies and new spaces are constantly created. Play itself follows a "life-long" process of development becoming more complex and elaborate. Its benefits are significant throughout the whole life. Brown (2009) suggests that lifelong play supports neoteny, the capacity of the brain to remain young and more flexible.

As it was shown before presenting the different theories of play, the study of the instrumental value of play has been the mainstream approach. From this perspective, adults have the power to enhance forms of play which can be considered beneficial in later life and criticise other types of play which they consider not functional to the development. The standpoint of this research project, however, is to consider play mainly for its autotelic value, rather than

just about future benefits. Yet, considering the autotelic value of play does not mean that the benefits of play are not recognised.

The role of play in the development of physical, cognitive, social, psychological, and emotional skills in children is now widely recognised (Brown, 2009; Else, 2014; Fromberg and Bergen, 2006; Lester and Russell, 2008, Pellegrini and Smith, 1998; Sutton-Smith, 1997). Yet, play is little explored during adolescence (Scheu and Xu, 2012). Play is considered fundamental in supporting the development of the brain in the first three years of life which are considered a period of high brain plasticity (Fromberg and Bergen, 2006; Lester and Russell, 2008). Recent studies in neuroscience suggest that adolescence is another important period of high brain plasticity (Steinberg, 2014). Pesce et al. (2016) argue that an activity which is characterised by novelty, diversity, effort, and successfulness supports cognitive development. These are also the characteristics of a play activity, so adolescents' participation in active play activities might sustain their cognitive development. However, Mullan (2019) in his 40-year longitudinal study on UK based school-age young people's use of daily time, reports a significant decrease in the amount of time young people spend playing both at home and out-of-home. If only the out-of-home activities are considered, there was no difference in time spent taking part in sports activities between 2000 and 2015, while in the same period young people decreased the time spent playing by 17 minutes. When the comparison is between 1975 and 2015 the decrease is close to 30 minutes per day (Mullan, 2019). Therefore, it is important to understand how to facilitate active play participation in adolescents.

Active play has been linked with the development of motor skills in children (Johnstone *et al*., 2019). Perceived competence has been found as one of the principal facilitators in being active (Barnett *et al.*, 2009; Stodden *et al.*, 2009). However, research on secular trends on movements competencies has shown that an increasing number of children and young people have low levels of basic motor skills and coordination (for example, running, jumping, throwing, and catching) (Filippone *et al.*, 2007). Physical activity recommendations for young people focus on the quantitative characteristics (60 minutes of daily MVPA) but they seem to miss the

important role of the qualitative aspects of physical activity, such as skill development, socialisation, and enjoyment (Myer *et al*, 2015). Furthermore, Brockman et al. (2011) found that for children, enjoyment and spending time with friends were primary motives for taking part in active play activities. The important role that active play activities might have in encouraging adolescents' participation in physical activities is still under-researched.

The benefits of active play are widely recognised. Active play encourages enjoyment, creativity, and autonomy in a non-judgemental environment supporting movement skills, self-esteem, resilience, problem-solving, managing stress, and social, emotional and cognitive well-being (Brockman *et al.*, 2010; Ginsburg *et al.*, 2007; Kentel and Dobson, 2007; Matthews *et al.*, 2011). While all those benefits are important, play should be valued primarily for its autotelic value and for the enjoyment and the pleasure of doing it (Bauman, 1993). Yet play is mostly considered in its instrumental perspective, in achieving outcomes that are more adult-orientated, rather than its intrinsic value (Lester and Russell, 2008). This approach is called "ludiforme" (play-like) because the end of play is not in itself but is usually adult-determined (Staccioli, 1998) and it is reflected in the type of play that is proposed or accepted. This approach affects mostly young people's play behaviour, mostly in the form of "hanging out", which is often critiqued as unproductive. While play is supported in primary schools, it is restricted in secondary schools. Play culture in secondary school is greatly influenced by the classical and the developmental theories of play. Here, play when not completely opposed (McKendrick, 2019b), is accepted if the adults consider it useful. A report from Scotland looking at the views held by secondary school students about play (Robinson, 2014) reported that teachers and parents pressured them into behaving "like adults" (p.6) also in the playground. This adult behaviour reflects the development perspective where young people are seen as "adults-in-becoming" (Thorne, 1987, 93) and they are expected to do something productive even in their "free" time.

Bruner's concept of play as "an approach to action" (1977, p.v) helped me to consider play as a form of behaviour. The players, in the case of this study the adolescents, are the experts in

distinguishing active play from other types of physical activities. Hence, for me as a researcher, it was important firstly to listen to adolescents' voices about their experiences and perspectives on active play opportunities during lunch break; and secondly to involve them as co-researchers for recommending diverse opportunities for active play in secondary school to encourage wider adolescents' participation in physical activities.

There has been little research into the outcomes of the process of intergenerational collaboration between adolescents and adults on school environment interventions and on devising policy responses at a local level, which can enhance freely chosen and self-directed active play as part of school life (McLaughlin, 2006; Robinson 2014; Morton *et al.*, 2016). This research study intends to understand the role of intergenerational dialogue (Mannion 2007, 2010) in creating sustainable, rights-based, and culturally relevant schooling (Kretchmar, 2000). A whole school approach involving the physical, social, and cultural environments to support active play culture is needed. By specifying the characteristics of a model of co-creation, this project has the potential to provide ways of enabling pupils to participate collaboratively with the adults in changing the school's physical activity culture. Such changes have the critical potential to encourage more students to be more active by taking part in active play activities during lunch break. Other additional benefits are predicted such as supporting more emphatic relations with adults and their peers.

2.5 Literature review summary

The school may play an important role in promoting physical activity, yet recent reviews stated that interventions in secondary schools are not successful in increasing physical activity levels (Dobbins *et al.*, 2013). To change behaviour successfully the involvement of the whole school may be required (PHE, 2020), yet the participation of young people as experts to ensure that the planning of activities matches the interests and fosters motivation in young people to be

more physically active has not been further explored. There has been little research into how young people and other stakeholders (including teachers and other adults from the school community, third sector facilitators, and local authority staff) can work together to devise effective responses to enhancing play cultures and improving physical activity levels as part of school life (McLaughlin, 2006; Robinson, 2014).

Active play, with its own characteristics (pleasurable, constantly transforming, requiring active and holistic engagement from the players) could improve physical literacy. It is a form of behaviour where all the dimensions of the individual (physical, social, cognitive, emotional, and spiritual) are actively involved in a simultaneous interdependent relationship. It will also foster a more profound connection between their embodiment and the environment. During active play, children can "know through movement, about movement, and because of movement" (Kentel and Dobson, 2007, p159). As it was noted before, play is not just an activity, but an "approach of action" (Bruner, 1977). However, play and active play, have been studied mostly for their instrumental value. This view created a culture of play, where some forms of active play are considered useful for children and young people for their future as adults and so promoted, while other forms of play are seen as unproductive and so useless.

Policy, theory, and empirical studies (Kirby, 2003; PHE, 2020; Tibbitts *et al*., 2021) all suggest that adults and young people in secondary schools should have more opportunities for creating a cultural and physical environment together which encourages active play opportunities. These opportunities might support enhanced physical activity participation. The period during the transition from primary to secondary school is an important phase and it might negatively affect participation in physical activities, particularly in girls (Martins, et al., 2015). Therefore, early adolescence is a key period for physical activity interventions.

The proposed study addresses a significant gap in the literature in understanding how enhanced play culture might support behaviour change and increased participation in PA in secondary school during break times. The review of the literature indicates there is a need to explore the potential of involving adolescents' expertise by giving them a voice and actively

engaging them in the design and implementation of physical activity activities tailored to their interests together with adult stakeholders (school staff, local authority, and NGOs).

Commentators from various disciplinary perspectives (Leask *et al*., 2019; Morgan, *et al*., 2019; Popp *et al*., 2021; Verloigne *et al*., 2017) have argued that adolescents should be involved in projects aimed at encouraging young people's participation in physical activities, and at supporting the adoption and the maintenance of physically active lifestyles. It is important to take into account adolescents' perspectives by giving students a voice in collaboratively designing, creating, and implementing projects aimed at promoting physical activity participation. The involvement of adolescents as experts has the potential to create opportunities that are tailored to their interests and needs. Young people, and in particular those at risk of being inactive (girls, students who have low perceived competence, or those who had little experience of physical activity) and adults need to work collaboratively in intergenerational projects for developing specific strategies for creating physical activity interventions. Yet, little research has been done on the characteristics of models of co-creation of opportunities for physical activity and active play in secondary schools which might encourage wider participation.

Chapter 3 Methodology

Introduction

Using a mixed methods approach, this research project explores, in an integrated approach, the effects of the school's physical and cultural environments on S1 students' physical activity participation during lunch break. It also investigates how adults and young people together can collaboratively explore, suggest, and create active play opportunities. Opportunities aimed at students who would like to be more active during break times. The integration of data from objective and subjective measures on physical activity and physical literacy, collected and produced in the first part of the project, shaped the topics of discussion of the group interviews and intergenerational focus group sessions in the second part of the study. These sessions looked at collaboratively exploring, proposing, and creating opportunities for active play for students who want to be more active during break times, but do not feel comfortable taking part in sports orientated physical activities in a secondary school context.

Given the diverse research questions presented at the end of the previous chapter, the adoption of a synergistic approach (Hall and Howard, 2008) combining different typological elements of mixed methods is appropriate. I integrated a mixed methods core design (convergent in the first phase followed up by explanatory sequential design in the second phase) with complex design (mixed methods case study with participative/transformative framework).

A mixed methods approach integrates "objective" and "subjective" aspects of physically active behaviours through qualitative and quantitative data. In this study, I draw from the interactive (or equal-status) mixed methods research approach (Johnson, 2017, Maxwell *et al*., 2015; Maxwell and Loomis, 2003), which considers the methods involved to bear the same weight and importance. A mixed methods study is apt to investigate the relationship between the various dimensions which affect and are affected by a playful and physically active behaviour:

physical activity levels; the domains of physical literacy (physical competence, motivation, confidence, knowledge and understanding of the importance of a physically active lifestyle); the importance of fun and enjoyment during physical activities; the role of the school environment (physical, material, social and cultural); the influence of age and gender on active play and physical activity participation; the role of the peers, older students and adults. The knowledge obtained from the investigation of these dimensions in separated and integrated forms will provide an understanding of the intricacy of adopting and maintaining a playful and active lifestyle, considered as a complex behaviour, in a school, a complex environment. The findings will offer the basis for providing strategies to promote active play in secondary school during lunch break. In a bottom-up approach, the opportunities for being more active are proposed and created by the students themselves in collaboration with adults. This way, the opportunities will be tailored to adolescents' needs and interests.

In this chapter I will present the paradigm, dialectical pluralism, I adopted for this research project and the reasons behind my choice of methods and theoretical orientations. I will describe the *ethico-onto-epistem-ology* (Barad, 2007, p.185 original italics), the position that supported me throughout this mixed methods study, and how it affected and influenced the whole research process. Next, I will present the theoretical framework of this study which draws upon ideas from new materialism, socioecological, self-determination and participatory theories. These ideas have framed the design, methodology and methods adopted for data collection and production as well as for data analysis. The theoretical framework will be discussed together with the rationale of adopting a synergistic approach (Hall and Howard, 2008) as appropriate for interpreting and understanding the diverse dynamic and complex intra-action (Barad, 2007) between adolescents' physical active and playful behaviour and their social world in school. Since most studies on physical activity and health adopt quantitative methods, I consider it necessary to present a detailed justification of the

philosophical position that supports the adoption of a mixed methods approach as a logic of inquiry.

3.1 Philosophical position

In this section, I will present my philosophical and paradigmatic stance and my commitment to a particular way of knowing the world and producing knowledge. The paradigm, a personal worldview (Creswell and Plano Clark, 2018), is generally considered to be constructed from diverse positions (Denzin and Lincoln,2005: Heron and Reason,1997; Mertens, 2010): ontological (about the nature of reality), epistemological (about the nature of knowledge), methodological (about approaches to systematic inquiry), and axiological (about the role of ethics and values in conducting research). Philosophical assumptions, which provide the framework of rigorous research, and the choice of the appropriate research methods for the production of knowledge are fundamental for any research project and deserve clear explication in the research reporting (Creswell and Plano Clark, 2018; Guba and Lincoln, 2005). This is particularly important in mixed methods studies in providing a framework for combining qualitative and quantitative approaches.

Before a critical report of the different approaches to paradigm and its perceived value in mixed methods research, I will state, for philosophical transparency, my position. My philosophical position is also influenced by Barad's *ethico-onto-epistem-ology* (2007, p.185 original italics), indicating that the world and our knowledge of it are entangled. "Practices of knowing and being are not isolable; they are mutually implicated. We don't obtain knowledge by standing outside the world; we know because we are of the world. We are part of the world in its differential becoming" (Barad 2007, p.185). For this reason, in the following statement where I present my personal philosophical position, the entanglement between epistemology, ontology and axiology is the core of my approach as a researcher.

I consider that diversity is at the heart of human and non-human reality. The dialogue between diverse ontologies, epistemologies, different axiological principles, methodologies, methods as well as participants with different perspectives and experiences will provide the ground for assembling new knowledge. Reality is constructed and extremely complex, multifaceted, and pluralistic. It is never possible to be entirely objective about it. Emotions, beliefs and values are an important part of reality. I think that a trusting relationship with a participant is essential and a relationship with participants strongly influences what type of information they are willing to share. I consider that the methods adopted in research should be suitable for the participants and they should participate in the project according to their capacities. I think that an interactive approach to obtain data should be the option to consider whenever there is the possibility and that it is important to explore extreme and dissonant results. I also consider that the inferences and conclusions are interpretive. I also believe that research should inform policy and practice to oppose inequalities and imbalance of power.

My paradigmatic position considers and integrates diverse viewpoints derived from more than one paradigm. It supports a dialectical mindset that involves complex and multiple mental models (Greene, 2007), the same perspective that brings researchers to design and conduct interdisciplinary and mixed methods studies, such as this project. In education, social and health sciences there is a lot of controversy about paradigms, their definition, and their purpose, and if paradigms are needed for conducting research. Paradigms have been described and defined by researchers and scholars in various ways. There is not a unique definition of paradigm (Johnson, 2011) and different authors (Biesta, 2010; Morgan, 2007) consider the different interpretations of the term paradigm non-mutually exclusive. The terms academics have been using to describe paradigm has moved from Kuhn's original definition as shared beliefs, values and techniques (Kuhn, 1962; Denscombe, 2008; Morgan, 2007) to, among others, human constructions (Creamer, 2018), mental models (Greene, 2007), personal worldviews and basic beliefs (Guba and Lincoln, 1994; Mertens, 2010) and epistemological stances or metaphysical paradigm (Morgan, 2007). Mertens' definition,

which I agree with, describes paradigm as a: "… way of looking at the world. It is composed of certain philosophical assumptions that guide and direct thinking and action." (2010, p.7). This position makes it clear that the researcher's worldviews motivate their choices of research approaches, it is not just a selection of methods in a specific research context.

There is also controversy amongst researchers about the importance and the adoption of paradigm in research. Some researchers find that paradigms might compel them into a single perspective, ignoring phenomena that are not appropriate for certain paradigms. However, while I agree on the validity of these critiques, I consider paradigm as an important concept for conducting research because it provides a frame of reference for every decision that researchers face during the research process. Paradigms are important, as Lincoln argues:

> … because they tell us something important about *researcher standpoint*. They tell us something about the researcher's proposed *relationship to the Other(s)*. They tell us something about what the researcher thinks *counts as knowledge*, and *who can deliver the most valuable slice of this knowledge*. They tell us how the researcher intends to *take account of multiple and contradictory values* she will encounter (2010 p. 7, *emphasis* in original).

Paradigms might be considered as fluid entities which support researchers' approaches to research problems and not as a static stance which confine researchers' perspectives (Freshwater and Cahill, 2013). They support the way research is conducted; the research questions, design, data collection and production, and analyses. Paradigms are related to the researcher's professional and life experiences, personal ideas, and values. Sparkes and Smith (2014) argue that

> we conduct inquiry via a particular paradigm because it embodies assumptions about the world that we believe in and supports values that we hold dear. And, because we hold those assumptions and values, we conduct inquiry according to the precepts of that paradigm. (p.9).

This position, which is in line with my view as a researcher, implies that it is not the research question 'that drives a study, but, either implicitly or explicitly, our assumptions and theoretical orientations' (ibid.: p.9). Therefore, the researcher might need to consider the important role of the intra-action (Barad, 2007) between their subjectivity, theoretical assumption and approaches to conduct a research study. Johnson and Gray remark that "science is not just objective, and it is not just subjective" (2010, p. 85). I do not consider approaches of knowledge and the researchers' subjectivity to be separate entities. Research questions are shaped by the researcher's personal interest and their way of seeing and constructing the world (Sparkes and Smith, 2014). The paradigm, research questions, methodology and methods that I adopted in this project intra-act (Barad, 2007) with by my values, philosophical assumptions, interests and life experiences, both as a practitioner and a researcher. All these elements hold equal value and importance in a dialogue where all of them are affected and affect each other.

During the process of evolution from just a combination of two methods to the actual position as a distinct type of methodology with its own worldview, vocabulary, and techniques, mixed methods went through a paradigm issue phase (Creswell and Plano Clark, 2018). The paradigm debate for mixed methods was a consequence of the 'paradigm war' in the 80s and 90s where social scientists promoting qualitative research and suggesting constructivism as an alternative paradigm criticised the dominant positivist and postpositivist paradigm of quantitative research (Mertens, 2010). The effect for mixed methods researchers was to identify a rationale for mixing and combining quantitative and qualitative methodologies (and their connected paradigms) and data despite the incompatibility thesis, which considers quantitative and qualitative research as incompatible approaches (Creamer, 2018).

In order to resolve the paradigm issue in mixed methods, different approaches for supporting mixed methods studies have been suggested. These approaches are a-paradigmatic position,

maintaining separation of the different paradigms, adopting a single paradigm, and a dialectic approach (Teddlie and Tashakkori, 2010; Bazeley, 2018; Creswell and Plano Clark, 2018).

The first of these approaches recognises the supremacy of the research questions over the paradigm in deciding which methods to use in research and consequently ignores any paradigmatic discussion. The second approach considers the methodological elements which are part of a mixed methods study as connected to conflicting ontological and epistemological foundations, as well as the data generated by them. The integration of these sets of information would be unattainable, therefore it is not considered a possible approach for mixed methods. The third approach recognises and supports both qualitative and quantitative approaches as appropriate to investigate the complexity of the social world in a single paradigm. The main paradigms in mixed methods studies are pragmatism (Biesta, 2010) critical realism (Maxwell and Mittapalli, 2010) and transformative-emancipatory (Mertens, 2003, 2009, 2010), even if the latter is also considered more as a perspective than a paradigm (Bazeley, 2018). Pragmatism is considered the most popular paradigm in mixed methods research (Biddle and Schafft, 2015; Creamer, 2018; Morgan, 2007; Teddlie and Tashakkori, 2010). It supports the adoption of both qualitative and quantitative research methods, highlighting the flexibility of choice of methods appropriate for answering the research questions, which they place at the core of the research process. Pragmatism recognises diversity and complexity, and it challenges dualisms, for example, objectivity-subjectivity. Its approach to research is practical, placing an important value on the consequences of research, leaving behind the concepts of truth and reality (Creamer, 2018; Creswell and Plano Clark, 2018; Mertens 2010), placing the research questions at the centre of a research project (Shannon-Baker, 2016). Pragmatism has been critiqued for its lack of axiological component (Biddle and Schafft, 2015) which I consider as an important element in conducting research, and therefore also in this study. Critical realism considers knowledge as impartial and dependent on the context, and the perception of reality to be influenced by the researcher's worldviews and experiences. Pragmatism and critical realism consider values, beliefs and

emotions as part of reality (Creamer, 2018). The transformative-emancipatory (Mertens, 2003, 2009, 2010) paradigm addresses issues of inequality, cultural diversity and social justice, placing them at the front of the axiological value of research. It places great importance on philosophical transparency and promotes active participation in the research process of the participants which are also the main components of this study.

Although I share some ideas with pragmatism and critical realism, and in particular with the transformative emancipatory perspective, I actively support and encourage knowledge that is gained through the engagement with various paradigms, perspectives and mental models, (Greene and Hall, .2010) taking a synergistic stance, considering the world in terms of continua rather than binaries. For this reason, I adopted the paradigmatic position of dialectical pluralism (Johnson, 2017) supported by the transformative emancipatory approach.

Dialectical pluralism respects, supports, and actively encourages intentional engagement with different points of view and ways of achieving knowledge (Johnson, 2017). This is also considered the underlying logic of mixed methods (Johnson, 2017). It supports a fair and equal collaboration between researchers and participants. Ontologically, dialectical pluralism considers reality as multiple and diverse. Knowledge is obtained by a dialogue between diverse paradigms, methodologies, disciplines, and perspectives (Johnson, 2017), and it can be gained by exploring the negative or extreme case. This approach moves away from any static binary opposition; dialectic is not a fixed binary or negative opposition. It entails a nomadic approach open to encouraging rhizomatic multiplicities and differences (Deleuze and Guattari, 1987), which opposes dualistic perspectives and supports the pluralistic monistic approach (Pluralism=Monism, Deleuze and Guattari, 1987 p.20). Some authors (Bazeley, 2018) consider the transformative emancipatory approach as an additional perspective rather than a paradigm. In this study, I drew from diverse theoretical frameworks such as new materialism (Fox and Alldred, 2017) and affect theory (Ahmed, 2004), a socioecological model of health behaviour (Bronfenbrenner, 1979, 1994; Sallis *et al.*, 2006; Sallis and Owen, 2015; Shelton, 2019; Stokols, 1992, *et al.* 2003), self-determination theory (Ryan and Deci, 2017)

and participatory/transformative model (Mertens, 2010) that interact in a constant dialogue. The paradigmatic position in this study that actively promotes the value of plural perspectives encourages a more comprehensive understanding of the factors which facilitate or inhibit play culture in school, and a deeper sense of the effect that a favourable play culture has on supporting the promotion of physical activity and physical literacy.

3.2 Theoretical framings for data collection and analysis

This research project adopts an interdisciplinary approach, drawn from health sciences and social sciences. It explores how the intra-action (Barad, 2007) between human behaviour, social norms, the built environment and non-human agents in schools influence and affect (Ahmed, 2004) the opportunities for active play and physical activity levels during lunch break. Furthermore, it looks at how schools, considered as a complex ecological system where adults and adolescents intra-act (Barad, 2007) through intergenerational dialogue, might promote a model of co-creation of opportunities for less active students to engage in active play. For this study, which adopts a synergistic approach (Hall and Howard, 2008) combining typological with interactive or equal-status mixed methods approach (Johnson, 2017, Maxwell *et al*., 2015; Maxwell and Loomis, 2003) a dialogic approach between diverse theories is deemed suitable to look at the various facets of complex social phenomena (Johnson,2017). This approach supports the integration of data that come from diverse paradigmatic perspectives, both from a positivist approach (data on physical activity and physical literacy levels obtained through accelerometers, assessments, and questionnaires) and a constructivist, participatory approach (data gained from interviews and focus groups). In this study, the dialectical approach between diverse paradigms, which also considers the participatory ethos adopted, is guided by the fundamental role of the axiological component, as expressed in my philosophical statement above, which place at the centre the value of and respect for the participants rather than the research questions.

The theoretical framework of this study draws on concepts from different theories; new materialism (Fox and Alldred, 2017) and affect theory (2004), socioecological models of health behaviour (Bronfenbrenner, 1979, 1994; Sallis *et al.*, 2006; Sallis and Owen, 2015; Shelton, 2019; Stokols, 1992, *et al.* 2003) and participatory approach (Freire, 2000 [1970], 2005 [1974]) are the most influential.

New Materialism

New materialist theories are growing in social science and education research as a response to the material and relational turn in those disciplines (Fox and Alldred, 2017; Coole and Frost, 2010). There is also a growing interest in the contribution that new materialism might give to physical activity and play studies (Fullagar, 2017 Giardina, 2017; Monforte, 2018). For example, Roy (2014), adopted post-modern feminists and Deleuze and Guattari's theories of affect to study the entanglements of emotions and embodied experience for women surfers.

New materialism encompasses diverse theoretical perspectives which have in common a focus on matter. New Materialism originated from the work, amongst others of Deleuze and Guattari (1987), who theorise how human, non-human and material reciprocally affect each other, creating assemblages and events and of Barad, (2007) "intra-action" as a "dynamism of forces" (p. 141). These theories focus on the intra-action and entanglement of human, places and material, and how

> "bodies and things are not separate as we were once taught, and their interrelationship is vital to how we come to know ourselves as human and interact with our environment" (Hickey-Moody and Page, 2016, p.2).

New materialist theories are a reaction against the idea of humans as the only agents in the world, non-humans (such as playgrounds or material equipment) are active participants too. Through this approach is possible to explore how humans and non-humans affect and are affected by each other, and how things can be social agents (Fox and Alldred, 2017). New

materialism rejects dualism such as nature/nurture, human/non-human, or adult/adolescent (Barad 2007), where normally one concept is considered superior to the other (Fernández-Balboa,1997). One important dualism that this research study criticises, which has been influencing education and physical education in particular, is body/mind. This research project departs from the "either or" dualistic idea of opposing concepts. Body and mind form a unity and this concept is central in the notion of physical literacy (Whitehead, 2010), the "body is affected by the state I am" (Arnold, 1979 p.2). Spinoza considered "*affectus*" as the capacity of the body to increase, diminish, or maintain its "power of activity" (Spinoza, 1996 [1662], Part III Postulates I). In movement, embodied action (as the kinaesthetic awareness of one's movement), motivation, self-awareness and awareness of other persons are interrelated (Whitehead, 2010). The human brain is not the centre of all actions; the information that comes from the environment, "the affordances" (Gibson,1979) can also elicit movements and the intra-action (Barad, 2007) between environment both physical and material (equipment, fabric, matter) and the individual is significant.

New materialism allows the exploration of the complex biosocial structure of social life (Fullagar, 2017), the concept of the body as "both physical and cultural" (Ingham, 1997, p.176). It also allows investigation of the intra-action (Barad, 2007) between body, physical and cultural environment that characterise and influence movement, that as Ingham argues "is a neural-physiological and kinesiological activity… Anchored in "culturated" distinctions that can reproduce or resist the hegemonic cultural order" (1997. p.177). In the case of this project, it will help to understand the power of the hegemonic cultural and moral order (Chancellor and Hyndman, 2017) in secondary schools in inhibiting some forms of active play. New materialism, by rejecting both binary and hierarchical dualisms, supports a "posthuman" and socioecological perspective that moves over the division between nature and culture, recognising humans as integral to the environment (Fox and Alldred, 2017). Coole and Frost (2010, p.6) consider that "the dominant constructivist orientation to social analysis is inadequate for thinking about matter, materiality, and politics in ways that do justice to the

contemporary context of biopolitics and global political economy" and reflect on the opportunity to find common ground with natural sciences.

New materialism has been critiqued for its unfamiliar language which might create a block for readers and eventually have an impact on the future of these theories (Greene, 2013). Fox and Alldred (2017) propose a "flat ontology" where "there are no structures, no system and no mechanism at work in new materialist ontology" (p.7) while other researchers do not want to leave behind "ideals of social justice, empowerment and freedom" (Fullagar, 2017, p.250). However, Monforte (2018) argues that "we do not have to completely accept new materialist positions in order to learn something from them" (p. 6). New materialism might be adopted as a form of praxis (Freire, 2000 [1970]) and '*phronesis*' ('how to do something') (Greenwood, 2008; Mannion, *et al.*, 2011; Thomas, 2011).

In the case of this study, a new materialist approach helps to consider approaches of promoting active play and physically active behaviour from a diverse perspective. It also recognises how the entanglements of relations of bodies, emotions, places and matter affect participation in physical activity.

Affect theory

The concept of affect (Ahmed, 2004; Damasio, 2003; Massumi, 2002; Spinoza, 1996 [1662]), which focuses on embodied experiences, considers the capacity of contexts and environments to positively or negatively be influenced and influence behaviours and given the focus of this study, adolescents' active play behaviour. In this interdisciplinary study, I have conceptualised affect drawing on intra-action (Barad, 2007) between diverse disciplines and perspectives, neurocognitive, philosophical, and sociological, which originate from Spinoza's conception of *affectus*:

> "The human body can be affected in many ways, whereby its power of activity is increased or diminished, and also in other ways which do not render its power of activity either greater or less" (Spinoza, 1996 [1662], Part III Postulates I).

For the purpose of this study, I drew from conceptualisations that consider "a body movement looked at from the point of view of its potential – its capacity to come to be, or better, *to come to do*" (Massumi, 2002, p.215, italics in the original). These positions identified above emphasise the monistic perspective of unity between body and mind as well as the intra-action (Barad, 2007) between human and non-human. In light of these diverse perspectives, I explored and gained an understanding of the dynamic relations (Barad, 2007; Deleuze and Guattari, 1987; Fox and Alldred, 2017) between various factors and their "capacities to act and be acted upon" (Seigworth and Gregg, 2010, p.1) with regard to adolescents' active play behaviour during lunch break in secondary school.

Self-determination theory

In this study, I also considered affect from a psychological perspective, that is as a complex combination of "drives, motivations, emotions and feelings" (Damasio, 2003, p.8). To understand the important role of drives, motivations, emotions, and feelings in positively and negatively affecting adolescents' participation in active play activities during lunch break in secondary school I also drew from the self-determination theory (Ryan and Deci, 2017). Self-determination theory (SDT) focuses on exploring the effect of different types of motivations: lack of motivation, controlled motivation (doing physical activities because you "have to") and autonomous motivation (doing physical activities because you "want to") on human behaviour (Ryan and Deci, 2017). In addition, SDT explores the role of the social and cultural environments in affecting, positively and negatively, peoples' motivated behaviour (Deci and Ryan, 2000), that is for this study, adolescents' participation in active play activities during lunch break. The SDT' s organismic dialectical approach (Ryan and Deci, 2017), allowed me to consider adolescents as active systems in constant rapport with the social environment that

can support or hinder their participation in active play activities. SDT recognises two types of motivation considered in a continuum form: intrinsic and extrinsic. Intrinsic motivation is considered as “doing an activity because of its inherent satisfaction” (Teixeira *et al.*, 2012 p.2) and it is an autonomous form of motivation. Enjoyment and challenge, the improvement of one’s own motor skills are considered as features of taking part in an activity driven by intrinsic motivation. Play is an intrinsically motivated activity (Brown, 2009; Caillois, (2001 [1961]), Else, 2014; Pellegrini and Smith, 1998; Sutton-Smith, 1997). People play for the pleasure that comes from the play itself, it is an enjoyable and exciting activity where the players exercise their skills in a non-threatening environment. Extrinsic motivation means to take part in an activity for instrumental reasons, to gain some results that are not connected with the activity itself (Teixeira *et al.*, 2012). For example, taking part in physical activities to find friends or improve one’s appearance or gain an economical advantage. Extrinsic motivation is more connected to the form of controlled motivation. However, two types of extrinsic motivation can also be considered as autonomous forms of motivation: integrated and identified regulations (Deci and Ryan,2017). Integrated regulation is doing an activity because it is associated with personal beliefs and identified regulation is taking part in an activity because the outcomes are considered personally positive and significant. Systematic reviews on adolescents (Owen *et al.*, 2014) and adults reported positive associations between autonomous motivation and long term participation in physical activities.

SDT considers the importance of three basic psychological needs, autonomy, competence and relatedness, in supporting autonomous forms of motivation. The exploration of the role of these three basic psychological needs in positively or negatively affecting adolescents’ active play behaviour is relevant for this study. Play is an activity that can support all these needs. Regarding autonomy, players take part voluntarily in any play activity, they take control of the activity and the rules to support the play process. During play, players exercise their skills, challenging themselves and others. Although there are forms of solitary play, play is fundamentally a social activity, which can satisfy the sense of relatedness.

Socioecological models

Socioecological models for health behaviour (Bronfenbrenner, 1979, 1994; Sallis *et al.*, 2006; Sallis and Owen, 2015; Shelton, 2019; Stokols, 1992, *et al.* 2003) are considered a common approach for studies that aim at promoting physical activity (Stasi *et al.*, 2019). By adopting the Ottawa Charter in 1986 the World Health Organisation changed its approach in the promotion of health from focusing on the individual to emphasising the role of a healthy environment (WHO, 1986). However, this approach to health promotion is under attack by neo-liberal political and economic theories and practices. They require the individual to "assume responsibility for ensuring, monitoring, and acting upon their own health status" (Nadesan, 2008, p.108) avoiding any risks. The adoption of the socioecological models in this study, allowed me to explore how participation in physical activities is affected by the intra-action (Barad, 2007) at personal, interpersonal, community, environmental and policy levels (Sallis *et al.*, 2006; Sallis and Owen, 2015). They recognise the complexity of physically active behaviour, which is influenced by various factors, such as intrapersonal, social, cultural, physical, material and natural environments, and the school policies and the curriculum (see figure 1), and it cannot be investigated focusing only on the individual (Stokols, 1996). In the past, projects aimed at promoting physical activity in schools have not always evaluated the important intra-actions of all these factors in positively or negatively affecting adolescents' physically active behaviour.

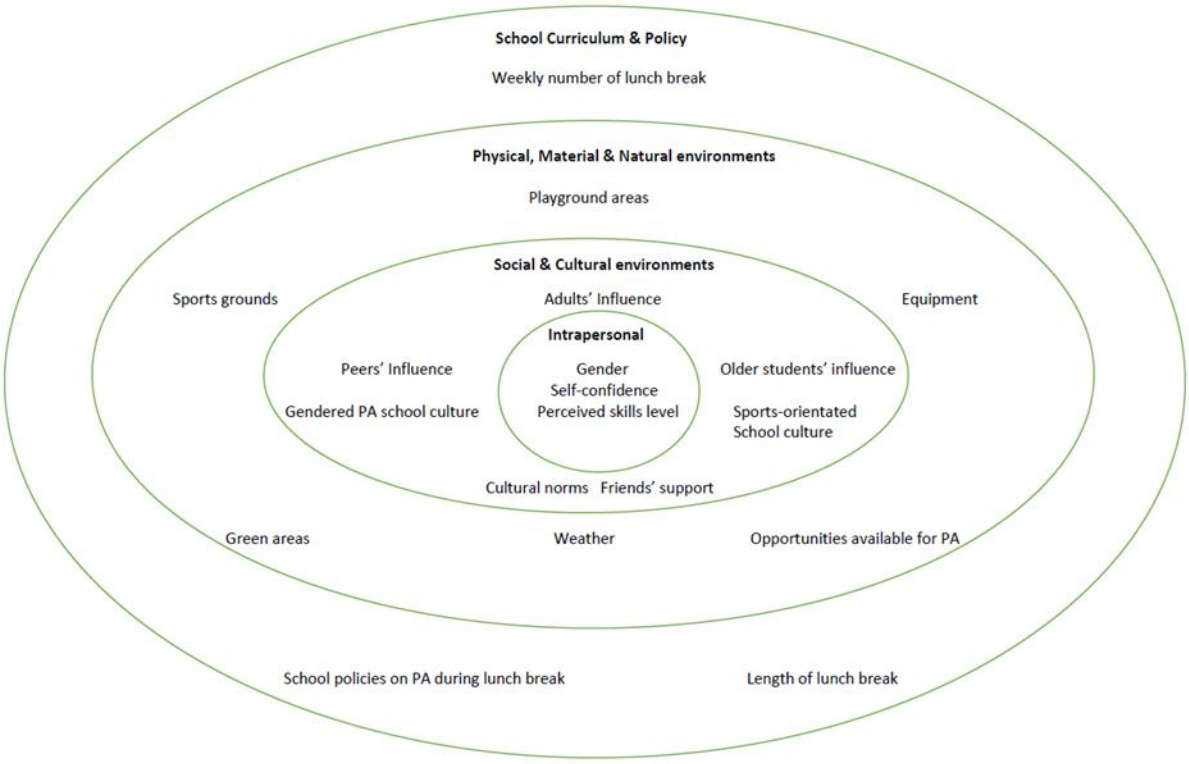

FIGURE 1. A SOCIO-ECOLOGICAL MODEL FOR ACTIVE PLAY OPPORTUNITIES DURING LUNCH BREAK, ADAPTED FROM SALLIS *ET AL.* 2006

In order to strengthen the effectiveness of physical activity interventions which might lead to long term behaviour change, Cale and Harris (2006) suggest the adoption of "an ecological framework… to address the multiple levels of influence of physical activity and to explore the potential of every aspect of the school to promote physical activity" (p412).

Socioecological theories for physical activity are influenced by the Ecological System Theory introduced by Bronfenbrenner (1979). In order to understand the complex interaction between personal, social and environmental levels he proposed different systems ("micro", "meso" and "macro"), where the first characterises the individual and the other two different levels of environmental and social/political influences (Bronfenbrenner 1994). Human development is the process through which the growing person

> acquires a more extended, differentiated, and valid conception of the ecological environment, and becomes motivated and able to engage in activities that

> reveal the properties of, sustain, or restructure that environment at levels of similar or greater complexity in form and content. *(*Definition 7, Bronfenbrenner, 1979, p. 27*)*

I draw upon socioecological models, such as Socio Ecological Model for Health Promotion (Sallis *et al.*, 2006; Sallis and Owen, 2015; Stokols,1992; Stokols, *et al.*, 2003), as a framework for understanding adolescents' barriers and facilitators to participation in active play activities during lunch break. I adopted socioecological models in this study for their approach in considering the role of the environment, policies and society, as well as intrapersonal factors, as forces that positively and negatively affect physical active behaviour (Sallis *et al.*, 2006; Sallis and Owen, 2015; Stokols,1992; Stokols, *et al.*, 2003). Physical activity behaviour is affected by factors at an intrapersonal level (such as age, gender, motor skills, motivation; self-perception), an interpersonal level (social environment made by the interaction with friends, peers, family, teachers and sports coaches, social climate), physical environments both planned for physical activity (such as playgrounds, parks, leisure centres) and not planned for physical activities (streets, city centres, natural reserves, parks), and policy environment (for example school policies) (Sallis *et al.*, 2006; Sallis and Owen, 2015; Stokols,1992; Stokols, *et al.*, 2003).

Even though different socioecological models adopt diverse terms, they all share the same principles; that there are multiple levels of influence on behaviours, that these levels of influence interact with each other, and the importance of multilevel and behaviour specific interventions (Sallis *et al.*, 2006; Sallis and Owen, 2015). The socioecological theories in this study are adopted to emphasise the important role of the personal, interpersonal, school setting, community and political factors and their intrarelationship in planning interventions aimed at offering opportunities for active play to support students in being more active.

According to Stokols (1992), human wellbeing is influenced by physical and social environments as well as personal attributes. Therefore, any initiative for promoting wellbeing should be grounded on the understanding of the dynamic interrelations among these factors.

The socioecological models seem appropriate to support a better understanding of physical activity promotion in school grounds, which are multidimensional and complex environments. In this research, the context of the school playground was considered as an ecosystem (Shelton, 2019) shaped by the relationship between humans and the sociocultural and physical environments. The interactions between humans and environments happen at different levels of aggregation from the individual, small groups (family, friends, peers), to larger groups and the entire population. All the relationships involved are reciprocal: humans affect environments, environments affect humans, humans affect other humans and environments affect other environments.

The socioecological models consider the important role of planning interventions that recognise the various elements affecting both the individual level as well as the environmental and policy levels (Sallis *et al.*, 2006; Sallis and Owen, 2015). Morton *et al.* (2015) in their systematic review on the influences of the school's physical (for example, facilities) and social (for example, teacher behaviour) environment and policies (break times length) on physical activity in adolescents highlighted the important role of creating a physically active culture within the school. Social, physical and policy environments play a fundamental role in shaping physical activity behaviour in adolescents (Rickwood, 2013). In the proposed study, it was important to recognise the role and the complex entanglement of all these factors, as well as how they affect and are affected by each other and the students. In order to create a physically active culture in secondary school, all these factors should be addressed when empowering students and adults in creating active opportunities (Dzewaltowski *et al.*, 2009).

The socioecological approach is considered suitable for this project because it recognises physical activity as a complex behaviour. It also acknowledges the intricacy of adopting such behaviour in a complex environment, such as a secondary school playground, where the entanglement of the social, cultural, physical and material environments affect positively and negatively adolescents' participation in active play activities.

Participatory approach

This research study also adopted a participatory approach (Freire, 2000 [1970], 2005 [1974]), considering, in certain phases of the project, the participants involved as co-researchers. Their involvement, especially during the peer-led questions session and in the focus groups made it possible to explore and delineate the characteristics of a model of co-creation of active play opportunities in a secondary school. A model which involved adolescents and adults in a dialogic process. During this process, adults and adolescents set out to listen, respect, and value each other's perspectives producing together knowledge based on their different experiences and ideas. This study, therefore, can be considered as a valid example of a research project that regards adolescents and adults as participants rather than objects or simple subjects. The participatory approach draws upon the concept of intergenerational dialogue (Mannion, 2012; Mannion, *et al.*, 2015) which engaged adolescents and adults as participants in decision-making applied anew here to physical activity in school. This approach supported the idea of horizontal society (Marzano and Urbinati, 2017) where pluralism and diversity are valued and encouraged.

In recent years, there is increasing focus on the importance of including stakeholders, including the public, as co-researchers, in co-produced health research projects (Bussel, *et al.*, 2009; Dzewaltowski *et al.*, 2009; NICE,2013; PHE, 2020), and in the design and implementation of interventions aimed at increasing physical activity participation in schools (Morgan *et al*., 2019). Although this project was not through and through a co-produced research study (as the participants were not involved in every stage of the study), I did draw upon *co-creative* approaches in physical activity promotion (Leask *et al*., 2019; Morgan, *et al*., 2019; Popp *et al*., 2021; Verloigne *et al*., 2017) to investigate the characteristics of a model that supports behaviour change focusing on the dynamics and the relationship between adults and adolescents during a co-creation of change process.

When stakeholder and target groups are involved in the planning and implementation of interventions, the knowledge, perspectives, experiences and expertise of those potentially

affected are respected and valued. This study, exploring the characteristics of a model of co-creation process framed by participatory dialogic approach (Freire, 2000 [1970], 2005 [1974]) acknowledges also the important role that adolescents have in influencing peers (Van Hoorn *et al.*, 2016). Furthermore, this research investigates the role of intergenerational dialogue (Mannion, 2007, 2012, 2018) in understanding the process of play culture enhancement in secondary school.

The participatory approach in this study is grounded on some core tenets. The first one is the understanding of young people as "being" in their own right (Boyden and Ennew, 1997; Prout and James, 1997), with their own knowledge and expertise. For example, in this study, the early adolescents were at times not just participants, but also acted as co-researchers asking questions posed by their peers and the adult participants. Significant knowledge is acquired when adolescents' active participation in the research process is stimulated deliberately, and when their perspectives and experiences are accepted as genuine valid evidence (Burke, 2005). Entitling children to be active participants in the research process increases their right to be heard with their own voice (Grover, 2004). Listening to adolescents is a challenge for the researcher; listening is an active, dynamic, and circular process (Clark, 2005) that involves young people and adults. In this study, the participatory methods employed empowered adolescents' voices. This approach is also deemed appropriate considering that one of the attributes of a physically literate individual is their ability to understand and talk about the importance of physical activity and to actively promoting participation.

The second principle is the acknowledgement of the power inequalities amongst the researcher, the adults and the early adolescent participants (Kostenius and Ohrling, 2008; Punch, 2002). It is important to consider that young people are not accustomed to expressing their point of view freely or being considered seriously in an adult-dominated society (Punch, 2002). It may also lead to an adolescent being made to say what the adults want them to say, or they may say what they think the adults want to hear. A serious challenge for the adult researcher is to be able to fully understand the world from young people's perspectives

(Punch, 2002). It becomes fundamental to remind us as adult researchers to respect the richness of adolescents' own culture and competencies.

This research project values and respects these ideas of complexity and diversity, and the goal of promoting participation through a dialogic approach lies both at the theoretical, methodological, and practical levels. In this study, adolescents and adults (both schoolteachers and the researcher) all worked collaboratively at various stages of the project. The focus for the research was both on the content and on the process of producing knowledge. A process which thrived on their different interests, experiences and perspectives.

Understanding better how models of co-creation could lead to creating opportunities for active play during break times is the first goal of the research. Understanding the characteristics of such models can lead to key impacts as schools seek to create new innovative and more effective ways for the "less active" adolescents to enjoy physical activity and become more active during break times.

Such a model of co-creation could lead to supporting each other in creating together opportunities for active play during break times. These opportunities might give alternative chances for the "less active" adolescents to enjoy physical activity and being more active during break times.

Case Study

In this section, I will illustrate the case study approach adopted in this study and its key elements. A case study approach is an exhaustive analysis which intends to acquire an in-depth understanding of a particular case. (Hancock and Algozzine 2006). The rationale behind the choice of a case study is that it will be able to gain a deeper understanding of the complexity of adolescents' physically active behaviour and explore the variability amongst students in the same setting, and yet it will still be possible to conduct the fieldwork within one school year. As there are different forms of case studies, for this study I consider a case study

defined as “the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances” (Stake, 1995, p.xi). A case study approach was considered appropriate for this study for its role in providing an insight into complex social phenomena (Yin, 2014), such as physical activity behaviour and its promotion in secondary school. Case studies provide an in-depth understanding of the lived assemblages (Deleuze and Guattari, 1987; Fox and Alldred, 2017) and intra-actions (Barad, 2007) that occur in a particular environment, a secondary school in this study, producing a detailed interpretation and description of those events. Conducting case studies allows the researcher to have a holistic perspective of events that happen in their natural context (Cohen *et al.*, 2007). According to Yin (2014), a case study approach is appropriate when the research questions are more exploratory and when the researcher is not interested in controlling actual behavioural events. Apart from providing an in depth description and interpretation of the “particularity and complexity of a single case” (Stake, 1995, p.xi) in its natural context, case studies give the opportunity to investigate “the unexpected and unusual” along with “the idiosyncratic” (Hodkinson and Hodkinson, 2001).

One of the main limitations of case studies is the lack of generalisability (Hodkinson and Hodkinson, 2001; Thomas, 2011; Stake, 1995; Yin, 2014). In social science generalisable knowledge has always been privileged over exemplary knowledge, however “it is not possible in any kind of social inquiry to seek generalisable knowledge” (Thomas, 2011, p. 32). The quest for generalisation might limit the possibility to consider and understand the individual. Cases studies, providing examples from a particular event in a particular context, offer exemplary knowledge gained from another’s ‘horizon of meaning’ (Thomas, 2011, p. 32) but read and interpreted from one’s own experience, one’s own phronesis. And this study seeks to inspire this kind of knowledge and the related process of understanding.

Dialectical pluralism, the paradigmatic position adopted in this study, share with a case study approach the emphasis on the importance of exploring negative, unexpected and contradictory results in gaining knowledge (Creamer, 2018; Johnson, 2017). Dialectical

pluralism also aims to address some “intellectual tensions” (Johnson, 2017 p.161). Taking a dialogical pluralist and mixed methods approach allows this study to overcome the conflict between the nomothetic or general knowledge, gained for example from the data obtained from the accelerometers to measure the adolescents’ physical activity levels, and the idiographic, or individual, knowledge, gained from the interviews and the focus groups, by considering them as complementary. The integration of these different forms of knowledge will support an understanding of the complexity of the processes of promoting active play and physically active behaviour in secondary school.

3.3 Mixed Methods

A mixed methods study includes a research design where, in the same study, the application, combination and the integration of approaches, methods and data which are traditionally described as quantitative and qualitative, are rigorously and systematically planned and organised (Bazeley, 2018; Creamer, 2018). Mixed methods research has been defined in various ways. Grounded in their review of different definitions, Johnson, and co-workers (2007) define mixed methods research as:

> The type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (p.123).

Advocates of mixed methods design normally consider various advantages in the adoption of this approach (Creswell and Plano Clark, 2018; Greene *et al.* 1989). For example, the adoption of different methods to utilise the strengths of the qualitative and quantitative research approaches and their methods of collecting, producing and analysing data; triangulating the

results through the use of different approaches to pursue confirmation, validate and investigate further the results; the possibility of study phenomena integrating diverse disciplines.

This study considers mixed methods are not just the simple combination of methods and forms of data but a different approach to understand and know about the world (Greene, 2007). It provides various lenses and perspectives through which to look at social phenomena like different facets of a gemstone (Mason, 2011), "respectfully engaging with difference and diversity" (Greene, 2015 p.5). Mixed methods are appropriate when through the integration of the "objective" and "subjective" aspects of a research object, which are both considered important, the aim is to gain a better understanding of the particular phenomena. For example, in the case of this project, in order to understand adolescents' playful and physically active behaviour which could encourage participation in active play during lunch break in secondary school, the data obtained through the accelerometers and the CAPL (Canadian Assessment of Physical Literacy) will objectively describe the level of physical activity and physical literacy. At the same time, the data produced through interviews and focus groups will reveal the social, emotional, motivational and environmental aspects which affect active play participation and physical activity levels during lunch break. The knowledge acquired here can be considered as the subjective aspects of physically active behaviour. The integration of these data will support, in the first phase of this study, the identification of extreme cases, the students with low levels of physical activity during lunch break and the material and non-material agents which are affecting their participation in active play and physical activities. The knowledge obtained in the first phase was employed in the second phase, during the intergenerational focus group session. Here, I used histograms illustrating participants' lunch break physical activity levels and the fictional characters, the personas (Cooper,1999), produced through the integration of quantitative and qualitative analysis as prompts to support adolescents and adults' process of designing active play opportunities during lunch break.

Mixed methods in physical activity literature

While in the past qualitative and quantitative approaches were considered as incompatible (Bazeley, 2018; Creamer, 2018), in the last two decades mixed methods research, which supports the active integration and dialogue at the method, methodology and philosophical levels, has been considered the third major research paradigm (Johnson and Onwuegbuzie, 2004),

Since then, a growing number of research projects have adopted a mixed methods approach methods design in education, social and health sciences, yet this approach occupies a marginal place in physical activity and exercise literature (Gibson, 2016). Here there is a tendency to favour post-positivistic and quantitative research, where qualitative methods are considered useful only if they support the essential quantitative component (McGannon and Schweinbenz, 2011). However, movement is deeply intra-related with sensations. During any movement, a body moves and feels (Massumi, 2002) as a way to express itself (Arnold, 1979; Whitehead, 2010), always through an intra-action (Barad, 2007) with the environment. The “objective” (movement) and “subjective” (feelings) components are mixed and mutually influencing each other. Therefore, as an important characteristic of mixed methods studies is the capacity to get a wider insight of the various perspectives and nuances of a phenomenon than a single method approach (Johnson and Onwuegbuzie, 2004), this approach is relevant in this project where active play and physical activity behaviour are essential elements of study.

However, there are examples of research studies which are taking advantage of the potentialities that mixed methods design can offer in gaining a better understanding of the complexity of the “events” (Fox and Alldred, 2017) which affect participation in physical activities. For example, Withall, and co-workers (2011) used a mixed methods design in their study which investigated the barriers, enabling factors, and motives perceived by participants and non-participants in community physical activity sessions and the session leaders. They utilised different methods (a questionnaire, the Motivation for Physical Activity Measure

(MPAM-R) and semi-structured interviews) to get a better understanding of the various components which affect participation in physical activity and to corroborate the analysis of the data, through the "triangulation" (Greene *et al.*, 1989) of the results. Skau Pawlowski (*et al.*, 2015) combined accelerometers and GPS measurements with go-along group interviews and participant observations to gain extensive knowledge of physical activity behaviour of Danish grade 4-6 students (10-13 years old) during breaktimes. Willenberg *et al.* (2010) designed a mixed methods study using SOPLAY (System for Observing Play and Leisure Activity in Youth) and focus group discussions to investigate the influence of the environment on primary school children's physical activity and active play behaviour during break times.

All the researchers involved in these projects emphasise the importance of mixed methods studies, which is also evident in their final reports, in gaining greater understandings of the role of barriers and facilitators (including the environment) to participation in physical activity, with the last two studies focusing particularly on physical activity behaviours in school playgrounds. Yet, with the exception of the study conducted by Willenberg (*et al.*, 2010), these projects did not integrate the results during the data analysis, where the quantitative and qualitative analyses were conducted separately. Integration of quantitative and qualitative data seems uncommon as Bazeley (2018) argues citing various reviews of mixed methods studies in education, social and health sciences.

Integration in mixed methods studies

While some authors (Creswell and Plano Clark, 2018) consider that integration should happen in at least one phase, other authors (Bazeley, 2018; Creamer, 2018; Greene, 2007) instead consider that the integration of the quantitative and qualitative approaches, data and analysis, should happen throughout the entire process (research design, sampling, data collection and production, data analysis, drawing inferences) of the same project. For some researchers, (Johnson, *et al*. 2007; Bazeley, 2018; Creamer, 2018) the difference between mixed methods and multimethod research lies in the designed and planned integration and combination of the

diverse approaches, methods and data. While in multimethod studies the different approaches are independent and autonomous, in mixed methods studies, they are integrated and interdependent in the different phases of the same study.

Integration has been defined as:

> Quantitative and qualitative components can be considered ‘‘integrated’’ to the extent that these components are explicitly related to each other within a single study and in such a way as to be mutually illuminating, thereby producing findings that are greater than the sum of the parts. (Woolley, 2009, p. 7)

Health and social science researchers who adopted mixed methods research design reported some barriers and challenges to the integration of qualitative and quantitative research (O’Cathain, Nicholl and Murphy, 2009). However, the integration of the qualitative and quantitative data has the capacity to provide insights that would have been otherwise missed (Bazeley, 2018; Creamer, 2018; O’Cathain, *et al*., 2009). The capacity to adopt different mental models supports integration (Maxwell *et al*., 2015).

The integration of the data in this study gave the opportunity to explain how active play participation and physically active behaviour are affected by the multifaceted interactions between the diverse and ever-changing agents that act in a complex social system. Schools are considered as a complex ecological system (Hawkins and James, 2018). Morin (1974) claims that in a complex system

> “the whole possess qualities and properties which are not to be found in the parts in isolation and, conversely, that the parts possess qualities and properties which disappear as a result of the organizational constraints of the system (p.558)”.

Complexity affirms that some systems show behavioural phenomena that cannot be explained by any traditional analysis of the system’s constituent parts individually. They can, however, be comprehended through the understanding of the nonlinear, context-dependent and

dynamic features of the real world and the interactions of the diverse components that shape the behaviour of the system (Sturmberg and Martin, 2013).

This study considers the quantitative and qualitative components as poles on a multidimensional continuum (Bazeley, 2018). The integration of these elements supported the emergence of a more complete understanding of a complex behaviour than the one that qualitative or quantitative data alone could have given. In the case of any physical activity behaviour the subjective feelings (the qualitative component), which are the effect of personal experiences and intra-action (Barad, 2007) with the environment and its capacity of affect, and the different physiological intensities (the quantitative component) are always intertwined. In this study, for example, in the first phase data obtained from device-based measurement of physical activity levels, assessment of the motor competence domain of physical literacy, and from an ethnographic approach employing observations and interviews were integrated in order to purposely encourage the discussion in the focus groups which took place in the second phase of the study. The diverse information collected and produced, integrated, and analysed allowed me to identify the least active adolescents and the barriers to participation in lunch break active play activities they experienced during their first year in secondary school. Through the integration of these data, I created two different personas (see Appendix 3). The personas were the result of the integration of qualitative and quantitative data collected in the first phase and a successive transformation into a more understandable form. These personas represented the general trends and characteristics of the physically active behaviour of the least active students. The different personas are fictional characters in the form of narrative descriptions which, in the case of this study represented the general trends and characteristics of the students' physically active behaviour. The Persona method (Cooper, 1999) has already been used to good effect in co-creative projects for example, in software design (Grudin and Pruitt, 2002) and in interior design accessibility for older people (Taşoz, and Afacan, 2020*).* The advantage of this approach is that it can support the process of co-creation by allowing the researcher to recognise the different needs and expectations of the

students and then support a more tailored discussion. The personas, adopted in the second phase of the study during the focus group discussions, were used as a prompt and to finely tuned the conversation. The involvement of the least active students in the focus groups discussions, with their own experiences and perspectives, provided valuable insights for understanding the interactions which affect behaviour change in supporting and motivating the least active adolescents to play more.

Furthermore, this information might have a practical impact by giving an insight into the factors which foster or inhibit active play participation and consequently better supporting the identification of appropriate interventions.

In the next section, I will illustrate the various methods adopted in this study to collect and produce data. In the section about the research design, I will present the different phases of the study, when they were used and how the integration of the diverse data obtained occurred.

Characteristics of Mixed Methods Design

Research designs indicate the process of collecting, analysing and reporting data in research projects. There are many debates and controversies about mixed methods research design (Creswell and Plano Clark, 2018; Teddlie and Tashakkori, 2012). There are two main approaches to mixed methods research design: the typological design which focuses on the type of design (Creswell and Plano Clark,2018) and the interactive, system-based approach (Johnson, 2017, Maxwell *et al*., 2015; Maxwell and Loomis, 2003) which focuses on the process of design. However, these two main approaches can be combined. The synergistic approach (Hall and Howard, 2008) is a dynamic approach which aims to combine typological approaches with an interactive approach. This last approach is the one I adopted in this study.

Creswell and Plano Clark (2018) consider that different mixed methods typologies are based on various characteristics: the timing, equal or different focus on qualitative and quantitative approaches, and the level of interaction. They consider two typological approaches in mixed

methods study design: the core designs and the complex design which have more elements than the core designs (2018). There are three main core designs: convergent, explanatory sequential and exploratory sequential (Creswell and Plano Clark, 2018). In a convergent design the qualitative and quantitative methods, data and analysis, which have equal weight for unravelling the research question(s), are collected separately. They are not determined by the result of the other. The results are then integrated and combined, in order to gain a more complete insight into the phenomena or to validate the diverse results.

The explanatory sequential design is characterised by two separate interactive phases (Creswell and Plano Clark, 2018) (see Figure 2). The first step is the collection and analysis of quantitative data. In the second phase, qualitative data are collected and analysed to explain the quantitative results of the first phase. The qualitative data collection depends on the results of the first quantitative phase. The exploratory sequential design is characterised by a sequential process too (Figure 1). In an exploratory sequential design study, the first step is the collection and analysis of qualitative data, which are more significant than the quantitative data. In the second phase, the researcher develops quantitative data collection strategies (instrument, new variables, measures, etc.) based upon the qualitative results. In the third phase, the new feature is quantitatively tested. The larger quantitative study is then, grounded on the qualitative experiences of a small sample of participants.

All these different designs, however, focus on analysing the diverse data separately before integrating them and do not represent more complex projects (Bazeley, 2018).

The complex mixed methods design contains more elements than the core design (Creswell and Plano Clark, 2018). They can be the combination of different mixed methods core designs, or the mixing of core designs with other methodological approaches (case study, action research) or with an overarching theoretical framework, for example, the transformative/participatory paradigm (Mertens, 2010).

Maxwell and Loomis (2003) choose a different approach focusing more on the process of design rather than the type. They promoted an interactive, system-based approach (Figure 2)

where five interrelated components (the study's purposes, conceptual framework, research questions, methods, and validity) create the structure which directs the research project. This approach promotes a relationship and dialogue between qualitative and quantitative approaches both between and across these dimensions.

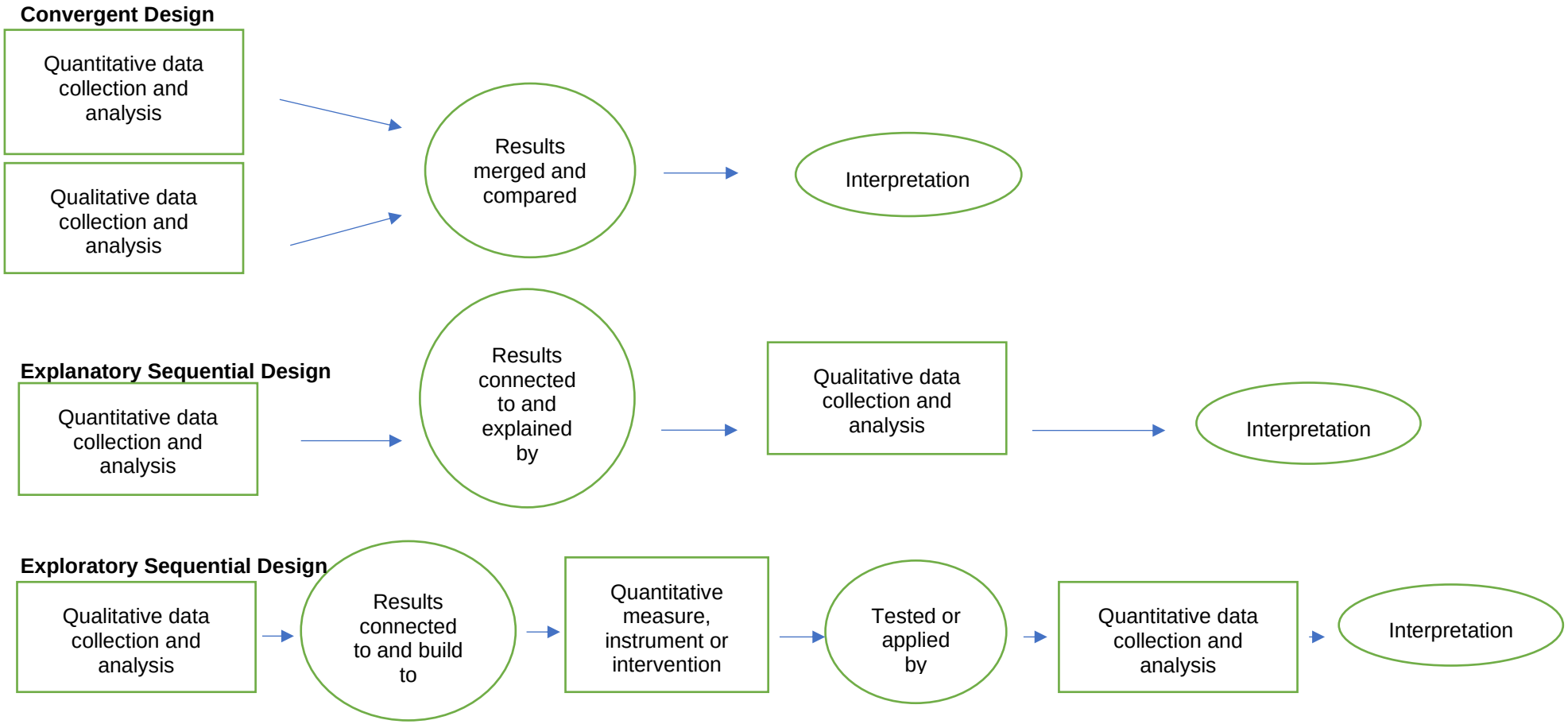

FIGURE 2 DIAGRAMS OF THE THREE CORE DESIGNS SOURCE: ADAPTED FROM CRESWELL AND PLANO CLARK, 2018

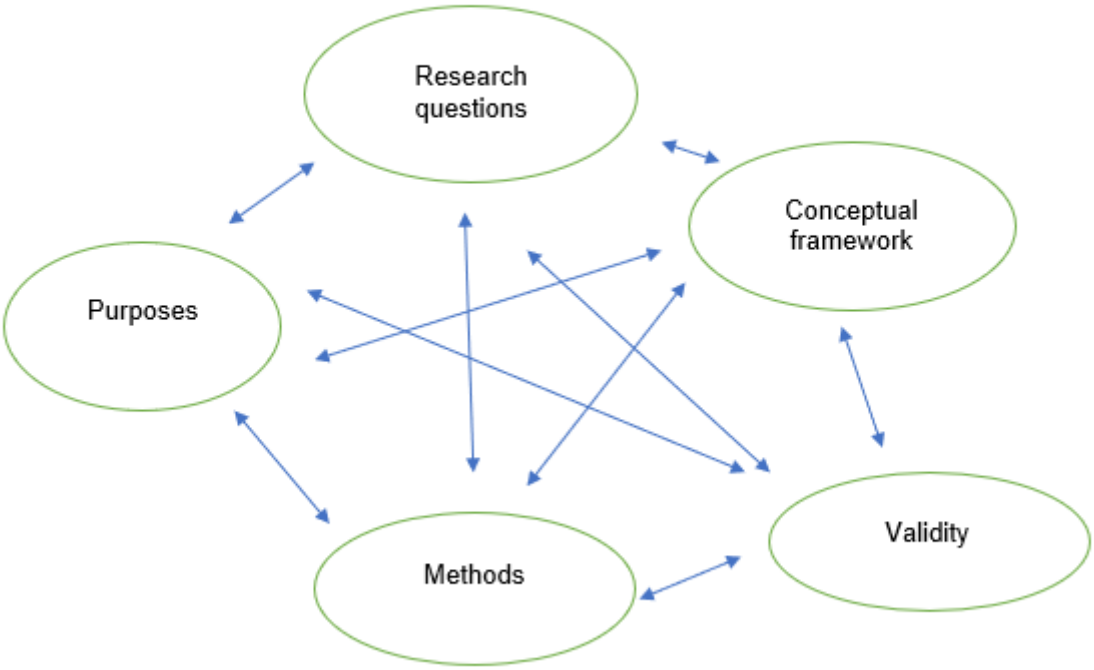

FIGURE 3 INTERACTIVE MODEL SOURCE: ADAPTED FROM MAXWELL AND LOOMIS, 2003

The dialogue and interaction between the diverse approaches have the potential to consider various perspectives and then produce valuable insights. The interactive approach resonates with dialectical pluralism (Johnson, 2017) which, as previously noted, is the paradigm adopted in this study. The aim of interactive mixed methods study is to adopt, respectfully listen to and integrate different approaches, philosophies, and paradigms, giving to all of them the same weight and value, to generate a knowledge which is more than the individual components (Fetters and Freshwaters, 2015).

While the typological designs, core and complex designs, follow a rather rigid approach, the interactive approach allows for more flexibility in the design process (Maxwell *et al*., 2015). This approach allows what Hunter and Brewer call “design for serendipity” (2015: 187), for

example when data are unavailable, circumstances change or results are inconsistent. Hall and Howard (2008) adopted a synergistic approach, which combines together the assumptions of the typological and the systemic approaches.

In the rest of this section, I will briefly present the core principles, the conceptual framework and the model of the synergistic approach and then the research design of this study.

Synergistic approach

The synergistic approach maintains the flexibility and the interrelationship between all the components of the interactive, systemic design approach and at the same time, it supports the structural elements of timing, level of interaction and status of the qualitative and quantitative approaches (Hall and Howard, 2008).

The core principles, which influence each other in an equal relationship are the concepts of synergy, the position of equal value, the ideology of difference, and the relationship between the researcher and the study design (Hall and Howard, 2008).

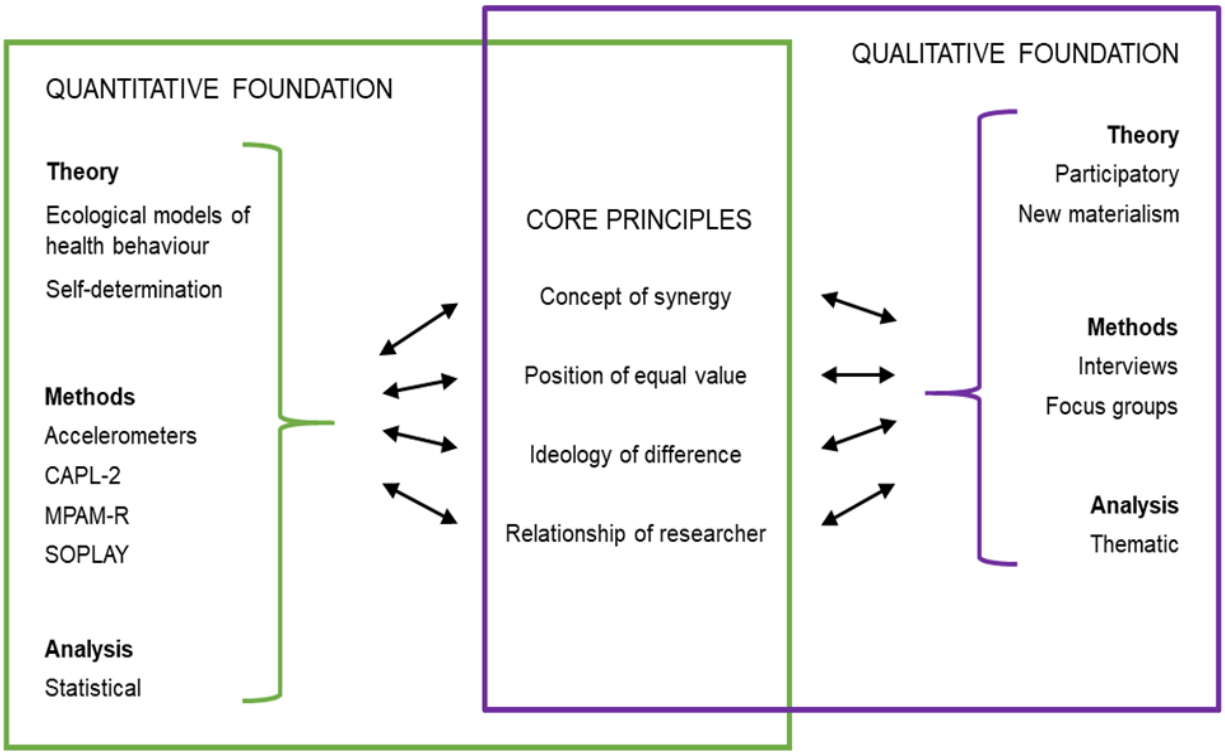

FIGURE 4: SYNERGISTIC APPROACH MODEL IN THE CO-PRODUCING OPPORTUNITIES FOR ACTIVE PLAY IN SECONDARY SCHOOL RESEARCH PROJECT SOURCE: ADAPTED FROM HALL AND HOWARD, 2008

These core principles will be illustrated in this section with their application to this study.

The concepts of synergy are related to the idea of the continuous interaction, dialogue and relationship between the diverse approaches which could lead to insights that are more than the individual approach alone. This study was designed as a mixed methods study from the beginning with the aim of fostering a continuous dialogic interrelationship between qualitative and quantitative approaches to get insight on active play behaviour and its promotion in secondary school.

The position of equal value puts the researcher as central to judging the qualitative and quantitative approaches equally, particularly considering the unavoidable variation of weight of one type of method (qualitative or quantitative) over the other during the whole research process. My commitment as a researcher was to maintain an equal weight and an integration of quantitative and qualitative approaches throughout the study, even when one method had

greater importance over the other. For example, during interviews and focus groups I used graphs of data generated by the quantitative data collection to generate discussion, and I put various boxes for comments and suggestions for the students to write their own thoughts on the topics presented in the questionnaires.

The ideology of difference recognises the independent significance of the qualitative and quantitative approaches in a mixed methods study which contribute by adding multiple perspectives for looking at the various facets of the object(s) of study as well as the importance of the dialogue between them throughout the research process. In physical activity and exercise sciences, qualitative methods are considered useful if they give more strength to a quantitative study (McGannon and Schweinbenz, 2011) rather than for its intrinsic value as a contribution to present different understanding. This study recognises the independent value of quantitative and qualitative approaches by presenting qualitative and quantitative results alone as well as the greater value of the integration of these data in elucidating the intra-actions which reciprocally affect a complex behaviour (physical active play) in a complex environment (school).

The relationship between the researcher and the study design must consider the challenge for the researcher to find a balance between the position of objectivity and subjectivity. As an interdisciplinary study, I had the support of experts in quantitative and qualitative approaches who supported me in the challenge to balance my position as a researcher. A mixed methods approach is also appropriate to understand the role of active play in providing enjoyable opportunities which encourage students to participate more in physical activities during break time.

The mixed methods approach will enhance the integrity of the study giving a more comprehensive understanding of the factors which facilitate or inhibit play culture in school, and a deeper sense of the effect that a favourable play culture has on supporting the promotion of physical activity and physical literacy in school.

3.4 Research Design

This study is informed by a synergistic approach (Hall and Howard, 2008) which mixed typological and interactive approaches. This study integrates a mixed methods case-study design (Creswell and Plano Clark, 2018; Yin, 2014) informed by transformative/participatory framework (Mertens, 2010) with a combination of convergent design (Creswell and Plano Clark, 2018) in the first phase and explanatory sequential design (Creswell and Plano Clark, 2018) in the second phase.

In the first phase the quantitative data were collected before the qualitative data. They were analysed and then the findings were integrated with the analysis of the qualitative data in a constant dialogue. The results of the integrated analysis informed the qualitative data collection of the second phase, providing a further explanation and elaboration of the results of the first phase.

The rationale for this approach is that the integration of the qualitative and quantitative data in the first phase provided useful insights into the complexity of adolescents' active play behaviour. The knowledge acquired in the first stage then provided the foundation of a more fine-tuned discussion during the intergenerational focus groups, in the second stage, on co-creating opportunities for active play in secondary school.

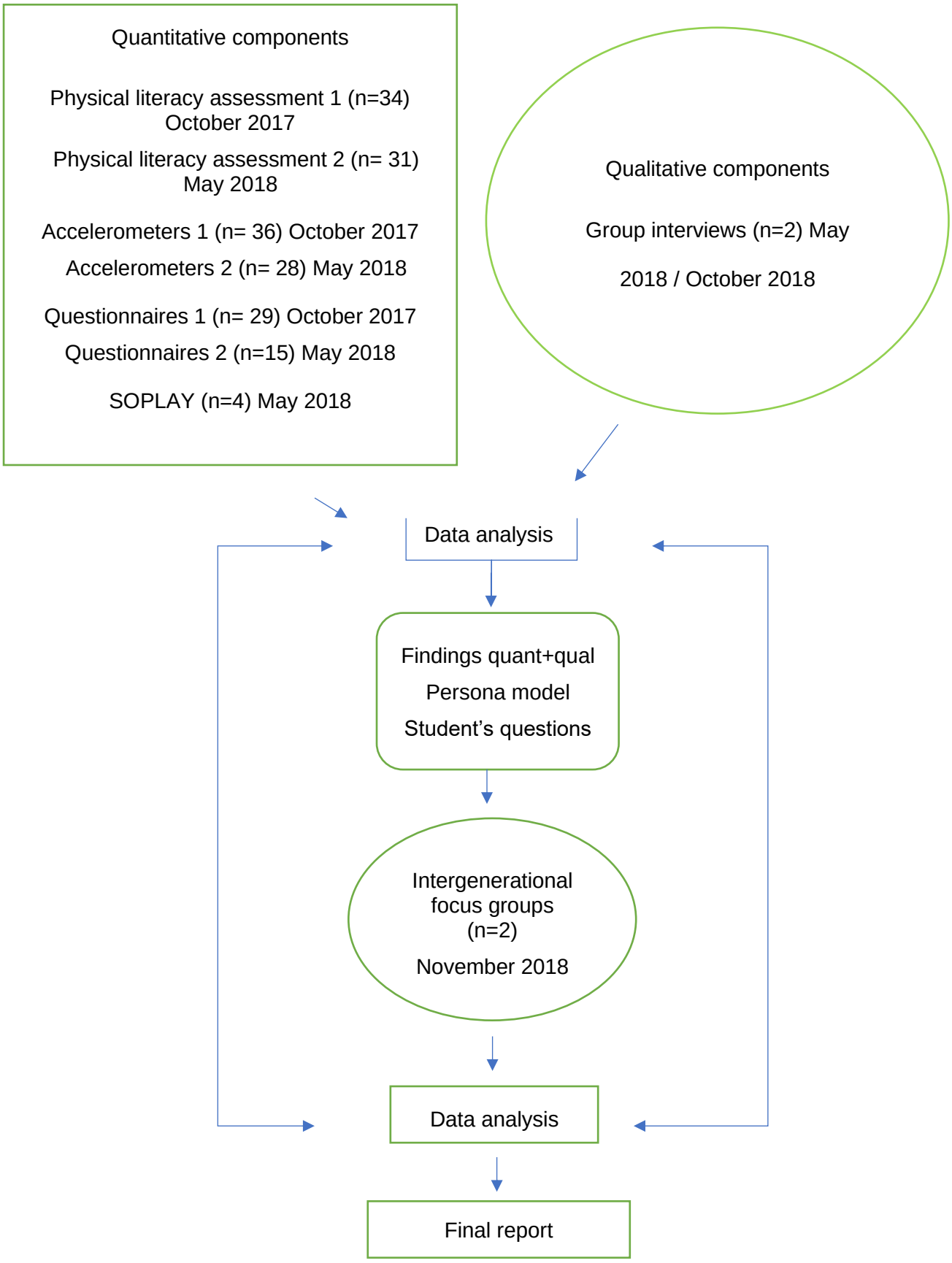

FIGURE 5 CO-CREATING OPPORTUNITIES FOR ACTIVE PLAY IN SECONDARY SCHOOL RESEARCH PROJECT RESEARCH DESIGN

3.5 Methods

In order to understand the diverse facets and complexities of physically active behaviours (Armstrong, 2019; Armstrong and Welsman, 2002; Brusseau, 2015; Draper and Stratton, 2019; Ridgers *et al.*, 2012; Sallis *et al.*, 2000), in a complex system like a secondary school, this study adopted diverse methods which provided qualitative and quantitative data. The methods adopted in this study aimed at collecting data on physical activity levels through accelerometers, the motor competence domain of physical literacy through the Canadian Assessment of Physical Literacy 2 and questionnaires, observational data on lunchtime activities through SOPLAY, and group interviews and intergenerational focus groups. During group interview sessions, they discussed their experiences and opinions on the difference between active play activities in primary and secondary schools during lunchtime, their perception of their actual physical activity level compared to their levels during primary school, and the recollection of enjoyable physically active experiences. They also talked about the barriers they experienced in their first year of secondary school, answering both researcher-derived and peers-derived questions. The knowledge acquired through the integration of quantitative and qualitative data supported the intergenerational focus groups where adolescents and adults collaboratively generated ideas and proposals for encouraging more students in enjoying being active. The research process, in particular the mixing of the methods, their sequencing and the role of young people at times as co-researchers, provides opportunities for insights to be generated about the characteristics of models of involving adolescents and adults in intergenerational dialogical practices to co-create opportunities for active play in secondary schools.

Physical activity measurement

Physical activity is a complex behaviour constituted by different dimensions. All of these dimensions (frequency, duration, type and intensity) can be measured at some levels. There are two main ways to measure the different dimensions of physical activity; self-report

methods (questionnaires, diaries or activity logs) and device based measures of physical activity (accelerometers, heart rate monitor, pedometer). However, at the moment, none of these tools alone can provide an accurate and reliable measure of all the four dimensions of physical activity (Trost, 2007) While self-report methods are often adopted in large surveys (HSCIC, 2017; Cruickshank *et al.*, 2015) because they are more practical, convenient and less expensive to administer, they have been criticised because they tend to significantly overestimate the levels of Moderate and Vigorous Physical Activity (MVPA[3]) (Basterfield *et al.*, 2008) and rely on the capacity of the participants to recall the activities performed during the day or even the week, possibly missing the unstructured and spontaneous short bursts of activity typical of children and young people (Biddle *et al.*, 2011).

Accelerometers are judged to provide an objective measure of some of those dimensions of physical activity: its frequency, intensity, and duration. The use of the quantitative data in this mixed methods research is warranted since they provide important contextual knowledge about the adolescents' levels of physical activity and the motor competence domain of physical literacy, and the motives for taking part in physical activity during the lunch break (Dobbins *et al.,* 2013; Owen *et al.*, 2014; Reilly *et al.,* 2016; Ridgers, *et al.,* 2012; Tremblay *et al.*, 2018). The quantitative data provided an image of the students' physical activity level, the stage in their physical literacy journey regarding the physical competence domain plus their motives for taking part in physical activities. These results added further insight into the possible associations between young adolescents' physical activity levels in school with their levels of physical literacy and the motives for taking part in physical activities. Furthermore, as the quantitative data were collected longitudinally at the beginning and the end of the participants' first year in secondary school, I was able to compare their physical activity level, the level of their physical competence domain of physical literacy, and their motives for taking part in physical activities at the beginning and the end of their first year in secondary school. The first data collection was in October 2017 and the second in May 2018.

[3] Levels of physical activity are routinely calculated using established ranges (Rest is 1.0 to 1.4 MET (Metabolic Equivalent Task), Light physical activity [LPA] is 1.5 to 2.9, Moderate physical activity [MPA] is 3.0 to 5.9, Vigorous physical activity [VPA] is 6.0+) (Welk *et al.*, 2017 p.12).

Physical activity levels were measured objectively through an accelerometer activity monitor, the ActiGraph GT3XPlus (ActiGraph LLC, Pensacola, FL) which is a non-intrusive device (it is worn above the hip on an elastic belt and can be hidden by clothes). The ActiGraph measures and records acceleration across three planes of movement: vertical, medio-lateral, and antero-posterior axes. Although the accelerometers can provide a reliable estimate of physical activity in adolescents, they have some limitations: as they are not waterproof, they cannot record any water-based activity. The students who agreed to participate wore the accelerometer for a week in October and a week in May. This device gives valid and reliable measurements on time spent in sedentary and active behaviour at different intensities. Consistent with previous studies on active play (Brockman *et al.*, 2010) a 10-s epoch was adopted to detect the intermittent and rhapsodic (Ceciliani and Bortolotti, 2013) nature of adolescents active play and physically active behaviour. In this study, all participants received the ActiGraph in an envelope with an information sheet which explained the use of the accelerometer during the week and emphasised the notion that the accelerometer is a monitor device which can measure only the length and intensity of activities and not the type or the location of these activities, therefore, their privacy was assured (Appendix 5). Data were collected for seven continuous days, including two weekend days. The participants were required to wear the device during the break time periods and also for at least eight hours on a weekday and a weekend day for an estimate of daily physical activity. Participants were included in the analyses if they provided ≥ 500 min of data for at least four weekdays. The International Physical Activity and the Environment Network (IPEN) adolescent accelerometer data collection protocol guidelines advise to include in the analysis only participants with at least five days of data including one weekend day. However, considering the small sample in the current study, adolescents who provided four days of valid data were included in the analysis. Non-wear period was considered as 60 consecutive minutes of zero movements recorded by the device, non-wear time was removed from the analysis. Accelerometer data were analysed using Actilife v6.11.9, proprietary software from the Actigraph manufacturer.

The following data were extracted from the accelerometers: the average Counts per minute (CPM)[4], mean daily time spent sedentary (in hours), mean time spent sedentary during break times (in minutes), mean daily time spent in light-intensity activity (in hours), mean time spent in light-intensity activity during break times (in minutes), mean daily MVPA (in minutes) and mean time in MVPA during break times (in minutes). The mean daily MVPA data were then used to determine whether a participant was meeting the government recommendations for physical activity (>= 60 mins/day).

In order to measure the intensity of adolescents' physical activity, the Evenson *et al.*, (2008) count threshold, which is considered to produce an accurate measure of the different intensities of physical activity (Trost, 2007), was adopted to classify activities with the appropriate 'cut points'. Cut point uses the Counts for Minute measure to classify activities as sedentary, light, moderate, or vigorous (Table 1).

TABLE 1 CLASSIFICATION OF SEDENTARY AND PHYSICAL ACTIVITY INTENSITY (EVENSON ET AL., 2008)

Intensity classification	Counts per minute (CPM)
Sedentary	≤ 100
Light	101 - 2295
Moderate	2296 - 4011
Vigorous	≥ 4012
MVPA	≥ 2296

[4] Average Counts per minute (CPM): "Counts" is a metric which records all movements from the accelerometer. When we consider the length of time that the accelerometer is worn, the "counts" are standardised into "counts per minute" (CPM).

In the same week, they wore the accelerometers the students performed the Canadian Assessment for Physical Literacy (CAPL-2) (HALO, 2017; Longmuir *et al.*, 2015, 2018). This assessment gives a picture of four domains of physical literacy: physical competence, daily behaviour, motivation and confidence, and knowledge and understanding. This assessment is based on peer-reviewed protocols which are considered valid and reliable. The assessment is quite flexible and gives the option to score both single assessment and more general aggregate score (HALO, 2017) and for this study, it was deemed appropriate to consider only the motor competence domain. I assessed motivation and confidence through the MPAM-R questionnaire that is widely used. The daily behaviour domain was not considered as it is based on a pedometer score. It seemed inappropriate to ask the students to wear both pedometer and accelerometer at the same time. While the pedometer gives a score on the steps performed on a length of time accelerometers were preferred for their capacity to detect different intensity of movement, from light to vigorous, that better reveals the continuous variations of intensity which characterises adolescents' physical active behaviour, consequently more apt for this study. The knowledge and understanding domain is assessed through a questionnaire which is based on the Canadian physical education curriculum. Although it was used in this study as it is not validated in UK and the number of respondents too little it was considered not appropriate for the analysis. I asked adolescents and adults, during the interviews and the focus group discussions, about their thoughts on the importance of physical activity to capture the nuances of the different perspectives of the adolescents and adults involved. In the period between the two assessments the Healthy Active Living and Obesity Research Group (HALO), who designed the physical literacy assessment, published a new version, the CAPL-2, to make the assessment more accessible. In the physical competence assessment, the measurement of height and weight to calculate the body mass index (BMI), the measurement of the circumference of the waist, the grip test, and the sit & reach assessment of flexibility used in CAPL were dropped in the CAPL-2, as well as some of the items in the questionnaires to assess motivation and confidence. These differences between the old and the new versions did not affect the data collection. Before the first data collection in October, I considered the measurement of height, weight, and waist

circumference as intrusive tools which could have given the participants the feeling of being considered as objects for research. The sit & reach assessment required an instrument, a flexometer, which usually is not part of the PE equipment of a school, therefore made it more difficult to administer. Only the grip test was performed but it was not considered in the data analysis.

The motor competence domain of CAPL-2 is measured by three protocols: the CAMSA, the PACER and the plank (HALO, 2017)[5]:

When I first designed the study, in addition to the CAPL-2, a number of physical literacy assessments were already existed, mostly from Canada: such as the "Passport for Life" (PHE Canada, 2013) and the "Physical Literacy Assessment for Youth (PLAY) (CS4L, n.d.) The CAPL-2 was preferred to the other two for its easy accessibility; "Passport for Life" requires all students and teachers to fill an online registration form in order to access the protocols for the assessment, while the CAPL-2 manual is easily accessible online. In the CAPL-2 physical competence assessment, the various movement skills are performed sequentially in a dynamic environment, similar to any active play activity or any other physical activity, while PLAY measures each movement skills individually in a closed task. CAPL-2 can also be adopted by PE teachers, indeed the head of PE of the case study school was eager to add

[5] **The CAMSA** (Canadian Agility and Movement Skill Assessment) is adopted to assess complex and combined fundamental movement skills. In the CAMSA the adolescents had to complete a standard agility course (the layout of the obstacle course is in Appendix 8) where a number of fundamental (jump on two feet, slide sideways, catch, overhand throw, skip, hop and kick a ball) and more complex motor skills (for example acceleration, change of direction, and dynamic balance) were performed in a sequence. The score is based on the quality of the fundamental movement skills (1 point for each of them) and the time which gives information on the level of the more complex skills.

The PACER (Progressive Aerobic Cardiovascular Endurance Run) is used to measure aerobic endurance. In this assessment, the adolescents had to run back and forth across two lines 20m apart following a signal. They need to pass the opposite line with both feet to change direction before the next signal. During the PACER the time between two signals is progressively shorter every time a level is reached. The score was given when for the second time the student did not reach the line. In the CAPL-2 manual, there is a table which transforms the level score into points.

The plank is an assessment to measure muscular endurance. The students were asked to maintain the correct position (body in a straight line from head to ankles and supported by forearms and toes) as long as possible. In the CAPL-2 manual, there is a table which transforms the time into points.

the CAPL-2 in the curriculum in the future. CAPL-2 was also the only assessment with reports published in peer-reviewed journals.

The participants also filled the Motives for Physical Activity Measure (MPAM-R) questionnaire. This questionnaire is based on the self-determination theory (Deci and Ryan, 1985) and it assesses five different motives for participating in physical activities (appearance, competence, social, fitness, and interest/enjoyment). The scale reveals the relative value of these motivators to exercise.

Accelerometers, CAPL-2, and MPAM-R were used in both the first data collection in October and the second in May.

I initially planned to use also other questionnaires alongside the MPAM-R. However, considering the sample size of the students involved (n=34) and the number of questionnaires completed in the first round of data collection (n=29) I decided to use only the MPAM-R in the second data collection point.

In order to record students' active behaviours in the school's playground during lunch breaks, I used SOPLAY (System for Observing Play and Leisure Activity in Youth) (McKenzie, *et al.*, 2000; 2006) during the observations at the second data collection period, for three consecutive days in May 2018. SOPLAY is an instrument that facilitates recording of the number of students who spent their lunch break in some predetermined outdoor physical activities areas (which I chose after consultation with the head of PE), their physical activity levels, and the different types of activities. The predetermined area is scanned from left to right, the researcher records "frames" of students' physical activity, which is classified as sedentary, walking, or very active, and coded according to a predetermined classification. During the three days, my observation point was in an outdoor space where I could observe the all-weather pitch, the basketball court, the areas around these sporting facilities, and the path the students used to leave the school premises during lunch break. During the observations, I filled the SOPLAY observation form (a blank copy in appendix 9) to record the physical activities the students performed during lunch break.

Group interviews and intergenerational focus group sessions

Next to these more quantitative methods adopted to collect data on physical activity, I used semi-structured group interviews and intergenerational focus group discussions to produce data together with some of the student participants and some adults, who were members of the school staff.

In the first group interview, which took place on the 4th May 2018 straight after the end of the CAPL-2 assessment session, interviewees were randomly selected from the whole group of participants, as all of them wanted to take part in the session. The PE teacher wrote their names on a piece of paper, the pieces of papers with the names of the adolescents were divided into two groups, boys and girls, then some of the adolescents picked the names one at a time. The first six boys and six girls extracted participated in the group interview session. The second group interview took place on the 26th October 2018 and both the focus groups on the 22nd November 2018. The adolescent participants in these sessions were purposely selected. The majority of the participants were amongst those who recorded the lowest levels of physical activity during lunch break (see "Participants in group interviews and intergenerational focus groups" section for further details). In the second group interview, the participants were six boys and six girls. For the focus groups, three boys, three girls, and a member of staff participated in the first one, and five girls (it was planned to have six girls but one of them was not in school on the day of the session) and one member of staff in the second. Some of these participants took part in more than one session. The members of the school staff were randomly selected dependent on their availability. All these sessions, group interviews, and focus groups were digitally recorded and transcribed verbatim. Thematic analysis (Braun and Clarke, 2006 Braun *et al.*, 2016) was adopted in the analysis of the transcriptions (see "Data analysis" section for further details).

The data collected from group interviews and focus group sessions allow me to gain a better understanding of the factors that support or discourage active play culture and participation in physical activities in secondary schools from young people's perspectives. These data were gathered using a voice recorder and hand-written notes.

The participatory approach influenced the qualitative data production; drawing on Hart's ladder of young people's participation (1997) the adult researcher shared decisions with the early adolescent participants in the group interviews as co-researchers about some of the questions which were subsequently part of the intergenerational focus group discussions. The intergenerational approach involved interactions and dialogue among participants from different generations (Mannion, 2012). The aim of the intergenerational dialogue is to facilitate communication and cooperation between adolescents and adults.

3.6 Selection of the case

This study anticipated the case study of secondary schools that have playgrounds designed to offer opportunities for active play. However, the case study approach underwent some changes during the research process. After successfully being awarded the ethics clearance from the University of Stirling, I contacted several schools regarding taking part in the research project. In order to find secondary schools in Scotland with an enhanced play policy, I contacted Play Scotland, Education Scotland, various PE support officers, and the Scottish Association of Teachers of Physical Education (SATPE) but with no success. Two schools that had submitted a proposal for a grant, offered by a national charity, to change part of their playground to provide active play opportunities were selected and ethics clearance requests to the local authority were submitted and awarded. One of the two schools won the grant and a new playground area opened in Autumn 2016. In this school grounds project, all stakeholders have already set in motion a participatory approach to transforming the opportunities for leisure, playtime, and physically active learning. A third school was selected after an inspection I did in May 2017 and a meeting with the Learning for Sustainability Coordinator and the head of Physical Education where they expressed their interest in taking part in this study, however, this school was ultimately unable to participate.

The research study envisaged collecting data from S1 students in these two schools. Longitudinal data collection was planned at two timepoints (at the beginning of their first year in secondary school and then at the end of the same year) to evaluate the impact of the enhanced play space in one of the two schools and have a control group in the other. S1 students have been identified as the appropriate age group to explore for this study since it has been found that it is during the transition from primary to secondary school there is a marked decline of PA levels (Cruickshank et al., 2015).

I had the first meeting in December 2017 with the headteacher of the school that won the national charity's grant where I presented the project and a subsequent meeting with two PE teachers. During these meetings, they expressed more interest in collecting data on S2/S3 students who were taking part in a project called "school of sport" rather than S1 students as planned in this study. Although it was not relevant for this project, in order to build a good relationship with the school, I agreed to collect data from these students. In February 2018, I presented the study to the 35 students who were part of the 'school of sports' project. The week after, 20 of them returned signed consent forms and took part in the physical literacy assessment, and I gave them accelerometers and questionnaires. Two weeks later (in the first week the school was closed for snow) all of them brought back the accelerometers with valid data, and 14 of them the questionnaires (11 valid and 3 incompletes). However, after a meeting in April 2018 where I presented the project to two groups of S1 students selected by the teachers, only two students brought back the consent form signed, so this school was not involved in the study.

The second school was from the start, the most hospitable and most interested in the study. The Aqua Valley School (a pseudonym) is a non-denominational rural school located in a village in the North-East area of Scotland.

Although the school covers one of the widest catchment areas in Scotland, the school roll has been in constant decline since 2013. From informal conversations with school staff, it appeared that the vast majority of the students use buses provided by the local authority to get to the school and back home, and in the interviews with the adolescent participants it

emerged that for some of them the journey to school was around 45 minutes by bus each way. Some of the participants reported in the interview that school is the main place for spending time with their friends

In the case study school the average attendance was lower than the average in the region and lower than the Scottish national average. The third level attainment[6] results of the case study school in Reading, Writing, and Listening and Talking were lower than the regional and national averages. However, the Numeracy third level attainment results were consistently above the regional averages and in line with the national averages. The percentage of S5 students achieving SCQF level 6 awards was above the regional and national average.

In this school, male students make up between 50 and 60% of the school population, and this proportion of males and females was similar amongst the participants in the study. The majority of the students, between 60 and 70%, are in the Q4 of the Scottish Index of Multiple Deprivation[7], and more than 90% are not registered for a free meal. More than 90% of the students are of white UK ethnic origin and a similar number live in rural areas (Scotland average in secondary school: white UK, 86%; rural areas: 19%). The ethnicity of the participants in the study reflected the same proportion of the whole school. All these data were correct as of September 2019 (SG Education Analytical Services).

Local authority reports highlight the important role this school gives to students' voices and their involvement in the school improvement. The main arena is the "Young Person Senate" which is involved in activities related to Teaching and Learning, and School Facilities. There are also the "Sports Ambassadors" who run the Sports Committee, examine possible changes within the Physical Education Department, and organise extra-curricular sports activities. Some of these activities, for example the Parkour club which will be mentioned by the participants in the focus groups, are pupil-led.

[6] The third level attainment is related to the curriculum level at years S1-S3.

[7] The Scottish Index of Multiple Deprivation is a relative measure of deprivation. SIMD ranks data zones from most deprived (ranked 1) to least deprived (ranked 6,976). (Gov.Scot, 2020)

The school building was constructed in the late 1970s, with a new wing added within the last 5 years. The school has extensive playing fields with different rugby and football pitches on natural grass, an all-weather pitch, and a basketball court. During lunch break, there were two main outdoor spaces where the students could be found socialising within the school grounds. An area outside the school building entrance with benches and flower beds where groups of students spend lunch break sitting and chatting, and the largest outdoor area with sports facilities and surrounding areas on the side of the school. The all-weather pitch and the basketball court, which are the closest to the school building, were used by the students during the lunch breaks I observed.

The school has two breaks, the morning interval of 15 minutes at around 10.30am, and a lunch break of 50 minutes. After a personal inspection of the school ground during my first visit and various comments from school staff and student participants, it was evident the during the morning break the vast majority of the students remained inside the school building, while during lunch break they spent more time outside. Therefore, the monitoring of physical activity levels using accelerometers, my observations, and the interview questions were focused on lunch break periods.

The weather conditions both in November and in May throughout the whole week of data collection of physical activity levels were similar: no rain, scattered clouds, and the temperature was around 11-12 °C.

I had meetings with the headteacher and the head of Physical Education in January and March 2017 to introduce the project and both of them were very interested in taking part in the study. During the study, there were 15 day-visits to the school in total: three with the school staff (headteacher and head of PE) to present the project and organise the data collection and production between January 2017 and March 2017, and 11 for data collection. This included: three in September 2017 (one to present the project to the students and two for the first round of the CAPL assessment with 36 students involved), six in May 2018 (two for the second round of the CAPL assessment with 34 of the initial 36 involved, a group interview with 12 randomly selected students and three for observation during lunch break in the week the students were

wearing accelerometers), one in October 2018 for a group interview and one in November 2018 for the two intergenerational focus group sessions.

At the school which participated in the whole project, I presented the study project to all the S1 students in the school (n=91) in September. In this school, all four S1 groups had their PE lessons in two consecutive periods on the same day. At the end of the presentations, all the students received the information booklet and the consent form to be signed by both the students themselves and their parents or carers. The following week, 36 of them brought back the consent form signed and received an accelerometer to wear over that week and an envelope with the questionnaires to be completed during the week. The group of participants could be considered representative of the S1 group in the school. They were 56% boys and 44% girls, a proportion which is similar to the overall gender ratio in S1. Furthermore, as it emerged from the analysis of the data, some of them were very active while others were quite inactive during lunch break. These different physically active behaviours during lunch break allowed this study to gain an understanding of participants' diverse perspectives and experiences of barriers and facilitators to participation in active play and physical activities during lunch break.

The students' participants completed the physical literacy (CAPL) assessment (four different activities: the 10m. shuttle run, obstacle course, grip test, and plank test) in two PE lessons in two consecutive weeks. As there were student participants in all four groups it took four sessions in total. Given the assessment took the whole period of a lesson (in theory this would be 50 minutes but taking into account the time to get changed into their PE kit and then back into their school uniform it was less) and considering that for some students their PE lesson is the only time to be physically active, I decided to ask the participants to fill the questionnaire at home. This might be one of the reasons that explain the number of incomplete or non-returned questionnaires. At the end of the first round, I collected valid data from 36 accelerometers, 34 CAPL assessments, and 20 questionnaires.

Of the 36 participants in the first round, 31 students decided to take part in the research project again in the second round in May. In this round, the assessment was performed on two days

in the same week, both of them during a “non-PE” period, where only the student participants in the study were present. I collected data from 31 CAPL assessments tests, 28 valid accelerometers results, and 17 fully completed questionnaires. Furthermore, at the end of the last session of the assessment, I organised a group interview with 12 students (six boys and six girls). In that same week, I also collected observational data in the playground during breaktime for three consecutive days using SOPLAY.

The first semi-structured group interview, which took place straight after the end of the second physical literacy assessment in May with 12 students (six boys and six girls randomly selected) lasted 45 minutes. I asked questions about the differences between lunchbreaks activities in primary and secondary school (mostly regarding active play activities), their perception regarding their level of physical activity in primary compared to their level in secondary school, and their recollections of the most enjoyable play activity in school.

The second semi-structured group interview took place in September 2018 and lasted 45 minutes. Twelve students were involved (six boys and six girls) and they were purposely selected; they were some of the students identified after the analysis of the data from the accelerometers who reported a diminished level of physical activity in the second data collection compared to the first.

During this group interview I asked questions about their definition of play, about their perception regarding their level of physical activity in primary compared to their level in secondary school, and if they could change one thing about lunch break to make students more active and to play more, what would they change. Then I asked them to step into my position as a researcher and ask questions to the rest of the group, and possibly to bring some of the questions to the focus group discussions with the adults. At the end of the discussion, of all the questions they produced, the group decided on two to be asked in the successive intergenerational focus group discussions. The questions were about what people like about being active and about girls feeling embarrassed while being active, and measures to help girls in feeling more comfortable in being active.

The two intergenerational focus groups sessions took place in November 2018 and lasted 45 minutes each. In the first focus group, there were six students (three boys and three girls) purposely selected from the least active students and the adult who decided to join the discussion was the deputy head. In the second focus group, there were five girls and the outdoor learning coordinator. This girl-only group was selected after the analysis of data which showed a decline in the level of physical activity in girls during lunchtime between the two data collection periods and also because I considered that the girls would talk more freely about their embarrassment in being active without boys. During the focus groups discussions, I used the persona method (Cooper,1999), described above, the histogram which reported participants' lunch break physical activity levels, and aerial photos of the school ground as prompt to facilitate discussion. The protocol and the complete question set for the intergenerational focus groups are in appendix 1.

Participants in physical activity, physical literacy levels, and MPAM-R questionnaires

There were 36 students (11.8±0.4y) who agreed to take part in the measurement of physical activity levels, physical competence domain of physical literacy, and motives for taking part in physical activity in the first data collection (boys=24; 11.8±0.4 years and girls=12; 11.6 ±0.5 years) and 31 of these also agreed to take part in the second data collection (boys=19 and girls=12).

Valid data were considered to be as follows. The accelerometer data were considered valid when they provided measures for at least four weekdays and one weekend day at both time points. Valid data were considered when the accelerometer recorded data for at least eight hours between 07.00 and 22.59 (Cooper *et al.*,2015), and as this study is focused on active play and physical activity behaviour during lunch break, the whole period of lunch break during weekdays. For the CAPL valid data were considered when the participant provided data on all three tasks at both time points. For the MPAM-R questionnaires, data were considered valid when they provided completed or partially completed questionnaires at both time points.

There are some limitations to consider in the analysis of physical activity levels, physical competence, and motives for taking part in physical activities. At the two time points a limited number of valid data (n= <50% of participants) from the MPAM-R questionnaires was collected. The participants completed the Motives for Physical Activity Measure-Revised (MPAM-R; Ryan *et al.*, 1997) at home and then they gave the questionnaires back at the end of the data collection period together with the accelerometers. This procedure generated a low response rate. The reason behind the choice of filling the questionnaires at home was motivated by school time constraints. The assessment took two complete PE lessons in the first data collection point (when the students who did not agree to participate but wanted to complete the assessment were allowed to, but their results were not registered for the research purposes) and a complete school period in the second data collection point (where only the participants were present). It is likely that if I had asked the students to complete the questionnaires immediately after the CAPL assessment or during a PE lesson I would have received a higher number of responses. However, this would have resulted in students missing PE opportunities which for some students may be their only opportunity to be active during the week.

Another limitation to consider is related to the number of missing data. Between the first and the second data collection points, five boys decided to drop out from the study and other boys did not provide valid data at both time points (valid data: accelerometers: 1st time point=22, 1st and 2nd time point=14; CAPL: 1st time point=21, 1st and 2nd time point=16; MPAM-R: 1st time point=14, 1st and 2nd time point=8). The number of girls who provided valid data at both time points remained quite constant (valid data: accelerometers: 1st time point=11, 1st and 2nd time point=11; CAPL: 1st time point=10, 1st and 2nd time point=10; MPAM-R: 1st time point=9, 1st and 2nd time point=9).

The students who provided valid data at both time points had a higher mean daily moderate and vigorous physical activity (MVPA) compared to the ones who dropped out of the study.

The analysis of the data showed a statistically significant difference[8] in the average mean daily MVPA (p= .043[*]). The other values of physical activity levels measured during the day (CPM[9]: p= .065; sedentary p= .986) showed no statistically significant difference. When the lunch break time is considered the analysis showed no statistically significant difference in every value (CPM: p= .370; MVPA: p= .745; light-intensity: p= .706; sedentary: p= .616). All the values of physical activity level, except the daily MVPA, showed no statistically significant difference between the boys who provided valid data at both time points and the others. However, the differences in the means (see table 2) show that on average the boys who dropped out of the study after the first data collection were less active than the boys who participated in both data collection points, both daily and during lunch break. The boys who took part only in the first data collection showed no statistical difference from the ones who took part in the whole research study in their activity levels during lunch breaks, which is the period of the day that is most relevant for this study.

The difference between the two groups of boys in the scores of the assessment of the physical competence domain of physical literacy showed no statistically significant difference (*p*= .232) although the scores of the boys who did not provide valid data at both time points were lower than the other boys on average.

When the scores of the different subscales (enjoyment, competence, appearance, fitness and social) of the MPAM-R questionnaire were compared, the two groups of boys showed no statistically significant difference (enjoyment: *p*= .777; competence: *p*= .360; appearance: *p*= .795; fitness: *p*= .477; social: *p*= .158).

As this study was interested in exploring adolescents' physical activity behaviour during lunch break across their first year of secondary school, in the subsequent data analyses, only the students who took part in both data collection points in each measurement were included.

[8] Alpha set at 0.05 two tailed.

[*] *p* <0.05 level (2-tailed).

[9] Average counts per minute (CPM) were used as a means of assessing the average physical activity per minute.

TABLE 2 COMPARISON MEANS BETWEEN BOYS WHO PROVIDED VALID DATA IN BOTH FIRST AND SECOND DATA COLLECTION POINTS AND BOYS WHO DROPPED AFTER THE FIRST DATA COLLECTION POINT.

	Boys 1st & 2nd t. p. M ±SD	Boys only 1st t. p. M ±SD
Average daily CPM	492.36 ±116.57 (N= 14)*	394.97 ±104.55 (N= 8)*
Daily MVPA (min.)	55.16 ±14.26(N= 14)	40.58 ±16.94 (N= 8)
Daily Sedentary (hrs.)	8.05 ±1.55 (N= 14)	8.04 ±1.32 (N= 8)
Average lunch break CPM	1411.66 ±567.28 (N= 14)	1233.29 ±664.73 (N= 8)
Lunch break MVPA (min.)	13.83 ±7.12 (N= 14)	12.66 ±9.38 (N= 8)
Lunch break LiPA (min.)	20.25 ±5.97 (N= 14)	19.37 ±7.82 (N= 8)
Lunch break Sedentary (min.)	16.27 ±8.36 (N= 14)	17.96 ±10.05 (N= 8)
CAPL	20.47 ±6.38 (N= 16)	16.31 ±7.26 (N= 5)
MPAM-R Enjoyment	5.03 ±1.91 (N= 8)	5.70 ±.90 (N= 6)
MPAM-R Competence	5.18 ±1.36 (N= 8)	5.79 ±.70 (N= 6)
MPAM-R Appearance	2.75 ±1.75 (N= 8)	4.95 ±1.38 (N= 6)
MPAM-R Fitness	5.00 ±.73 (N= 8)	6.04 ±.66 (N= 6)
MPAM-R Social	3.40 ±1.75 (N= 8)	4.98 ±.90 (N= 6)

Notes: 1st t.p. = first time point, October; 2nd t.p.= second time point, May; M = Mean; SD = Standard Deviation; (min.)= minutes; (hrs.)= hours; CPM= counts per minutes; MPVA= moderate and vigorous physical activity; LiPA= Light-intensity physical activity; N= Valid numbers; CAPL= Canadian Assessment of Physical Literacy; maximum value 30; MPAM-R Likert scale values: minimum 1="not at all true for me", middle 4= "somewhat true", maximum 7= "very true for me".

TABLE 3 COMPARISON MEANS BETWEEN GIRLS WHO PROVIDED VALID DATA IN BOTH FIRST AND SECOND DATA COLLECTION POINTS AND GIRLS WHO PROVIDED VALID DATA ONLY IN THE FIRST TIME POINT.

	Girls 1st & 2nd t. p. M ±SD	Girls only 1st t. p. M ±SD
MPAM-R Enjoyment	4.63 ±1.91 (N= 6)	5.90 ±1.90 (N= 3)
MPAM-R Competence	4.81 ±1.95 (N= 6)	5.90 ±1.90 (N= 3)
MPAM-R Appearance	3.72 ±1.10 (N= 6)**	1.11 ±.19 (N= 3)**
MPAM-R Fitness	4.90 ±1.48 (N= 6)	5.33 ±2.38 (N= 3)
MPAM-R Social	4.33 ±1.32 (N= 5)	3.57 ±1.88 (N= 3)

Notes: 1st t.p. = first time point, October; 2nd t.p.= second time point, May; M = Mean; SD = Standard Deviation; N= Valid numbers; n= Statistically significant difference: p >0.05 non-significant, *p <0.05, **p<0.01, ***p<0.001; MPAM-R Likert scale values: minimum 1="not at all true for me", middle 4= "somewhat true", maximum 7= "very true for me"

Participants in group interviews and intergenerational focus groups

The findings from quantitative data guided the selection of the adolescent participants in the second group interviews and the two intergenerational focus groups.

The first group interview, though, took place in May (in the last term of S1 year), on the same day as the second CAPL-2 assessment and therefore before the analysis of the quantitative data. The participants in this group interview were 12 adolescents (six boys and six girls) randomly selected amongst the 26 participants in the second CAPL assessment. This session took place in the sports hall where the students previously participated in the CAPL-2 assessment. The session lasted the length of a lesson in the case study school (45 minutes).

Together with the students, we arranged some benches in a circle and we sat down together. At the start of the session, I told them again that their participation was voluntary and they could stop at any moment or not answer a question without giving any explanation. I asked them if I could record the session reminding them that their answers were going to be anonymous and confidential. I also clarified that I was interested in their ideas and experiences

and they could express their thoughts without any positive or negative judgment both from me and from their peers. They started saying their name to facilitate the link of participants and their quotes during the transcription. The first group interview had questions on four areas: lunch break experiences in primary and secondary school, enjoyment during physical activities, their ideas on play and, the perception of the difference in their levels of physical activity between primary and secondary school. During the group interviews and the intergenerational focus groups, I used open-ended questions to better explore early adolescents' experiences during lunch break.

In the second group interview and the two intergenerational focus groups, the samples were purposely selected. For the second group interview and one intergenerational focus group, the participants were the same number of boys and girls. The sample included the students who were less active during lunch breaks as a majority, plus a boy and a girl who were amongst the more active students to explore their different experiences. In the second group interview, which took place in October 2018 (the students were now in their S2 year), there were 12 adolescents (six boys and six girls). In the first intergenerational focus group, which took place in November 2018 (second term of S2 year), there were six adolescents (three boys and three girls) and one adult, a member of the senior leadership team of the school. The second intergenerational focus group, which took place on the same day in November as the other focus group, had a different selected sample of participants. The purposely selected sample constituted of five adolescents girls (it was planned to have six girls but one of them did not turn up) and a female teacher. In this case, their physical activity level during lunch break was not considered.

There were several reasons behind the choice of a single-sex focus group. The data from accelerometers showed that girls were less active than boys during lunch breaks, and the intra-actions between the boys and girls who took part in the first two group interviews, suggested that the girls would have been more open to discussing the barriers to taking part in physical activities at lunch break if they were in a group without boys.

The general structure of the second group interview was similar to the first one. It took place in the same sports hall as the first group interview and, as before, we all sat in a circle on benches. This session lasted 45 minutes as per the previous one. At the start of this session, I reminded them that their participation was voluntary, and their answers were going to be anonymous and confidential. They could leave the room or not answer a question without giving any explanation. They gave me permission to record the session. I made clear that they could express their thoughts without any positive or negative judgment both from me and from their peers. As for the first group interview, I asked them to say their name to facilitate the link between participants and quotes during the transcription. In the second group interview, I also adopted a participatory approach. Alongside the same questions asked during the first group interview, I asked the group what question they would like to ask students like them and adults if they were the researchers. Four questions (one of them contained two questions) stimulated intense discussions and interest in all the participants. At the end of the group interview together we decided to bring these four questions to the intergenerational focus groups. Two of these questions were related to barriers to participation in play and physical activities,

"What stops you being active if you are not active?"
"A lot of people say girls feel more embarrassed, like, going out and playing football, but why should they feel embarrassed?"

and the other two were more related to facilitators to participation.

"Is there a club we can make or, like, a space where girls can be more confident?" (this was the second part of the question about girls feeling embarrassed during physical activities)
"What do you like about being active?"

These students' questions will provide the framework for understanding barriers and facilitators to active play and physical activities during lunch break for secondary school first year students in the rest of the section.

The two intergenerational focus groups had the same structure. They both took place in a classroom and they lasted 45 minutes. I put together some tables in order to allow all the participants to sit in a circle and to have enough space to write if they needed to. This time I did not sit with the participants as in the two group interviews, but I stayed outside the circle. This position gave me the opportunity to observe the interaction between adolescents and the adult participants. At the beginning of both sessions I reminded all the participants that their participation was voluntary, they could leave the room or not answer a question without giving any explanation. I also made clear that their answers were going to be anonymous and confidential and I asked their permission to record the session. I emphasised that they were free to express their thoughts without any positive or negative judgment both from the adult participant and from their peers. As for the first group interview, I asked them to say their name to facilitate the link between participants and quotes during the subsequent transcription. Then I verbally articulated every question, leaving on the table a written version of the same question to help the group to remain focused on the topic.

In the intergenerational focus groups alongside the questions prepared with the participants, the other questions were about approaches for encouraging other students to be active during lunch break and ways for designing, with students and adults working together, active play opportunities.

3.7 Data analysis

In this study, there were no interventions planned and designed to promote physical activity during lunch break (line marking, equipment, or sport/play clubs) so the activity levels described can be considered typical for the participants during this period.

Statistical analysis was performed using SPSS 25.0 for Windows (SPSS Inc, Chicago, IL).

Descriptive statistics at the first timepoint (October) and the second timepoint (May) for all the physical activity data extracted from the accelerometers included: the average Counts per minute (CPM)[10], mean daily time spent sedentary (in hours), mean time spent sedentary during break times (in minutes), mean daily time spent in light-intensity activity (in hours), mean time spent in light-intensity activity during break times (in minutes), mean daily MVPA (in minutes) and mean time in MVPA during break times (in minutes). Descriptive statistics are presented as mean and standard deviation for the overall group, for boys and girls.

The mean daily MVPA data were then used to determine whether a participant was meeting the government recommendations for physical activity (>= 60 mins/day). During the completion of this study, the UK CMO produced a new physical activity guidelines document. The main difference between the new UK (2019) and the previous UK (Start active, stay active, 2012) and the current WHO (2011) physical activity guidelines relevant for this study is related to the approach adopted to determine if the participants are either meeting or not meeting the physical activity recommendations.

While the WHO and the old UK CMO physical activity guidelines (2011), which the latest Scottish Health Survey based their analysis of adolescents' physical activity levels on, recommend 60 minutes of MVPA *every day*, the actual UK CMO physical activity guidelines document suggests that the 60 minutes MVPA should be achieved *on average* across 7 days. In the analysis, I used both approaches: "threshold" and "average".

Descriptive statistics at the first and second timepoints were also used for the data collected through the CAPL-2: overall motor competence assessment, CAMSA, PACER, and plank tests. Also, in this case, descriptive statistics are presented as mean and standard deviation for the overall group, for boys and girls.

[10] Average Counts per minute (CPM): "Counts" is a metric which records all movements from the accelerometer. When we consider the length of time that the accelerometer is worn, the "counts" are standardised into "counts per minute" (CPM).

Regarding the MPAM-R questionnaire, I first checked the internal reliability of the five subscales through Cronbach's alpha. Cronbach's alpha values were considered between good and excellent (Gliem and Gliem, 2003). I then performed descriptive statistics presented as mean and standard deviation for all the five subscales for the overall group, for boys and girls.

As these data were collected longitudinally, for all the different variables of physical activity levels, CAPL-2 and MPAM-R, I then conducted repeated measures ANOVAs analysis to compare the effect of time on these variables, the effect of time within the group of boys and girls between the two time periods, and also to compare the differences between the two genders on the same variables. For all these analyses, the level of significance was set at 0.05. For the ANOVA the effect size, a measure of the level of association between an effect and the variable of variance explained by the variable and not explained by other variables was considered as small=0.01; medium=0.06; and large=0.14. In reporting the values of the ANOVA analysis, I considered both the *p*-value to measure the statistical significance and the η^2 eta squared value to measure the effect size. As the sample of participants was small, the presentation of the effect size in the analysis was important because sample size does not affect the value of the effect sizes, while the *p*-values might be affected (Field, 2018). Lakens (2013) suggests that effect sizes should always be reported and he considers them as "the most important outcome of empirical studies" (2013, p.1). Ellis (2010) regards the reporting of effect sizes as fundamental in the interpretation of research results. Effect sizes present the amount of the specified effects in standardised metrics which can be read without considering the measurement adopted to determine the variable. Therefore, rather than only reporting the statistical significance, reporting effect sizes is a method for communicating the practical implications of the findings (Lakens, 2013). Reporting p-value and effect size values together give a better picture of changes in adolescents' physical activity behaviour over time.

I then performed correlation analysis to explore possible associations, strengths, and directions between the variables related to physical activity levels, CAPL-2 and MPAM-R. A Pearson product-moment correlation coefficient (r) was calculated to measure the relationships between the various variables: the average time students spent in light-intensity activity, MVPA, and inactive during the whole day and lunch break, the overall activity during the whole day and during lunch break, the level of the physical competence domain of physical literacy, and the motives for taking part in physical activities.

The two groups interviews and two intergenerational focus group sessions were digitally recorded, and the participants called their names only at the beginning of the session to help me to identify the participant speaking. I then anonymised the recording by deleting the first part with the names of the adolescents and sent the audio recording to a professional transcriber. The discussions were analysed adopting thematic analysis (Braun and Clarke, 2006 Braun *et al.*, 2016) to name and interpret patterns and themes. I followed the six-phase process of the thematic analysis, identifying the overarching themes and the subthemes. All the themes that emerged during the discussions are presented in the findings chapters.

3.8 Ethics principles, approval, and consent

This study followed the ethical guidelines of the British Educational Research Association (BERA, 2018) and was granted institutional approval from the University of Stirling School of Education Research Ethics Committee (Appendix 6). Once potential participants had been identified, I gave them all a booklet outlining more information on the data collection process and two consent forms, one for the adolescent and one for their parents/carers, to be both signed in (Appendix 5). Included with the booklet there was some detailed information about the accelerometers and physical literacy assessment. The adolescents that returned the consent form signed could take part in the assessment and wear the accelerometer for a week. At the beginning of every assessment, interview, and focus group session, the participants

were verbally reminded they could withdraw from the research process at any time without any explanation. They were also reminded that the information they gave during the group interviews and focus groups was treated anonymously. At the beginning and at the end of every session the participants were also asked for oral consent to use the information they provided in my final report.

The consent process included a commitment to removing any obvious identifiers in the data. All the data were stored in password-protected external hard drives. The data, audio files, and transcripts will be destroyed ten years after the date of data collection in 2028.

Because young people's behaviour change was at the centre of this research project, I placed a strong emphasis on the axiological question. Axiology considers "the nature of ethics and what we value" (Biddle and Schafft, 2015 p.321). The axiological question examines the type of knowledge which is "intrinsically valuable" (Heron, 1996 p.277). The participatory approach and the intergenerational dialogue adopted in this research study allow addressing the axiological question in terms of human flourishing (Heron, 1996). Human flourishing is valued as intrinsically worthwhile, it is a

> "process of social participation in which there is a mutually enabling balance, within and between people, of autonomy, co-operation and hierarchy… which enables people to be involved in the making of decisions, in every social context, which affect their flourishing in any way" (Heron, 1996, p. 11).

This research project adopts a participatory approach to find which factors can enhance or hinder play culture in secondary schools. It will also support the idea of horizontal society (Marzano and Urbinati, 2017) adopting the intergenerational dialogue approach (Mannion, 2012; Mannion *et al.*, 2015) for engaging and listening to adolescents as co-researchers and participants in decision-making about physical activity promotion in school. There is a growing awareness of the importance of consulting and including stakeholders, including the public, in health research and in the design and implementation of interventions aimed at increasing physical activity participation in schools (NICE,2013; PHE, 2020). When stakeholders and target groups are consulted and involved in the planning and implementation of interventions,

the knowledge, perspectives, experiences, and expertise of those potentially affected are valued. Furthermore, this research seeks to emphasise the involvement of adolescents in planning and realization of interventions and strategies to promote physical activity in secondary school can have onward effects on their confidence and self-esteem.

Chapter 4 Physical activity, physical literacy and active play

Introduction

The chapter is divided into two main sections. The first section presents the findings from the quantitative study which adopted a “research on adolescents” approach. This study explored adolescents’ physically active behaviour. In the second section, the findings from the quantitative study are integrated with the qualitative data collected adopting a research “with adolescents” approach. The qualitative study explored adolescents’ perceptions and experiences of active play during lunch break.

The findings and knowledge acquired from the separate and then integrated analysis allowed me to explore the first of the research questions.

Research question 1

When and how does active play in secondary schools support increased levels of physical activity and the promotion of physical literacy?

Structure of the chapter

Deciding how to present findings from data that were collected and analysed both separately and in an integrated manner itself brings a challenge. I have chosen to structure this chapter following the same separated and then integrated approach I adopted during the data collections stages and their analysis. Firstly, in the section “Physical activity levels, physical literacy, and motives for taking part in physical activities” I present the analyses and findings from the quantitative data which were collected separately from and before the qualitative data at both the first and second timepoints. This section presents the results of the analysis of the quantitative data related to early adolescents’ physical activity levels, their levels of motor competence, and their motives for taking part in physical activities, which are considered as the fundamental interconnected domains of physical literacy (Lloyd *et al.*, 2010). Then, I also

present the results of the correlation analysis to explore any possible associations, positive and negative, between these variables. These results provided a useful description of the early adolescents' physically active behaviour during the day and lunch breaks at the beginning and the end of their first academic year in secondary school. The longitudinal data collected in October and in May revealed the variations in adolescents' physical activity levels, motor competence and the motives for taking part in physical activity during their first year of secondary school.

In the second section "The role of lunch break active play activities on physical activity levels and the promotion of physical literacy", I shifted my research approach from "research on adolescents" to "research with adolescents". Here, I present the analysis of the adolescents' narratives on their lunch break experiences in their first year of secondary school integrated with the findings from the quantitative data. During the "research with adolescents" stage, I considered them as "the experts on life in the playground" (Blatchford and Sharp, 1994, p.4), that is, the experts of the events that take place during lunch break in secondary school. Their stories and perspectives provided a valuable source of information to facilitate understanding of the role of lunch break active play activities in encouraging adolescents in being more active and in enjoying physical activity. Adolescents' narratives and experiences from primary school memories and then as newcomers in secondary school also offered valuable insight into the differences between primary and secondary school lunch breaks. The knowledge and the findings which emerged from the continuous dialogical process (Freire, 2000 [1970]), the integration (Bazeley, 2018), and the synergy and the constant rapport (Hall and Howard, 2008) between the research "on adolescents" and the participatory research "with adolescents" approaches allowed me to explore and answer the first research question from diverse perspectives. As a result, the combined outcome should be greater than the separate results from either of the quantitative and qualitative approaches.

4.1 Physical activity levels, physical literacy, and motives for taking part in physical activities

Introduction

The first main section of this chapter is a study on adolescents' physically active behaviour during lunch break and the whole day. The knowledge gained from this investigation offers a useful picture of the participants' active behaviour which will be then integrated with the information gathered from the participatory approach and intergenerational study with the adolescents and adults presented in the second part of the chapter. The integrated analysis allows the study of the participants' active behaviour during lunch break to move the perspective from "what is" to "what might be" (Oliver and Kirk, 2015 p.3). Therefore the acquired knowledge produced by the interaction between the two different research approaches provides a better understanding of the complexity of adolescents' active play and physically active behaviour (Draper and Stratton, 2019), and it offers valid support for a co-creative approach of tailored opportunities for active play activities, which might encourage more students in being more active during lunch break.

This first section is divided into four subsections. In the first subsection, I present the analysis of the participants' physical activity levels. Data were collected using accelerometers which recorded participants' daily physical activity levels during a whole week. The data related to the lunch break period were isolated and analysed separately (see data analysis for details on the data extracted from the accelerometers).

The second subsection focuses on the results of the CAPL (Canadian Assessment of Physical Literacy) which assesses the participants' motor competence domain of physical literacy. The third subsection illustrates the results of the MPAM-R questionnaire (Motivation for Physical Activity Measure-Revised, Ryan *et al.*, 1997) on the different motives which affect participation in physical activities. The data from the accelerometers, CAPL, and MPAM-R were collected longitudinally at two timepoints (October and May) in the same week.

The fourth and last subsection presents the analysis of relationships between adolescents' physical activity levels, their level in the motor competence domain of physical literacy, and the motives for taking part in physical activities.

A summary of the analyses and findings that emerged are presented below.

Quantitative study finding 1 **The majority of boys and girls in their first year of secondary school were not sufficiently active during the day.**
Quantitative study finding 2 **Lunch break physical activity levels decreased between October and May for both boys and girls. Variance in physical activity levels showed that some adolescents were highly active and others were quite inactive. This was especially true in boys.**
Quantitative study finding 3 **During lunch break, girls were more sedentary than boys. However, both boys and girls increased their sedentary behaviour over time.**
Quantitative study finding 4 **Intrinsic motives, competence, and enjoyment showed a positive association with participation in physical activity in boys. For girls, extrinsic motive, social, facilitated participation in physical activity.**
Quantitative study finding 5 **In girls, enjoyment in taking part in physical activities was strongly positively associated with motor competence.**

Before the exploration of these analyses and findings, I restate the definitions of active play activities, physical activity, and physical literacy adopted in this study

In this study, I consider “active play” any voluntary, pleasurable, episodic, active (Fromberg and Bergen, 2006), engaging and fun activity (Eberle, 2014). Play is focused on the process rather than the ends (Wood, 2009) and it is characterised by a “continuation desire” (Brown, 2009, p.18). It is an approach to action (Bruner, 1977), related to a playful context rather than a particular activity. A playful context is an environment that supports the characteristics of any active play activity. It is a context where active play activities are played freely for the sake of it without any expectation of external outcomes, an environment enjoyable, fun, and inclusive. During lunch breaks, active play activities might be quite varied. They might be both sports and leisure-orientated activities, free or governed by rules.

For the purpose of this study, physical literacy is defined as “the motivation, confidence, physical competence, knowledge, and understanding, to value and take responsibility for engagement in physical activities for life.” (IPLA, 2017). Physical literacy is intended as a potential that everyone possesses at their own level and therefore everyone can achieve physical literacy.

In this study, I adopted Caspersen and co-workers’ definition of physical activity: “any bodily movement associated with muscular contraction that increases energy expenditure” (1985, p.126). This definition includes activities like play, leisure, recreation, and sport, as well as walking. Pellegrini (2005) suggests that all the physical activities performed during lunch breaks can be considered as active play activities. The above conceptualisation of active play during lunch break needs to be considered with respect to the aims of this study. The vast majority of physical activities that the adolescents perform at moderate and vigorous intensity were considered in this study as active play activities because they include the characteristics of playful activities. Regarding light-intensity physical activities, it is important to acknowledge some additional challenges. In Scotland in general, and in the case study school in particular, secondary school students are allowed to walk outside the school premises, and during my observations I noticed several students walking outside the school premises. As it was not possible to identify and remove these behaviours from the analysis of physical activity levels, I have included any activities performed at a light-intensity level as active play.

These results are not intended for drawing general inferences as the sample of adolescents participants who provided valid data was small. However, these results allowed me to understand adolescents' physically active behaviour during lunch break in the case study setting. The knowledge acquired was utilised in the intergenerational focus groups supporting adults and adolescents in creating together active play opportunities during lunch break. These opportunities are aimed at encouraging adolescents' participation and enjoyment in physical activities.

4.1.1 Adolescents' physical activity levels

Daily levels of light-intensity physical activity, MVPA, and sedentary time.

Given the focus of this study on early adolescents' active play and physically active behaviours during lunch break in secondary school I do not seek to investigate their daily active play and physically active behaviours. Yet, it is useful to present the students' daily physical activity levels to understand their general levels of physical activity and to look at the differences and associations between overall physical activity and their physical activity levels during lunch break.

TABLE 4 AVERAGE TIME SPENT SEDENTARY, IN MVPA AND LIGHT-INTENSITY PHYSICAL ACTIVITY DURING THE DAY, OVERALL AND BY GENDER.

	Overall		Boys		Girls		ANOVA Effects		
	1st tp. M ±SD	2nd tp. M ±SD	1st tp. M ±SD	2nd tp. M ±SD	1st tp. M ±SD	2nd tp. M ±SD	Time df(1,23)	Gender df(1,23)	Time x gender df(1,23)
Sedentary (hrs.)	7.98 ±1.17	8.31 ±1.61	8.05 ±1.55	7.94 ±1.90	8.07 ±0.75	8.79 ±1.03	F = 1.228 p = .279 η^2 = .051	F = 1.268 p = .272 η^2 = .052	F = 1.007 p = .326 η^2 = .042
MVPA (mins.)	54.05 ±14.33	58.94 ±28.55	55.16 ±14.26	64.50 ±33.65	52.63 ±15.00	51.87 ±19.63	F = .741 p = .398 η^2 = .031	F = .989 p = .330 η^2 = .041	F = 1.030 p = .321 η^2 = .043
LiPA (hrs.)	2.96 ±0.86	2.86 ±0.65	2.98 ± 0.97	2.85 ±0.63	2.92 ±0.75	2.87 ± 0.69	F = .281 p = .601 η^2 = .012	F = .004 p = .951 η^2 = .000	F = .058 p = .812 η^2 = .003
CPM	478.63 ±106.84	502.98 ±181.72	492.36 ±116.57	537.64 ±213.01	461.14 ±95.56	458.87 ±128.38	F = .408 p = .529 η^2 = .017	F = 1.222 p = .280 η^2 = .050	F = .498 p = .487 η^2 = .021
Valid numbers	25	25	14	14	11	11			

Notes: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; M = Mean; SD = Standard Deviation; (min.)= minutes; (hrs.)= hours; *df*(n,n) = degrees of freedom; *F* = *F*-value; *p* = *p*-value ; Statistically significant difference: p >0.05 non-significant, *p <0.05, **p<0.01, ***p<0.001; η^2p = effect size, Eta² proportion of variance explained by the variable not explained by other variables (0.01=small; 0.06=medium; 0.14=large); MPVA= moderate and vigorous physical activity; LiPA= light-intensity physical activity; CPM= counts per minutes.

The descriptive analyses of the accelerometers' data showed that during the day boys were more active than girls at both timepoints in the average CPM (Counts per minute) (see table 4). Boys spent more time than girls in MVPA (Moderate and Vigorous Physical activity) both in October and May, while girls spent more time than boys in light-intensity physical activity. However, when the time spent in light-intensity and MVPA are combined, boys were overall more active than girls at both timepoints. Over time boys and girls showed different patterns; boys increased both MVPA and CPM while they reduced time spent in light-intensity. On the other hand, the girls decreased time spent in light-intensity and MVPA and the CPM level.

Repeated measures ANOVAs were conducted to compare the effect of time on CPM levels, time spent in light-intensity and MVPA within the group of boys and girls between the two time periods, and also to compare the differences between the two genders on the same variables. The results showed no significant main effect for gender, or time or for the gender by time interaction for any of the three variables (CPM, light-intensity, and MVPA). The effects yield small effect sizes. These results suggest that, although boys increased their physical activity level between October and May and they were more active than girls at both timepoints, there was no statistical difference in daily activity levels between boys and girls and between the two timepoints.

Descriptive analysis of the time the participants spent inactive on average during the day, showed that girls were more sedentary than boys during the day at both timepoints. The repeated measures ANOVA showed that the difference was not significant. Although both groups increased their average daily sedentary time in the second timepoint, the effect for time was not significant with medium effect size, and the effect for the interaction of gender by time was not significant and produced a small effect size, suggesting that boys and girls follow the same pattern of change over time.

It is important to notice, however, the large standard deviation in all the variables considered, which denote the wide range of values. These results indicate that the physical activity behaviour of the participants was quite varied, with some of the participants showing high levels of physical activity and others very low levels. The difference in the scores was more

noticeable in particular amongst boys at the second timepoint. The two more active boys recorded 147 and 101 minutes of MVPA per day on average, while the two least active boys recorded 25 and 28 minutes of MVPA. The two more active girls recorded 88 and 84 minutes, while the two least active girls recorded 28 and 33 minutes.

Together these results suggest that, although there was an increase in time spent in MVPA and CPM levels in springtime in the boys' group, and a decrease in physical activity and CPM levels in the girls' group, there was no real difference between boys and girls over time, either when the whole group was considered or between boys and girls.

Time spent in MVPA during the overall day compared to the WHO and UK CMO guidelines

Research suggests that there is a decline in physical activity levels from mid-childhood into adolescence and adolescents in Scotland, as well as in the UK in general, do not meet the WHO and UK CMO guidelines for physical activity (Inchley *et al.*, 2020; McCrorie *et al.*, 2018).

As explained in the data analysis section in the methodology chapter, I adopted two different approaches to determine if the participants were either meeting or not meeting the physical activity recommendations. Firstly, I analysed the participants' daily physical activity levels calculating the percentage of the participants who met the threshold of 60 minutes of MVPA *every day*, which is the approach adopted by the current WHO (2010), the UK CMO physical activity guidelines at the time of the data collection (DH, 2011), and the latest Scottish Health Survey (Cheong *et al.*, 2020).

The second approach I used was the "average approach". During the course of the study, the CMO published new guidelines for physical activity (UK Gov., 2019). The new guidelines state that "children and young people should engage in moderate-to-vigorous intensity physical activity for an average of at least 60 minutes per day across the week" (UK Gov., 2019, p.9). I then also adopted this approach which averages the MVPA across the valid days of

accelerometer wear time. The participants with an average time of ≥ 60 mins/day across the week are considered to be meeting the guidelines.

For both analyses, I did not consider the time spent in MVPA as a binary variable (›60 minutes of MVPA =Active / ‹60 minutes of MVPA = Nonactive), but I adopted the approach of the Health Survey for England (HSCIC, 2017) with a third level of activity considered ("some activity": students spending 30 to 59 minutes of MVPA on all the seven days or at least 60 minutes of MVPA on three to six days). The reason behind this decision was to move away from binary oppositions to explore the complexities and multiplicities that characterise adolescents' physically active behaviour.

When the total daily MVPA on *each day* recorded was considered, only one boy and one girl in the first round (6% of the total number of participants) met the 2011 UK CMO guidelines (DH, 2011) (see table 5). However, this number doubled by the second round: two boys and two girls. Yet, although the number of boys and girls who met the more strict 60 minutes MVPA *every day* recommendations increased, only 4 out of 25 participants were considered active according to the 2011 UK CMO guidelines (DH, 2011) at the second timepoint.

The number of students who were in the "low activity" category was somewhat constant at the two timepoints, while some of the students who were in the "some activity" category became more active in the second timepoint.

TABLE 5 MEETING THE CMO GUIDELINES (DH, 2011) OVERALL AND BY GENDER, TOTAL MVPA PER DAY.

Levels of activity	Overall		Boys		Girls	
	1st tp.	2nd tp.	1st tp.	2nd tp.	1st tp.	2nd tp.
Meets guidelines	8% (n=2)	16% (n=4)	7% (n=1)	14.3% (n=2)	9.2% (n=1)	18.2% (n=2)
Some activity	44% (n=11)	32% (n=8)	43% (n=6)	35.7% (n=5)	45.4% (n=5)	27.3% (n=3)
Low activity	48% (n=12)	52% (n=13)	50% (n=7)	50% (n=7)	45.4% (n=5)	54.5% (n=6)
Some + Low activity	92% (n=23)	84% (n=21)	93% (n=13)	85.7% (n=12)	90.1% (n=10)	81.8% (n=9)
Valid numbers	25	25	14	14	11	11

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; Meets guidelines: 60 minutes or more in MVPA on all seven days considered – Some activity; Between 30 -59 minutes in MVPA on all seven days considered or at least 60 minutes of MVPA on three to six days – Low activity: Lower levels of MVPA

Adopting the average approach, at the first data collection point five boys and three girls met the recommendation while at the second data collection point the students who met the recommendation were 10 out of 25 participants, with two more boys and the same number (three) of girls (see table 6). The number of students who were in the “some activity” category fell at the second timepoint as the two boys became more active. However, while in the first timepoint none of the participants was in the “low activity” category, in the second timepoint two boys and one girl were active for less than 29 minutes of MVPA average per day.

In summary, these results produced the first finding of the quantitative study: **The majority of boys and girls in their first year of secondary school were not sufficiently active during the day.**

TABLE 6 MEETING THE CMO GUIDELINES (UK GOV, 2019) OVERALL AND BY GENDER, AVERAGE MVPA PER DAY

Levels of activity	Overall		Boys		Girls	
	1st tp.	2nd tp.	1st tp.	2nd tp.	1st tp.	2nd tp.
Meets guidelines	32% (n=8)	40% (n=10)	35.7% (n=5)	50% (n=7)	27.3% (n=3)	27.3% (n=3)
Some activity	68% (n=17)	48% (n=12)	64.3% (n=9)	35.7% (n=5)	72.7% (n=8)	63.6% (n=7)
Low activity	/	12% (n=3)	/	14.3% (n=2)	/	9.1% (n=1)
Valid numbers	25	25	14	14	11	11

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; Meets guidelines: 60 minutes or more in MVPA average per day – Some activity; Between 30 -59 minutes in MVPA average per day – Low activity: Less than 29 minutes in MVPA average per day

Levels of light-intensity physical activity, MVPA, and sedentary time during lunch break.

In order to analyse the time spent in sedentary, light-intensity physical activity, and MVPA during lunch break, the average time was adopted. When I collected the data for this project, the case study school had two break periods. The first one was 15 minutes long and the second one, lunch break, was 50 minutes long. For the purpose of this study, only the data from the lunch break period have been considered. I based my decision on inquiries with students and members of the school staff during the initial meetings where I introduced the study. It emerged that lunch break was the period when the students were more likely to go outside and be active. At the time of the first and second data collection points, the school had five lunch breaks per week.

It is important to acknowledge that some factors might have an impact on adolescents' physical activity levels during lunch break but they were not considered in the analysis. I did not consider the amount of time the adolescents spent queuing in the canteen and eating their

lunch. After a further explanation from the adolescents and some members of staff, it emerged that the length of time the adolescents spent on their lunch did not change between the first and the second time point. However, it is important to note that the participants during the interviews, which will be presented in the next chapter, judged the length of lunch break to be a barrier to participation in physical activities.

I have not considered the difference in physical activity levels between the adolescents who stayed on the school premises during lunch break and those who left the school premises. I did not use for ethical reasons, as I judged it to be intrusive, GPS (global position system) devices together with the accelerometers to observe where the participants spent their lunch break. In the case study school, students in their first year of secondary school are not allowed to go outside of the school premises during lunch break in the Autumn term. At the end of this term, the first year students can choose to stay inside or outside the school premises like all the other students. Both data collection periods took place after the Autumn term, so I considered the conditions as similar in the two timepoints. Furthermore, as I was interested in exploring adolescents' physical activity behaviour during lunch break, I considered in the analysis not only physical activities of moderate and vigorous intensity, for example running or playing a sports game, but also light-intensity activities, for example walking. Therefore, for the purpose of this study, I did not consider it important to explore the differences between students who stayed on the school premises and those who went outside during lunch break.

The descriptive analysis of the data collected through accelerometers showed that both boys and girls decreased their activity levels during lunch break between October and May (see table 7). Repeated measures ANOVAs were conducted to compare the effects of time and gender on CPM levels, time spent in light-intensity, and MVPA during lunch break. The results showed a significant main effect for time with CPM levels, light-intensity physical activity, and MVPA all decreasing over time. The effect sizes were large. There was also a significant main effect for gender for CPM and light-intensity physical activity with a large effect size with boys more active than girls. There was no main effect for gender on MVPA. Boys had higher CPM

and more light-intensity physical activity levels than girls. The gender by time interaction was not significant for any of the three variables considered.

Descriptive analyses showed that during lunch break girls spent on average more time in sedentary mode than boys, and that sedentary time increased between timepoint 1 and timepoint 2. Repeated measures ANOVA was conducted to compare the effects of gender, time, and the interaction gender by time on sedentary mode during lunch break. There were significant main effects for gender (girls > boys) and time (tp2 > tp1) on sedentary mode during lunch break. The effects produced large effect sizes. The gender by time interaction was not significant, meaning that boys and girls did not change differently over time.

Ridgers and Stratton (2005) suggest that children and adolescents should spend at least 40% of the lunch break in MVPA. At the first timepoint in the overall group, only four boys out of 25 participants were spending more than 40% of the lunch break time in MVPA. At the second timepoint, all the participants were below the 40% suggested time in MVPA. The analysis of the time the participants spent in MVPA showed that the boys spent 27% of their lunch break time in MVPA in the first timepoint and 21% in the second timepoint, and the girls 20% and 13% respectively. When light-intensity and MVPA were counted together, the percentage of time the participants spent being active during lunch break showed that boys were active for 68% of the time in October and 58% in May. Girls were active for 53% of lunch break time in October and less than half of lunch break time in May (38%).

The analysis showed a significant decrease in light-intensity physical activity, MVPA, and CPM at the second timepoint for both boys and girls but and consequently, a significant increase in time spent in sedentary mode. This increase was particularly evident in the girls' group, who spent around 60% of their lunch break inactive.

It is important to consider that during lunch break the physical activity behaviour of the participants was also quite diverse, as the large standard deviation in all the variables considered indicates. This result suggests that the two groups, boys and girls, were varied in their activity levels. For example, at the first timepoint, the two most active boys recorded over 20 minutes in MVPA (out of 50 minutes of lunch break) while the two least active boys recorded

five and just over one minute in MVPA. At the same timepoint, the two more active girls recorded 16 and 15 minutes in MVPA and the least active three minutes. At the second timepoint, the two more active boys recorded 18 and 14 minutes in MVPA while the least active four and two minutes. The two more active girls recorded nine minutes while the two least active scored one and two minutes. Therefore, amongst the boys and the girls, some of them were very active during lunch break and, on the contrary, some of them were quite inactive.

These results produced two main findings as reported in the quantitative data findings summary.

Lunch break physical activity levels decreased between October and May for both boys and girls. Variance in physical activity levels showed that some adolescents were highly active and others were quite inactive. This was especially true in boys.

During lunch break, girls were more sedentary than boys. However, both boys and girls increased their sedentary behaviour over time.

These results suggest that the student participants, who were more active in October at the beginning of their first year in secondary school, changed their physically active lunch break behaviour during the school year. As the results showed, girls halved their time spent in MVPA during lunch breaks at the second timepoint and significantly increased their sedentary time. The results also showed important differences in physical activity levels amongst the groups, in particular in boys. Some of the boys were quite inactive and others were highly active.

It is important then to understand the different barriers and facilitators to participation in active play that the groups experienced during lunch break in their first year in secondary school. They will be presented in chapter 5 "Co-creating active play opportunities during lunch break".

These results, together with the results of the daily levels of physical activity, indicate that adolescents' physical activity behaviour is a complex behaviour. Therefore, it is important to listen to their experiences to gain a deeper understanding of the different approaches to physical activity, exploring the reasons which influenced the significant drop in physical activity

levels between October and May. By understanding the barriers early adolescents encountered in the new environment, this study sought, in a contextualised manner, to support adults and adolescents in creating different opportunities to encourage more students in being more active together.

TABLE 7 AVERAGE TIME SPENT SEDENTARY AND IN MVPA AND LIGHT-INTENSITY PHYSICAL ACTIVITY DURING LUNCH BREAK OVERALL AND BY GENDER

	Overall		Boys		Girls		ANOVA Effects		
	1st tp. M ± SD	2nd tp. M ± SD	1st tp. M ± SD	2nd tp. M ± SD	1st tp. M ± SD	2nd tp. M ± SD	Time df(1,23)	Gender df(1,23)	Time x gender df(1,23)
Sedentary (minutes)	19.25 ±8.22 (38%)°	25.86 ±8.16*** (52%)°	16.12 ±8.36 (32%)°	21.83 ±7.09** (44%)°	23.27 ±6.42 (47%)°	30.99 ±6.56** (62%)°	F = 17.958 p = <.001*** η^2 = .438	F = 9.712 p = .005** η^2 = .297	F = .658 p = .426 η^2 = .028
MVPA (minutes)	12.05 ±6.55 (24%)°	8.94 ±4.39*** (18%)°	13.73 ±7.12 (27%)°	10.77 ±4.63 (21%)°	10.00 ±5.29 (20%)°	6.60 ±2.78 (13%)°	F = 25.795 p = <.001*** η^2 = .529	F = 4.109 p = .054 η^2 = .152	F = .042 p = .899 η^2 = .002
LiPA (minutes)	18.70 ±5.06 (38%)°	15.20 ±5.23*** (30%)°	20.15 ±5.97 (41%)°	17.31 ±5.45* (35%)°	16.73 ±2.75 (33%)°	12.41 ±2.92* (25%)°	F = 25.480 p = <.001*** η^2 = .526	F = 7.441 p = .012* η^2 = .244	F = 1.111 p = .303 η^2 = .046
Counts per minutes (CPM)	1256.51 ±537.76	928.10 ±490.53***	1411.66 ±567.28	1135.26 ±521.04*	1059.04 ±446.21	664.42 ±296.62*	F = 18.737 p = <.001*** η^2 = .529	F = 5.409 p = .029* η^2 = .190	F = .582 p = .453 η^2 = .025
Valid numbers	25	25	14	14	11	11			

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; M = Mean; SD = Standard Deviation; ° Percentage of average time spent at different levels compared to the 50 minutes length of breaktime; df(n,n) = degrees of freedom; *F* = *F*-value; *p* = *p*-value ; Statistically significant difference: p >0.05 non-significant, *p <0.05, **p<0.01, ***p<0.001; η^2p = effect size, Eta² proportion of variance explained by the variable not explained by other variables (0.01=small; 0.06=medium; 0.14=large); MPVA= moderate and vigorous physical activity; LiPA= light-intensity physical activity; CPM= counts per minutes.

Contribution of lunch break MVPA on daily MVPA

Results from this study found that the contribution of average lunch break MVPA to the average daily MVPA varied between the two timepoints. At the first timepoint, the volume of MVPA gained during lunch break contributed to 22% of the daily MVPA compared to only 15% at the second timepoint (Boys: 26% 1st: 17% 2nd - Girls: 19% 1st: 13% 2nd). When the students were divided into categories that indicate their level of daily physical activity ("Meet guidelines", "Some activity", and "Low activity", see table 8), the analysis displayed a particular image of students' physical activity behaviour. Lunch break MVPA contributed to the overall daily MVPA more in students who were not sufficiently active during the whole day than the ones who met the CMO daily recommendation. These results suggest that for adolescents, lunch break is an important opportunity for being active and in particular for students who do not have the possibility to take part in physical activities outside school. Therefore, during lunch break, it seems important to offer adolescents a wide range of opportunities for being active.

TABLE 8 CONTRIBUTION AVERAGE LUNCH BREAK MVPA TO AVERAGE DAILY MVPA

Levels of activity	Overall		Boys		Girls	
	1st tp.	2nd tp.	1st tp.	2nd tp.	1st tp.	2nd tp.
All the participants	22.3%	15.2%	26.3%	16.7%	19%	12.7%
Meets guidelines	21% (n=8)	12% (n=10)	27.5% (n=5)	14.5% (n=7)	10.4% (n=3)	5.3% (n=3)
Some activity	23.5% (n=17)	14.6% (n=12)	23 % (n=9)	16.2% (n=5)	24% (n=8)	13.5% (n=7)
Low activity	/	21.4% (n=3)	/	18.8% (n=2)	/	26.3% (n=1)
Valid numbers	25	25	14	14	11	11

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; Meets guidelines: 60 minutes or more in MVPA average per day – Some activity; Between 30 -59 minutes in MVPA average per day – Low activity: Less than 29 minutes in MVPA average per day

Adolescents' physical activity levels summary

The analysis of the daily physical activity data showed that the majority of the students involved in this study were not sufficiently active at both timepoints, either according to the more strict WHO (2011) guidelines related to the 60 minutes of MVPA *every day*, or the more flexible UK CMO (2019) approach of 60 minutes of MVPA *on average*. Although the overall group, and boys in particular, showed an increase in the time spent in MVPA between October and May, this difference was not statistically significant. However, the decrease in lunch break physical activity levels that both boys and girls recorded in the same period was significant. Girls also significantly increased the time spent sedentary during lunch break and a significant difference between boys and girls was found in the time being inactive during lunch break. The heterogeneity of the scores of daily and lunch break physical activity levels showed that some of the participants were quite active while others were quite inactive, in particular boys.

The analysis also showed that lunch break MVPA made an important contribution to the accumulation of the daily MVPA at the second timepoint for the students who were in the daily "low activity" category.

In the next two subsections, I will explore the results of the assessment of the physical competence domain of physical literacy and the forms of motivation, intrinsic or extrinsic, which drive the early adolescent participants in taking part in physical activities.

4.1.2 Levels of motor competence domain of physical literacy

The descriptive analysis of the assessment of the motor competence domain of physical literacy showed that both boys and girls improved their motor competence score at the second timepoint and at both timepoints girls had a higher score than boys (see table 9). However, the repeated measures ANOVA showed no statistically significant difference.

When the different tasks were analysed separately the pattern of change over time for boys and girls showed some differences. Both groups lowered their scores in the CAMSA obstacle course test, which measures fundamental movement skills, but the analysis of the difference for time, gender, and the interactions gender by time were not statistically significant with a negligible effect size.

The results showed an improvement for the boys in the PACER shuttle run test, which measures cardiorespiratory endurance, while the girls had similar scores in the first and second timepoints. However, the repeated measures ANOVA results showed that these differences were not significant.

The girls improved their score in the plank test, which measured the adolescents' muscular endurance, while the boys had similar scores in the first and second timepoint. The repeated measures ANOVA for the plank test score showed a significant main effect for time with a medium effect size. There was also a significant gender by time interaction, meaning that boys and girls did change differently over time in the plank test with girls demonstrating an improvement while boys stayed the same.

As mentioned previously, girls showed on average, higher physical competence in the overall CAPL assessment than boys in both the first and in the second timepoints. Between October and May, the girls' mean score moved up from the "progressing" to the "achieving" category, while the boys' mean score was at the top end of the "progressing"[11] category at both timepoints (see table 9)[12]. When the individual scores are ranked according to the four

[11] The Healthy Active Living and Obesity Research Group who developed the CAPL assessment linked the scores to one of four interpretive categories for physical literacy: beginning, progressing, achieving, excelling. After collecting data from over 10,000 children these interpretive categories were linked to a percentile range: beginning = ‹17th percentile; progressing = 17th to 65th percentiles; achieving = ›65th to 85th percentiles; excelling = ›85th percentile (see Appendix 1 for the message assigned to the four interpretive categories for physical literacy).

[12] The score ranges for the different categories are different for gender and age.

Girls of 12 years old: Beginning: ‹15.2; Progressing; between 15.2 to 20.7; Achieving; between 20.8 to 23.3; Excelling: ›23.3.

Boys of 12 years old: Beginning: ‹14.9; Progressing; between 14.9 to 21.6; Achieving; between 21.7 to 24.5; Excelling: ›24.5.

interpretive categories for physical literacy (beginning, progressing, achieving, excelling), it shows a similar pattern for boys and girls (see table 10). Both groups increased the number of participants who were “achieving” or “excelling” when these categories were combined. Both groups decreased the number in the “beginning” category.

TABLE 9 PHYSICAL LITERACY PHYSICAL COMPETENCE SCORE OVERALL AND BY GENDER

	Boys		Girls				ANOVA Effects		
	1st tp. M ± SD	2nd tp. M ± SD	1st tp. M ± SD	2nd tp. M ± SD	1st tp. M ± SD	2nd tp. M ± SD	Time df(1,24)	Gender df(1,24)	Time x gender df(1,24)
Physical competence score (out of 30)	21.05 ± 5.98	21.91 ± 4.88	20.47 ± 6.38	21.36 ± 5.11	21.97 ± 5.48	22.80 ± 4.59	F = 1.359 p = .255 η^2 = .054	F = .491 p = .490 η^2 = .020	F = .001 p = .974 η^2 = .000
CAMSA score (out of 28)	22.54 ± 3.93	21.73 ± 2.96	22.50 ± 3.46	22.00 ± 3.22	22.60 ± 4.79	21.30 ± 2.58	F = .913 p = .349 η^2 = .037	F = .078 p = .782 η^2 = .003	F = .180 p = .675 η^2 = .007
Plank test score (seconds)	78.04 ± 42.99	92.30 ± 50.92	72.56 ± 42.26	72.69 ± 34.05	86.80 ± 44.92	123.70 ± 59.08	F = 6.578 p = .017* η^2 = .215	F = 4.011 p = .057 η^2 = .143	F = 6.490 p = .018* η^2 = .213
PACER 20m. shuttle run score (out of 10)	7.11 ± 3.06	7.77 ± 2.08	6.87 ± 3.13	8.00 ± 2.13	7.50 ± 3.06	7.40 ± 2.07	F = 1.245 p = .276 η^2 = .049	F = .000 p = .990 η^2 = .000	F = 1.778 p = .195 η^2 = .069
Valid numbers	26	26	16	16	10	10			

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; M = Mean; SD = Standard Deviation; df(n,n) = degrees of freedom; *F* = *F*-value; *p* = *p*-value ; Statistically significant difference: p >0.05 non-significant, *p <0.05, **p<0.01, ***p<0.001; η^2p = effect size, Eta² proportion of variance explained by the variable (0.20=small; 0.50=medium; 0.80=large); CAMSA= Canadian Agility and Movement Skill Assessment; PACER= Progressive Aerobic Cardiovascular Endurance Run.

TABLE 10 PHYSICAL LITERACY PHYSICAL COMPETENCE SCORE ACCORDING TO HALO INTERPRETIVE CATEGORIES

Physical competence	Boys		Girls	
	1st tp.	2nd t tp.	1st tp.	2nd tp.
Beginning	18.8% (n=3)	12.5% (n=2)	20% (n=2)	10% (n=1)
Progressing	37.5% (n=6)	25% (n=4)	20% (n=2)	20% (n=2)
Achieving	6.3% (n=1)	37.5% (n=6)	10% (n=1)	20% (n=2)
Excelling	37.5% (n=6)	25% (n=4)	50% (n=5)	50% (n=5)
Valid numbers	16	16	10	10

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May.

The analysis of the results of the assessment for the motor competence domain of physical literacy indicated that there was no significant difference between boys and girls, and over time, in their motor competence scores. Yet, the previous section showed that both boys and girls significantly decreased their physical activity levels during lunch break. This suggests that, for the participants, the levels of actual motor competence assessed through the CAPL 2, were not related to the decline of their participation in active play and physical activities during lunch break. Therefore, there might be other factors that motivate adolescents in being more active during lunch break. The following section is related to the analysis of the motives for taking part in physical activity. In the last section, I explore the possible relationship between the students' physical competence, their motives for taking part in physical activities, and their lunch break and daily physical activity levels.

4.1.3 Motives for taking part in physical activities

The questionnaire assesses the strength of five different motives for taking part in physical activities. The questionnaire contains 23 items measuring reasons for participating in physical activity, rated on a seven-point Likert scale. The subscales of enjoyment and competence (related to intrinsic motivation) and appearance, fitness, and social (related to extrinsic motivation) were measured by calculating the average of the participants' scores on the items relating to each subscale. The five subscales had an internal reliability Cronbach's alpha of .961 and .931 for enjoyment in the first and second data collection point; .938 and .947 for competence; .965 and 9.21 for appearance; .907 and .889 for fitness; and .894 and .758 for social. All these Cronbach's alpha values are considered between good and excellent (Gliem and Gliem, 2003).

The descriptive analysis revealed that in the first and second data collection points, boys and girls considered competence, fitness, and enjoyment as important motives for taking part in physical activities, social was considered as somewhat important, and appearance as not important. (Table 11).

The analysis of differences showed statistically significant effect only for the interactions of gender over time for social motives, meaning that for boys and girls the importance of the social motives for taking part in physical activities changed differently over time: over time social motives were more important for boys but less important for girls. All the other analyses showed no significant effect.

The results showed that a complex interaction of intrinsic (competence and enjoyment) and extrinsic (fitness and social) drives are important motives for the early adolescents who participated in the study for taking part in active play and physical activities during lunch break. The results suggest that taking part in fun, enjoyable, inclusive, and challenging physical activities with their friends might encourage adolescents' participation. The participants also consider physical activities as important for keeping themselves fit and healthy.

In the previous sections, I presented the results of the analyses of adolescents' physical activity levels, level of the motor competence domain of physical literacy, and motives for taking part in physical activities. In the next section, I report the findings that emerged from the analysis of the association between these variables. In chapter 6 the quantitative findings integrated with the qualitative findings will be discussed more in detail, and in relation to previous studies.

TABLE 11 MPAM-R SUBSCALES DESCRIPTIVE RESULTS, OVERALL AND BY GENDER.

MPAM-R Scales	Overall		Boys		Girls		ANOVA Effects		
	1st tp. M ± SD	2nd tp. M ± SD	1st tp. M ± SD	2nd tp. M ± SD	1st tp. M ± SD	2nd tp. M ± SD	Time df(1,15)	Gender df(1,15)	Time x gender df(1,15)
Enjoyment	4.80 ±1.82	4.92 ± 1.77	5.03± 1.91	5.28 ± 1.20	4.63 ± 1.91	4.62 ± 2.20	F = .130 p = .727 η^2 = .014	F = .252 p = .628 η^2 = .027	F = .130 p = .727 η^2 = .014
Competence	4.96 ± 1.66	5.20 ± 1.99	5.18 ± 1.36	5.53 ± 1.80	4.81 ± 1.95	4.97 ± 2.24	F = .726 p = .419 η^2 = .083	F = .147 p = .712 η^2 = .018	F = .094 p = .767 η^2 = .012
Appearance	3.33 ± 1.40	3.32 ± 1.76	2.75 ± 1.75	2.75 ± .51	3.72 ± 1.10	3.69 ± 2.24	F = .001 p = .976 η^2 = .000	F = 1.105 p = .324 η^2 = .121	F = .001 p = .980 η^2 = .000
Fitness	4.94 ± 1.18	5.01 ± 1.69	5.00 ± .73	5.28 ± .91	4.90 ± 1.48	4.83 ± 2.13	F = .060 p = .813 η^2 = .007	F = .096 p = .765 η^2 = .012	F = .157 p = .702 η^2 = .019
Social	3.92 ± 1.51	4.04 ± 1.69	3.40 ± 1.75	4.30 ± 1.95	4.33 ± 1.32	3.84 ± 1.66	F = .486 p = .508 η^2 = .065	F = .048 p = .833 η^2 = .007	F = 5.584 p = .050* η^2 = .444
Valid numbers	17	17	8	8	9	9			

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; M = Mean; SD = Standard Deviation; n= valid numbers; df(n,n) = degrees of freedom; *F* = *F*-value; *p* = *p*-value ; Statistically significant difference: p >0.05 non-significant, *p <0.05, **p<0.01, ***p<0.001; η^2p = effect size, Eta² proportion of variance explained by the variable (0.20=small; 0.50=medium; 0.80=large).

4.1.4 Relationship between lunch break and daily MVPA and light-intensity physical activity, motor competence, and motives for taking part in physical activities

In this section, I present the results of the correlation analyses. These analyses explored the relationship between participants' physical activity levels, motor competence, and motives for taking part in physical activities. The findings that emerged provide a better understanding of the associations between different factors that might encourage participation in active play activities during lunch break.

Correlation analysis supports the exploration of possible associations, their strength, and directions, between the variables considered, but it will not establish cause and effect (Schober *et al.*, 2018).

A Pearson product-moment correlation coefficient (r) was calculated to measure the relationships between various variables: the average time students spent in light-intensity activity, MVPA, and inactive during the whole day and lunch break, the overall activity during the whole day and during lunch break, the level of the physical competence domain of physical literacy, and the motives for taking part in physical activities. The analysis examined if there was a linear relationship between the variables (i.e. a change in one variable was related to a proportional change in the other variable). In this section, I present in detail only the r values when the relationship is significant. The tables which summarise all the results are in appendix 7.

In this section, I report the relationships of MVPA and light-intensity physical activity with motor competence and motives, but not with the CPM. The analyses of the relationships between the different intensities of physical activity and the other variables provided a more detailed understanding of adolescents' physical activity behaviour than the CPM, which is a measure of all the movements recorded by the accelerometer.

Relationship between lunch break and daily physical activity levels and motor competence

Given the focus of this study was on adults and adolescents creating opportunities for active play activities during lunch break together, I explored the relationship between adolescents' daily and lunch break physical activity levels (MVPA and light-intensity). I also explored the associations between the levels and intensities of physical activity – both daily and during lunch break – and motor competence.

The results of the analysis of the data of all the students considered together showed a statistically significant moderate[13] positive correlation between average daily MVPA and lunch break MVPA at the second timepoint (r = .632, n = 25, p = .001) and a relationship between physical competence and average daily MVPA, at the first timepoint (r = .524, n = 23, p = .010). Light-intensity physical activity level showed no significant relationship with the other variables at either timepoint (see table A in appendix 7).

When boys and girls were analysed separately they presented different patterns (see table B in appendix 7). The boys showed a significant strong positive relationship between the time spent in MVPA during the whole day and during lunch break at the first data collection point (r = .703, n = 14, p = .005), and at the second (r = .854, n = 14, p = <.001). At the first timepoint they showed also a significant moderate positive correlation between lunch break and daily

[13] The correlation coefficient was interpreted using Schober *et al*.(2018) conventional approach:

Absolute magnitude of the observed correlation coefficient	Interpretation
0.00 – 0.09	Negligible correlation
0.10 – 0.39	Weak correlation
0.40 – 0.69	Moderate correlation
0.70- 0.89	Strong correlation
0.90 – 1.00	Very strong correlation

light-intensity physical activity (r = .578, n = 14, p = .031). The relationship between motor competence and the intensities of physical activity was not significant at both timepoints.

The girls showed a significant strong positive correlation between the physical competence level and the average time spent in MVPA during the day at the first timepoint (r = .710, n = 10, p = .022). At the second timepoint, in May, this correlation was moderate but non-significant. The girls, contrary to the boys, showed a negative non-significant relationship between the daily and lunch break MVPA at both timepoints.

Overall, the results suggest a strong, positive correlation between time spent in MVPA during the day and the time spent in MVPA during lunch break for boys. These results indicate that the boys who were more active during lunch break were also more active during the day.

The results showed that the girls with higher levels of motor competence were more active during the day but not during lunch break. There was no real relationship between lunch break activity levels and motor competence in the boys' group.

Relationship between lunch break and daily activity levels, and motives for taking part in physical activities

In this section, I present the analysis of the possible association between the five subscales of the MPAM-R questionnaire and the time spent in MVPA and light-intensity physical activity. Given the focus of this study on lunch break physical activity, I present first the relationship between the MPAM-R subscales and lunch break activity levels, and then a brief summary of the relationship with the daily activity levels and MVPA as a comparison.

The results showed that the associations between lunch break physical activity levels and the motives for taking part in physical activities changed during the school year for boys and girls. In general, in October, at the beginning of their school year, the relationships between the five motives (enjoyment, competence, fitness, appearance, and social) and lunch break MVPA and light-intensity at the first timepoint were statistically not significant (for MVPA: see table C and for light-intensity see table E in appendix 7).

In contrast, at the second timepoint, competence (r = .663, n = 17, p = .026), and social (r = .698, n = 17, p = .017), had a significant positive moderate relationship with lunch break MVPA. The relationships between enjoyment, fitness, and appearance were statistically not significant. All relationships between the five motives and lunch break light-intensity at the second timepoint were not statistically significant.

When boys and girls are analysed separately the results showed different patterns of relationships between lunch break MVPA and light-intensity physical activity with the five motives explored through the MPAM-R questionnaire. For the boys (for MVPA: see table D and for light-intensity see table F in appendix 7), at the first timepoint, enjoyment had a significant strong relationship with light-intensity (r = .719, n = 8, p = .029). Competence had a significant very strong relationship with lunch break MVPA (r = .994, n = 8, p = .006) at the second timepoint. All the other relationships were non-significant.

For the girls, at the second timepoint social motives showed a significant strong association with MVPA (r = .904, n = 9, p = .034). All the other motives showed no significant associations with MVPA and light-intensity physical activity.

The results of the analysis of the relationship between the five motives with daily MVPA and light-intensity showed a significant very strong association between appearance and light-intensity for boys at the second timepoint (r = .959, n = 8, p = .041). All the other relationships were non-significant (for MVPA: see table G; for light-intensity: see table I in appendix 7) and by gender (for MVPA: see table H; for light-intensity: see table J in appendix 7).

Overall, the analysis of the association between the motives for taking part in physical activities and lunch break physical activity – MVPA and light-intensity - showed that enjoyment and competence, for boys, and social motives, for girls, were associated with participation in physical activities during lunch break. These results produced the fourth finding of the quantitative study: **Intrinsic motives, competence, and enjoyment showed a positive association with participation in physical activity in boys. For girls, extrinsic motive, social, facilitated participation in physical activity.**

Taking these points into account, it is important to consider these motives and the difference between boys' and girls' motivation in taking part in physical activities when projects aimed at encouraging adolescents' participation in physical activities are implemented. These motives – enjoyment, competence, and social – for the participants should be the main characteristics of an environment which facilitates participation in active play and physical activities as it will emerge in the next section on the exploration, from adolescents' perspectives, of the factors that encourage active play participation during lunch break.

Relationship between overall motor competence domain of physical literacy, and motives for taking part in physical activities

One of the research questions in this study is related to the exploration of the possible links between active play, an intrinsically motivated activity (Ryan and Deci, 2017), and increased levels of physical activity and physical literacy. Therefore, I investigated empirically the theoretical links between intrinsic motivation with the level of the motor competence domain of physical literacy and increased levels of physical activity and physical literacy by exploring the association between these variables. Pearson product-moment correlation coefficient was adopted to measure the associations between the level of motor competence and motives for taking part in physical activities.

The results (see table L2 in appendix 7) showed that, for the girls, there were significant strong positive correlations between motor competence and enjoyment (intrinsic motivation), at both timepoints (Enjoyment: 1st timepoint r = .878, n = 9, p = .002; 2nd timepoint r = .784, n = 9, p = .037). There were also strong and very strong positive significant correlations between motor competence and both intrinsic (competence) and extrinsic (fitness and social) motives, statistically significant at the first timepoint. (Competence: r = .902, n = 9, p = .001 – Fitness: r = .957, n = 9, p = .000 – Social: r = .812, n = 9, p = .008)

Boys on the contrary, (see table L1 in appendix 7) showed negative correlations between motor competence and the five motives at the first timepoint. Appearance and fitness had a

significant strong correlation (Appearance r = -.879, n = 8, p = .004; Fitness r = -.745, n = 8, p = .034). All the other motives had negative correlations which ranged between negligible and moderate but not significant. At the second timepoint, all the motives had no significant correlation with motor competence. Enjoyment, competence, appearance, and fitness changed their correlation from negative to positive while social had still a negative association. All the associations ranged from negligible to moderate.

Overall, for girls, the results showed a strong positive correlation between their level of motor competence and enjoyment at either timepoint. Boys showed no real correlation between their level of motor competence and motives for taking part in physical activities. These results produced the fifth finding from the quantitative study: **In girls, enjoyment in taking part in physical activities was strongly positively associated with motor competence.**

This finding suggests that to encourage more girls to enjoy being active, programmes could focus on opportunities for increasing their motor competence. Active play activities have the potential to foster the development of motor skills (Johnstone, 2018). Furthermore, as emerged in the "Motives for taking part in physical activities" and in the "Relationship between lunch break and daily activity levels, and motives for taking part in physical activities" sections, taking part in fun, enjoyable, challenging physical activities with friends encourages participation in physical activities in girls and inactive boys. These are the characteristics of a playful environment.

4.1.5. Physical activity levels, motor competence, and motives for taking part in physical activities summary

The quantitative research design of this study which adopted a “research on adolescents” approach was aimed at gaining an understanding of adolescents’ physically active behaviour, and the motives which affect their participation in physical activity. Physical activity levels, the motor competence domain of physical literacy, and motives for taking part in physical activity were collected longitudinally at two timepoints, in October at the beginning of the school year and in May at the end of the same school year. The longitudinal design supported the exploration of the similarities and differences in students’ physically active behaviour during lunch break throughout their first year in secondary school. The findings from the quantitative study, which provided an understanding of participants’ physically active behaviour, informed and integrated with the qualitative study.

The adolescents’ levels of motor competence, a mixture of intrinsic and extrinsic motives, and differences between boys’ and girls’ involvement in physical activities during lunch break all play a role in affecting, positively or negatively, adolescents’ participation in physical activities. The daily and lunch break physical activity levels results were all characterised by heterogeneity of scores. These results suggest that amongst the boys and the girls some of them were quite active both daily and during lunch break while others were quite inactive.

In this summary, I offer only a brief outline of the findings that emerged from the analysis of physical activity levels, motor competence domain of physical literacy and motives for taking part in physical activities. I present here again the findings which were presented in the introduction of this section.

Quantitative study finding 1 **The majority of boys and girls in their first year of secondary school were not sufficiently active during the day.**
Quantitative study finding 2 **Lunch break physical activity levels decreased between October and May for both boys and girls. Variance in physical activity levels showed that some adolescents were highly active and others were quite inactive. This was especially true in boys.**
Quantitative study finding 3 **During lunch break, girls were more sedentary than boys. However, both boys and girls increased their sedentary behaviour over time.**
Quantitative study finding 4 **Intrinsic motives, competence, and enjoyment showed a positive association with participation in physical activity in boys. For girls, extrinsic motive, social, facilitated participation in physical activity.**
Quantitative study finding 5 **In girls, enjoyment in taking part in physical activities was strongly positively associated with motor competence.**

The first finding from the quantitative study is related to the adolescents' physical activity level during the whole day. The analyses of the data related to adolescents' daily physical activity levels showed that the majority of the adolescents involved in this study were not sufficiently active according to the CMO guidelines for physical activities (DH, 2011; UK Gov, 2019). Also at both timepoints, boys were more active than girls during the day and lunch break.

The results of the exploration of adolescents' physical activity levels during lunch break showed that both boys and girls significantly decreased their lunch break physical activity levels, both MVPA, and light-intensity, between the beginning of their first year in secondary school, in October, and the end of the same school year, in May. Consequently, the results showed a significant increase in the time the participants spent inactive during lunch break. For example, the boys moved from 32% in October to 44% in May of lunch break time as inactive, while the girls increased the percentage of lunch break time spent inactive from 47% in October to 62% in May. That means that boys were inactive for more than 20 minutes and the girls more than 30 minutes out of 50 minutes of their lunch break time.

These results might suggest that the initial experiences in the secondary school playground during lunch break had a negative impact on the majority of the adolescent participants' physically active behaviour. It is important then to explore, through adolescents' experiences, how the secondary school's social, cultural, and physical environments positively and negatively affected early adolescents' physically active behaviour during lunch break. The differences between primary and secondary school lunch breaks and their impact on physically active behaviour from the participants' perspectives will be explored in the next part "Adolescents' perspectives on active play during lunch break". The barriers to participation in active play activity the adolescents encountered during their first year in secondary school will be explored in Chapter 5 "Co-creating active play opportunities during lunch break".

The correlation analysis of daily and lunch break MVPA showed, for boys but not for girls, a strong positive correlation. This result indicates a physical activity version of the "Matthew effect" (Merton, 1968), where the boys who have more opportunities to be active outside school are also more active during lunch break. These results seem to indicate that for boys the opportunities to be active appeal to the ones who are generally active also out of school time. Therefore there is the need to create opportunities for the boys who normally are less active. For the girls, on the other hand, although the negative correlation between lunch break and daily MVPA could suggest that the girls who were not very active during the day were

more active during lunch break, the non-significant values do not allow the drawing of any inferences.

These results suggest that, although lunch breaks have the potential to increase adolescents' participation in physical activity this potential is underdeveloped. However, there is a paucity of research on the factors which may encourage the less active students in taking part in physical activities during lunch breaks in secondary schools. Some authors (Blatchford and Sharp, 1994) consider the adolescents as the experts of playground' activities during lunch break. Therefore, in the next chapter, these factors will be explored firstly with the adolescents and successively with some of the adult members of the school staff.

To my knowledge, this was the first time the CAPL2 assessment of the motor competence domain of physical literacy was adopted with 12 year old boys and girls in Scotland. The results of the participants were in line with the same age group from other countries (Longmuir *et al.*, 2015), although, in this study, girls had a higher score than boys. The correlation analysis between motor competence and lunch break physical activity levels showed no associations between these two variables. This result suggests that the objective level of motor competence is not related to participation in active play activities during lunch break. Yet, the results of the association between motor competence and the five intrinsic (enjoyment and competence) and extrinsic (appearance, fitness, and social) motives showed that for the girls, but not for boys, enjoyment, and motor competence were significantly correlated with a strong positive association. This significant result indicates that girls enjoy being active when they feel competent. Therefore, higher levels of motor competence might increase intrinsic motivation in girls.

The analysis of the MPAM-R questionnaire showed that for the adolescents a mix of intrinsic and extrinsic motives - enjoyment, competence, fitness, and social - encourage their participation in physical activity. The results suggest that for the girls, taking part in physical activities with their friends has the potential to facilitate increased participation in physical activities during lunch break, while for the boys challenging activities might encourage participation. However, the role and influence of these motives were different for boys and

girls. Competence and enjoyment, considered as intrinsic motives according to the self-determination theory (Ryan and Deci, 2017), had significant correlations with both MVPA and light-intensity physical activity during lunch break in boys. Social motive, an extrinsic motive (Ryan and Deci, 2017), was associated with higher levels of MVPA during lunch break. Boys who were more active than girls during lunch break and the day overall both in October and in May were more intrinsically motivated in taking part in physical activity than girls.

Intrinsic motivations have a positive association with physical activity (Owen *et al.*, 2014). Research suggests a possible link between the development of motor competence and active play (Johnstone, 2018). Active play activities provide an inclusive, fun, varied, and challenging environment where adolescents can try and develop a great range of motor skills while enjoying being active with their friends. Therefore a variety of opportunities for active play during lunch break has the potential to support the motor skills development of a large number of adolescents. The role of active play on increasing physical activity levels and encouraging physical literacy will be further explored in the section "Adolescents' perspectives on active play during lunch break". In the "Minority world" (Punch, 2000 p.60) where adolescents take part more in organised physical activities than in active play activities (Gray, 2011) lunch breaks are the only period in school time where the students can self-organise and freely choose active play activities with their friends (Baines and Blatchford, 2019). Yet, as the results of the lunch break physical activity levels indicate, the transition from primary school to secondary school might negatively affect adolescents' participation in physical activities during lunch breaks. The initial experiences in the secondary school playground, more sports-orientated, compared to the one in primary school, where diverse forms of active play are generally encouraged, might negatively affect the participation in active play activities of the less sporty adolescents.

In the second part of the chapter, the findings from the quantitative study will be integrated with the analysis of the adolescents' experiences of active play in primary and secondary school collected through the group interviews and from the intergenerational focus groups and observations of playground's activities during lunch break. In the next section, the importance

of involving and consulting adolescents in matters related to physical activity during lunch break became evident in the exploration of the effects of taking part in active play activities on physical activity levels and the promotion of physical literacy.

4.2 Adolescents' perspectives on active play during lunch break

Introduction

One of the objectives of this research project was to study the impact of participation in active play activities during lunch break on physical activity levels and the promotion of physical literacy levels on S1 students. The research question explored in this chapter was:

> Research question 1
>
> **When and how does active play in secondary school support increased levels of physical activity and the promotion of physical literacy?**

In this second part of the chapter, the data obtained through participant observation of lunch break activities for three days in May (using SOPLAY System for Observing Play and Leisure Activity in Youth, McKenzie *et al.*, 2000; 2006), and adolescents' experiences and perspectives gathered during group interviews and focus groups, together with the findings from the quantitative study, provided an understanding of the effect of active play on physical activity levels and the promotion of physical literacy. Although the quantitative data were collected from a small number of participants, the integration with the qualitative data gave more strength to the validity of the data collected and its importance with respect to the research questions. Furthermore, as the quantitative data was collected longitudinally, I was able to explore changes over time and then integrate this data with their experiences and perspectives collected during the group interviews. Therefore, the adoption of a mixed methods design provided a more complex and detailed nuanced picture of S1 students' physically active behaviour during lunch break.

The qualitative data, as mentioned in the "Methods" section in the methodology chapter, were collected during the two group interviews and the two intergenerational focus groups. During the group interviews and the intergenerational focus groups, I used open-ended questions to better explore early adolescents' active play experiences during lunch break and facilitate discussions also within the group. The questions were relevant for exploring participants' lunch break experiences in primary and secondary school, participants' ideas on play and enjoyment during physical activities, and the perceived difference in their lunch break physical activity levels between primary and secondary school.

The following starting questions were asked

"Please tell me about lunchtime break in primary school and secondary school?"
"Do you think that you were more active during lunchtime time break in primary school or now? And why?"
"Tell me about one time that you enjoyed doing any kind of physical activity. What kind of activity were you doing?"
"Could you tell me what is play for you?"

To understand the role of active play in supporting high levels of physical activity in adolescents and encouraging their physical literacy journey I draw upon Spinoza's concept of "*affectus*" which denotes the capacity of the body to increase, diminish, or maintain its "power of activity" (Spinoza, 1996 [1662], Part III Postulates I). Motivations, emotions, and feelings have an important effect on participation in play activities (Ogden *et al.*, 2006), play does not happen in an environment perceived as insecure or intimidating. Therefore, I considered it important to explore the way the complex social and physical environments of the school's playground intra-act with adolescents' motivations, emotions, and feelings to affect, positively

or negatively, their participation in active play activities during lunch break. Posthumanist studies recognise affect as an important factor in the production of the social world (Roelvink and Zonkos, 2015). A posthumanist approach allowed me to explore the emotions, motivations, and feelings affectively (Ahmed, 2004), to look at the effect they have on adolescents' participation in active play activities. However, posthumanism does not consider emotions, motivations, and feelings as necessary elements in the affective flows (Fox and Alldred, 2017). While, as Arnold argues, when we move the "whole body is affected by the state (we are) in" (1979, p.4). Therefore, motivations, emotions, and feelings are fundamentals in understanding the factors that might hinder or facilitate adolescents' participation in active play activities during lunch break. To approach the study in this way, I integrated posthumanist disposition with a psychological perspective drawing from self-determination theory (Ryan and Deci, 2017), and neurosciences (Damasio, 2003; Steinberg, 2014, 2016). I drew also from Gibson's affordance theory (1979) and Vygotsky's "zone of proximal development" (1978) to explore the role of active play in encouraging the promotion of physical literacy. I considered this theoretical set of resources adequate to the aim of understanding the role of active play on physical activity levels and in sustaining adolescents' in their physical literacy journey (see the "Theoretical framings for data collection and analysis" section in the Methodology chapter).

Next, we exemplify the approach taken to the analysis which leads us to the following findings.

Research question 1

Finding 1

The participants reported and showed high physical activity levels during lunch break when involved in active play activities. However, the current secondary school environment supports the participation in active play activities of only a minority of students.

Research question 1

Finding 2

The enjoyable, inclusive, and challenging nature of active play activities supports adolescents in their physical literacy journey.

As the next sections show, this finding emerged from the integration of adolescents' description of the perceived difference in activity levels between primary and secondary school, and the findings from the quantitative study. In the quantitative study, it emerged that they significantly decreased their lunch break physical activity levels between October, at the beginning of the school year, and May at the end of their first secondary school year. The rest of this section is structured in the following way. First, I address how early adolescents reasoned about active play and physical activity. Then, informed by early adolescents' experiences of active play activities I explore the role of active play in promoting physical literacy. At the end of the chapter, a summary presents the integrated findings related to the first research question.

Active play and physical activity

Two themes emerged from the analysis of the group interviews and focus groups related to participation in active play activities in secondary school: a) the role of significant others; b) variety of opportunities for active play. As these themes overlapped I presented them together to explain the findings and to consider their intra-actions (Barad, 2007) in affecting adolescents' active play participation. Different opportunities to take part in a variety of active play activities and the role of the significant others hindering or facilitating participation in active play activities will be further explored in Chapter 5 "Co-creating active play opportunities during lunch break".

Differences in participation in active play activities during lunch break emerged from the discussions in the group interviews and the intergenerational focus groups. The adolescents' perceptions of their lunch break participation in active play activities varied on a continuum from being more active in primary school to being more active in secondary school. These differences mirror the heterogeneity of the scores of lunch break physical activity levels,

presented in the quantitative study: some of the participants were very active while others were quite inactive. The integration of quantitative and qualitative data tends to support the idea of adolescents' physically active behaviour as complex behaviour (Draper and Stratton, 2019). The majority of the adolescents, both boys and girls, who took part in the group interview and focus groups sessions perceived themselves as more active in primary school than in secondary school.

> Teacher[14]: So do you think you were more active at lunchtime in primary school?
>
> Zoe[15]: Yeah, definitely.
>
> Maggie: Yeah.
>
> Teacher: That's interesting. Do you think there's any reason why you're less active? You know, and I don't mean just you three, I mean like generally, second years less active?
>
> Zoe: I don't know, I think it was just like in primary school there used to be big games of tag and everybody, just the whole school basically. But there's not that here. It's like just separate little groups.
>
> Second Intergenerational focus group[16] – 21/11/2018
>
> Al: I was more active in primary school cause we could really, really run about and play.
>
> First group interview – 24/05/18

[14] Teachers were present only in the intergenerational focus groups.

[15] As previously mentioned in the ethics section of the Methodology chapter, in the description of the adolescents' quotes, all the names reported are pseudonyms.

[16] In the intergenerational focus group 1 the participants were both boys and girls; in the intergenerational focus group 2 the participants were only girls, as well as the member of school staff.

James: At primary, there were a lot more games going on that involved a lot of people. Like sometimes half the school was playing one game… but now the only good game that's going on is football and I don't really like football.

Second group interview – 26/10/18

When the adolescents compared their primary and secondary school experiences in the playground the majority of them pointed out the limited number of activities and the small number of peers involved. Primary school playgrounds are usually full of students running around, involved in various active play activities with different materials and equipment at the top of their voices. Having spent their previous seven years in similar playgrounds, for some of the newcomers, the impact of the playground atmosphere in secondary school, quieter and with fewer students active, might look like a different world. For Zoe, Al, and James, lunch break in primary school was an enjoyable moment during the school day when a great number of students were involved in a variety of active play activities. From their experiences emerged the important role of feeling connected to others, relatedness, one of the main tenets of self-determination theory (Ryan and Deci,2017) in motivating adolescents in being active. The opportunity to be active with their friends and lots of other students in leisure-oriented active play activities, in a game of tag for example, were the factors that created positive experiences of being active in primary school. It is important to notice that, as it emerged from the analysis of MPAM-R questionnaires, social motives were important in motivating girls in being active. We could infer that the different social environments had a negative effect in particular on girls. Their lunch break physical activity levels showed a significant decrease between the beginning and the end of the first year in secondary school. Another factor, as James noted, that negatively affected adolescents' participation was the lack of alternative active play activities alongside football matches. Football matches are a common feature in primary as well as secondary school playgrounds (Baines and Blatchford, 2019), however, in secondary school, the lack of alternative active play activities did not encourage the adolescents who are less interested in competitive sports in being active.

Lucy: I think I was more active in primary because you do more activities. Like for me I do, I play tag a lot. But now in high school, like most of my friends like they do like, they like going outside but they don't like, like normally we stand by the basketball court, but we don't actually play basketball, we just stand there and chat.

Ally: Cause at primary school we always used to play, like, tag and catching the flag. Like, all around the school, and everyone used to do it. So, when we moved up, everyone was probably a bit shocked… they didn't know what to do now, because we used to play that, like, every day.

Pete: I feel like I'm more active at high school because we've got bigger astro[17] to play on. There's a basketball court. There's a lot more ways to play sports now.

Second group interview – 26/10/18

The different perspectives of Ally, Lucy, and Pete showed the effects of diverse ecosystems (Bronfenbrenner, 1979, 1994) on motivating adolescents in being physically active during lunch break. Ally's experience is also indicative of the intra-action (Barad, 2007) of "drives, motivations, emotions and feelings" (Damasio, 2003, p.8) and the environment in affecting adolescents' active play behaviour. Primary and secondary school are two ecosystems that consider active play activities during lunch break in different ways. In primary schools, as Ally noted, active play seems encouraged through informal activities such as running around, or traditional playground games (tag, chasing games, catch the flag) next to sports orientated activities (football).

[17] All-weather pitch

In secondary school, as it was evident from Pete's observations and experiences, (and James's quote further above), active play activities during lunch break seem more sports orientated. The adolescents involved in sports activities, football, and basketball, during lunch break, who were a minority in the group interview and focus groups sessions, perceived themselves as more active in secondary school. For them, the larger sports facilities in the secondary school's playground encouraged participation in active play.

Newcomers in secondary school adapt (Shelton, 2019) their active play behaviour to the new environment in the playground. Rodriguez-Navarro and co-workers (2014) found that newcomers in primary school took around six weeks to adapt and integrate into a new environment. The higher levels of lunch break physical activities recorded in October could be interpreted as an initial period of adaptation. The adolescents who were involved in sports-oriented active play activities (football for example) in primary school found a facilitating environment (Shelton, 2019) in secondary school with larger and better facilities which motivated them in being more active. On the contrary for adolescents who took part in alternative active play activities (tag, running around) with lots of other students in primary school, the environment in secondary school hindered their participation in active play activities. The decrease in physical activity levels recorded in May is in line with the results of a systematic review (Pearson *et al.*, 2017), which evidenced an increase in time spent inactive during lunch break in the transition primary-secondary school across several studies. We could reason that adolescents stop being active in secondary school because they find a social and material environment which does not facilitate a variety of active play activities.

Although there was a small number of active students in the playground, it is important to remember also that the study and the observations were focused on the outdoor activities inside the school premises. There was a significant number of students who spent lunchtime away from the school premises. I do not know if they also took part in active play activities outside the school playground, enjoying the freedom from adults' supervision as a form of resistance from adults' norms. Lastly, some other students stayed indoors where there were

two table tennis tables, yet the number of active students in the school grounds outdoor was a minority.

The image of the playground during lunch break that emerged from my personal observations in May and adolescents' narratives supports the findings from the analysis of lunch break physical activity levels. The analysis showed that, between October and May, lunch break physical activity levels decreased for the overall group. For the girls this decrease was significant.

The analysis of the lunch break physical activity levels showed that the more dynamic boys were active at any intensity for over 40 minutes (one of them for over 46 minutes out of 50 minutes) in the first timepoint. They decreased their physical activity levels to over 30 minutes in the second timepoint. The more active girls on average were active for around 35 minutes in the first timepoint and just over 20 minutes in May. On the contrary, just over 10 minutes of activity were recorded at both timepoints by the least active students. Therefore students who took part in active play activities spent the vast majority of their lunch break in light intensity and moderate and vigorous physical activity; however the active students were the minority in the school. These findings were supported by the evidence that emerged during the observations in the playground in May. During the three days of observations, on the basketball court and the all-weather pitch, at the beginning of lunch break, there were adolescent-initiated games of basketball (1 on 1, "knock out" shooting games[18]) and football ("heads and volley[19]). Then, when there were enough players for a match, there were long and intense matches of football and basketball played till the end of the break. In a school of more than 400 students, there were less than 30 students active. Furthermore, on the basketball court and the all-weather pitch, playing basketball and football, all the players were

[18] "One on one is a game when two players play against each other; Knockout shooting is a game played with two balls. The aim of the game is to make free throws in order to survive, while at the same time eliminating the other players (jr.NBA, 2020).

[19] Heads and volley is a game where one player crosses the ball and the other players attempt to score a goal with a header or volley. Only goals scored with a header or volley count. There are dozens of different variations of the game (FA, 2014).

boys. However, next to these areas, there were some examples of alternative play activities. In a willow hut, three girls were sitting socialising and, in turn, playing with a plastic bottle. The game consisted of flipping the bottle and get it upright. Also, around the basketball court, where S1 students were playing basketball, some boys and girls, of the same S1 age group, were watching the match and at the same time, chasing each other around the basketball court in an intermittent mode.

The first research question aimed at exploring **how does active play in secondary school support increased levels of physical activity and the promotion of physical literacy?**

The integration of adolescents' narratives, personal observations, and device-based measures of physical activity levels produced the first finding related to this research question: **The participants reported and showed high physical activity levels during lunch break when involved in active play activities. However, the current secondary school environment supports the participation in active play activities of only a minority of students.**

Active play activities can positively affect adolescents' physical activity levels, and lunch breaks are an ideal moment for encouraging adolescents from any social, economic and ethnic background in enjoying being active (Baines and Blatchford, 2019). The importance of adopting a mixed methods design in exploring the complexity of adolescents' physically active behaviour was evident when the qualitative and quantitative data were combined together validating each other. In this study, the integration of qualitative and quantitative data, in the mixed methods design, built a more complete picture of how active play impacts on adolescents' physical activity levels. The qualitative data collected in the interviews showed that the participants reported higher levels of physical activity in primary school, where more peers were involved, and more opportunities for active play activities were available. This result was in line with the results of quantitative data obtained through the device-based measures of physical activity levels that showed that the students, who were active during lunch break had high levels of moderate and vigorous physical activity. However, active students in secondary school during lunch break were only a minority. Device measures

showed differences in participants physical activity behaviour over time and the qualitative data added depth and perspective to these findings through participants explanations of their own behaviour. Although a small number of young people was involved in the study, the quantitative data gave a picture of physical activity levels in early adolescents that could be further explored. Also because the quantitative data were a measure of physical activity in general (at different intensities) and not specifically a measure of active play, the qualitative data added important information. They provided a stepping stone into discussions around participants' physical activity behaviour and active play more specifically.

Active play and physical literacy

From adolescents' perspectives, emotions connected with active play have an important role in supporting adolescents' in their physical literacy journey. Two themes emerged from their narrative about experiences of active play: active play activities should be a) fun, and b) challenging.

The emotion that adolescents linked with experiences of active play activities was fun. Some adolescents considered the environment in primary schools in general, more enjoyable than in secondary school, and the behaviour and activities in the playground remarked this difference.

> James: I just miss everything about primary cause we did it so differently. And I feel like now that we're in secondary like it is good here but like you don't have as much fun.
>
> Second group interview – 26/10/18

From participants' perspectives, it emerged that fun was one of the fundamental characteristics of play as well as an important facilitator to participation. This finding is in line with a systematic review of barriers and facilitators of adolescents' physical activity (Martins

et al., 2015). Martins and co-workers found that fun was the most cited factor which facilitates participation. Fun and taking part in active play with friends will emerge again as factors that facilitate participation in active play activities in the next chapter in the section "Social and cultural environments facilitators". Fun can be defined as the "active involvement in an activity which the individual is doing" (Podilchak, 1991, p. 140) together with others. In this definition emerges the complex active participation of the adolescents' cognitive, physical, social, and emotional capacities.

For example, when I asked them to tell me what they think play is, the majority of the participants considered the internal and emotional aspects of a playful environment more important than the activity in itself.

> Andy: Really any activity, any activity… if people enjoy sports then it doesn't matter what sport it is, as long as you enjoy it.
>
> Zoe: Like, you would, like, you are constantly doing it because, like, you think it's fun.
>
> Pete: It's like when you play football, you don't want the bell to ring at lunchtime cause you're having so much fun playing it.
>
> Paul: I think it's anything you could consider fun could be play. Seeing as you're having fun and enjoying it.
>
> Ally: Competitive but fun.
>
> Second group interview – 3/10/2018

From the participants' quotes fun emerged as the main feature of any play activity. Pete's quote highlights the importance of active play in supporting high levels of physical activity during lunch break. Pete recorded an average of 46 minutes of physical activity during the 50 minutes of lunch break. The enjoyment of playing football was a factor that motivates him in

participating in physical activities during lunch break. From Ally's quote emerge the intra-action (Barad, 2007) between fun and competition. Active play activities include both enjoyment and competition in a fine balance. For the majority of the participants, active play activities may be fun without being competitive, but without fun, they become something else.

Through different active play activities, adolescents can broaden their movement vocabulary, which is "the movement version of the content of a dictionary for speakers" (Maude, 2010, p.106). The movement vocabulary contains all the different movements that are possible. From their suggestions emerged the role of active play in fostering the other two main tenets of self-determination theory, the sense of autonomy and competence (Ryan and Deci, 2017), which are positively associated with adolescents' participation in physical activities (Owen *et al.*, 2014).

For example, in both intergenerational focus groups, an obstacle course was the physical feature the majority of the participants considered as a facilitator to participation in physical activities. According to their experiences, such a feature in a secondary school playground might encourage more students in being active.

> Andy: I would say, like, an inflatable obstacle course, a massive inflatable obstacle course. When we got the obstacle course at our school it was in primary seven, and then the whole school was literally on it at once. Like, there was no free spaces at all on the obstacle course, so I would think it would be a good idea because, like, loads of people would want to do it.
>
> First intergenerational focus group – 21/11/2018

The obstacle course might be considered as a semi-structured play activity which facilitates different forms of play. I suggest it supports both the sense of autonomy and competence in adolescents. A feature like an obstacle course combines challenge and enjoyment. It might promote the "zone of proximal development" (Vygotsky, 1978). That is the zone between the

“actual development level” (where a child can perform a skill independently and with competence), and the “potential development level” (the limit to which their abilities can be stretched with the assistance of a more competent peer or adult, but not beyond the capabilities and understanding of the child). Although Vygotsky’s theory is often related to pre-schoolers, his theory could be considered appropriate for supporting the development of motor competence in adolescents. Previous studies (Haug *et al.*, 2008) do suggest that outdoor obstacle courses increase physical activity levels in secondary school students. Through experiences in the obstacle course, the participants improve their capacity to read the affordances (Gibson, 1979) of the environment. However, as the case study school demonstrated, there is no need to build an obstacle course when you can “make” one in the school playground. The school, a few weeks before the intergenerational focus groups, had just started a parkour club.

> Teacher: I like the fact that the parkour club has started, have you tried the parkour club on a Monday… are there quite a lot of people doing it?
>
> Maggie: Yeah there's quite a lot. It’s really good cause if you can do something then like good then you can do it so you can do hard stuff, but you can also do easy stuff, I think, as well.
>
> Zoe: That’s right aha. Yeah it’s really good fun.
>
> Second intergenerational focus group – 21/11/18

Parkour is a playful, and informal mode of intra-acting (Barad, 2007) with the environment, not focused on competition against others, which is popular amongst adolescents (Pyyry and Tani, 2017; Saville, 2008). The traceur, parkour practitioner, actively reads the affordances of the environment and intra-act (Barad, 2007) with them as they became part of her/his movement (Pyyry and Tani, 2017; Saville, 2008). However, parkour can be perceived by adults as a dangerous activity. This opinion is mostly influenced by “extreme” videos which circulate on

social media (McLean *et al.*, 2006), yet an informed approach shows that the danger is not in the activity in itself but the individual behaviour (Fernández Gavira *et al.*, 2018). Schools then, seem an optimal place to put in place preventative strategies to manage risks and improve safety knowledge (for example teaching techniques in a safe and controlled setting such as a school playground). Furthermore, it is an inclusive activity tailored to the skills and abilities of the participants (Saville, 2008). Through the intra-action (Barad, 2007) with the environment, adolescents are affected and affect their environment. The intra-action (Barad, 2007) produces movements that are coordinated, controlled, intelligent, emphatic, creative, and appropriate for the individual in different conditions (De Rossi, 2020). Those are also the attributes of a physically literate individual.

From the adolescents' perspectives emerged the second finding related to the first research question: **The enjoyable, inclusive and challenging nature of active play activities appears to support adolescents in their physical literacy journey.** Active play for its nature supports the three main tenets of the self-determination theory (Ryan and Deci, 2017): autonomy, competence and relatedness. They have been found to support participation in physical activities (Owen, *et al.*, 2014; Teixeira, *et al.*, 2012). Furthermore, for adolescents, play is linked with fun and enjoyment. Fun and enjoyment are considered by adolescents as facilitators to participation in physical activities (Martins *et al.*, 2015). Active play activities can also positively affect the development of motor competence (Ginsburg *et al.*, 2007; Johnstone, 2017, 2018) and the application of motor skills in a different environment. Motivation, physical competence and interaction with the environment are the main attributes of a physically literate individual (Whitehead, 2010). From the adolescents' perspectives, the perceived environment is more important than the activities. Therefore, the adolescents' narratives of their active play experiences in primary school, and the perspectives of the highly active adolescents in the case study school, indicate that a playful environment, enjoyable, inclusive and challenging, can support both increased levels of physical activity and the promotion of physical literacy in adolescents.

4.3 Physical activity, physical literacy and active play summary

In this chapter, we have seen the nature of the complex and continuously changing relationship between the different social and physical environments of primary and secondary school playgrounds and adolescents' emotions, feelings and motivations. The relationship, which develops through the adolescents' positive and negative experiences affect, both positively and negatively, their active play behaviour during lunch break.

In this chapter, I sought to answer the first research question

Research question 1

When and how does active play in secondary school support increased levels of physical activity and the promotion of physical literacy?

Two main findings emerged from the integrated analysis of lunch break physical activity levels, assessment of motor competence, motives for taking part in physical activities, playground observation during lunch breaks, group interviews and intergenerational focus groups.

Research question 1

Finding 1

The participants reported and showed high physical activity levels during lunch break when involved in active play activities. However, the current secondary school environment supports the participation in active play activities of only a minority of students.

Research question 1

Finding 2

The enjoyable, inclusive and challenging nature of active play activities supports adolescents in their physical literacy journey.

The findings that emerged from the integrated analysis of the quantitative and qualitative data indicate that the transition from primary to secondary school had a negative effect on active play participation and physical activity levels in the majority of the participants. They significantly decreased their activity levels between the beginning and the end of their first year in secondary school. At the beginning of the school year, the young students' active play activities were similar to the ones they organised in primary school. Then, during their first year in secondary school, their active play behaviour changed and their inactivity levels raised. Only a minority of S1 students, and almost exclusively boys, were active during lunch break.

From their experiences and narratives, two main differences between the primary and secondary school social and cultural, and physical and material environments were identified. These differences which negatively affected the majority of the participants were related to the role of peers and the opportunities for active play activities.

During the interviews, it emerged that their first impression of the secondary school playground during lunch break hindered their participation in active play activities. The transition from the primary school playground during lunch break where the majority of students are active in a variety of active play activities to the secondary school playground where few students are active, the vast majority of the boys, in few sport-oriented activities negatively affected the majority of the participants, girls in particular. It emerged that an inclusive environment where the adolescents can experience the feeling of staying connected with others, relatedness according to self-determination theory (Ryan and Deci, 2017), supports participation in active play activities.

However, active play activities during lunch break can support high levels of physical activity and they can offer an important contribution to daily physical activity. The students who were active during lunch break recorded high levels of physical activity and they were active for more than 40 minutes out of the 50 minutes duration of lunch break at the first timepoint but not at the second. Yet, in secondary school, these students are a minority. From adolescents' comparison of lunch break activities in primary and secondary school, emerged the complexity of adolescents' active play behaviour. Therefore, it is important firstly to explore and address, listening to the students' perspectives, the barriers to participation that the adolescents encountered in their early experiences in secondary school. And secondly, there is a need to consult and involve them together with significant adults in co-creating a social, cultural, physical and material environment which encourages a variety of active play opportunities; a playful environment aimed at encouraging more students to enjoy physical activity and be more active, for students who are missing the opportunity to be more active in one of the few daily moments where they are with their friends in charge of the activity. The barriers and facilitators to participation in active play activity will be explored in the next chapter "Co-creating active play opportunities during lunch break".

In the next chapter, initially I further explore the barriers to participation in active play activities the adolescents experienced in their first year in secondary school. Then I present the factors which might facilitate participation in active play activity that emerged during the group interviews, and especially during the intergenerational focus groups. In these sessions, I also used the findings from the quantitative study and the integrated findings related to the first research question as prompts to stimulate a collaborative process of creation of active play opportunities aimed at encouraging more students in being active during lunch break.

Chapter 5 Co-creating active play opportunities during lunch break

Introduction

In the previous chapter, I initially presented the results of the quantitative study "on" adolescents' physical activity behaviour during lunch break, and during the whole day. Adopting a research "on adolescents" approach, the quantitative study allowed me to gain an understanding of "what is" participants' physical activity behaviour during lunch break and the overall day. Furthermore, the quantitative study adopted a longitudinal design with the data collected in October and in May, at the beginning and the end of their first year in secondary school. The longitudinal design allowed me to investigate the differences in their physically active behaviour during lunch break and daily over the course of the school year through the analysis of the quantitative data of the participants' daily and lunch break physical activity levels, the motor competence domain of physical literacy and the motives for taking part in physical activities and the correlations amongst these variables. The analyses of the quantitative data generate several findings.

Quantitative study finding 1
The majority of boys and girls in their first year of secondary school were not sufficiently active during the day.
Quantitative study finding 2
Lunch break physical activity levels decreased between October and May for both boys and girls. Variance in physical activity levels showed that some adolescents were highly active and others were quite inactive. This was especially true in boys.

Quantitative study finding 3
During lunch break, girls were more sedentary than boys. However, both boys and girls increased their sedentary behaviour over time.
Quantitative study finding 4
Intrinsic motives, competence, and enjoyment showed a positive association with participation in physical activity in boys. For girls, extrinsic motive, social, facilitated participation in physical activity.
Quantitative study finding 5
In girls, enjoyment in taking part in physical activities was strongly positively associated with motor competence.

The results in the quantitative study showed that the secondary school context negatively affected adolescents' physical activity behaviour. During lunch break, boys and girls significantly decreased their physical activity levels by May. On the other hand, in the same period boys increased their overall daily physical activity levels evidencing the important role the context has on physical activity behaviour. The variation of the values of physical activity during lunch break and the whole day also showed the significance of acknowledging the complexity of adolescents' physical activity behaviour (Armstrong, 2019; Armstrong and Welsman, 2002; Draper and Stratton, 2019; Ridgers *et al.*, 2012; Sallis *et al.*, 2000). It is therefore important to recognise the value of considering adolescents as individuals with different interests and motivations. These considerations posed useful framings for exploring the first research question.

Research question 1

When and how does active play in secondary school support increased levels of physical activity and the promotion of physical literacy?

To answer this research question I integrated the findings from the research “on adolescents” with the analysis of the qualitative study. This study adopted a participatory research “with adolescents” approach. The integration of these two research approaches allowed me to explore the role of active play in enhancing physical activity levels and supporting adolescents in their physical literacy journey.

The integration of the two research approaches produced two main findings.

Research question 1

Finding 1

The participants reported and showed high physical activity levels during lunch break when involved in active play activities. However, the current secondary school environment supports the participation in active play activities of only a minority of students.

Research question 1

Finding 2

The enjoyable, inclusive and challenging nature of active play activities supports adolescents in their physical literacy journey.

The integrated analysis of the participants' lunch break physical activity levels with their recollection of lunch break experiences in primary and secondary school highlight the role of different contexts and interests in affecting adolescents' active play behaviour. For a small number of participants, the transition from primary to secondary school had a positive effect on their participation in active play activities during lunch break. On the other hand, for the majority of the participants, the transition had a negative effect. Therefore, I considered it important to engage the adolescents firstly in a critical examination of the barriers to participation they experienced in their first year of secondary school. Then secondly, to facilitate their involvement in propositional dialogue together with the significant adults, for creating an environment which promotes wider participation in active play activities during lunch break.

In this chapter, I first present the integrated findings related to the second research question.

Research question 2

Which factors can support or hinder the enhancement of active play opportunities for younger adolescents of secondary school age in the UK?

To answer this second research question, I integrated the findings that emerged from the previous chapter with the analysis from the qualitative data related to the barriers and facilitators to participation in active play which emerged during group interviews and focus groups. Next, as we will see in the reported integrated analysis, some barriers to participation related to social, cultural, and material environments became apparent.

Research question 2

Finding 1

Early adolescents' active play behaviour during lunch break was negatively affected by the intra-actions of:

social and cultural factors, in particular pressure from older students, gender inequality, lack of peer support, and self-confidence;

and material factors which offered limited opportunities for active play activities.

A number of factors which might facilitate enhanced participation in active play during lunch break emerged during the intergenerational focus groups. Adolescents and adults engaged in dialogic collaboration suggested that a multi-level approach for creating together meaningful and tailored active play activities is needed. This multi-level approach should consider the social, cultural, physical, and material environments to increase participation in physical activities.

Research question 2

Finding 2

Together the adolescent and adult participants identified key factors which can facilitate enhanced participation in active play activities during lunch break. These were:

social and cultural factors, in particular competence, enjoyment and being with friends;

material factors, various opportunities, and diverse equipment available for self-organised, informal and recreational active play activities.

In the second part of the chapter, I look into the perspectives of the adolescents and adults involved in a model of co-creation of opportunities for active play, together with my personal evaluation to explore the third research question.

Research question 3

What are the characteristics of effective models of co-creation of play provisions? How can these be utilised in schools settings?

As we will see in the following analysis, the participants' (adolescents, adults, alongside my own reflections) personal evaluations produced some interesting findings in relation to the characteristics of an effective model of co-creation of opportunities for active play in secondary school.

Research question 3

Finding 1

This research demonstrates that a viable model for the co-creation of active play in schools will:

involve stages where the young act as co-researchers with their peers;

involve times when young people act collaboratively with significant adults to make changes in culture and practice; **be based on dialogue, equal relationships, respect, understanding, and shared interests.**
Research question 3 Finding 2 **In relation to supporting play in secondary school settings, intergenerational dialogue inclusive of young people needs to consider important differences between early adolescent and older adolescent sub-groups.**

Structure of the chapter

This chapter is divided into two main parts. In the first part, "Exploring the factors that affect adolescents' participation in active play activities during lunch break" I present the barriers and the facilitators to participation in active play activity the adolescents experienced.

In the second part of the chapter, "Dialogic approach for co-creation", I will look into the participants' experiences to explore the characteristics of an effective model of co-creation which might be utilised in educational settings.

5.1 Exploring the factors that affect adolescents' participation in active play activities during lunch break

This research project, as stated previously, is a mixed method study which employs a synergistic approach (Hall and Howard, 2008), which supports the synergic process and the integration of the quantitative and qualitative studies I used in this project. The synergistic approach allowed me to explore the research questions from diverse perspectives to gain an

understanding of the complex intra-actions (Barad, 2007) that characterise adolescents' physically active behaviour. In line with the synergistic approach, I present the analysis of the data collected through group interviews, intergenerational focus groups, and the observations of playground activities during lunch, integrated with the findings from the quantitative data. The dialogue (Freire, 2000 [1970]) between the different approaches allowed me to explore the complexity of adolescents' physically active behaviour (Draper and Stratton, 2019), in particular, given the focus of this study, during lunch break.

I considered the secondary school playground as an ecosystem (Shelton, 2019), where an affective entanglement of relations (Barad, 2007) influenced, positively and negatively, early adolescents active play participation during lunch break. To approach the study in this way I drew from socioecological models (Sallis and Owen, 2015; Shelton, 2019), affect theory (Ahmed, 2004), and self-determination theory (Ryan and Deci, 2017). The adoption of this theoretical set of resources allowed me to identify, analyse and explore the barriers and facilitators to participation in active play activities perceived by the adolescents. Drawing on new materialism I was able to explore the affective economies (Ahmed 2004) of the dynamic and entangled relations (Barad, 2007; Deleuze and Guattari, 1988) that influence adolescents' opportunities of active play "in ways that are corporeal and social at once (shame, joy, pleasure and pain)" (Fullagar and Pavlidis, 2018, p.447). I adopted a socioecological model drawing from health and social sciences (Bronfenbrenner, 1979, 1994; Sallis *et al.*, 2006; Shelton, 2019) as a framework to understand the interplay between the different factors, which emerged from adolescents' experiences and perspectives, that positively and negatively are affected by and affect adolescents' active play behaviour. The factors which affected their physical activity and active play behaviour during lunch break, assembled under the socioecological model categories were:

a) intrapersonal environments, such as gender, self-confidence, and perceived skills level.

b) interpersonal or social and cultural environments, such as gendered school culture, sports-orientated school culture, adults, peers' and older students' influence.

c) physical, material and natural environments, such as playgrounds areas, sports grounds, equipment, green spaces, range of opportunities during lunch break and weather.

d) school curriculum and policy environments such as the number of lunch breaks during the week, and their duration (see Figure 1. A socio-ecological model for active play opportunities during lunch break, adapted from Sallis *et al.* 2006).

I also adopted self-determination theory (Ryan and Deci, 2017) to explore the ways the adolescents' perceived barriers and facilitators to participation affect the satisfaction of relatedness, autonomy and competence; the three basic needs that predicts self-determined motivation.

It is worth remembering that the participants in the study were the youngest students in secondary school and the majority of the participants selected for the group interviews and focus groups discussion were amongst those with low physical activity levels recorded during lunch break. Thus, the results that emerged are not for generalisation. However, some of the barriers to participation the adolescents experienced, which affected their decline in physical activity levels between October and May, are, we can expect, common to other students in the case study school who did not participate in the study and, in the general population in secondary schools.

Although in this first part of the chapter, barriers and facilitators are presented in separate sections, during the discussions barriers and possible facilitators were often linked together. On several occasions, the adolescents illustrated the barriers that affected their active behaviour during lunch break and then they critically described possible solutions that might facilitate their participation. However, the discussions in the group interviews were predominantly focused on exploring the factors that negatively affected participation in active play and physical activities during lunch break, while the discussions in the intergenerational focus groups were largely centred on the process of co-creation of opportunities for active play. The synergy (Hall and Howard, 2008) between the different approaches allowed me to investigate "what might be" (Oliver and Kirk, 2015, p.4) possible to achieve in supporting

adolescents' physical activity behaviour during lunch break with different and varied opportunities for active play.

Before the presentation of the analysis of the qualitative data collected through interviews and focus groups, it is useful to restate the theoretical conceptualisations of play that I found adequate to describe the different activities adolescents take part in during lunch break. Pellegrini (2005) considers that

> "…what goes on in the playground at recess is play-like. That is, children interact with peers and materials on their own terms, relatively unfettered by adults" (p.23).

In light of this perspective, this study considered the physical activities that took place during lunch break and that the adolescents recollected in their stories as active play activities.

The first part of the chapter is divided into two main sections; the first is related to the barriers to participation and the second is related to the factors that facilitate participation. In the first section, I integrated the findings that emerged from the research "on" early adolescents' physical active behaviour with the analysis of the participatory research "with" early adolescents to explore the barriers to participation they experienced. The findings related to the barriers to participation in active play activity then informed the successive exploration of the factors which facilitate participation in active play activities. These factors are presented in the second section. In exploring the facilitators to participation, I adopted a different approach of "co-research with adolescents and adults".

5.1.1 The barriers to participation in active play activities

In this section, the different barriers to participation in active play activity during lunch break perceived by the early adolescent participants are divided into three main environments – social and cultural, school policy and curriculum, and physical and material. This division resulted from adolescents' experiences and perceptions as newcomers in a secondary school

setting. These barriers are part of the complex playground ecosystem, formed by the active involvement and intra-action (Barad, 2007) between the different environments (socio, cultural, physical, material, and policy), the adults and the adolescents with their emotions, motivations, and desires. The entanglements (Barad, 2007) and the assembled relations (which constitute the context that shapes adolescents' active behaviour), reveal the different ways these relations and intra-actions (Barad, 2007) might negatively affect and be affected by adolescents' active play behaviour.

The two questions which facilitated an understanding of the social and cultural barriers perceived by the early adolescent participants were:

"What stops you being active if you are not active?"
"A lot of people say girls feel more embarrassed, like, going out and playing football, but why should they feel embarrassed?"

Taking into consideration the role of the adolescents as experts I decided to adopt these two questions, which the adolescents as co-researchers posed to their peers and the adults, as frameworks for the analysis of the findings of the qualitative study. These questions, which showed the adolescents' perception of the important role of being active, generated much discussion during group interviews and focus groups. The knowledge and understanding of the importance of physical activity, the involvement in discussion with peers about increasing participation in physical activity, is also one of the main attributes of a physically literate individual (Whitehead, 2010, 2013). The first question is related to both boys' and girls' participation in physical activities and active play. The findings that emerged from the analysis of the accelerometer data showed that both boys and girls decreased their participation in physical activities and active play during lunch break between October and May. The second question supports a further investigation of the barriers to participation the girls in particular experienced during lunch break. It also provides an understanding of the factors that had an important role in the significant drop in their physical activity levels during lunch break between

the first and the second data collection point. The qualitative data analysed in this chapter were collected during the two group interviews and the two focus groups.

From the discussions, different themes emerged. They were related to the social and cultural environments (pressure to conform, conflicts, self-confidence and perceived motor competence; friendship; gendered environment), school policy and curriculum environments (weekly number of lunch break and their duration; commuting time and homework), and physical and material environments (playground as boys' territory; lack of varied opportunities).

Social and cultural environments

> Ally[20]: And people are also stereotypical and expect teenagers to be moody. All teenagers are moody. It's, like, they can't play games, they expect them just to sulk.
>
> Second intergenerational focus group – 21/11/2018

According to the majority of the participants, the most powerful barriers to active play they experienced during lunch break in their first year of secondary school were related to the social and cultural environments. The intersectional system (Hill Collins and Bilge, 2016) of gender, age, peer pressure, and perceived motor competence influenced the adolescents' complex active play behaviour during lunch break. The less active students, which formed the majority of the participants in the group interviews and focus groups perceived different social and cultural barriers. These were the pressure from older students to conform to the mainstream physically active behaviour, pressure from their S1 peers and the perceived competitive climate during some sports-related active play activities as barriers to participation in active

[20] As previously mentioned in the ethics section of the Methodology chapter, in the description of the adolescents' quotes, all the names reported are pseudonym.

play activities. This climate in the playground affected the self-confidence of the boys and girls who perceived themselves as less able or less skilful. Furthermore, the power imbalance perceived by the girls has a significant impact on their physically active behaviour, which was evident in the analysis of girls' physical activity levels presented in the previous section and as it emerged from the interviews and focus groups which will be presented in this section.

The pressure to conform

> Claire: You feel like if you go around playing, like, tag and that, they're classed as, like, the little kids' games.
>
> First group interview – 24/05/18

In the previous chapter, it became evident that both boys and girls decreased their levels of physical activity between October and May. It also emerged that the secondary school playground environment negatively affected the majority of the participants. One of the main barriers that affected both boys' and girls' active play behaviour during the lunch break was the pressure to conform to the prevailing social and cultural norms which dominate in secondary schools playgrounds. From the young adolescents' experiences, these norms were not imposed by adults, but they came from their intra-action (Barad, 2007) with older students. The older students pressured the younger ones to change and adapt their behaviour to conform to a physically active behaviour that they considered appropriate during a secondary school lunch break.

> Alexandra: Also like in primary school, like because most a' the people are younger and like if you're in P7[21] and you're the oldest obviously then like they all like playing tag and that. But when you come into the high school you are

[21] Last year of primary school in Scotland.

automatically the youngest again. And then you, I dunno, I just think that like normally people think they're gonna like be made fun off if they go and play like tag and that cause like most primary schools do that rather than high schools.

Chris: And now, we don't. I guess we're the youngest now, and probably because you've just got to, you can't do it or else people would think it's childish. So, we don't do it.

First group interview – 24/05/18

The pressure from older students affected the younger students, both boys and girls, especially at the beginning of their first year in secondary school. In this period, as the results of their physical activity levels collected through accelerometers at the first timepoint in October showed, they were active for over 60% of the lunch break period. At the second timepoint, this percentage dropped to 48% (see Table 7 Average time spent sedentary and in MVPA and light-intensity physical activity during lunch break overall and by gender)

The transition from primary to secondary school is a significant moment in an adolescent' life (West *et al.*, 2010). Early active play activity experiences in the secondary school playground might have a long term effect on their participation in physical activities. Furthermore, Dolto (1990) suggests that adolescents consider the pressure to conform that comes from peers as more important than the same pressure that comes from adults. Smith (2016) also considers that the influence of peer evaluation and fear of rejection is strong in early adolescence, and negative experiences affect their anxiety levels.

The power hierarchy and the need to conform to a type of behaviour expected in secondary school affected the type of physically active behaviour allowed during lunch break. It seems so pervasive and possibly institutionalised that some adults might not be completely aware of its extent, or they tend to justify such actions in terms of "natural development" and progression from the primary to the secondary environment. The following discussion during one of the

intergenerational focus groups between the adult and the adolescents could be considered as an example:

> Teacher: So, they're very, without being rude, very primary still, you know, just October holidays kind of time, but now they've been into secondary a bit longer, do you think that has an effect on things?"
>
> Andy: Normally when we used to play, we used to jump and run around as well, and lots of the older people didn't like the younger people playing because, like, they always, like, got in the way and things, so maybe we stopped because we think that we're gonna get in the way of the older people here.
>
> Teacher: Who are the older people? Are you talking about…
>
> Claire: S5s.
>
> Teacher: S5 up?
>
> Andy: Yeah.
>
> Emma: S4s. Anyone older than us.
>
> First intergenerational focus group – 21/11/2018

Their initial experiences in a new environment and intra-actions (Barad, 2007) with older students might have played an important part in shaping their physically active behaviour during lunch break for the rest of their first school year. Older students' pressure emerged then as one of the factors that affected the decline of adolescents' physical activity levels during lunch break between October and May. These findings had further support from the analysis of the observations of playground activities in May. In this period only a few of the S1 boys, who took part in the study, were active in the playground area observed. Some of the girl participants were in the playground area and they were chatting or walking. Some of the participants walked outside the school ground and possibly the majority were inside the school

building. As mentioned earlier, physical activities during lunch break are play-like activities, so active play activities did not disappear from a secondary school playground. They changed into more sports related activities. For example, during the playground observations in May, on the all-weather pitch, I observed games of "heads and volley"[22], followed by adolescent-initiated football matches. On the basketball court, there were "one on one" and "knockout"[23] shooting games followed by adolescent-initiated matches. The age groups of the participants were quite different: on the basketball court, there were only S1 students, while on the all-weather pitch there was a mix of students, the majority of whom were older students. A common feature in both events, which will be further explored later on, was the gender of the players. They were all boys.

It is important to note, however, that this imbalance of power between older and younger students in playgrounds is not exclusive to secondary school playgrounds, but it was common also in primary schools, as it emerged from the participants' descriptions of their experiences in primary school. As older students in their final year of primary school, their active play behaviour affected and was affected by younger students' active play behaviour.

> James: Our primary school was just like sometimes you could just play with anybody. It was all free then, you could play with anybody you wanted. It was, it wasn't really, it wasn't really basic, it wasn't really the strict rules.
>
> Ally: At our primary school, we weren't allowed to play any football. And there was once the tag got banned and things.
>
> Interviewer: And why do you think it was banned?

[22] Heads and volley is a game where one player crosses the ball and the other players attempt to score with a header or volley. Only goals scored with a header or volley count. There are dozens of different variations of the game (FA, 2014).

[23] "One on one is a game when two players play against each other; Knockout shooting is a game played with two balls. The aim of the game is to make free throws in order to survive, while at the same time eliminating the other players (jr.NBA, 2020).

Ally: It was…banned because loads a' people were accidentally walking into the little ones.

Jenny: Then like the little ones would go on one side and then the older ones would go on the other so that nobody got hurt. And then the little ones started thinking they, they were as good as the older ones. Then they started coming in and getting hurt. So then it was banned for us.

Oliver: The P7s had to look after P1[24]. Like they couldn't really play wi' their friends, like football and do that. So they had to let the like P1s maybe tell them what to play and all that. And it was kind of like a bit boring cause they, like they're younger and they play like little, little games and all that. But the P7s are kind of wanting to do other stuff but we had to look after the primary ones for a good year. So we never really got much opportunity to play in P7.

Paul: So in primary seven there was a lot of us had to play with primary ones even though we didn't want to play with them. Because we played tag and things but they would always like demand to hold our hands. So we would have to just like jog round instead of actually sprint away so we could get caught easily. And but found it annoying because we didn't really wanna play wi' them but we had to. And here no one really does that anymore.

Second group interview – 26/10/18

The discussion above showed how the assemblage of the dynamic relations (Deleuze and Guattari, 1987) between older and young students, teachers, school environment and type of activity were affected and affected students' active play behaviour. The power hierarchy in primary school was also somewhat controlled by members of staff which pushed older and younger students into playing together. However, the differences in integration between older

[24] First year of primary school in Scotland.

and younger students across various schools are noticeable from participants' experiences: from James's positive experiences of integration to Ally, Jenny, Oliver, and Paul's perceptions of younger students' participation as constraints to active play. Furthermore, from the participants' perspectives emerged the role of adults in deciding the forms of play which are allowed in school and the ones which are discouraged or banned. In primary schools, policies and rules in the playground and the behaviour control from members of staff limit students' choices of play activities. Yet, this form of control would be regarded even more as non-educative and inappropriate in secondary schools where the adolescents are building their own personality and independence.

School is a complex environment (Hawkins and James, 2018) and although the power hierarchy and the need to conform acted as a barrier to active play in the playground during lunch break, there were still opportunities for active play activities in secondary school. For example, during PE lessons, adults organised semi-structured active play activities like tag or chasing games the participants used to play during lunch break in primary school. Yet, the pressure to conform to the typical physically active behaviour in the playground stopped them from organising the same activities during lunch break in secondary school.

> Teacher: Do you think, is that sort of because it's seen as socially, you know, you're too old for that? Or would you like it if people did play it? Would you join in?
>
> Lizzy: Like well it's kinda difficult cause at P.E. like we sometimes play it for a warm-up or that. But then at lunch time, I dunno.
>
> Second intergenerational focus group – 21/11/2018

It seems that the same play activity "event" involves different entanglements (Barad, 2007) with the physical, social and cultural environments. The "event" may take place in the same physical environment, a school in this case. Yet it may be affected by different social and cultural environments. For example, in a lesson when adults "allow" play activities compared

to the playground where play activities were considered “childish”. A contradiction emerged. The participants recognised that games of tags can be played and are accepted during PE lessons, yet they might not be played in their free time because they are not culturally accepted during lunch break. Furthermore, Lizzy’s experiences of games of tag played during PE lessons shows that is possible to challenge the binarism between play and education (McKendrick, 2019b). A playful approach during structured PE lessons could encourage wider participation also in students less interested in traditional sports. It allows adolescents to develop their motor competence levels and explore different patterns of movements, an educational approach that is inspired by the etymology of the word “education” (from Latin e-ducere means to bring out, The Concise Oxford Dictionary of English Etymology). This approach recognises the pedagogical value of play (Farné, 2005) in supporting students in bringing out their potential and capabilities focusing more on the process than the outcomes (McKendrick, 2019b).

From the participants’ stories about their experiences of active play during lunch break in primary and secondary schools emerged a variety of entanglements (Barad, 2007) between older and younger students, adults, environments, policies, and rules that affected and were affected by their physically active behaviour. Sometimes, more often in primary school, the older ones acted as facilitators by involving the young ones and playing together with them; other times, both in primary and secondary school, the young ones were perceived by older students as a barrier. In primary school, the young ones were perceived as a barrier because the older ones could not play their favourite activities freely or because those activities were banned. While in secondary school, the young ones’ active play activities did not fit in with the expected behaviour. From the participants’ experiences, in secondary school, the pressure to conform was sometimes associated with a conflictual relationship with the older students. Their relationship with older students was perceived by the majority of the younger ones as a barrier to participation in active play activities.

From the adolescents’ narratives on their lunch breaks’ experiences, it was evident that the pressure to conform to the expected behaviour in a secondary school playground negatively

affected younger students' physically active behaviour. When these findings are considered with the results of lunch break physical activity levels, and the observation of the physically active behaviour, they show the influence of older students' pressure on early adolescents' physically active behaviour. At the beginning of the school year in October, when they had not yet experienced the pressure to conform from the older students, they were more active during lunch break compared to their levels at the end of their school year in May, as the analysis of adolescents' lunch break physical activity levels showed. Also, the majority of the participants perceived themselves as more active in primary than in secondary school during lunch break. The negative experiences might have had a greater impact on adolescents with lower self-confidence and high levels of anxiety, as other studies do suggest (West, *et al.*, 2010).

Taken together, the findings from the quantitative and the qualitative studies, show us that the intra-action (Barad, 2007) with the older students who pressured the younger students, both boys and girls, to conform to the expected physically active behaviour in a secondary school' playground negatively affected the early adolescents' participation in active play activities throughout the school year.

Conflicts

> James: Cause we're just the, we're just the fishes and like the S6s are the sharks and we're just the fishes.
>
> Second group interview – 26/10/18

In order to maintain the power hierarchy and to conform to a "grown up" physically active behaviour during lunch break, conflicts in the playground between older and younger students happened. Some of the participants recognised the impact of these conflicts in affecting their active play and physically active behaviour. Sometimes the young ones were confronted overtly:

Zoe: People will come up to you and say that you're a child and you shouldn't be doing it because you're too old to do it now. And you should be talking to your friends instead, cause that's what teenagers should do.

James: Well at our school, our primary school there was like no, there was some, there was quite a lot a' arguing at our school but there was not a lot with my friends. But now since they've come up to high school there's been a lot more arguing. Arguments during break, lunchtime and after school, there have been much more arguments. There's been fighting going on. And it wasn't nearly that primary school.

Interviewer: What do you think is the reason?

James: I dunno. I just think people think when they come up to high school some people when they come up to high school they think they're just big. Like trying to make on that they're, they're the best.

Second group interview – 26/10/18

In other cases, the pressure from the older students to conform to the general behaviour was so pervasive that there was no need for conflicts. At the beginning of their secondary school experiences, the younger students are constructing their sense of school connectedness (Rickwood, 2015) which guides them throughout their secondary school years. For some of the students, those more anxious or with lower self-confidence, there was no need for an overt confrontation with the older students. The concern they would be considered "childish" if they started to run around was enough to stop them.

Lucy: It's just that fact that you think people would think you're childish. That's what I think.

Second group interview – 26/10/18

However, some of the students noted that the playground in secondary school provided a safer environment, compared to the one in primary schools in case of conflicts. They could leave a potentially dangerous situation and find some other place to avoid arguments.

> Mike: In primary school, if you got into a fight you couldn't really avoid it because the playground was very small. Here, if you get into a fight you can just walk away cause you've got so many more places to go.
>
> First group interview – 24/05/18

As mentioned before, the pressure to conform that the older students exercised upon the younger students negatively affected participants' active play behaviour. In this section, I have shown that the conflictual environment created by the intra-actions (Barad, 2007) between younger and older students had a further negative effect on the active play and the physically active behaviour of the majority of the early adolescents, both boys and girls. The conflictual environment influencing them both at the intrapersonal and interpersonal levels, as well as the choice of activities that were "allowed" during lunch break.

Self-confidence and perceived motor skills level

> Oliver: I used to (walking outside the school) in S1, cause there was, like, mainly, like, the older ones were quite aggressive with you when you played football, so I didn't, I didn't really do the football, but now (in S2) there's not that many older ones that play it and, like, if they are, they're kind of a bit nicer to you. Like, they're not aggressive.
>
> First intergenerational focus group – 21/11/2018

As it emerged from the discussions the perceived social and cultural environments affected early adolescents' self-confidence and self-consciousness. The perceived social and cultural environments affected their participation not just in "little kids' games" but also in "accepted" physical activities, such as football. Some of the participants perceived the football environment as too competitive and unpleasant. The quote above, which was recorded during one of the intergenerational focus groups (held at the beginning of their second year in secondary school) demonstrates the role of the perceived environment (Bronfenbrenner, 1979, 1994; Shelton, 2019) in affecting physically active behaviour (Damasio, 2003; Massumi, 2002). The environment generated by conflicts and aggressiveness affected mostly the less confident participants, both boys and girls; the ones who perceived themselves as less able or less skilful. They considered the playground environment they experienced as a barrier to their participation in physical activities and this perception affected their choices of activities during lunch break. For example, instead of being involved in active play activities, they decided to walk outside the school, chat with friends or take part in non-active indoor clubs.

> Andy: I was probably more active at the start of S1 seeing as back then I used to play a lot of basketball and football than now (May, end of S1). Like, I've changed so, like, now I prefer to stay inside because, like, at school I'm not much of an outdoors guy.
>
> Second group interview – 26/10/18

During the discussions, it emerged that the girls considered motor competence and skills as a requirement for playing football with the boys in the school environment. The capacity of a perceived male dominated environment to affect their self-confidence and self-consciousness was noticeable. For the girls with low self-confidence and high self-consciousness, their perceived motor competence and skills levels became a barrier to participation.

Beth: I think there is a girl in the first year that does it (Playing football) but she's really good so she's good enough really.

Ally: Some boys don't want you to join in, because they think that you'll just be bad at it.

Second intergenerational focus group – 21/11/2018

Furthermore, during the discussions, it emerged that these barriers, related to the competence and skills levels which affected several girls, happened in specific contexts and events. For example, the school environment was perceived by some of the girls as a barrier to play football with the boys who instead enjoyed playing outside the school. Same activity but a different environment, different context:

Ally: I play a lot of football at home with my, like, cousins and that, but I still don't play it at school.

Second intergenerational focus group – 21/11/2018

The girls observed that there were differences between different activities and games played with boys, both during lunch break and during PE lessons. Some sports, football, for example, were perceived as boys' territory from both boys and girls. For example, the girls noticed the difference between playing football and other physical activities:

Jenny: It's generally 'cause all the boys are really good at something, and then we can't, like, do it as well, and it's kind of embarrassing.

Emma: Most sports it's okay, but it's especially with football because, like, they do it all the time, and the girls don't necessarily.

Zoe: Basketball's not bad normally but…

Second intergenerational focus group – 21/11/2018

However, during the discussions it emerged that the girls did not passively accept the perceived imbalanced environment, but critically proposed alternatives for encouraging girls' participation.

The impact of the perceived climate during sport-related active play activities on adolescents' participation emerged from the integration of the quantitative findings and the experiences and feelings expressed by the adolescents during the interviews and focus groups. It appears that a competitive environment and a climate focused on performance, such as the football matches that took place during lunch break in school, produced a sense of anxiety which affected the self-confidence in boys and girls who perceived their motor competence level as low. Therefore, a competitive and performance-driven environment acts as a barrier to participation in physical activities, in particular in boys and girls with a low sense of self-confidence. In this kind of environment, the more skilful students get more opportunities to be active and possibly become even more skilful. On the contrary, to support the participation of a greater number of students, during lunch break there should be, next to more competitive activities the opportunity to participate in activities which take place in a more relaxed environment. The majority of the participants, as will be presented in the section related to the facilitators, proposed a different environment to support participation in active play activities. They recommended an inclusive environment, which supports self-confidence, enjoyment, satisfaction, and the development of motor skills and competence without pressure and anxiety, to increase participation in active play during lunch break.

Friendship

> Sara: Sometimes can be friends, like if they don't like sports that you like, then you won't do it because, like, you don't wanna be alone doing it, and you sometimes feel awkward just turning up by yourself...
>
> First intergenerational focus group – 21/11/2018

From the various discussions, it also emerged the important role of lunch break in developing social skills, spending time with friends is an important component of the lunch break experience. In the previous chapter, it emerged that the lack of participation in any type of active play activities from the older students was the main difference the newcomers perceived between the playground in primary and in secondary school. This difference negatively affected the majority of the participants. From the analysis of the MPAM-R questionnaire, it also emerged that social motives, relatedness, for example spending time with friends, was one of the motives that facilitated participation in physical activities during lunch break. However, as it appeared from the participants' narratives, for example in Sara's quote above, being with friends facilitates participation in physical activities but on the other hand, it might become a barrier to participation. Lunch break is a valuable opportunity for adolescents to stay with their friends; it is the longest period during the school day where they can spend time, in person, with their friends. This is particularly relevant in a school with a large catchment area where, as some of the participants noted, it was difficult for them to meet their friends outside school time.

> Holly: Your friends aren't wanting to do it then probably wouldn't go alone or would miss times with them so…
>
> First group interview – 24/05/18

The majority of the participants stressed the relationship between the support and participation of their friends with their personal participation and experience in physical activities and active play. The important role of taking part in active play activities with their friends is evident when the participants recalled their enjoyable experiences of active play activities during lunch break in primary school. They emphasised the social context that characterised these activities, where an inclusive environment encouraged increased student participation, and the difference with the social context they found in the playground in secondary school.

> James: So we had like everybody. The whole school was in our playground, in the playground for breaktimes or lunchtimes, whatever. And there was a huge, there's a huge, big playing field that people played football on. There were tag games out in the playground during lunchtimes and breaktimes. (Now) there's not a lot of people that play sport at lunchtime.
>
> Second group interview – 26/10/18

An additional barrier to participation in physical activities that the girls experienced during lunch break emerged during the group interviews and the intergenerational focus groups. All the girls interviewed found it difficult and embarrassing to join a game when only boys were playing. The small number of girls taking part in physical activities affected and was affected by the participation of other girls.

> Emma: Most of your friends don't want to do it, so you kind of, you can't go yourself, they want to do football but they don't want to be embarrassed.
>
> First intergenerational focus group – 21/11/2018

The boy-dominated environment that the girls perceived and experienced in the playground during lunch break negatively affected their participation in active play and physical activities.

The integrated analysis of the quantitative and qualitative data shows that the entanglement (Barad, 2007) of pressure to conform, a perceived competitive environment and the conflictual context hindered the participation of several of the participants in physical activities and created a domino effect on adolescents' participation in active play and physical activities more generally. Boys and girls with a low level of self-confidence and a high level of self-consciousness were the most affected. From the analysis of the MPAM-R questionnaire, it emerged that social motives were correlated with participation in physical activities in girls. Therefore, their motivation to spend time with friends was stronger than their interest in taking part in activities without their friends. The lack of friends' support and involvement limited early adolescents' participation in active play. Although this factor affected the whole group, the significant drop in girls' physical activity levels during lunch break at the second timepoint tends to support the indication that the lack of friends' support and involvement in active play activities can be considered as a further influential barrier to girls' participation.

Gendered environment

> Ally: I think there's more, like, girls that do stuff out of school than in school.
>
> Second intergenerational focus group – 21/11/2018

A critical perspective on factors that influence positively and negatively participation in physical activities is one of the attributes of a physically literate individual (Whitehead, 2010, 2013). The girls adopted a critical stance in analysing the barriers to participation in active play and physical activity during lunch break they experienced throughout their first year in secondary school. They considered that a competitive and male dominated environment was negatively affecting their self-confidence, self-consciousness and therefore limiting their participation and their opportunities to play. This gendered environment which negatively affected their level of participation in physical activities in school forced them to find alternative opportunities to be active outside school, as the quote above suggests. However, as some of the girls in the

section of "School policies and curriculum" below suggested, lunch break, for some students, might be the only opportunity to be active outdoors during the day. For students in schools, like the case study, which cover a wide catchment area, time, homework, and other factors not investigated in this study restrict their opportunities for taking part in physical activities outside school time during the week.

In the previous sections, it emerged that girls, in particular, perceived competence and skill levels as important factors for taking part in mixed physical activities. For the girls, enjoyment in taking part in physical activities was associated with motor competence. During the focus groups for example, the participants offered a possible explanation of the differences between girls' physical activity levels during lunch break between October and May. In October during lunch break, there was a mixed football club which was popular with the girls but later on, it stopped. From the discussions, it appears that when the girls played mixed games they felt anxious and they did not enjoy the environment, although they enjoy playing football. If girls and boys, during a football game or any other physical activity at lunch break, experience an environment which is exclusive, judgemental, and not enjoyable they stop taking part in such activities since lunch break is the period during school time when they have freedom of choices:

> Lucy: There's a mixed one (Club), but more boys go to it than girls, and girls don't go probably cause of the boys.
>
> Ally: It's also annoying though cause like the boys think that they're the best and don't give the girls a shot.
>
> Zoe: Like if they're picking teams, they'll pick all their, the boys and things like that.
>
> Ally: … they don't pass to you in football …
>
> Zoe: Sometimes they start yelling at you if you can't do it like they can.
>
> Interviewer: And what could be the solution then?

Andy: Don't yell at them.

Pete: Or the girls could try to get better, like, by practising at home.

Second group interview – 26/10/18

It is interesting to note the differences between the varying perspectives in finding solutions for involving the girls more and creating a more inclusive environment. The first boy, Andy, who during the intergenerational focus group told the rest of the group that he stopped playing football during lunch break in S1[25] because he perceived and experienced the football environment as too aggressive, suggested that a more relaxed and inclusive environment may encourage girls, and possibly also boys, in taking part in active play activities, a football game in this case. The second one, Pete, who played football during lunch break in his first year in secondary school and was still playing at the time of the intergenerational focus group, considered the competitive aspect of the football game as very important. He, therefore, suggested a more exclusive environment where the levels of skills and competence are important factors in taking part in the game.

From the integration of the analysis of the discussions with the adolescent participants during group interviews and focus groups, and the physical activity levels registered with the accelerometers during lunch break, it became apparent that the girls perceived an additional barrier to participation in active play compared to the boys. The social and cultural environment perceived by the girls as boy-dominated restricted their participation in active play activities. The imbalance of power the girls experienced and voiced during the group interviews and the focus groups occurred in different phases of active play activity and negatively affected their participation in active play activities

[25] The intergenerational focus group took place when the participants were at the beginning of their S2 school year.

School policy and curriculum environments

From the adolescents' narratives, it emerged that school policies and curriculum might have negative effects on early adolescents' active play and physical activity behaviour both in school and outside school. In school time, the perceived barriers to participation in active play during lunch break were related to the weekly number of lunch breaks and their length. Furthermore, as some of the participants noted school policy and curriculum also affected adolescents' participation in physical activities outside the school period.

Weekly number of lunch breaks and their duration

> Beth: The lunch break isn't that long because you, you, like, most people go down the street, but then by the time they come back up then there's no time to do anything.
>
> Second intergenerational focus group – 21/11/2018

Some of the participants judged the length of the lunch break as a barrier to participation in active play. Research does suggest that breaks in secondary school are shorter than breaks in primary school (Baines and Blatchford, 2019), and the difference in the length of time for the students involved in this study, who were in their first year of secondary school, negatively affected their participation in active play. They noticed that once they had queued up in the canteen or had gone outside the school premises to buy some lunch, there was not enough time to start any physical activity.

Another barrier they encountered was related to the weekly number of lunch breaks. During the two focus groups, it emerged that the school had just changed its timetable. On Fridays, as they now finished school at 2 pm they did not have a lunch break.

> Maggie: There's other clubs on at lunch as well … we asked if we could do a junior badminton club, but he (PE teacher) said the hall was full like every lunch because we don't have a Friday lunch anymore.
>
> Teacher: That's one of the problems, we've lost that lunchtime. So, we've only got four lunchtimes now instead of five. We finish at lunchtime on a Friday. But it has had that knock-on effect so there are now, the clubs that used to be on a Friday moved into the other days as more competition.
>
> Second intergenerational focus group – 21/11/2018

This new school policy had a negative effect on adolescents' physically active behaviour during lunch break because It limited the opportunities to be active and the number of clubs available during the week. As it was presented in the Contribution of lunch break MVPA on daily MVPA section in the previous chapter, the analysis of the contribution of lunch break MVPA to the overall daily MVPA showed that lunch break activities played an important role in the daily physical activity levels in students who did not meet the CMO daily recommendation. Hence, the reduction of weekly lunch break periods more negatively affected the students who have fewer opportunities to be active after school.

Commuting time and homework

As was mentioned previously, the case study school covers a wide catchment area, therefore for some students, the commute back home and homework were perceived as further barriers to participation in physical activities and active play after school time.

> Sara: The school day is so long, by the time we finish school and get home on the bus, and, like, you've changed and everything, it's basically your tea, so you've hardly got any time to do anything.
>
> First intergenerational focus group – 21/11/2018

Although these factors are not related to lunch break physical activity levels, they are related to the daily physical activity levels and they show the important role of lunch break in students' lives.

In this section, I showed how school policy and curriculum affect adolescents' physically active and active play behaviour, both during lunch break and during the whole day. From adults' and adolescents' narratives, the dynamic relationship (Shelton, 2019) between different systems emerges. The school policy and curriculum environment, a mesosystem according to Bronfenbrenner's Ecological System Theory (Bronfenbrenner, 1979), affects and is affected by adolescents' behaviour, a microsystem. In the example of the case study school, an apparently small change in school policy, four lunch breaks per week instead of five, can have a wider effect on adolescents' participation in active play activities during lunch break as well as on their social skills. Although research does suggest that students have a positive attitude towards breaktimes (Baines and Blatchford, 2019), lunch break is often reduced for learning and curriculum purposes (Baines and Blatchford, 2019). In the case study school, 16% of the daily school time was allocated to break times (in the current COVID-19 emergency this percentage is now reduced to 13% of a school day). The important role of the lunch break for active play and physical activity emerged from participants' perspectives and the analysis of their physical activity levels. For some students, it is the only period during the day when they can play with their friends without adults' guidance and be physically active. Furthermore, the lunch break is important for adolescents' social well-being and for developing social skills (Baines and Blatchford, 2019). It can be, for some students the only period they can spend time and intra-act (Barad, 2007) in person, and not through social media, with their friends and peers. By recognising the important role that lunch break holds in adolescents' life and its value for their holistic development and well-being, the schools should involve adolescents in discussing and co-producing policies concerning break times.

Physical and material environments

> Teacher: If you wanted to play it are, were there, have you, do you feel that you've got places you could play it?
>
> Maggie: Yeah cause there's the huge bits of grass round there.
>
> Second intergenerational focus group – 21/11/2018

Playground as boys' territory

From the interviews and focus groups, it emerged that the participants did not consider the physical environment as a barrier to active play, for example, in the dialogue above between one of the adolescents and one of the teachers during one of the intergenerational focus groups above. However, the participants noted the difference between the physical or natural environment and the perceived or experienced cultural environment. While the physical environment was not a barrier in itself, the perceived cultural environment was considered a barrier, especially by the girls.

> Ally: Go outside and see the football. There's no, you don't really see any girls playing football, or no girls playing the basketball.
>
> Teacher: And why is that?
>
> Zoe: Cause they get embarrassed being the only girl.
>
> Teacher: Do you think there could be something else to do?
>
> Ally: I do the basketball club, but that's inside. And it's only on once a week.
>
> Second intergenerational focus group – 21/11/2018

During the observations of the students' behaviour during lunch break it was evident that the sports-oriented facilities, the all-weather pitch and basketball court, were considered boys'

territory. Only the boys occupied and played in these two main outdoor areas where students were active. While the boys were in the centre of the area and playing, the girls were on the perimeter of these areas chatting and watching.

> Claire: We just stand at the side and watch.
>
> First intergenerational focus group – 21/11/2018

However, the physical and material environments positively affected some of the boys' active play behaviour. For the more active boys, the sports-oriented playground in secondary school positively affected their physical activity levels (see Active play and physical activity section in the previous chapter). They commented on the positive differences between playgrounds in primary and secondary schools which allowed them to be more active in the secondary school lunch break. However, the sports-oriented physical environment of the case study secondary school's playground created during lunch break, as mentioned previously a physical activity version of "Matthew effect" (Merton, 1968), where the boys who were more skilful and confident had more opportunities to be active, improving and demonstrating their motor skills.

Lack of varied opportunities

Regarding the opportunities to be active during lunch break from the experiences and perspectives of the participants, the complexity of adolescents' physically active behaviour (Draper and Stratton, 2019) became evident. On the one hand, some of the adolescents found they had more choices of activities in secondary school. For this reason, they were more involved in active play activities during lunch break in secondary school than previously in primary school. They perceived that their physical activity levels during lunch break were higher in secondary school.

Chris: In primary school, if one person wanted to play basketball they couldn't do that because everyone else wanted to play football. And now you're allowed to do whatever you want.

Simon: In primary school, we didn't have a lot of options. Like here we've got a lot more clubs and brand new clubs from my primary school. And there's just a lot more options like to go down the street. And there's just a lot more to like do and play here.

First group interview – 24/05/18

On the other hand, the majority of the participants commented on the lack of alternative opportunities for taking part in other activities alongside football and basketball as emerged in the previous chapter. They felt that the variety and the choice of physical activities they could take part in during lunch break was limited, and it was difficult for them to find alternative activities. They also noted that there were not enough materials and equipment to encourage active play.

Al: They're like not doing what, like we would be playing the, playing tag within primary school. But then when we come up to high school they just kinda walk around and chat. They don't really do, as they get older they don't really play, like some a' them play football and basketball but most a' them just kinda sit and talk and stuff. So it's very different.

David: I think it's just because like nobody else really does anything or there's not really games of tag at high school so...

First group interview – 24/05/18

The opportunities for active play during lunch break were affected by the expectations to conform to secondary school physically active behaviour. These expectations limit the choices to be active. The majority of the adolescent participants perceived that only sports-related activities were allowed. This limited choice of physical activities available during lunch break, which as noted previously were performed in a competitive and exclusive context, had various effects on adolescents' physically active behaviour. It negatively affected the involvement and participation in active play activities of the adolescents who were not interested or did not feel confident in taking part in those physical activities. Also, the limited choice and the competitive context forced other adolescents to choose between staying with friends or playing a game without their friends. As it emerged previously, some of the boys and the majority of girls preferred to spend time with their friends than playing a game.

In the next section, I present the participants' critical views on co-creating opportunities which might facilitate participation in physical activity during lunch break.

5.1.2 Factors facilitating participation in active play activities

In this section, the perceived facilitators, and the participants' ideas to encourage participation in active play activities are offered. Previously in this chapter, I presented the barriers and facilitators to participation in active play during lunch break in separate sections, although, during the discussions adolescents' critical views of the barriers to participation and adolescents' and adults' proactive ideas of co-created alternative active play opportunities for encouraging participation were often intra-related (Barad, 2007). In the group interviews the focus was more on the barriers perceived, while during the intergenerational focus groups, the emphasis of the discussions was on the factors which facilitate participation, and the adolescents' and adults' ideas for creating an environment which enhances active play and physically active behaviour during lunch break. Yet, during the intergenerational focus groups,

the adolescents, as experts of playground's activities during lunch break, described and shared with the adults the barriers to participation in active play they experienced throughout their first year of secondary school.

In order to facilitate the discussions during these meetings and incorporate early adolescents' expertise and privileged knowledge of lunch break active play opportunities, I adopted four questions as a framework for the analysis. Two of them were questions that the adolescents collaboratively as co-researchers, decided to further explore in the intergenerational focus groups. These two questions were:

"What do you like about being active?"
"Is there a club we can make or, like, a space where girls can be more confident?"

The other two questions, as well as the persona method (Appendix 3 Personas) (for further description of this method see the "integration in mixed methods studies" section in the Methodology chapter), emerged from the integrated analysis of the quantitative study and the adolescents' narratives that emerged in the two group interviews. These two questions and the persona tools were aimed at promoting discussions between adolescents and adults about creating opportunities together to encourage young people in being more active during lunch break, and about practical ideas for changes in the playground environment which could increase active play participation. These questions were:

"How would you encourage young people to be more active during lunch break?"
"If you could change one thing about lunch break to make it easier for young people to play, what would you change and why?"

These four questions together shaped the analysis of the findings related to the factors which produce an ecosystem where the relationship and the intra-action (Barad, 2007) of the social and cultural, school policy, material and physical environments might positively affect early adolescents' participation in active play activities.

In this section related to the facilitators to participation in active play activities, I adopted the same structure of the previous section on the barriers to participation in active play activities. In this section following participants' narratives, experiences and critical proposals, the facilitators to participation in active play activities are also divided into socio and cultural, curriculum and policy, and physical and material environments. Yet, throughout this section, it will often transpire that the intra-actions (Barad, 2007) amongst these environments that, in a continuous flux, shape the complex ecosystem (Shelton, 2019) of a playground in secondary school. For example, in the quote below from one of the participants, it is evident that to facilitate active play various elements need to be assembled and intra-related in a complex system to create the conditions that might encourage playing:

> Andy: if they didn't want to join in, like, football, basketball, or whatever, they could just, like, they'd probably go to, like, the other side of the "astro" and do whatever they want there because it might be out of view. So, like, you could play tag, or capture the flag, or whatever you want there. So even if you don't wanna play football or basketball, you can still have fun and be active.
>
> First intergenerational focus group – 21/11/2018

Here the adolescent emphasises the role of the physical environment: "*the other side of the astro*"(the "astro", or all-weather pitch, is an area that the participants experienced as boys and football dominated), the material environment: "*if they didn't want to join in, like, football, basketball,… you could play tag, or capture the flag, or whatever you want there*", and the social and cultural environments: "*do whatever they want there because it might be out of view*". In the quote, the boy also added the emotional component of enjoyment: "*So even if you don't wanna play football or basketball, you can still have fun and be active*", which the participants considered as the main characteristics of play and important motive to

participation. It is the intra-action (Barad, 2007) and the assemblage of these factors and environments which create a context that facilitates the "event" of any active play activity.

The participants considered the relationship and the entanglement (Barad, 2007) of the socio, cultural, school policy, physical, and material environments, together with the emotional factor of enjoyment, as fundamental in creating factors which might facilitate participation in active play activities. Their perspectives reveal the complexity of adolescents' physically active behaviours, and the role the diverse environments play in creating opportunities for encouraging active play participation during lunch break. Their perspectives and experiences indicate that focusing only on the enhancement of the physical and material environments might not be sufficient for creating opportunities for enhancing active play participation. The themes that emerged from the dialogue between adolescents and adults were related to the social and cultural environments facilitators (varied opportunities in an inclusive and playful environment; friends and enjoyment; opportunities for active play and physical activity for girls), material and physical environments, and school policy environments facilitators.

Social and cultural environments facilitators

Varied opportunities in an inclusive and playful environment

Although the results of the adolescents' physical activity levels daily and during lunch break showed that the participants, in general, were not sufficiently active according to the CMO guidelines (UK Gov, 2019), during the discussions, it appeared that the adolescents like being active:

> Simon: It clears my head, like, say there's stuff going on, like arguing and all that, then I'll just go out for a run and it clears my head.
>
> First group interview – 24/05/18

> Zoe: If you go out for a run then you'll get better and you feel better about yourself.

Oliver: It's really fun, keeps me happy.

Pete: It makes me healthy, and you want to do more because you feel you have achieved something.

Sara: And if you got like a personal best or something, it's fun to try to beat it

Second group interview – 26/10/18

It emerged that the adolescents highlighted the importance of being active and they had a knowledge and understanding of the value of physical activity and the physical, emotional and mental health benefits related to physical activity, which is also one of the attributes of a physically literate individual (Whitehead, 2010, 2013). The adolescents involved in the group interviews and intergenerational focus groups actively participated in the discussions offering critical proposals aimed at creating opportunities for encouraging more students to participate in active play activities during lunch break.

It was evident from the participants' experiences that one of the main barriers perceived to participation in active play was related to the pressure from the older students to adopt a physically active behaviour which conformed to the secondary school environment. The type of active play activities they performed in primary school seemed not to be suitable anymore in a secondary school playground, but alternatives were not in place, apart from sports-oriented activities, such as football and basketball. While for some newcomers, particularly boys with perceived good motor skills levels, these two activities encouraged them to be active, other participants did not know what to do during lunch break. Some of the students suggested that lunch break may be an occasion for trying different sports or physical activities (for example, one of the participants suggested a circus skills club) using different areas of the playground:

Paul: Like, different clubs on, like different places, cause there's a club on every day of the week in here, so there's, like, there's no room for any more but, like, in other places, like out on the grass and stuff.

First intergenerational focus group – 21/11/2018

The majority of the participants stressed the idea of lunch break as their free time where the students themselves can take ownership of the type of activity they want to play and of the clubs they want. Here it emerges how active play fosters the sense of autonomy, positively associated with participation in physical activity (Owen *et al.*, 2014).

Zoe: You could set up clubs different games each week with their suggestions what games they'd want to do.

Second intergenerational focus group – 21/11/2018

For the majority of the participants, physical activity participation during lunch breaks could be encouraged by creating opportunities which facilitate unstructured activities where anyone might take part in, without the intervention of adults.

Lizzy: It's like not basketball club it's just basketballs and there's quite a lot a' people that go to it. So it's because it's a bit more free and you can do what you want… and take part as little much as you want.

Ally: Cause some of the girls doesn't feel like she's good enough but in that you don't need to be, cause you just kinda run around and do stuff.

Zoe: So to try and keep the girls who want to be kind of active but no competitive.

Second intergenerational focus group – 21/11/2018

Although the participants did not name these activities as play, the characteristics of the activities which might encourage participation in physical activities they mentioned are all considered as having the distinguishing features of play (Brown, 2009; Bruner, 1977). These are activities which are performed in a supportive, encouraging and non-judgemental environment. Adolescents want to take part in these activities for their own sake, for the enjoyment of playing with no expectations of any results or a "required" skills level.

Friends and enjoyment

From the adolescents' narratives, it emerged that being with friends and enjoyment were important factors that facilitate participation in active play activities during lunch break. As noted previously, see Friendship in the barriers section, spending lunch break with friends appeared to be more important than participating in physical activities without their friends. They considered active play activities during lunch break as a moment to share with friends, where you can play and have a chat at the same time, fostering a sense of relatedness. From the quotes below the entanglement (Barad, 2007) between being with friends and having fun can be seen:

> James: It's fun if you've got, like, friends doing it with you, so you can, like, laugh and have a chat, as well as doing it. It's a lot more fun than being on your own".
>
> Sara: I think quite a lot of people like games that are quite easy, so like, capture the flag, and things like that, and they attach people's interests cause they're really fun".
>
> Ally: I think football's good because you can talk to each other".

Second group interview – 26/10/18

They recognised that an inclusive environment which supports success, competence, self-esteem, and enjoyment has the capacity to increase participation in active play activities, improve their self-confidence, and the intrinsic pleasure of being active.

During the interviews and focus groups, the early adolescents' capacity to critically evaluate and differentiate the internal and emotional characteristics of diverse physical activities environments was evident. This is also one of the attributes of a physically literate individual (Whitehead 2010, 2013).

> Beth: He (the PE teacher) has, like, ability levels as well so like he'd put people that don't feel that good at it like with people who don't feel that good so they're not like pressured to like really play really quickly. So they can like take their time and have a look to see who you want to pass it to instead of being, have to kick it straight away in football and stuff.
>
> Second intergenerational focus group – 21/11/2018

Their analysis of positive experiences in PE highlights the fundamental role of the significant adult, in this case the PE teacher, in creating an inclusive environment during PE lessons that offers more opportunities to students with a perceived lower level of motor competence and self-confidence to enhance them both. This approach might work as an example for the students who could then transfer to a similar inclusive environment for physical activity during lunch break. It might then lead to increased participation in physical activities. Furthermore, positive physical activity experiences during adolescence have a positive influence on adult participation in physical activities (Thompson, *et al.*, 2003).

From the discussions, and the results of the MPAM-R questionnaires, it emerged that social motives and enjoyment are very important motives for participating in physical activities. As it was mentioned before, lack of participation and support from peers was perceived as a barrier

to participation in physical activities. The participants considered that an environment which is competitive (like the football game mentioned by Ally) but at the same time inclusive, enjoyable, and relaxed (it is possible to chat with a friend while playing) could enhance participation in physical activities, in particular in adolescents that perceive their motor skills as low and have low levels of self-confidence.

Opportunities for active play and physical activity for girls

Girls' perspectives on the type of environment which might facilitate participation in physical activities reflected the idea of the importance of creating an inclusive and supporting environment. From the analysis of the device-based measures of physical activity, which showed a significant decrease in girls' lunch break physical activity levels between October and May, and from the discussions with the early adolescents, it emerged that girls encountered more barriers to physical activity than boys. In particular, during the discussions, the girls highlighted the imbalance of power that happened during mixed clubs and PE lessons as was mentioned in the "Gendered environment" section. The imbalance negatively affected girls' participation, potentially more during lunch break when participation is free compared to the structured PE lesson. However, the girls' ability to critically assess these negative experiences facilitated the process of evaluation and generation of possible alternatives for increasing girls' participation.

> Maggie: The girls could maybe do, they could do, like, girls', if it was girls' hockey and boys' hockey and then you could mix together one day if they're confident, for a tournament.
>
> Teacher: So, a tournament is mixed?
>
> Maggie: Yeah. Boys' team and a girls' team.

Zoe: So, the girls could train, and then the boys could train for maybe a term, and then…

Teacher: Separately?

Maggie: Yeah. And then the next term they could have, like, a match.

Teacher: Okay. So, working towards a mixed tournament?

Maggie: Yeah.

Second intergenerational focus group – 21/11/2018

During the discussion, the adolescents demonstrated their capacity to critically evaluate the various features (social and cultural, and material and physical) of the playground environments, and pragmatically propose alternatives. The students' experiences and perspectives suggest their fundamental role in assessing physical activities programs and intervention to tailor them to their interests and the complex ecosystem of the school playground. They showed that they should be considered as the experts of physical activity during lunch break. The relationship with the boys during physical activities played together affected girls' self-confidence and they perceived it as a barrier to participation. However, as it emerged from the discussion the girls wanted to be more active during lunch break. They want an environment where they can improve their motor skills and their self-confidence and play in an inclusive and playful environment.

This section about the factors related to the social and cultural environment which facilitate adolescents' participation in active play activities has shown that during lunch break the adolescents want to spend time with friends and have fun. Furthermore, play encourages the development of motor competence (Ginsburg *et al.*,2007; Johnstone, 2017, 2018) that the girl participants associated with enjoyment. From the analysis of the MPAM-R questionnaires and the suggestions and proposals originating from the discussions, it emerged that enjoyment and social motives facilitate adolescents' participation in physical activities and active play. The girls, considered a gender-equal environment important, where boys and girls are treated

as equals during games or other active play activities. For the participants, in particular the ones who are less active during lunch break, the context the activities take place in seems more important than the activity in itself.

Material and physical environments facilitators

From the analysis of early adolescents' lunch break experiences as newcomers in secondary school, it emerged that two of the main barriers to participation were their relationships with older students and the lack of opportunities for taking part in different active play activities, apart from football and basketball. They showed their critical skills in problem-solving in tackling both issues. For example, regarding the issues they had with older students, the early adolescents proposed to dedicate some areas of playground or sports hall to smaller peer groups with different materials available:

> Paul: Well there could be, like, certain days where, older people get their turn, or younger people. So, like, Monday would be S1s, Tuesday would be S2s, and so on.
>
> First intergenerational focus group – 21/11/2018

The early adolescents recognised that there are different and distinct approaches to active play for younger and older students. They pragmatically considered and examined diverse options with the adults present in the intergenerational focus groups. Then together, adolescents and adults explored and suggested possible solutions tailored to and respectful of adolescents' different interests and ways of playing and being active. The participants, for example, proposed an "equipment shed" as a potential option to provide sport and activity materials to be accessed from the playground. The material can then be used in a structured

way, for example organising a match, and it can also in a non-structured and informal way, for example passing the ball to each other or throwing at the basket.

> Oliver: Bring a bag and then, like, bring in the playground put it in the middle of the school and let people, like, get the stuff they want to play and over lunch just leave them to it.
>
> Teacher: So, where would you put that? What would be in it?
>
> Oliver: Like, tennis rackets, badminton rackets, footballs, basketballs. Just, like, stuff to do different sports with.
>
> Teacher: Where would you put it?
>
> Andy: Could you have, like, an equipment shed, like, so you don't have to keep coming in and out with, like, some equipment?
>
> Teacher: That's a good idea. There's actually that, you know that great big green container, can you picture that? That could potentially be used … if we tried that then all the equipment was lost then they might say, 'right well we can't do this'. So could we put something in place?
>
> Emma: Well if it was like, do you know like the wooden boxes you get and it's just like built into the ground? Like people use them as bins, you could almost use that as like you just put everything in there and lock it.
>
> Teacher: Yeah okay, that's a good idea.
>
> First intergenerational focus group – 21/11/2018

The idea of a "fun bag" (and also the obstacle course the participants proposed, which was explored in the previous chapter in the section related to the possible influences of active play on physical activity and literacy levels) with various equipment and materials allows the adolescents to play different activities both in conventional and possibly unconventional ways.

For Oliver, lunch break could offer the opportunity to try different activities

> Oliver: I would introduce them to new sports that they haven't tried, and then if they liked those then they can carry on doing it, because maybe they've tried a sport they don't know, and then they get into that sport.
>
> First intergenerational focus group – 21/11/2018

Some participants suggested that lunch break could be a moment for the adolescents to try and experiment, also without adult supervision, various activities (circus skills was one of the most cited possibilities), and different movements. In this way, adolescents might enjoy new activities and sports. These new activities might also motivate them to be active out of school.

This section about the factors related to the physical and material environments confirmed the findings of the section above. For the adolescent participants, the enjoyable and playful environment where they can play and spend time with their friends is more important than the activity in itself. The adolescents who were not active during lunch break wanted to stay with their friends taking part in an enjoyable and not competitive activity. The findings show also that for them is important to have the ownership and the capacity to choose and organise their physical activities during lunch break.

School policy environments facilitators

As it was mentioned before, this study considers the adolescents as lunch time's experts. Listening to their perspective helps adults to understand issues that adults might consider trivial or never considered which could negatively affect adolescents' physical active behaviour:

Paul: Also, like, there should be a bell that goes so that then, like, people that are on the astro, sometimes they're, like, late for class, so then they don't have time to put the ball back.

Teacher: Okay.

Paul: Five minutes before the bell, which is five minutes before the end bell.

Teacher: [Laughs]. So, like, a warning.

Paul: They should just get, like, a tidy up bell and then a warning bell, and then an actual bell. With different sounds.

First intergenerational focus group – 21/11/2018

When players are involved in any play activity, they might "lose a sense of the passage of time" (Brown, 2009: 19). When students lose their sense of time during lunch breaks, they might be late in the first lesson after the break which will carry some consequences. Negative experiences, mostly for newcomers, can have a long-lasting effect on their lunch break behaviour in secondary school. A simple, pragmatic, and practical solution in school policies, like the one proposed by the participants above, might positively affect participation in physical activities.

5.1.3 Co-creating active play opportunities during lunch break summary

In this summary, the findings of the quantitative and qualitative studies aimed at answering the second research question are integrated and presented. The second research question was

Research question 2

Which factors can support or hinder the enhancement of active play opportunities for younger adolescents of secondary school age in the UK?

This study, by mixing two different approaches to research, on adolescents and with adolescents, explores the changes in adolescents' physically active behaviour during lunch break throughout their first year of secondary school, their critical perception of barriers and their ideas and proposals to increase participation in active play activities.

The early adolescent participants identified some factors that hinder their participation in active play activities during lunch break.

Research question 2

Finding 1

Early adolescents' active play behaviour during lunch break was negatively affected by the intra-actions of:

social and cultural factors, in particular pressure from older students, gender inequality, lack of peer support, and self-confidence;

and material factors which offered limited opportunities for active play activities.

In this study, during the different stages of a process of co-creation (including adolescents alone in the group interview and then together with the adults in the intergenerational focus groups), participants identified some local issues which might facilitate enhanced participation in active play during lunch break. These issues exemplified the more general 'factors' identified below which are applicable to other settings.

Research question 2

Finding 2

Together the adolescent and adult participants identified key factors which can facilitate enhanced participation in active play activities during lunch break. These were:

social and cultural factors, in particular competence, enjoyment and being with friends;

material factors, various opportunities, and diverse equipment available for self-organised, informal and recreational active play activities.

The integrated analysis of the data presented in this chapter reveals the complex and dynamic relations and intra-actions (Barad, 2007), which shape the school playground ecosystem (Shelton, 2019) during lunch break. This complex ecosystem is formed by the assembled dynamic relations and intra-actions between behaviour and emotions of early adolescents, older students, and adults, and the social, cultural, physical, material, policy and curriculum environments in secondary school. This ecosystem has the "capacities to act and be acted upon" (Seigworth and Gregg, 2010 p.1) positively and negatively with respect to adolescents' active play and physically active behaviour. The integrated analysis of the participants' experiences of lunch break in secondary school with their motor competence domain of physical literacy levels, their physical activity levels and the motives for taking part in physical activities revealed that these assembled relations and intra-actions are not static, but are fluid and ongoing processes emerging every time around different "events" (Deleuze and Guattari, 1987). At the beginning of their first year in secondary school, on average the participants were active, at any intensity, for more than 60% of the lunch break time. However, at the end of the same school year, this percentage dropped to less than 40% of the duration of lunch

break. Using intersectionality as an analytical tool (Hill, Collins and Bilge, 2016) it emerged that the entanglement (Barad, 2007) of gender, age, peer pressure, and perceived motor competence negatively affected adolescents' active play behaviour during lunch break. The analysis of the physical activity levels and the adolescents' narratives of their lunch break experiences showed that in the girls, in particular, inactivity levels raised significantly. However, it was evident from the girls' perceptions and involvement in the discussion that they did not stop playing through a lack of interest. Studies (West, *et al.*, 2010) suggest that in the transition between primary and secondary school negative experiences affect adolescents with lower self-confidence in particular. The narratives of some of the boys involved in this study confirmed these findings. Participation in active play activities decreased amongst the boys who perceived their motor skills levels not adequate enough for taking part in the activities, and/or did not enjoy the competitive and exclusive environment which was often created by older students. For example, playground observations showed that the boys who took part in the basketball games were all S1 students while the majority of the players in the football match were older students.

The results suggest that when the senses of relatedness, competence and autonomy are fostered adolescents are motivated in taking part in active play activities. For the majority of them, enjoyment, opportunities for taking part in different and varied activities, not only sports-orientated, in a relaxed context together with their friends are the factors that can enhance participation in active play activities during lunch break. Spending time with friends is fundamental in adolescent life (Smith, 2016). Lunch break is one of the few moments of the school day they can have a chat and spend time with friends and various participants stated that if their friends did not want to take part in physical activities during lunch break, they would rather spend time inactive with them than play a game with other students.

In the second part of the chapter, I present the participants' and my own perspectives based on this extensive fieldwork and contact with the settings on the characteristics of an effective process of co-creation based on intergenerational dialogue.

5.2 Dialogic approach for co-creation

This second part of the chapter looks at the characteristics of an effective model for co-creating opportunities for active play. These characteristics emerged from the analysis of adolescent and adult participants' perspectives and experiences integrated with my own links between the review of literature and fieldwork experience as a researcher embedded in this setting.

The research question explored in this part was

> Research question 3
>
> **What are the characteristics of effective models of co-creation of play provisions? How can these be utilised in schools settings?**

The research process itself can be considered as an exploration of the characteristics of an effective model of co-creation of play provisions. This model was supported by intergenerational dialogue and it can be applied in educational settings. The reflections from the participants (adolescents, adults, and myself) on the research process suggest that an effective model of co-creation should be based on some important characteristics, dialogue, equal relationships, respect, understanding, and shared interests.

Research question 3

Finding 1

This research demonstrates that a viable model for the co-creation of active play in schools will:

involve stages where the young act as co-researchers with their peers;

involve times when young people act collaboratively with significant adults to make changes in culture and practice;

be based on dialogue, equal relationships, respect, understanding, and shared interests.

Research question 3

Finding 2

In relation to supporting play in secondary school settings, intergenerational dialogue inclusive of young people needs to consider important differences between early adolescent and older adolescent sub-groups.

In this study, co-creation was considered as a "collaborative public health intervention development by academics working alongside other stakeholders" (Leask *et al*., 2019, p. 2), and "involving the target audience in both the design and implementation stages of an intervention" (Morgan, *et al*., 2019, p.2). In this project, the co-creative elements of the research process are intended as an approach where, in some of the different stages of the research project, the researcher, school professionals, and students were actively involved, and collaborated working in a partnership built on mutual respect, to produce new ideas and knowledge. The involvement of adults, adolescents, and the researcher in the process of co-creation of opportunities for active play produced significant understandings of the complexity

of adolescents' active play behaviour in secondary school. The importance of involving early adolescents as co-researchers emerged during the intergenerational focus group sessions. Here, the power imbalance between adolescents and adults was, to some extent, readjusted by involving adults and adolescents in an intergenerational dialogue stimulated by both adolescent-defined and researcher-defined questions. The role of early adolescents as co-researchers also supported a different relational approach between adults and adolescents where adolescents' voices are listened to and can make a valuable contribution. In this way, both adolescents and adults were at the centre of the collaborative process of co-creation. I restate the definition of intergenerational dialogue adopted in this study. Intergenerational dialogue is described as any "activity or program that increases cooperation, interaction or exchange between any two generations." (Ventura-Merkel and Lidoff,1983, p. 3).

I considered intergenerational activities in an educational setting as

> "(a) involving people from two or more generations participating in a common practice that happens in some place; (b) involving different interests across the generations and can be employed to address the betterment of individual, community, and ecological well-being through tackling some problem or challenge; (c) requiring a willingness to reciprocally communicate across generational divides (through activities involving consensus, conflict, or cooperation) with the hope of generating and sharing new intergenerational meanings, practices, and places that are to some degree held in common, and (d) requiring a willingness to be responsive to places and one another in an ongoing manner" (Mannion, 2012, p. 397)

In what follows I present the perspectives of the adolescent and adult participants gained from their comments about the co-creation process. I also explore the intra-action between adolescents and adults that emerged during the intergenerational dialogue sessions. The process of co-creation was supported by the knowledge that originated through the integration of the different findings that were identified in this study. These findings emerged from the

image of adolescents' active play behaviour during lunch break devised from the analysis of the quantitative data, integrated with adolescents and adults' experiences and perspectives on the barriers and facilitators to active play activities.

During the intergenerational focus groups sessions, adolescents and adults collaborated in identifying factors that might facilitate participation and in co-creating opportunities for active play. When considering this collaboration, there is an important element which characterises a co-creational approach: the link between theory and practice (Horner, 2016), Greenwood considers *phrónêsis* as "the design of problem-solving actions through collaborative knowledge construction with the legitimate stakeholders in the problem" (2008 p.327). *Phrónêsis* thrives in a democratic and transformative process where all the participants identify the problem to be addressed and collaboratively generate ideas and different forms of knowledge (Greenwood, 2008).

The process of collaborative knowledge construction supports the understanding of the ways other people assemble knowledge and their forms of interactions with others (Wellard, 2014). The knowledge generated through the dialogue (Freire, 2000 [1970], 2005 [1974]) between the expertise and experiences of the protagonists in the playground with the knowledge and experiences of the researcher and the adult members of the school staff links to *phrónêsis*, a democratic process of knowledge production (Greenwood, 2008; Thomas, 2011). Comprehending a specific case, such as the school in this study, can produce "exemplary knowledge" (Thomas, 2011) related to the specific contexts, actions, and events. Mannion and co-workers (2011) noted that exemplary knowledge can emerge also through the active participation of the readers. The capacity to consider practical solutions, *phrónêsis,* that a case study offer may resonate with the readers' experiences, their own *phrónêsis*, to generate new ideas and insights (Thomas, 2011). This case study research project can contribute through experiences of exemplary knowledge in supporting policymakers, educators, and others in better understanding of the complexity of adolescents' physically active behaviour and the factors that affect positively and negatively their participation in physical activities.

To investigate the characteristics of an effective model of co-creation based on intergenerational dialogue I integrated adolescent and adult perspectives with my personal consideration. Adolescents' and adults' perspectives were investigated by analysing their comments on the intergenerational focus group sessions which they provided in the feedback form anonymously (see appendix 4). At the end of the sessions, I also had conversations with the adult participants after the adolescents left the room.

The main themes that emerged were related to the opportunity to have a forum with adults to discuss issues they experienced in school with the chance to offer and suggest ideas and proposals.

All the adolescent participants stressed the significance of communicating their ideas with other peers and adults

> Adolescent: Getting to discuss ideas with other people.
>
> Adolescent: It gives us a chance to say what we think.
>
> Adolescent: Ideas are being generated from younger students.
>
> Adolescent: I can give ideas of my own.

For the adolescents was important to share their experiences in the playground as newcomers in secondary school, both amongst their peers and with significant adults. During the intergenerational focus groups, the adolescents' expertise and knowledge about life in the playground during lunch break became clear. They critically identified the barriers to participation in active play activities they experienced in their first year in secondary school and proposed practical solutions for increasing participation in active play activities. The knowledge generated was useful for the adult participants as the majority of the members of school staff generally do not spend lunch break in the playground. The adults' unawareness

of some of the barriers the young students encountered during lunch break emerged during the sessions.

For the adult participants, the opportunity to take part in these sessions and discuss in an equal and horizontal relationship (Freire, (2005 [1974]) was important too.

> Adult: Getting the chance to talk about young people getting active and trying to make it happen.
>
> Adult: Exploring ideas that could be implemented in school to encourage free play, outdoor learning and increased activity levels for all.

During the sessions and the debriefing conversation with the adult participants, the importance of these sessions for gaining a better understanding of the factors that hindered students' participation in active play activities became evident.

> Adult: You know, my opinion is it's definitely that stigma, peer pressure, scared to run about and have fun, and be a kid.

The co-creational sessions sustained a reflective stance (Beebeejaun *et al.*, 2015) on issues that adolescents encountered in their first year in secondary school. These issues can be addressed, and the outcome might support the wellbeing of the individual and the whole school community (Mannion, 2012). Throughout the section "Co-creating factors facilitating participation in active play activities", the capacity of the adolescents to propose and suggest practical and pragmatic ideas to encourage more students to be active during lunch break was evident. A key example was the proposal of a "fun box" in the playground that contains equipment from different sports that the students can use during lunch time. In the context of

horizontal relationships (Freire, 2005 [1974]) the adults' ability to listen and recognise the relevance and value of some of the adolescents' solutions was also evident; see for example the discussion between one of the adults, Oliver, Emma, and Andy in "Material and physical environments facilitators". This example shows the importance for adolescents and adults to discuss together ideas and suggestions about shared contexts and spaces (Mannion, 2012).

The democratic, collaborative, and transformative characteristics of an effective model of co-creation framed in an intergenerational dialogue supported the production of knowledge and problem-solving ideas, the *phrónêsis* (Greenwood, 2008). The process of co-creation also generated an actual change in lunch break opportunities. A few months after the focus groups sessions, one of the adolescents' proposals (Oliver's idea about trying different sports during lunch break), was implemented and once a week during lunch break students had the opportunity to try different activities.

During the intergenerational focus group sessions to explore the relationships between adolescents and adults, I adopted a different role than in the previous data collection stages. Throughout the research process my role of researcher changed continuously, while my position of learner remained constant. During the quantitative study, my role was the main researcher. In the group interviews, I became a co-researcher together with the adolescent participants. During the intergenerational focus groups, my role changed again and I became a facilitator. My role as facilitator was to create the conditions to encourage discussion and active involvement from all the participants. I distanced myself from the discussions (I was not seated at the table where the participants were seated) and concentrated on the adolescent-adult dynamics.

In the sessions, the communications between the adolescents and adults were based on respect and understanding. Furthermore, the intra-action (Barad, 2007) between adolescents and adults during the discussions about encouraging more students to be active was built on an equal relationship. The importance of inclusive and positive relations between participants

emerged as one of the fundamental characteristics of an effective model of co-creation based on intergenerational dialogue.

> Adolescent: Everyone gets to talk.

All the participants in the intergenerational focus groups, the adolescents, adults and myself, together created a horizontal (Freire, 2005 [1974]; Marzano and Urbinati, 2017), democratic, educational environment where everyone could bring out (e-ducere) their ideas, critical comments and suggestions freely without any judgement. Both adolescents and adults might raise their awareness of the intrinsic importance of being active by participating in discussions about creating an environment that supports wider participation in physical activities. This increased understanding of the importance of physical activity is also one of the attributes of physical literacy (Whitehead, 2010). Therefore the participation in discussions, such as the intergenerational focus group session in this study, might support both adolescents' and adults' physical literacy journey, which is an added value for both generations (Mannion, 2012).

> Adult: The whole community understanding the value of health and wellbeing, having equal status to literacy and numeracy!
>
> Adolescent: Give our ideas to help more children be active.

One of the characteristics of intergenerational education considers the importance of having different interests across the generations (Mannion, 2012). During the focus groups session, however, it was a common interest in physical activity across the generations that encouraged the conversation between adults and adolescents. The shared interests amongst the participants across the generations emerged as another important characteristic of an

effective model of co-creation based on intergenerational dialogue. The two adults involved in the focus group sessions were professionals in two of the subjects where physical activity is a core component: PE and outdoor learning. Both of them enjoyed being active. During their time in school one of the two adults experienced similar barriers to participation in physical activities as the adolescent participants. The shared interest in physical activity and play helped to break the intergenerational barriers and find a common ground for building knowledge and influencing change. The shared interest emerged from the discussion stimulated by the first question of the focus group sessions (*What do you like about being active?*). This first question was proposed during the session of peer-led questions as part of the second group interviews, and it is one of the questions the whole group also decided to adopt in the focus groups session. The relevance and the significance of this question indicate the importance of involving adolescents in creating physical activity and active play interventions in schools.

The last of the findings related to the characteristics of effective models of co-creation of play provisions based on intergenerational dialogue in secondary school is associated with the concept of intergeneration. Donati (1995) argues that generations evolve and change more rapidly now than before. The integration of the findings related to the negative effect of the transition from primary to secondary school on lunch break physical activity levels on the majority of the participants with the barriers experienced by the participants, revealed the role of the older students in affecting younger students' participation. The intergenerational approach that considers only the binary concept of young generation-old generation might just reinforce stereotypes and fails to understand the complexity and the differences between early adolescents' (11 years old in S1) and late adolescents' (18 years old in their last year of secondary school) active play behaviour. Significant differences between early and late adolescents' approaches towards active play behaviour during lunch break emerged in this study. This finding suggests that a different intergenerational approach is needed in secondary schools for encouraging participation in active play activities. In a complex environment, such as a secondary school, it is fundamental to consider the important differences between early

and late adolescents. For example, the participants in this study considered the pressure to conform from the older students as one of the main barriers to participation in active play activities. Therefore, an intergenerational approach that sees adolescents as one generational block might overlook the important differences between adolescents. An effective model of co-creation of opportunities for active play in secondary schools based on intergenerational dialogue should consider the relationships and the different and shared interests between adolescents and adults as well as between early and late adolescents.

In the next chapter, all the findings that emerged in this study will be discussed in relation to some selected literature. At the end of the chapter, I present some limitations and future directions that resulted from this study's findings. I also offer some recommendations for the application of these arising characteristics of an effective model of co-creation of opportunities for active play in secondary school involving adolescents and adults. Opportunities which might encourage adolescents' participation in active play activities during lunch break.

Chapter 6 Discussion

Introduction

In this chapter, I discuss all the findings that emerged in this study in relation to existing understanding and research on early adolescents' participation in physical activity, on active play during lunch break, and on the characteristics of an effective model of co-creation. I consider how the findings from this research project suggest considerations for policymakers, physical activity, and active play practitioners and academics, and for educators on the importance of involving adolescents in co-creating opportunities for encouraging active play in secondary school. This study, which regarded the promotion of the intrinsic value of play and physical activity as fundamental, explored how negative experiences hinder adolescents' participation and how positive experiences of play and physical activities encourage adolescents' enjoyment of being active. It also investigated the ways gender, age and motor competence intersect and affect adolescents' levels of participation. For adolescents, taking part in physical activities for (future) health benefits might not be as motivating as participating in physical activities with friends in an enjoyable and inclusive environment, playing actively just for the sake of movement (Wellard, 2014). Participation in active play and physical activities during lunch break are important and valuable at any physical intensity. Adolescents' experience of positive physically active events might lead to stronger motivation in maintaining a physically active lifestyle throughout life. By understanding what adolescents consider as an enjoyable, inclusive, and positive environment, adolescents and adults can together create opportunities for active play during lunch break which have the potential to facilitate a greater number of students enjoying being active.

Extensive research has been done on the health benefits of physical activity and now it is widely recognised that physical activities performed at moderate and vigorous intensity are fundamental for health and wellbeing (Lee *et al.*, 2012; McKinney *et al.*, 2016; Poitras *et al.*, 2016; Warburton, *et al.*, 2006; Strong *et al.,* 2005). Recent studies also suggest that light-

intensity activities are beneficial for health (Füzéki *et al.,* 2017; Poitras *et al.*, 2016). Research does also recognise that long periods of inactivity are detrimental to health and wellbeing (Lee *et al.*, 2012). The physiological, psychological, emotional, mental and social benefits of participation in active play (Brockman *et al.,* 2010; Brown, 2009; Ginsburg *et al.,* 2007; Matthews *et al.,* 2011) in young people are recognised. Yet, research suggests that during the day adolescents are not sufficiently active, and girls are less active than boys (Cooper *et al.*, 2015; Dumith *et al.*, 2011; Guthold *et al.*, 2020). The daily physical activity levels of the majority of the participants in this study confirm this trend. Adolescents in the "minority world" (Punch, 2000, p.60) spend nearly half of their waking time in school (Fox *et al.,* 2004; Ramstetter *et al.,* 2010; Waring *et al.,* 2007). Therefore, the school might be an ideal environment to encourage adolescents of any social, economic, and ethnic background in enjoying being physically active (Dobbins *et al.*, 2013; Harris and Cale, 2019; Hyndman, 2017; Nettlefold *et al.*, 2010; Ramstetter *et al.,* 2010; Rickwood, 2013).

During school time, adolescents have different opportunities to be active. These opportunities take place in an environment that can be both formal (PE classes), and informal. The informal environment can be both organised by adults (for example clubs run by adults during lunchbreak and after-school time) and self-organised (clubs run by adolescents and active play activities during lunch break and after-school time).

Lunch breaks, although structured (they are limited by time constraints decided by adults) are the only periods in school time when the students can self-organise and take part in active play activities together with their friends. Many studies do consider lunch breaks as an ideal opportunity for every adolescent to be active in self-organised activities (Hyndman, 2017; Pellegrini, 2005; Reilly *et al.*, 2016; Ridgers *et al*, 2012; Parrish, *et al.*, 2013). However this promise is currently underdeveloped (Reilly *et al.*, 2016), and the lunch break physical activity levels of the participants confirm this suggestion. Furthermore, interventions to encourage physical activity in secondary schools seem ineffective (Dobbins *et al.*, 2013).

In this study, while I recognise the holistic health benefits of physical activity, I did not investigate the ways in which adolescents and adults consider physical activity for health. This

study adopted a bottom-up approach in looking at opportunities for active play activities to encourage wider participation in physical activities during lunch break. The early adolescents, the newcomers in secondary school, were involved in exploring and critically considering the barriers to participation in active play activities they experienced during lunch break in their first year in secondary school. Then, early adolescents and adult members of the school staff participated in a process of co-creation of opportunities for active play activities which might encourage enjoyment and participation in physical activities.

This study, framed by a health and social sciences interdisciplinary focus, adopted a mixed methods approach drawn from synergistic and dialogic approaches (Freire, 2000 [1970]; Hall and Howard, 2008) to explore the diverse factors which influence and positively and negatively affect early adolescents' active play behaviour during lunch break. This approach provided a framework for understanding the relationship and the intra-action (Barad, 2007) between human behaviour, social norms, and natural and material contexts in a complex ecological system (Bronfenbrenner, 1979, 1994; Shelton, 2019). The synergy between the quantitative and qualitative approaches and their constant rapport (Hall and Howard, 2008), dialogue (Freire, 2000 [1970]), and integration (Bazeley, 2018) allowed me to explore the research questions from the diverse perspectives and approaches of health and social sciences.

Barriers and facilitators to participation in physical activities and active play were explored through the three basic tenets of self-determination theory (Ryan and Deci, 2017), autonomy, competence and relatedness, and the concept of affect. Affect was considered as a relational network (Ahmed, 2004; Seigworth and Gregg, 2010) of relations between peers, older students and adults. These concepts were integrated into a socioecological model of health behaviour (Bronfenbrenner, 1979, 1994; Sallis *et al.*, 2006; Sallis and Owen, 2015; Shelton, 2019; Stokols, 1992, *et al.* 2003) informed by a new materialist approach (Fox and Alldred, 2017) to explore how the relations and the entanglements between those emotions relations, motivation, bodies, places and matter affect participation in physical activity and active play.

The quantitative study, which adopted a "research on adolescents" approach, provided useful insights on adolescents' physically active behaviour during lunch break and the overall day.

A number of findings emerged from the quantitative study

Quantitative study finding 1
The majority of boys and girls in their first year of secondary school were not sufficiently active during the day.
Quantitative study finding 2
Lunch break physical activity levels decreased between October and May for both boys and girls. Variance in physical activity levels showed that some adolescents were highly active and others were quite inactive. This was especially true in boys.
Quantitative study finding 3
During lunch break, girls were more sedentary than boys. However, both boys and girls increased their sedentary behaviour over time.
Quantitative study finding 4
Intrinsic motives, competence, and enjoyment showed a positive association with participation in physical activity in boys. For girls, extrinsic motive, social, facilitated participation in physical activity.
Quantitative study finding 5
In girls, enjoyment in taking part in physical activities was strongly positively associated with motor competence.

The findings from the quantitative study firstly informed the qualitative study. Then the knowledge acquired from the quantitative study mixed with the analysis of the qualitative study produced integrated findings that answered the first research question.

Research question 1

When and how does active play in secondary schools support increased levels of physical activity and the promotion of physical literacy?

The analysis of adolescents' physical activity levels during lunch break showed a significant decrease in physical activity levels of both boys and girls between October and May for the overall group, as well as a marked diversity of the scores, especially in boys. The integration of these findings with early adolescents' reports of the perceived difference in their involvement in active play activities between primary and secondary school and their views and experiences of active play produced some findings related to the first research question.

Research question 1

Finding 1

The participants reported and showed high physical activity levels during lunch break when involved in active play activities. However, the current secondary school environment supports the participation in active play activities of only a minority of students.

Research question 1

Finding 2

The enjoyable, inclusive and challenging nature of active play supports adolescents in their physical literacy journey.

To answer the second research question I adopted a similar approach. I integrated the findings related to the first research question and those that emerged from the quantitative study with

early adolescents' perceptions of the barriers experienced in their first year of secondary school, and also with early adolescents and adults' ideas and proposals of factors that might facilitate participation in active play activities during lunch break.

Research question 2

Which factors can support or hinder the enhancement of active play opportunities for younger adolescents of secondary school age in the UK?

The adolescents identified some findings related to the barriers to participation in active play activities during lunch break.

Research question 2

Finding 2

Early adolescents' active play behaviour during lunch break was negatively affected by the intra-actions of:

social and cultural factors, in particular pressure from older students, gender inequality, lack of peer support, and self-confidence;

and material factors which offered limited opportunities for active play activities.

Some potential facilitators to participation in active play activity were also identified during both group interviews amongst adolescents and intergenerational focus groups together with adults.

Research question 2

Finding 2

Together the adolescent and adult participants identified key factors which might facilitate enhanced participation in active play activities during lunch break. These were:

social and cultural factors, in particular competence, enjoyment and being with friends;

material factors, various opportunities, and diverse equipment available for self-organised, informal and recreational active play activities.

To answer the third question, I evaluated, together with the participants' perspectives, the characteristics of a model of co-creation of opportunities for active play that involved the participants.

Research question 3

What are the characteristics of effective models of co-creation of play provisions? How can these be utilised in schools settings?

The research process revealed some of the features of a viable model of co-creation based on intergenerational dialogue. The participants' reflections on the co-creation process suggest necessary qualities as follows.

Research question 3

Finding 1

This research demonstrates that a viable model for the co-creation of active play in schools will:

involve stages where the young act as co-researchers with their peers;

involve times when young people act collaboratively with significant adults to make changes in culture and practice;

be based on dialogue, equal relationships, respect, understanding, and shared interests.

Research question 3

Finding 2

In relation to supporting play in secondary school settings, intergenerational dialogue inclusive of young people needs to consider important differences between early adolescent and older adolescent sub-groups.

In the rest of the chapter the findings are discussed in relation to some selected literature and the theoretical approaches adopted in this study. In line with the synergistic approach (Hall and Howard, 2008) some of the findings are presented alone and other integrated. In the first part, I present the quantitative findings related to the daily physical activity levels of the participants. In the second part, I present the findings related to the lunch break physical activity levels that emerged both from the objective data recorded by the accelerometers and the subjective data that emerged from early adolescents' experiences of lunch break in primary and secondary school. In the third part, I discuss the findings related to the barriers to

participation in active play activities the early adolescents faced in their first year in secondary school. In the fourth part, I present the findings related to the factors that might facilitate active play activities during lunch break in secondary school and the role of active play in encouraging enjoyment and participation in physical activities and in supporting the adolescents' physical literacy journey. In the fifth part, I present the findings that emerged from the evaluation of the research process related to the characteristics of an effective model of co-creation of play provisions based on intergenerational dialogue. At the end of the chapter, I present some recommendations about active play opportunities in secondary school.

6.1 Daily physical activity levels

In the first part of the chapter, I discuss the findings related to the analysis of early adolescents' daily physically active behaviour. The knowledge will give an insight into the participants' physical activity behaviour in relation to adolescents of similar age in Scotland and other countries in the "Minority world" (Punch, 2000 p.60)

Quantitative study finding 1

The majority of boys and girls in their first year of secondary school were not sufficiently active during the day.

In this study adolescents' daily physical activity levels were measured using accelerometers. The suitability of this method is warranted from the consistency of the results shown by the participants in this study and various UK and international studies with participants of similar age to the students involved in this study, but considerably larger sample sizes (SPACES: McCrorie and Ellaway, 2017; SPEEDY: Corder, *et al.*, 2010; PEACH: Page, *et al.*, 2009; ALSPAC: Riddoch *et al.*, 2007; EYHS: Riddoch *et al.*, 2004) as well as the International Children's accelerometry database (ICAD), which contains data from twenty studies

performed in ten countries with 27,637 participants aged 2.8 to 18.4 years (of which 10,741 participants aged between 9 and 13 years) (Cooper *et al.*,2015). The uniformity of all these results indicates that the use of accelerometry for measuring physical activity levels in young adolescents is appropriate.

When the CPM mean score was compared with studies which involved adolescents of similar age (ALSPAC, Riddoch *et al.*, 2007) or older (EYHS, Riddoch *et al.*, 2004), in a comparatively larger sample size, the results showed that the participants in this study were the least active. They were also less active than the younger children who took part in the other studies considered (SPACES: McCrorie and Ellaway, 2017; SPEEDY: Corder, *et al.*, 2010; PEACH: Page, *et al.*, 2009; ALSPAC: Riddoch *et al.*, 2007; EYHS: Riddoch *et al.*, 2004). These results confirm the conclusions of a systematic review and pooled analysis (Dumith, *et al.*, 2011) that physical activity declines during adolescence.

While the participants' values of CPM, which is a standardised and consistent unit of measure for all the activities and their intensities, can be compared with other studies, it is more difficult to compare the values of MVPA. This is due to a discrepancy in the approaches to quantify the different intensities of physical activity and different protocols (Guinhouya *et al.*, 2013). The adolescents who took part in this study spent on average 54 minutes in MVPA during the day at the first timepoint and 60 in the second. The participants in the SPACES (McCrorie and Ellaway, 2017) study from Scotland and of a similar age group of the participants in this study, although they were primary school students, recorded much higher time spent in MVPA (73 mins). However, the percentage of participants in this study who met the guidelines adopting the threshold measure was higher than the participants in the SPACES study. Other studies that investigated MVPA levels during the day and recess in secondary school (Klinker, *et al.*,2014; Grao-Cruces *et al.*,2019) showed similar results.

Systematic reviews and pooled analysis (Dumith *et al.*, 2011; Guthold *et al.*, 2020) indicate that the majority of adolescents globally do not meet the CMO recommendation on physical

activity. The results of this study are in line with their findings. The percentage of adolescents in this study who met the CMO guidelines of at least 60 mins of MVPA time on each day recorded was 8% at the first timepoint and 16% at the second timepoint. This result confirms the findings of a previous study of adolescent physical activity in Scotland (Hughes *et al.*, 2018). In this study, which compared various countries on physical activity levels and other indicators, Scotland scored the lowest grade in overall physical activity. This study also adopted an "average" approach, where the adolescents' physical activity level threshold was considered not daily but on average across the seven days. The average of 60 minutes daily across the week is the recommendation of the actual CMO guidelines for physical activity (UK Gov., 2019, p.9). When the average approach was considered the percentage of participants who met the recommendation increased to 40%. Two other studies adopted both the daily and the average approaches (McCrorie *et al.*, 2018; Mooses *et al.*, 2016). Both studies found a significant increase in the percentage of adolescents who met the guidelines when the average approach is considered (11% daily, 68% average McCrorie *et al.*, 2018; 24% daily, 52% average Mooses *et al.*, 2016). Although the average approach is considered to overestimate the percentage of young people considered active (Price *et al.*, 2018), it gives a reasonable picture of the complexity of physical active behaviour without adopting the 60 minutes division active/not active.

In this study, in general, boys were more active than girls at both timepoints both during the day and during lunch break. These results confirm the vast evidence produced in studies, systematic reviews and similar studies (Cooper *et al.*, 2015; Dumith *et al.*, 2011; Guthold *et al.*, 2020; McCrorie *et al.*, 2018; Van Hecke *et al.*, 2016) that 11 years old girls are less active than boys. However, in this study at the second timepoint six boys (out of 14 participants) recorded less than 45 minutes per day of MVPA. Therefore, these results suggest that there is a need to understand the barriers that girls and non-active boys find in participating in physical activities and to involve them in promoting policies to create opportunities to support their participation in physical activity. The findings in this small study confirmed the international and national trends showing low levels of adolescents daily physical activity.

Although the knowledge of daily physical activity levels is important for getting a general picture of overall participants' physical activity behaviour, it is also crucial to study adolescents' physical active behaviour within the diverse context in which they spend their time during the day.

6.2 Lunch break physical activity levels

Many studies suggest that adolescents are not sufficiently active during the day and their levels of activity constantly decline from childhood to adolescence (Cooper *et al.*, 2015; Corder *et al.*, 2010; Dumith *et al.*, 2011; Farooq *et al.*, 2018, 2020; Guthold *et al.*, 2020). The daily physical activity levels of the adolescent participants in this study were in line with those of previous studies. School lunch breaks provide boys and girls from any ethnic, social, and economic backgrounds with an equal opportunity to be active (Baines and Blatchford, 2019; Baines, *et al.*, 2020; Dobbins *et al.*, 2013; Harris and Cale, 2019; Hyndman, 2017; Nettlefold *et al.*, 2010; Ramstetter, *et al.*, 2010; Rickwood, 2013). Furthermore, for adolescents, lunch breaks are one of the few occasions they have during the day to self-organise and take part in active play activities with their friends without adults' involvement, and the only long period of free time during school time (Baines and Blatchford, 2019; Baines, *et al.*, 2020; Dobbins *et al.*, 2013; Harris and Cale, 2019; Hyndman, 2017; Nettlefold *et al.*, 2010; Pellegrini, 2005; Ramstetter *et al.*, 2010; Waring, *et al.*, 2007)

Physical activity is a complex behaviour influenced by different factors in various contexts (Ridgers *et al.*, 2012). Since in this research study the emphasis is on the opportunities for active play and physical activity behaviour during lunch break, the focus on this section is on the findings related to adolescents' physical activity levels during lunch break.

Quantitative study finding 2 **Lunch break physical activity levels decreased between October and May for both boys and girls. Variance in physical activity levels showed that some adolescents were highly active and others were quite inactive. This was especially true in boys.**
Quantitative study finding 3 **During lunch break, girls were more sedentary than boys. However, both boys and girls increased their sedentary behaviour over time.**
Research question 1 Finding 1 **The participants reported and showed high physical activity levels during lunch break when involved in active play activities. However, the current secondary school environment supports the participation in active play activities of only a minority of students.**

Children and adolescents spend a large proportion of their waking time in school (Waring *et al.*, 2007). Lunch breaks, which are the only period within school time when they can take part in unstructured activities such as active play, have the potential for providing opportunities for physical activity (Waring *et al.*, 2007). For their potentiality, lunch break physical activity behaviour has been the subject of several studies (Reilly, *et al.*, 2016). The majority of these studies, however, are focused on primary school children, while adolescents' physical activity behaviour during lunch breaks is still under researched (Ridgers *et al.*, 2012).

Researchers recognise that students should spend at least 40% of recess time in MVPA (Reilly, *et al.*, 2016) as suggested by Ridgers and Stratton (2005). However, a systematic review (Reilly, *et al.*, 2016) which included studies on physical activity levels during lunch

break in primary and secondary schools, showed that only in four (three in primary schools: Ridgers *et al.*, 2010; Verstraete, *et al.*, 2006; Wickel and Eisenmann, 2007; one in secondary school: Martinez-Gomez *et al.*, 2010) out of 26 studies this target was achieved. In secondary school (see table 12) this level of activity might be difficult to achieve. Furthermore, as mentioned before, daily physical activity levels diminish during adolescence (Dumith *et al.*, 2011) and physical activity levels during lunch breaks follow the same trend. Ridgers (*et al.*,2011) in their five-year longitudinal study found a significant decrease in physical activity levels during lunch breaks. However, during lunch breaks, although adolescents spent a part of their lunch break in MVPA they are not sedentary for the rest of the time, they spent considerable time in light-intensity activity (see table 12). Therefore, in line with growing evidence on the possible health benefits of light-intensity physical activity (Füzéki *et al*., 2017; Poitras *et al.*, 2016) and the CMO recommendation about reducing the time spent sedentary, the 40% target might be more realistic when all the intensities of physical activity are considered. More studies should consider light-intensity physical activity in their analysis. The participants in this study spent on average 12 minutes in MVPA and 19 minutes in light-intensity physical activity at the first timepoint and 9 minutes and 15 minutes respectively at the second timepoint for 50 minutes lunch break. They were also inactive for 19 minutes at the first timepoint and 26 minutes at the second timepoint. These results are similar to previous studies in secondary schools (see table 12). However, the participants in this study recorded large differences in their activity levels during lunch break, particularly between boys. The students who were involved in football or basketball games during lunch break and reported higher participation in active play activities during lunch break in secondary school compared to the same period in primary school were active for over 60% of their time. However, they were a minority in the school. Yet, they show that when adolescents find an opportunity to play close to their interests they spend time being active.

While primary school physical and cultural environments during lunch break seem more active play oriented, where a variety of different activities take place at the same time, secondary school environments seem more sports oriented (Harrison *et al.*, 2016; Rickwood, 2013

McKendrick, 2005, 2019a) The different physical and cultural environments in secondary schools affected, both positively and negatively, students' physical activity levels. The students more interested in sports-related play activities were positively affected by the environments in secondary school. They recorded high levels of physical activity during lunch break and reported increased participation in active play activities compared to the same period in primary school. On the contrary, the students in their first year who felt insecure or were not interested in taking part in competitive sports games were negatively affected by the secondary school lunch break physical and cultural environments, which led to an increase in the time spent inactive during lunch break.

TABLE 12 COMPARISON WITH UK AND INTERNATIONAL STUDIES: LEVELS OF ACTIVITY DURING LUNCH BREAK OVERALL

Study	Location / length lunch break (minutes)	Participants / age	Threshold MVPA	Sedentary		Light		MVPA	
				1st timepoint	2nd timepoint	1st timepoint	2nd timepoint	1st timepoint	2nd timepoint
Active Spaces	North East Scotland / 50	25 / 11.8	›2296cpm¹	19.2" 38%	25.9" 52%	18.7" 38%	15.2" 30%	12" 24%	8.9" 18%
Klinker *et al.*, 2014	Denmark / na	367 / 12.4-14.3 (two groups)	›2296cpm¹	na		na		7.8" 15% (12.4 y.o.) / 5.7" 10% (14.3 y.o.)	
Martinez-Gomez *et al.*, 2010	Spain / 25	32 / 12.7	›2000cpm²	na		na		13.1" 52%	
Frago-Calvo *et al.*, 2017	Spain / na	216 / 12.15	›2296cpm¹	na 42%		na 49%		na 8%	

Notes: "= minutes in activity levels; %= percentage of time in activity levels; Accelerometers adopted: ¹Actigraph GT3X; ²Actigraph GT1M; Active spaces: Current research project.

A common feature amongst the different studies is that boys are more active than girls. As mentioned earlier, during the day boys are more active than girls (Cooper *et al.*, 2015; Dumith *et al.*, 2011; Guthold *et al.*, 2020: McCrorie *et al.*, 2018; Van Hecke *et al.*, 2016). This trend was also confirmed in reviews which focused on physical activity levels during the lunch break

in early years, primary and secondary schools (Hinkley *et al.*, 2008; Ridgers *et al.,* 2012; Sallis, *et al.,* 2000; van der Host *et al.,* 2007) and studies on lunch break physical activity in secondary school (Frago-Calvo *et al.,* 2014; Klinker *et al.,* 2014; Martinez-Gomez *et al.*,2010; Bailey *et al.*,2012) (see table 13). In this study, at the second timepoint girls were active (light intensity and MVPA) only for slightly less than 40% of the lunch break time. They were sedentary for more than 60% of their lunch breaks time, which may have a negative effect on their health. However, while the lunch break physical activity levels of the girls as a group were quite homogeneous, the physical activity levels of the boys were quite different. The least active boys recorded less than 15 minutes of MVPA and light-intensity activities. Thus, it is important to find opportunities for engaging girls and non-active boys in physical activities during lunch breaks in secondary schools.

It has been suggested that the difference in participation in physical activities between boys and girls during lunch break might be explained by their different approaches to lunch breaks. While boys generally spent their lunch breaks for playing games (e.g. football, basketball), girls may consider lunch breaks as a time for socialising with friends (Blatchford, *et al.*, 2003; Frago-Calvo *et al.*, 2017; Nettlefold *et al.*, 2010; Ridgers *et al.,* 2012) and these stereotypes act as barriers for adolescent girls who want to be active (Martins *et al.*, 2015; WSFF,2012) but also for the boys who do not like or do not feel competent enough in playing games. As it emerged during the group interviews and the intergenerational focus groups the girls were more involved than the less active boys in critically challenging the barriers to participation they experienced and in identifying alternative spaces and opportunities for being active.

TABLE 13 COMPARISON WITH UK AND INTERNATIONAL STUDIES: LEVELS OF ACTIVITY DURING LUNCH BREAK BY GENDER

Study	Loc. / time	Part. / age	Thres.	Sedentary		Light (b/g)		MVPA (b/g)`	
				1st time point	2nd time point	1st time point	2nd time point	1st time point	2nd time point
Active Spaces	North East Scot / 50 mins.	14(b) 11(g) / 11.8	›2296 cpm[1]	16 ̋ / 32% (b) 23 ̋ / 47% (g)	22 ̋ / 44% (b) 31 ̋ / 62% (g)	20 ̋ / 41% (b) 17 ̋ / 33% (g)	17 ̋ / 35% (b) 12 ̋ / 25% (g)	14 ̋ / 27% (b) 10 ̋ / 20% (g)	11 ̋ / 21% (b) 7 ̋ / 13% (g)
HAPPY (Bailey *et al.*, 2012)	Eng. / 45-65 mins.	57(b) 78(g) / 11.8	›960 cpm[4]	16 ̋ / 30% (b) 25 ̋ / 45% (g)		14 ̋ / 25%(b) 17 ̋ / 29% (g)		26 ̋ / 45%(b) 15 ̋ / 26% (g)	
Martinez *et al.*, 2010	Spain / 25 mins.	20(b) 12 (g) / 12.7	›2000 cpm[2]	na		na		13.5 ̋ / 54% (b) 12.5 ̋ / 50% (g)	
Medina *et al.,* 2015	Mexico / 30 mins.	72 (g) / 13.5	›1500 cpm[3]	14 ̋ **/** 41**% (g)**		18 ̋ **/** 53**% (g)**		2 ̋ **/** 6**% (g)**	
Frago-Calvo *et al.*, 2017	Spain / na	116(b) 100(g) / 12.15	›2296 cpm[1]	na ̋ / 39% (b) na ̋ / 47% (g)		na ̋ / 49%(b) na ̋ / 49% (g)		na ̋/ 12%(b) na ̋ / 4% (g)	
Klinker *et al.*, 2015	Den. / na	175(b) 192(g) /11-16	›2296 cpm[1]	na		na		8 ̋ / 16%(b) 6 ̋ / 11% (g)	

Notes: Loc. = location of the study; time = length of lunch break; Part = participants; Thres. = MVPA threshold ̋= minutes in activity levels; %= percentage of time in activity levels; Accelerometers adopted: [1]Actigraph GT3X; [2]Actigraph GT1M; [3]Actical; [4]Stayhealthy RT3; Boys= (b), Girls = (g); Active spaces: Current research project; HAPPY= Health and Physical Activity Promotion in Youth; Scot. = Scotland; Eng. = England; Den. = Denmark; mins. = minutes.

Reilly (*et al.,* 2016), in his systematic review on the contribution of recess physical activity levels on daily MVPA, reached two alternative conclusions. He observed that at the moment lunch breaks do not offer opportunities for a significant contribution of daily MVPA and suggested that policies should focus more on physical education and physical activity opportunities outside school (Reilly *et al.,* 2016). On the other hand, he noted that the potential of school recess is still yet to be discovered (in the systematic review only two studies were conducted in secondary schools) and more monitoring of physical activity levels during lunch breaks is needed (Dobbins *et al.,* 2013; Reilly *et al.,* 2016). The results of this study showed that the contribution of lunch break MVPA on daily MVPA was 23% at the first timepoint and 13% in the second overall. The contribution of lunch break MVPA was higher for boys at both timepoints (Boys: 25% 1st; 15% 2nd. Girls: 19% 1st; 11%2nd). These results are consistent with other studies that used accelerometers to monitor adolescents' physical activity levels during lunch breaks. The results in this study showed a similar contribution as the results of the HAPPY study (Bailey *et al.,* 2012) found (26% for boys and 15% for girls) and higher than what Klinker (*et al.,* 2015) (12% overall and 11% boys and girls) and Medina (*et al.,* 2015) (3.3% for girls) found. The importance of the contribution of lunch break MVPA in this study was more evident in the students who did not meet the CMO daily recommendation, girls at both timepoints, and boys at the second timepoint. In this study, the girls who were more active during lunch breaks were the least active outside school. This result shows how lunch breaks could positively contribute to the adolescents' health and well-being as well as providing an important contribution to their daily physical activity (Parrish *et al.,* 2013; Ridgers, *et al.,* 2012). Although in the UK there is an increasing number of schools that are reducing the length and the weekly number of their lunch breaks (Baines and Blatchford, 2019), they provide equal opportunities to every adolescent (regardless of any social, economic, or ethnic backgrounds) for socialising, reducing sedentary behaviour, cultivating their interests, being active and play. Socialising and being active are two activities not mutually incompatible, considering the rhapsodic and intermittent nature of the nature of adolescent's active play and physically active behaviour (Ceciliani and Bortolotti, 2013). Lunch breaks are the only periods in a school day

where the students can participate in unstructured physical activities, such as active play with their friends. This is relevant in a school with a wide catchment area, like the case study school, as it emerged from the participants' narratives. For some of them was the only moment of the day they could spend face to face with their friends.

6.3 Barriers to participation in active play activities

In this section, I discuss the findings related to the barriers to participation in active play activities during lunch break identified by the early adolescents.

Research question 2

Finding 1

Early adolescents' active play behaviour during lunch break was negatively affected by the intra-actions of:

social and cultural factors, in particular pressure from older students, gender inequality, lack of peer support and self-confidence;

and material factors which offered limited opportunities for active play activities.

Adolescence is a period of transitions, biological, social, and psychological (Dolto, 1990; Smith, 2016; Steinberg, 2016). The transition from primary to secondary school is an important period in the life of adolescents (West *et al.*, 2010). Research reported that in early adolescence, during the transition from primary to secondary school and in the first year of secondary school, physical activity levels decline significantly, particularly in girls (Cruickshank et al., 2015). During the first few months in secondary school, the early adolescents experience, during lunch break, a playground environment quite different from the one in primary school. These initial experiences in a new school environment were important for the participants. Through the assemblage of early experiences with peers, other students, and

teachers, younger students build their sense of school attachment (Rickwood, 2015). Ogden *et al.* (2006) suggest that play is inhibited in an environment perceived as insecure or threatening. If the perception is prolonged it might have a longer effect on the ability to play in that environment. The early experiences they have in the playground with few other active students and older students who pressure them to stop behaving like a child might affect their experiences and perceptions of active play for the rest of their secondary school life. Negative experiences with peers, other students, and teachers might affect their self-confidence (West *et al.*, 2010).

The perceived barrier most frequently cited by the early adolescent participants, both boys and girls, was the pressure from older students to conform to the behaviour of the other students in secondary school. During adolescence boys and girls are developing their identity (Dolto, 1990; Steinberg, 2016; Smith, 2016). During this process adolescents consider the pressure to conform that comes from peers as more important than the same pressure that comes from adults (Dolto,1990). Smith (2016) also considers that the influence of peer evaluation and fear of rejection is strong in early adolescence, and negative experiences affect their anxiety levels. Blatchford and Baines (2010) suggest that the less formal peer culture in the playground compared to the school culture has its own influential rules and standard of judgment. The fear of early adolescents getting negative reactions from peers has been identified as a barrier during lunch break in a systematic review (Martins *et al.*, 2015). The concept of affect as relational network of relations (Ahmed, 2004; Seigworth and Gregg, 2010) helps to better understand how the intra-action between peers, older students and adults influence positively or negatively participation in physical activities and active play. Massumi (1987) considers affect as a network of various people that affect each other. One affect might enhance or suppress other affects. For example, S1 students were told by older students which activities are appropriate in the secondary school playground and which behaviours are instead linked to primary school children, and therefore out of place in secondary school. Previous studies in Scotland (Robinson, 2014) and elsewhere (Coakley and White, 1992) found that teenagers did not want to be associated with activities which might be considered

as ‘little kids games’, as reported by Claire during the first group interview. They chose instead either activities which were considered more as adult games (football or basketball matches) or chose to be inactive like the majority of the students in the playground.

The other barrier the adolescent participants experienced was related to the performative nature of the active play activities that took place in the playground during lunch break. Systematic reviews found that fear of showing incompetence in front of peers and the competitive nature of physical activities in secondary school act as a barrier to participation in physical activities in adolescents (Martins *et al.*, 2015). In this study, as it emerged from their narratives, the girls and the less skilful boys who took part in these activities at the beginning of the school year experienced devaluation, exclusion, and criticism. Both boys and girls accepted this situation, abandoned these activities and, possibly because they did not find alternative active play activities, they spent their lunch break as inactive or walked out of the school premises. These findings indicate the importance of considering emotions as a product of the relational network between individuals. These “affective economies” (Ahmed, 2004 p.8) play a role in creating opportunities for participation in physical activities and active play. Negative emotions related to the physical activity events the adolescents experienced during lunch break affected their physically active behaviour.

Lunch break is the longest period during the school day when adolescents socialise with their friends (Baines and Blatchford, 2019; Baines, *et al.*, 2020; Blatchford, 1998). Friendship holds a significant role in adolescent life (Dolto, 1990; Smith, 2016; Steinberg, 2016). As it emerged from various early adolescents’ narratives, spending time with friends was more important than taking part in active play activities. This finding is in line with Martins and co-workers (2015) who in their systematic review (2015), found that friends’ interests in activities not related to physical activity have a negative effect on adolescents’ participation in physical activity. The participants noted that, in some cases, they perceived friendship as a barrier to participation in active play activities. They would have liked to be active with their friends. Blatchford (1998) suggests that in the playground friends like the same game, in some other

cases, they decide to be inactive. In the case of this study, however, as emerged from their experiences and their critical evaluation of the performative and gendered nature of the active play activities in the playground, the decision to be inactive might have been affected by the intra-action (Barad, 2007) of the social, cultural, and material environments. It is important, then, to consider the role of positive and negative emotions. They are the effect of a network of relations between people affecting each other (Massumi, 1987; Seigworth and Gregg, 2010). These relations affect adolescents' participation in physical activities.

Next to the social and cultural factors, the early adolescent participants considered the lack of opportunities for active play as a barrier to participation. Various studies on school playgrounds in Scotland (McKendrick, 2005, 2019a), and elsewhere (Harrison *et al.*, 2016; Haug *et al.*, 2008; Rickwood, 2013) found that secondary school playgrounds have more sports facilities than primary school playgrounds. As some of the findings of this study suggest, for some students the availability of a greater number of sports facilities acts as a facilitator to participation in active play activities. Yet for the majority of the students, this availability might be not supportive of wider participation. In a systematic review of the effect of playground design on physical activity levels during lunch break in younger students Escalante *et al.* (2014) found the interventions of playground markings, game equipment, and physical structures had no or short to medium effect. This might suggest that to encourage more adolescents in enjoying physical activities and increase long-term participation a different approach is needed.

The adoption of a socioecological model for health behaviour (Sallis *et al.*, 2006; Sallis and Owen, 2015) helped me in getting a better understanding of the complex intra-action (Barad, 2007) of diverse environments (physical, material, and cultural) in influencing adolescents' participation in physical activities and active play. Therefore in planning and delivering programmes aimed at encouraging participation in physical activities it is important to acknowledge those multiple levels of influence on adolescents' physically active behaviour in school.

Together with physical and material environments, schools need to change their physical activity culture to make it more meaningful for adolescents and open to a variety of activities, active play amongst them. A first step might be to consult them about the factors that encourage adolescents' participation in active play activities during lunch break. Then, to involve them in initiatives for encouraging participation in active play activities during lunch break.

6.4 Facilitators to participation in active play activities and the role of active in supporting adolescents' physical literacy journey

In this section, I discuss together all the findings related to the factors that encourage active play participation from the adolescents' perspectives and the role of active play in promoting adolescents' physical literacy journey.

Quantitative study finding 4 **Intrinsic motives, competence, and enjoyment showed a positive association with participation in physical activity in boys. For girls, extrinsic motive, social, facilitated participation in physical activity.**
Quantitative study finding 5 **In girls, enjoyment in taking part in physical activities was strongly positively associated with motor competence.**
Research question 1 Finding 2 **The enjoyable, inclusive, and challenging nature of active play supports adolescents in their physical literacy journey.**

Research question 2

Finding 2

Together the adolescent and adult participants identified key factors which might facilitate enhanced participation in active play activities during lunch break. These were:

social and cultural factors, in particular competence, enjoyment, and being with friends;

material factors, various opportunities, and diverse equipment available for self-organised, informal, and recreational active play activities.

Adolescents' perspectives and the ideas and proposals they identified together with the adults in the focus groups sessions interrelate with the three basic psychological needs which are the main tenets of Self-Determination Theory: relatedness, competence and autonomy (Deci and Ryan, 2017). Situations that meet these three basic needs seem to have positive outcomes on participation in physical activity (Deci and Ryan, 2017; Owen, *et al.*, 2014; Teixeira, *et al.*, 2012). When relatedness, competence and autonomy are fostered both in the playground material environment and in the social and cultural environments, adolescents are more motivated in taking part in active play activities. Regarding the social and cultural environments, for example, adolescents' participation in the intergenerational focus groups and their role as experts of playground life captured a desire to be considered competent, to feel understood and valued by peers and important adults, and to be autonomous in the choice and engagement in physical activities and active play. Furthermore, regarding the material environment, for the participants, a 'fun box' in the playground full of different sports equipment was one of the most cited material factors that might encourage participation in active play activities during lunch break. This suggestion reflects adolescents' need for autonomy, a desire to choose their way of being active. Yet, a systematic review (Morton *et al.*, 2015) found

no association between physical activity levels and access to sports equipment during lunch break, so it is possible that the material environment alone may be ineffective. As emerged during the interviews and focus groups for both boys and girls, it was important to take part in these activities with their friends, to foster their sense of relatedness. These activities should take place in an enjoyable, supportive and non-judgemental environment, where they would have the opportunity to try different motor skills, to support their sense of competence, without consequences. These are also the features of a playful environment (Bauman,1993; Brown, 2009; Bruner, 1977; Sutton-Smith, 1997).

In this study, from the questionnaires that explored the motives for taking part in physical activities and from the adolescents' experiences and perspectives, it emerged that the social and cultural factors that encourage active play were enjoyment, competence, and being with their friends. These results are consistent with the findings of a systematic review (Owen *et al.*, 2014) on self-determined motivation and physical activity in children and adolescents. For the participants, enjoyment, the opportunities for taking part in different and varied activities, not only sports-orientated, in a relaxed context together with their friends are the factors that can enhance participation in active play activities during lunch break. Enjoyment has been found as the main motivation for taking part in physical activity for young people in Europe (European Commission, 2014). Fun is considered a significant factor in various systematic reviews (Allender, *et al.*, 2006; Martins *et al.*, 2015; NICE, 2007; Rees *et al.*, 2006).

The participants, in particular girls, considered that taking part in activities with friends was an important positive factor for encouraging participation in physical activity. As it was mentioned before, spending time with friends is considered fundamental in adolescent life (Dolto, 1990; Smith, 2016; Steinberg, 2016) and lunch break is one of the few moments of the school day they can have a chat and hang out with friends (Baines and Blatchford, 2019; Baines, *et al.*, 2020; Blatchford, 1998).

For the boys, a sense of competence (for example, being active for developing old and new skills or to meet a challenge) facilitates participation in active play activities. Many reviews and studies suggest that there is a positive association between motor competence and

participation in physical activities in children and adolescents (Barnett *et al.*, 2009; Clarke, 2019; Holfelder and Schott, 2014; Logan *et al.*, 2015; Lubans *et al.*, 2010). Belanger (*et al.*, 2018) noted a positive relationship between the physical competence domain of physical literacy and daily physical activity. This study was the first study to assess the motor competence domain of physical literacy in 11-year-old adolescents in Scotland using the Canadian Assessment of Physical Literacy. In this study, on average, the physical competence score was 21.05 (out of 30) at the first timepoint and 21.91 at the second. These results are consistent with a study which involved more than 10,000 children and adolescents in Canada aged between 8 and 12 years old (4366 were between 11 and 12 years old) (Tremblay *et al.*, 2018). In their study, Tremblay (*et al.*, 2018) reported an average of 20.2 for 11-year-olds and 21 for 12-year-olds[26]. However, in this study, both boys and girls improved their scores in the tasks related to strength and endurance (plank and Shuttle run tests) but they lowered their score in the CAMSA test which assesses fundamental motor skills. The main difference with the Canadian study was that in this study the girls had a higher score in physical competence at both timepoints although they were less active than boys at both timepoints. Therefore, for girls, their objective level of motor competence was not a factor which supports participation in activities during lunch breaks. However, for the girls, enjoyment and motor competence were positively associated. Therefore, to encourage girls, and possibly boys, to enjoy being active it is important to support and develop their level of motor competence. Yet, research suggests that motor competence levels are low in children and adolescents (Hardy *et al.*, 2013; Huotari *et al.*, 2018; O'Brien *et al.*, 2015). Early adolescents are in the middle of the adolescent growth spurt, which some authors (Hirtz and Starosta, 2002) link with impairment of motor coordination. In this period they can grow between 8 cm and 14 cm per year during the peak rate of growth (peak height velocity), with a consequent change in body proportions (Armstrong and Welsman, 2002; Steinberg, 2016). This rate of growth, from a motor competence perspective, means adapting learned motor skills to a

[26] While this study adopted the CAPL2, their study used the older version of the CAPL where the score was out of 32.

different body. Active play is linked with the development of fundamental motor skills, which are the foundation of motor competence (Ginsburg *et al.*, 2007; Johnstone *et al.*, 2018, 2019). Active play is an example of an activity which is inclusive, enjoyable and challenging yet not overly competitive.

Adolescents, while taking part in active play activities, which can be adolescent-organised sports games, semi-structured (tag or chasing games) and unstructured activities (parkour, climbing or jumping), develop a wide range of movement skills, adapting fine and gross movement skills in a range of different environmental context (De Rossi, 2012, 2020). During these activities, they learn to read and interact with the affordances of their environment, coordinate their movements, cooperate with others both in a team and in groups, solving problems. They develop all these life skills both during the activities and in creating the conditions for play, and in the organisation of these activities. The development of these skills supports the adolescents in their physical literacy journey, encouraging them in maintaining a physically active behaviour.

It is apparent from this research that active play can support adolescents' physical literacy journey when they can choose amongst diverse active play activities. These activities can be both more sports orientated activities played in a competitive environment that appeal to some students, as well as more informal, recreational activities not focused on competition that attract other students. Active play activity can positively affect the sense of autonomy and competence, the other two main principles of self-determination theory (Ryan and Deci, 2017) which encourage participation in physical activity. During active play activities, both competitive and informal, the adolescents enhance their movement vocabulary, becoming more competent and confident, which then positively affects their motivation to be active (Brockman *et al.*, 2010; De Rossi, 2012, 2020; Ginsburg *et al.*, 2007; Johnstone, 2018, 2019; Kentel and Dobson, 2007; Kretchmar, 2005; Maude, 2010). Furthermore, as emerged in the quantitative study, the girl participants positively associated motor competence with enjoyment, which adolescents consider as one of the main factors which facilitate participation in physical activity (Martins *et al.*, 2015). Motor competence, motivation, and confidence are

the qualities of a physically literate individual who enjoys being active (Durden-Myers *et al.*, 2018; Jurbala, 2015; Tremblay and Longmuir, 2017; Whitehead, 2010; Whitehead *et al.*, 2018). During play, the adolescents have the opportunity to try different activities together with their friends focusing on the process rather than the outcomes, the final score.

Taking these points into accounts, I propose that a playful environment, enjoyable, inclusive and non-judgemental, that supports adolescents' sense of autonomy, relatedness and competence, the three basic psychological needs according to Self-Determination Theory (Deci and Ryan, 2017), might encourage more adolescents in being active during lunch break and promote their physical literacy journey.

6.5 Adolescents and adults involved in the process of co-creation of opportunities for active play

In this section, I discuss the findings related to the exploration of valuable characteristics of a model of co-creation which could support active play provisions in secondary school.

Research question 3

Finding 1

This research demonstrates that a viable model for the co-creation of active play in schools will:

involve stages where the young act as co-researchers with their peers;

involve times when young people act collaboratively with significant adults to make changes in culture and practice;

be based on dialogue, equal relationships, respect, understanding, and shared interests.

Research question 3

Finding 2

In relation to supporting play in secondary school settings, intergenerational dialogue inclusive of young people needs to consider important differences between early adolescent and older adolescent sub-groups.

During the research process, the importance of involving the early adolescents as co-researchers before the intergenerational dialogic approach became apparent. There are different approaches to co-production and co-creation which move from the involvement of the participants in all the stages of the project (Bell and Pahl, 2018) to the involvement in different stages of the research project (Voorberg *et al.*, 2014). In this study, the research process included different stages where the role of the early adolescent participants changed significantly. The early adolescents occupied a passive role during the quantitative study where they provided valuable information about their levels of physical activity and motor competence, and their motives for taking part in physical activities. Then, in the first group interview, they became participants describing their experiences in the playground answering adult researcher-defined questions. In the second group interview during the peer-led questions session, their role changed more dramatically. Here, the early adolescents became co-researchers asking their peers some questions related to encouraging participation in active play activities during lunch break. The adolescents then decided which of these questions needed further exploration during the intergenerational focus groups sessions. The early adolescents' role of co-researcher during the group interviews and in the focus groups was central to the process of uncovering and understanding the characteristics of a co-creative model. Camara *et al.* (2020) reflected on the importance of involving adolescents not only as participants who give their ideas and perspectives upon adult-defined questions and issues but also as co-researchers that are allowed to investigate issues that are important for them.

I considered the early adolescents' role as co-researchers important to reduce the adult-adolescents power imbalance that exists in research (Christensen and James, 2001). Kirby (2004) considers some important benefits in involving adolescents as co-researcher, for example, they can identify or offer different perspectives on issues that might be important but the researcher may have missed, and wording questions in a language more accessible to their peers. Camara et al (2020) argue that young people have the right to express themselves and are "experts by experience" (p 674) and in particular in the playground during break times (Baines and Blatchford, 2019). Although, as in this study, adolescents' voices and perspectives were analysed and reported by an adult researcher, there might be the risk that children's 'voice research' (p.414) might marginalise adults' perspectives (Mannion, 2007). I suggest that involving the early adolescents as co-researchers first and then in a horizontal (Freire, 2005 [1974]) collaborative process allows both adolescents and adults to share a relational space for producing knowledge.

The other important characteristic of a model of co-creational approach that emerged in this study is the importance of the positive relationships amongst the participants. The participants' considerations and my personal reflection indicate that a model of co-creation based on dialogue, equal relationships, respect, understanding, and shared interests encourages participation and collaboration. Horner (2018) considers a co-creational approach as an ethical approach rather than a methodology. The equal relationship, collaboration, and participation in the production of knowledge are fundamental in the co-creational process. They support the value of democratic and transformative participation that Fielding (2015) argues should be at the centre of the educational process in schools.

During the sessions, the participants maintained "relations based on sharing" (Newman and Sànchez, 2007 p.36). Dialogue was intended as a "horizontal relationship between persons" (Freire, 2005 [1974] p.40). The intergenerational dialogue supported communication, cooperation, and the exchange of knowledge between participants from different generations (Mannion, 2012). During the intergenerational focus groups, adolescents and adults communicated their feelings, opinions, and ideas freely without being judged. Communication

was not a “one-way transfer from knowing subject to a supposedly ignorant one (Pohl *et al.*, 2010 p.271) but it encouraged “*greater understanding and respect between generations*” (Mannion, 2018 p.313. Italics in the original).

The intergenerational focus groups session might be considered as a space for collaborative creation of knowledge between academia, and the local knowledge of the stakeholders. In these spaces where theory and practice merged to create opportunities for active play a form of “*phrónêsis*” is supported (Greenwood, 2008; Thomas, 2011). The proposals highlight the importance to consider, both the material (“fun box”, different sports opportunities, single gender and then mixed sports clubs) and the cultural (equal relationship, collaboration and participation) environments. The influences emerged from the adolescents and adults collaboration that identified opportunities aimed at increasing participation in physical activity during lunch break in secondary school.

During the research process, the differences between the younger and older adolescents on active play activities in the playground emerged from the early adolescents’ perspectives and narratives of lunch break’s experiences in secondary school. It might suggest that the concept of generation should be reconsidered (Donati, 1995) and intergenerational dialogue sessions should involve different age groups of adolescents together with adults.

During the process of the co-creation model, the value of a participatory approach in education emerged as opposed to the concept of education as a method of knowledge transmission, the “banking model” (Freire, 2000 [1970]). This participatory approach shares many similarities with a playful educational approach that focuses on the processes of bringing out adolescents’ capabilities, exploration skills, and critical perspectives, rather than outcomes. The process of co-creation supports principles of social justice (Bell and Pahl, 2018) and it involves the idea of a horizontal society (Marzano and Urbinati, 2017) where pluralism and diversity are valued and encouraged. In this study to collect qualitative data, I adopted traditional qualitative methods, such as interviews and focus groups. Christensen and James (2001) argue that doing research with children and adolescents does not imply using particular methods. In this

study, I privileged the dialogic (Freire, 2000 [1970]) transformative approach giving voice to adolescents and adults, and listening to their experiences and critical evaluations of life in the playground during lunch break. Throughout the different stages of a co-creative process, I focused more on developing an environment which supported dialogue, equal relationships, respect, understanding, and shared interests amongst the adolescents firstly within a group of peers, and then together with the adults. This environment allowed adolescents and adults to bring out their critical and creative capabilities and producing significant knowledge. This knowledge might support the creation of opportunities for active play that may then support wider participation in physical activities and promote adolescents' physical literacy journey.

The different findings corroborate the importance of adopting different theories and research methods in understanding the complexities of adolescents' physically active behaviour. In this study, the adoption of socioecological models of health behaviour (Sallis *et al*., 2006; Sallis and Owen, 2015) reflected the important role of the different environments. The framework of Self-Determination Theory (Deci and Ryan, 2017) showed the importance of creating opportunities that foster the three basic psychological needs autonomy, competence and relatedness. The importance of considering affect as a relational network of people affecting each other (Massumi, 1987) and a new materialist approach showed how the entanglements of relations of bodies, emotions, places and matter affected participation in physical activity. Those theoretical approaches together showed the fundamental role of considering multi-level interventions in the school environment (physical, material, social and cultural) to encourage wider participation in physical activities and active play.

This research project highlighted the importance and value of involving adolescents in projects related to the improvement of the playground in secondary schools. McKendrick (2005) reported that adolescents in secondary school are less involved in the planning and design phases of projects aimed at improving the playground than children in primary schools. Adolescents should be involved and consulted more in decision-making and projects related to playgrounds in secondary schools. Positive collaboration between adolescents and adults

is enhanced by a context that encourages dialogue, respect, understanding, and equal relationship. This approach might also support an adolescents' stronger connection with the school in general and possibly wider participation in active play activities.

6.6 Limitations and further research

In this section, I acknowledge some limitations and future directions of research that emerged from the findings of this project. This mixed methods research project had different objectives. It investigated the role of active play in encouraging physical activity participation and supporting adolescents' physical literacy journey. It explored the barriers to participation in active play the adolescents experienced in their first year in secondary school. The study involved adolescents and adults together in an intergenerational dialogue to collaborate in identifying factors that might support wider participation in active play activities. The study also explored the characteristics and the potential of a model of co-creational process that might be utilised in educational settings.

6.6.1 Limitations

This study initially intended to investigate the effects of active play through the comparison between two secondary schools. A secondary school with a renewed playground area not designed for sports activities, identified as a case study having enhanced play provision, and a school with a standard playground area. The planned investigation included a comparison of physical and literacy levels between the two schools, participant observation of lunch breaks, and the narrative of early adolescents' experiences and perspectives in both schools. However, as it was mentioned in the methodology chapter, the school identified as having enhanced play provision decided to not take part in the study with their S1 students and notwithstanding extensive research involving various PE support officers, charities, and organisations (Educational Scotland, Play Scotland, and the Scottish Association of Teachers of Physical Education) it was not possible to find another similar secondary school.

The sample of the student participants in the quantitative study was not representative of all the S1 students in Scotland, for example, the case study school was in a rural area and the results might have been different in a school in a city area. There are some limitations to consider in the analysis of physical activity levels, physical competence, and motives for taking part in physical activities. At the two time points a limited number of valid data (n= <50% of participants) from the MPAM-R questionnaires was collected. The participants completed the Motives for Physical Activity Measure-Revised (MPAM-R; Ryan *et al.*, 1997) at home and then they gave the questionnaires back at the end of the data collection period together with the accelerometers. This procedure generated a low response rate. The reason behind the choice of filling the questionnaires at home was motivated by school time constraints. The assessment took two complete PE lessons in the first data collection point (when the students who did not agree to participate but wanted to complete the assessment were allowed to, but their results were not registered for research purposes) and a complete school period in the second data collection point (where only the participants were present). It is likely that if I had asked the students to complete the questionnaires immediately after the CAPL assessment or during a PE lesson I would have received a higher number of responses. However, this would have resulted in students missing PE opportunities which for some students may be the only opportunity to be active during the week. As presented before (in the quantitative study's participants section in the methodology chapter), some of the boys dropped out of the study after the first data collection point. The boys who dropped out were more inactive during the lunch break than the boys who participated in both data collection points. The analysis of their physical activity levels and their active play experiences in primary and secondary school would have provided more insight into the barriers to participation that boys experienced during lunch break.

A final limitation is that regarding the role of young people as co-researchers only in limited phases of the research study. The findings of this study provide evidence for involving the target audience, in this case adolescents, in every stage of a research project aimed at enhancing their participation in physical activity and active play.

6.6.2 Further research

This study gave an insight into the barriers to participation that both boys and girls experienced during their first year of secondary school and the factors that might facilitate their participation in active play activities. In this project, the girl participants expressed their critical and transformative perspectives more than the boys, yet the analysis of lunch break physical activity levels showed that the scores of the boys were more heterogeneous than the girls, with some boys really active and others quite inactive. Further research should explore the barriers to participation that the least active adolescents boys experienced and the factors that could motivate them in participating more in active play activities. From the results of this study the need to explore the differences in adults' and adolescents' understanding of the characteristics and the importance of adolescents' active play activities during lunch break becomes apparent. During lunch breaks adolescents would like to take part in activities that are fun, spontaneous, self-chosen, personally directed, satisfying (where the pleasure comes from the play itself), uncertain, episodic, and intrinsically motivated together with their friends. Although they may not identify these activities as play, these are their version of active play activities, which might encourage and motivate a larger number of young people in being active. In the case study secondary school, some of these activities were linked to traditional team sports, for example football and basketball. The choices of these activities could have been influenced by school sports culture and the physical and material environments, the all-weather pitch, and the basketball court. However, these activities were not played only as traditional football matches or basketball games, the adolescents organised and took part in small games (for example scoring a goal in different and unconventional ways or throwing at the basket). Next to these traditional sports activities, new activities for example parkour or the opportunity to try different sports, might have a positive effect on adolescents' participation in physical activities during lunch break.

One of the findings of this study showed that students involved in active play activities during lunch break recorded high levels of physical activity for more than 50% of the duration of the

break. Yet, the only two active play activities on the playground were football and basketball. Further research should also investigate the impact of the availability of a variety of opportunities for active play activities during lunch break on physical activity levels and the promotion of physical literacy. After the intergenerational focus group, one of the factors that might facilitate participation that the early adolescents identified (the possibility to try different sports or activities during lunch break) was implemented. Therefore, a follow-on study, in the same case study school, could investigate the impact of this adolescent-designed opportunity on physical activity and motor competence levels.

The participants' opinions and my personal reflection on the characteristics of a model of co-creational process adopted in this study suggest that the involvement of adolescents and adults in various stages of the project produced valuable knowledge and could transform playground environments in secondary schools. Further research should investigate the involvement of the adolescents in research that more thoroughly employs a co-productive approach (including young people in the production of research outputs and communications to schools, policy makers). Furthermore, this project should involve early and late adolescents to explore the differences in their perspectives on active play behaviour during lunch break.

6.7 Conclusion, the contribution of the study and recommendations

In this last section, I present the major contributions that this study offers to the fields of adolescents' active play, physical activity, and physical literacy promotion and the involvement of adolescents and adults in a model of co-creation of play provisions in educational settings. In the end, I provide some recommendations that emerged from the findings of this study.

This study, by adopting a mixed methods approach, has explored different ways of thinking about the complexities of adolescents' active play behaviour and the promotion of physical literacy. During the research process, I firstly adopted quantitative methods that gave me a picture of adolescents' physically active behaviour during lunch break. The findings showed that the participants significantly decreased their physical activity levels between October and

May. These findings, then, were used to encourage discussion during group interviews and focus groups on the form of histograms, transforming the raw data into an understandable form. The quantitative and qualitative data were then integrated to create two personas, fictional characters with the characteristics of the participants, to prompt discussions and proposals for active play opportunities during the intergenerational focus groups. From a methodological perspective, the adoption and the integration of quantitative and qualitative approaches contributed towards a more refined understanding of adolescents' active play behaviour during lunch break. In particular, it supported a better understanding of the socio, cultural, physical, and material factors that hinder and facilitate their participation in active play activities during lunch break. This study provided valuable insight into the involvement of adolescents as co-researcher in research projects in collaboration with adults in an intergenerational dialogic approach. The intergenerational dialogue between adolescents and adults, when supported by respect, understanding, equal relationships might encourage the process of transformation of the social, cultural, physical, and material conditions that might, in turn, support active play opportunities in secondary schools as well as sustaining a communicative process towards a common understanding of each other. As a practical recommendation for researchers in physical activity promotion in adolescents, the results of this study highlight the importance of using a mixed methods design in studying physical activity and active play behaviour in adolescents. The adoption of mixed methods and the integration of quantitative and qualitative data allowed this research project to gain valuable knowledge even with a relatively small number of participants. They also produced an understanding of the factors that hinder and support adolescents' active play and physically active behaviours in school.

A practical recommendation that emerges from this study concerns governmental education agencies, for example, Education Scotland, and secondary schools. The important role of lunch break in adolescents' physical, social, mental, and emotional well-being should be considered in their policies. Lunch break should be regarded as a fundamental element of the wider curriculum. While more and more schools are reducing the length and the weekly

numbers of lunch breaks (Baines and Blatchford, 2019), this study argues for a reconsideration of their value and importance. Lunch break is an important opportunity for adolescents of any social, cultural, and economic background to be active together with their friends, in self-organised active play activities. However, break times in the UK have been subjected for the last 27 years to a reduction in the length and in the proportion of the daily school time especially in secondary schools (Baines and Blatchford, 2019). The case study school provided an example of this trend. The case study school reduced both the weekly number of lunch breaks (from five to four) and the amount of daily school time allocated to lunch break (from 16% to 13%). As it emerged from the interviews and focus groups, these changes in lunch break policies affected the number of clubs and the opportunities available to the students to be active. Furthermore, as it emerged from adolescents' experiences, the length of lunch break was perceived as one of the barriers to participation in physical activities during lunch break. The adolescents suggested that lunch breaks should be longer to give them enough time for queuing for food, eating their lunch, and being active. Therefore, if governmental and non-governmental agencies wish to encourage adolescents in being active during lunch break they would need to consider the length of time and the weekly number of lunch breaks.

Another consideration that stems from the results of this study is related to adults' understanding of the characteristics of adolescents' active play behaviour and the school physical, material, and cultural physical activity environments. These findings are particularly relevant for non-governmental organizations that aim at encouraging participation in physical activities in school both through the provision of sporting opportunities, for example, the Active School project by Sports Scotland, and the transformation of school playgrounds, for example Learning through Landscapes, and governmental organisations such as Public Health Scotland and local authorities. Secondary school physical activity and playground environments, both socio-cultural (Rickwood, 2013) and material (Harrison *et al.*, 2016; McKendrick, 2005, 2019) are more sports-oriented than play-oriented. During lunch break, this environment seemed to encourage the participation in physical activities of a minority of

students who enjoy playing traditional sports. Furthermore, the level of competitiveness that both boys and girls experienced which sometimes characterised these activities is considered as one of the barriers to participation in physical activities. Schools should support the involvement of the students who do not fit in this sports-oriented environment in active play activities.

To make these changes more sustainable, viable, tailored, and meaningful for the adolescents, the adolescents themselves should be involved in every stage of planning, designing, and implementing physical activity initiatives and on projects and policies related to lunch breaks and playground design and development. Projects aimed at making school playgrounds move active-oriented should consider adolescents' interests and differences in their physically active behaviour. Investing resources only on all-weather pitches supports participation in physical activities and traditional sports mainly in adolescents who are already quite active. To encourage wider participation in active play activities, changes to the physical and material features of the playground and opportunities for different physical activities, for example, parkour or rollerblading, might motivate adolescents, who are not sufficiently active, in taking part in physical activities. From the participants' perspectives and proposals natural or man-made areas which integrate spaces where adolescents can run, climb or jump, together with spaces for socialising should be considered. However, as it emerged from the participants' perspectives physical and material changes are not enough. A whole-school approach is needed (Tibbitts *et al*., 2021). The changes in the physical and material environment should be integrated with changes in the school's physical activity culture, to more equitably align play-based activity alongside sports-oriented activities.

The recommendations related to the school break times' policies, and the physical, material, and cultural environments demonstrate that during the planning and designing phases of any intervention aimed at encouraging adolescents' participation in physical activity, it is fundamental to consider schools as complex systems. Therefore, any interventions to encourage participation in physical activities during lunch break should be multi-level interventions. They should take into consideration all the different aspects of the school's

environments: school policies and wider curriculum planning, and the physical, material, and cultural environments.

The last recommendation is related to the finding regarding the positive association between motor competence and enjoyment in girls. Schools seem an ideal environment for the development of motor competencies as they are the place where girls and boys from any social, economic, and ethnic background have an equal opportunity to be active. Therefore, schools should provide a great deal of different and varied opportunities for the adolescents to be active, supporting the development of their motor competence in an environment supportive, inclusive, joyful, and focused more on the process than the outcome, the final score: in a word, a playful environment.

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Appendix 1 Focus groups protocol

Thank you for coming here to this session.

I will start by saying a few words about my research project, the objectives of this session, and some guidelines about this session.

I am interested in seeing how much active students are during their lunchbreaks in the first year of secondary school (as you were last year) and if they enjoy being active during lunch break. I am also interested to see if it is possible that students and adults can create together opportunities to enjoy being more active during lunch breaks.

I asked you to come here to see if we can come up with some ideas on how we could create enjoyable opportunities for being active during lunch breaks.

Before to start I will give you some guidelines about this session. First of all, there is no need to speak in any particular order, when you have something to say please do so. Second, please do not speak when some else is talking. Third, you do not need to agree with what everyone or anyone in the group says, I am interested in your point of view. All the different points of view are important.

Because we have limited time together, I may need to stop you and redirect our discussion.

I will give you a printout of the various questions, then I would like that you discuss in the group for 3/4 minutes, you can write down notes if you want, and then you will pass your comments and ideas on to me.

I want to remind you that your participation is free, if you want to stop your participation at any point you can do so without any explanation.

All your comments are anonymous and confidential, and If you agree I would like to put your comments and ideas in a report that I am planning to give to the headteacher.

This session will be audio-recorded, do you have any problem with that?

I would like also to clarify that your ideas and comments are for the purpose of the research project and there is no plan, as I am aware, for the school to adopt any of the ideas that will be generated from this session. However, if the school decide to implement some of your ideas I would like to be informed.

Do you have any questions?

Could you please say your name?

Let’s start with the first question:

What do you like about being active?

These (histogram about accelerometers data Appendix 2) are the results from the accelerometer, the tool I asked you to wear for a week in October and May which record your activity levels. What can you notice from this data? Could you explain that?

What stops you from being active during lunch break?

What stops you from playing during lunch break?

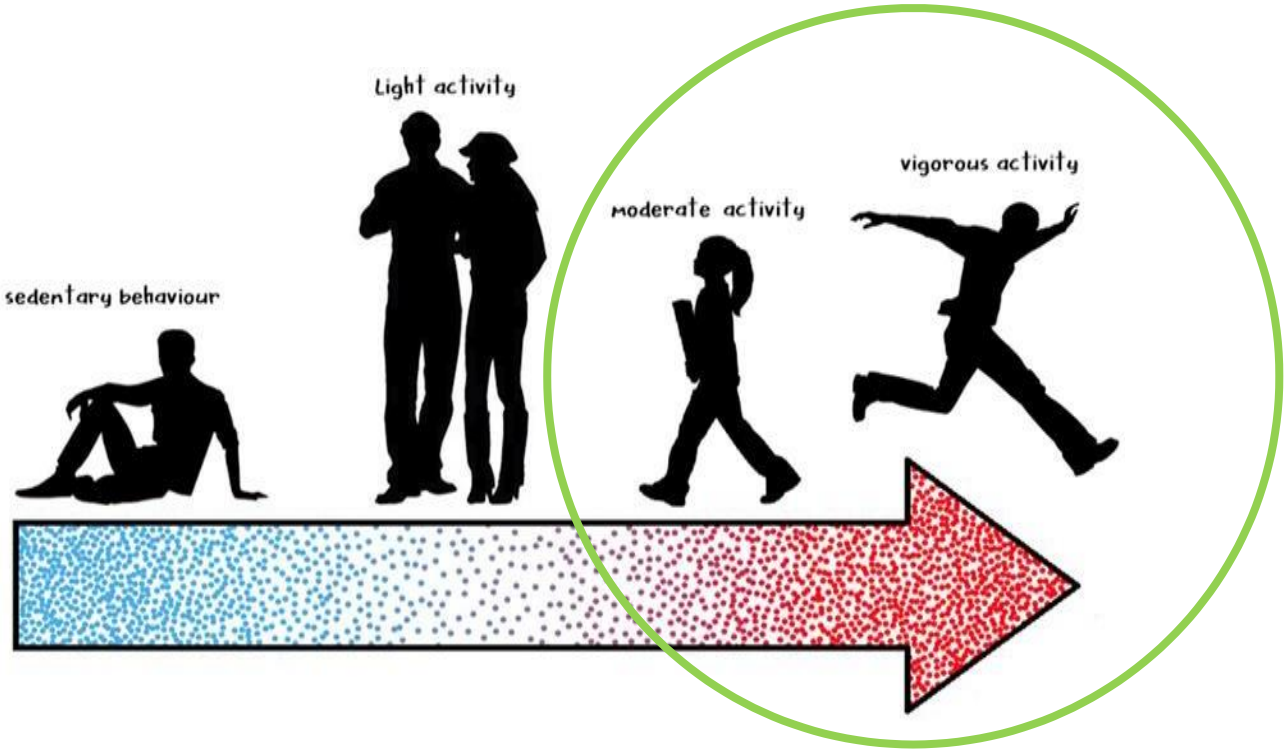
How would you encourage these students to be more active during lunch break? (Appendix 3 Figure 1 and 2)

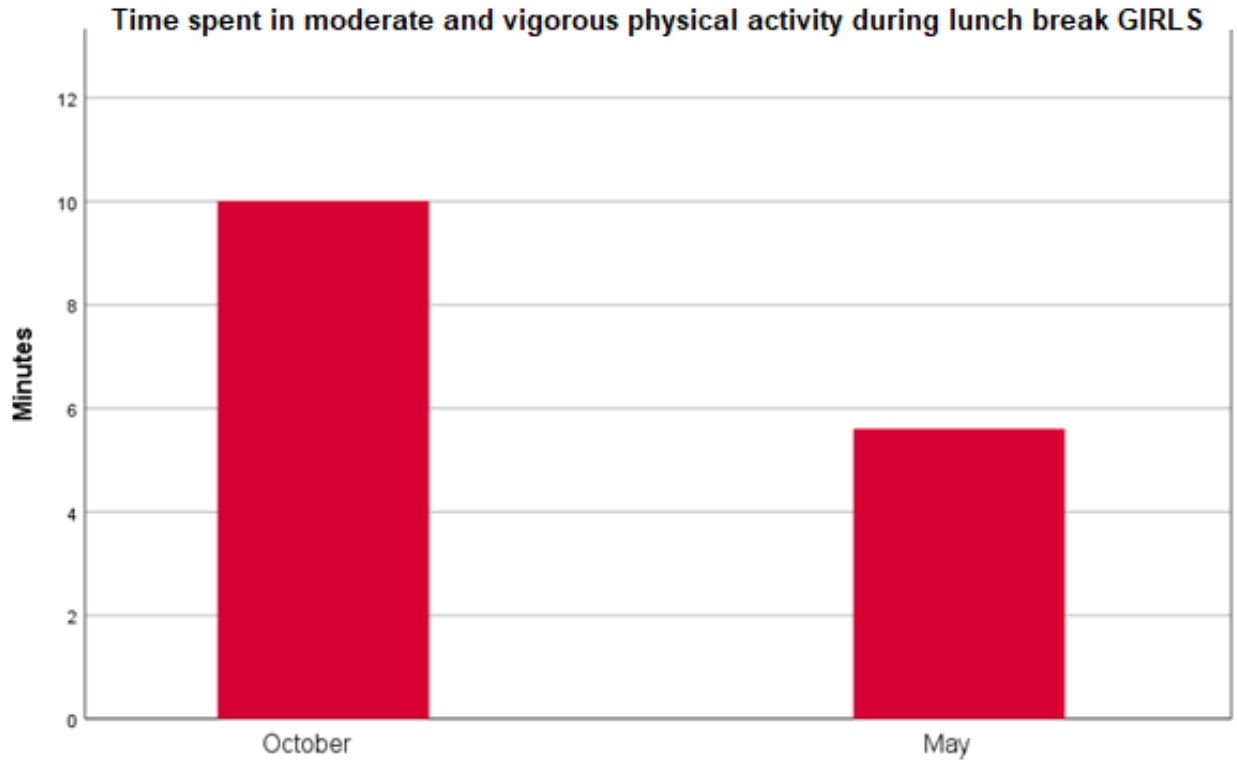
This is a double question: If you could change one thing about lunchbreak to encourage students to play more, what would you change, and why? (Equipment, clubs, activities, spaces) I give you a plan of the school, so you can draw your ideas.

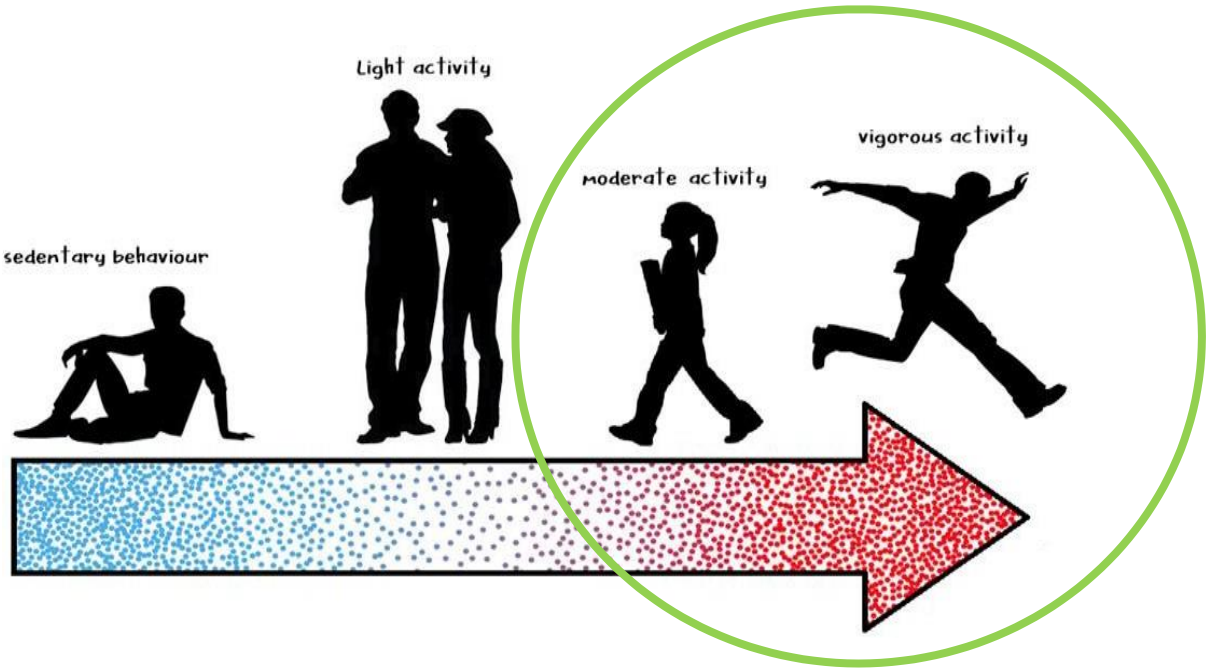
This is the last question and it is a double question: A lot of people say that girls feel embarrassed about playing sports, why do they feel embarrassed? Is there anything you could do to help them to be more comfortable in being active?

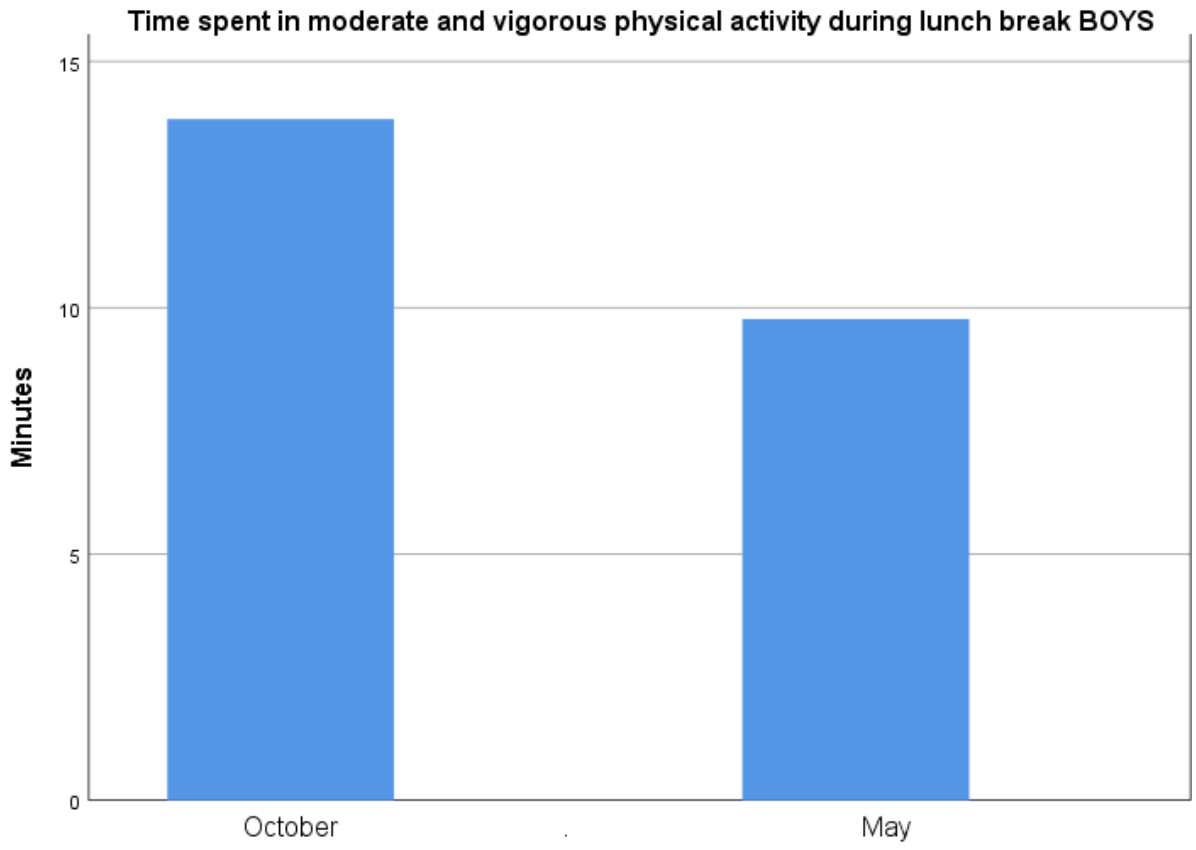
Thank you very much for your participation, please could you fill the evaluation form for the session? (Appendix 4)

Appendix 2: Histograms for group interview and focus group sessions






Light activity
vigorous activity
moderate activity
sedentary behaviour


Time spent in moderate and vigorous physical activity during lunch break BOYS
Minutes
15
10
5
0
October
May

Appendix 3 Personas

Projects - Active school - Sam Murray

Sam Murray

Behaviours

- Used to enjoy being active during lunchbreak in primary school.
- He likes walking outside school during lunchbreak.

Facts & Demographics

- 12 years old.
- One older brother and one younger sister.
- He doesn't join any sport clubs after school.
- He likes being outdoor with his bike.

Needs & Goals

- He would like to be more active during lunchbreak.
- He would like to play football or basketball but he feels he is not good enough.

Figure 1: Persona 1

Zoe Campbell

Behaviours

- Enjoys being active.
- Used to play tag or catch the flag a lot with her friends during lunchbreaks in primary school.
- Sometimes plays tag outside school.

Facts & Demographics

- 12 years old.
- She has one older sister.
- Does martial arts and swimming outside school.

Needs & Goals

- She misses playing tag or sport during lunchbreaks.
- She would like to be more active during lunchbreak with her friends.

Figure 2: Persona 2

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Active Spaces

Evaluation form

For any questions please contact:
Patrizio De Rossi patrizio.derossi1@stir.ac.uk

Your comments are essential for the research project. Please complete this questionnaire and return it at the end of the activity.

What do you value most about this session?

What would you change about this session?

Do you think it is important to be here? ☐ YES ☐ NO

Could you tell me why?

What is the most important thing that the school could get from today's session about creating opportunities for physical activity and play?

Do you consent for the ideas generated today to be, in anonymous form, in a report which will be given to the headteacher?

☐ YES ☐ NO

Thank you!

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Economic and Social Research Council
Shaping Society

Active Spaces

Participant and family information booklet

Faculty of Social Sciences
Colin Bell Building, University of Stirling
Stirling UK FK9 4LA

01786 467691 SSEschooloffice@stir.ac.uk

Active spaces study information

This sheet outlines for you and your parents/carer the details of the study and what participation will involve for you. Please take the time to read the information carefully and discuss it with others (for example your parents/carer) if you wish. Please take time to decide whether or not you wish to take part.

Background information

There is lot of attention towards the activity levels of young people, especially because of the positive effects of physical activity on physical, social, emotional, and mental health. The active spaces study project aims to explore if school grounds co-designed with young students can promote physical activity and wellbeing in young people. The study hopes to gain more information about your views on how you experience your school grounds, and how this might affect how physically active you are. The school you attend has signed up to take part in this project which is funded by the Economic and Social Research Council.

Why you?

We want to see if your school grounds allow you to be more active. By finding this out, we can hopefully increase the amount of people going outside and be more active during breaktimes.

What do we need you to do?

During a school day, you may be asked to take part in a number of activities. These will be spread across several hours and different days to prevent overload.

- Assessment for movement skills
- Height and weight
- Complete questionnaires about your views on physical activity and your well-being

All these activities will be carried out during a normal PE lesson.

In addition, you may be asked to:

- Wear an activity logger (accelerometer) every day for one week.

We may also ask to meet you to talk about your ideas and experiences in groups of about eight or we may ask you to participate in small groups interviews which would last around 30 minutes.

The researcher will also carry out observations in the school ground during breaktimes. If you do not want to be included in this aspect, please contact the researcher directly.

Who are the researchers?

Patrizio De Rossi is the main researcher involved in the study.

Patrizio is doing this study as part of his PhD as student at the University of Stirling.

When will these assessments take place?

The assessments will take place between:

October/November 2017, and January/June 2018.

More on some of the assessments

Assessment for movement skills

1. **Obstacle course**
   The obstacle course involves performing skills like hopping, skipping, throwing, and kicking over a 40m course. It will take between 20 and 30 seconds to complete an obstacle course. You will do four trials of the course (two practices and two timed/scored).

2. **Multi Stage Shuttle Test**
   This test involves running over a 20m distance. You will need to run in time to an audio signal (a 'bleep') which indicates when you should be at the end of each 20m. You will need to turn at the end of the 20m then begin the next 20m. You will be required to keep time to the 'bleeps' until you can no longer do so. The speed at which the 20m distance should be run increases every 60s. It will take between 5 and 10 minutes to complete the test

3. **Sit & Reach Test**
   This test involves sitting on the floor with the legs stretched out in front. You will lean forward from the hips and then bend forward as much as you can.

4. **Plank assessment of torso strength**
   This test involves lift the body in a straight line while lying on the elbows and toes and hold this position as long as possible.

5. **Assessment of grip strength**
   This test involves holding a hand grip dynamometer and squeeze the handle as hard as you can.

Physical activity assessment

Accelerometers are small lightweight physical activity loggers that give a measure of time spent being active and how hard someone is working while being active. It is worn above the hip and is attached with clip to a waist belt. Aside from remembering to put the accelerometer on and off there is no further demand made upon the wearer. They do not interfere with your normal activities.

Possible risks and discomfort:
None of the assessments are likely to cause any discomfort. However, you will be encouraged to stop if any exercise or task becomes uncomfortable for any reason.

Benefits of the Study:
The aim of this study is to gain more information about the effects that co-designed playgrounds in secondary school could have on young students' physical activity and well-being.

Important notes:

- **Although these assessments take place at school it is not compulsory for you to take part.**
- **Nothing will happen if you don't want to do this, or any part of it, or if you decide to take part but then change your mind at any time. You are free to say 'no' at any time without giving a reason.**
- **All staff working on the project have been trained in the measurements involved.**
- **All lead staff have Disclosure Scotland clearance to work with children.**
- **For this study, we use made up names for each participant involved and any details that may identify you are removed as early as possible, and held in separate and secure locations from any other data you provide.**
- **All information you give us will be treated as confidential and anonymous. Confidentiality is only lifted if the researchers are concerned something you have told us might be harmful to you or others.**
- **All information will be stored anonymously.**
- **No individual participant or school will be named in any report or research publication.**

What happens to the results of the study?

At the end of the study the results will be published as written reports and presented in talks at academic conferences. Your name and any identifiable details will be completely removed, which means no-one will be able to tell who you are from any report or publication.

After we've finished we'd be very happy to give you a copy of our results of your movement skills assessment - all you need to do is ask.

What to do now?

If you are willing to take part in the study, please have a talk with your parents/carers. Then together complete one of the attached informed consent forms, there is a part for you and one for your parents/carers to sign on, and return it to the school. Keep the other informed consent form so you and your parent will know what you signed on.

Contact details:

If you have any further questions, please contact

Principal Researcher Patrizio De Rossi
patrizio.derossi1@stir.ac.uk

Supervisors: Dr Greg Mannion greg.mannion@stir.ac.uk
Dr Trish Gorely trish.gorely@uhi.ac.uk

The research we want to carry out has been reviewed by the ethics committee at the University of Stirling.

If you have any concerns regarding the conduct of the research project please feel free to contact the General University Ethics Panel (GUEP) – guep@stir.ac.uk

Title of project: Active Spaces

Name of researcher: Patrizio De Rossi

Consent Form for you to keep

Please tick the boxes below

I confirm that I have read and understood the Participant and family Information Booklet for the above study and have had the opportunity to ask questions.	
I understand that participation is voluntary and that I am free to withdraw at any time, without giving any reason.	
I understand that all my answers will be anonymous and confidential.	
I agree to take part in the physical activity assessments if randomly selected.	
I agree to take part in group discussions and be audio recorded if randomly selected.	
I understand that I will be referred to in any written documents by a false name and I and my school will not be identifiable in the research and in any of the photos being published and presented at scientific outlets.	

Participant NAME Participant SIGNATURE

Consent Form for parents/carers to keep

Please tick the boxes below

I confirm that I have read and understood the Participant and family Information Booklet for the above study and have had the opportunity to ask questions.	
I understand that participation is voluntary and that my daughter/son is free to withdraw at any time, without giving any reason.	
I understand that all my daughter/son's answers will be anonymous and confidential.	
I agree to my daughter/son to take part in the Physical Education class delivered by the school PE teacher and the visiting researcher.	
I agree to my daughter/son to take part in the physical activity assessments if randomly selected	
I agree to my daughter/son to take part in group discussions and be audio recorded if randomly selected.	
I understand that my daughter/son will be referred to in any written documents by a false name and my daughter/son and the school will not be identifiable in the research and in any of the photos being published and presented at scientific outlets.	

Parent/carer NAME Parent/carer SIGNATURE

DATE:

Title of project: Active Spaces

Name of researcher: Patrizio De Rossi

Consent Form for you to return

Please tick the boxes below

I confirm that I have read and understood the Participant and family Information Booklet for the above study and have had the opportunity to ask questions.	
I understand that participation is voluntary and that I am free to withdraw at any time, without giving any reason.	
I understand that all my answers will be anonymous and confidential.	
I agree to take part in the physical activity assessments if randomly selected.	
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I understand that participation is voluntary and that my daughter/son is free to withdraw at any time, without giving any reason.	
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I agree to my daughter/son to take part in the Physical Education class delivered by the school PE teacher and the visiting researcher.	
I agree to my daughter/son to take part in the physical activity assessments if randomly selected.	
I agree to my daughter/son to take part in group discussions and be audio recorded if randomly selected.	
I understand that my daughter/son will be referred to in any written documents by a false name, and that my daughter/son and the school will not be identifiable in the research or in any of the photos being published and presented at scientific outlets.	

Parent/carer NAME Parent/carer SIGNATURE

DATE:

Thank you for taking the time to read our booklet!

Credits: Villiers High School

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Economic and Social Research Council
Shaping Society

University of Stirling, Scottish Charity No SC011159

Appendix 6 University Ethical approval

Patrizio De Rossi
Faculty of Social Sciences
University of Stirling
Stirling FK9 4LA

24/03/2017

General University Ethics Panel (GUEP)
C/O Faculty of Social Sciences
University of Stirling
Colin Bell Building
Stirling
FK9 4LA
Scotland UK

E: GUEP@stir.ac.uk

Dear Patrizio,

Ethics Application: Co-producing places for play in school: understanding the promotion of physical literacy and activity in early adolescence (GUEP109)

I am pleased to confirm that GUEP has approved your application, and you can now proceed with your research. Please note that should any of your proposal change, a further submission (amendment) to GUEP will be necessary.

The committee wished to make one comment for you to consider (no action or response required):
In Participant / Parents' booklet, it is noted that participants' height and weight will be taken. Have you considered whether this could impact negatively on the study? Could simple observations on BMI be made instead by researcher?

If you have any further queries, please do not hesitate to contact the Committee by email to guep@stir.ac.uk.

Yours sincerely,

Pp

On behalf of GUEP
Professor Helen Cheyne
Deputy Chair of GUEP

Appendix 7 Correlation tables

Table A: Relationship between average time of MVPA in lunch break with daily average of MVPA and motor competence domain of physical literacy overall.

Overall 1st tp.	MVPA lunch	MVPA daily	L-i lunch	L-i daily	Motor comp.
MVPA lunch break	1	(r) .383 (p) .059	(r) .070 (p) .740	(r) -.310 (p) .132	(r) .047 (p) .830
MVPA daily	N=25	1	(r) -.232 (p) .264	(r) -.033 (p) .874	(r) .524* (p) .010
L-I lunch	N=25	N=25	1	(r) .470* (p) .018	(r) -.365 (p) .087
L-I daily	N=25	N=25	N=25	1	(r) -.123 (p) .575
Motor competence	N=23	N=23	N=23	N=23	1
Overall 2nd tp.	**MVPA lunch**	**MVPA daily**	**L-i lunch**	**L-i daily**	**Motor comp.**
MVPA lunch break	1	(r) .632** (p) .001	(r) .255 (p) .218	(r) .017 (p) .935	(r) .013 (p) .954
MVPA daily	N=25	1	(r) -.080 (p) .703	(r) .274 (p) .185	(r) .363 (p) .089
L-I lunch	N=25	N=25	1	(r) .231 (p) .267	(r) -.076 (p) .729
L-I daily	N=25	N=25	N=25	1	(r) -.136 (p) .537
Motor competence	N=23	N=23	N=23	N=23	1

NOTES; 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; L-I = Light-intensity physical activity; N = number of cases; (r) = correlation coefficient; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed), (p) = probability value; Pearson correlation (r) .n= strong correlation (absolute value > 0.7).

Table B: Relationship between average time of MVPA in lunch break with daily average of MVPA and motor competence domain of physical literacy by gender.

Boys 1st t.p	MVPA lunch	MVPA daily	L-I lunch	L-I daily	Motor comp.
MVPA lunch break	1	(r) .703 (p) .005**	(r) -.101 (p) .731	(r) -.363 (p) .202	(r) .283 (p) .349
MVPA daily	N=14	1	(r) -.328 (p) .253	(r) -.392 (p) .166	(r) .409 (p) .165
L-I lunch	N=14	N=14	1	(r) .578* (p) .031	(r) -.431 (p) .141
L-I daily	N=14	N=14	N=14	1	(r) -.390 (p) .188
Motor competence	N=14	N=14	N=14	N=14	1
Boys 2nd tp.	**MVPA Lunch**	**MVPA daily**	**L-I lunch**	**L-I daily**	**Motor comp.**
MVPA lunch break	1	(r) .854** (p) .000	(r) -.050 (p) .865	(r) .114 (p) .697	(r) .046 (p) .887
MVPA daily	N=14	1	(r) -.334 (p) .243	(r) .175 (p) .549	(r) .315 (p) .319
L-I lunch	N=14	N=14	1	(r) .345 (p) .227	(r) -.139 (p) .667
L-I daily	N=14	N=14	N=14	1	(r) -.181 (p) .574
Motor competence	N=12	N=12	N=12	N=12	1
Girls 1st tp.	**MVPA Lunch**	**MVPA daily**	**L-I lunch**	**L-I daily**	**Motor comp.**
MVPA lunch break	1	(r) -.158 (p) .643	(r) .194 (p) .568	(r) -.265 (p) .431	(r) -.362 (p) .305
MVPA daily	N=11	1	(r) -.235 (p) .487	(r) .510 (p) .109	(r) .710* (p) .022
L-I lunch	N=11	N=11	1	(r) .255 (p) .449	(r) -.203 (p) .574
L-I daily	N=11	N=11	N=11	1	(r) .426 (p) .219
Motor competence	N=10	N=10	N=10	N=10	1
Girls 2nd tp.	**MVPA Lunch**	**MVPA daily**	**L-I lunch**	**L-I daily**	**Motor comp.**
MVPA lunch break	1	(r) -.277 (p) .410	(r) .209 (p) .538	(r) -.115 (p) .736	(r) .020 (p) .954
MVPA daily	N=11	1	(r) .146 (p) .669	(r) .533 (p) .092	(r) .559 (p) .074
L-I lunch	N=11	N=11	1	(r) .232 (p) .493	(r) .136 (p) .689
L-I daily	N=11	N=11	N=11	1	(r) -.095 (p) .781
Motor competence	N=11	N=11	N=11	N=11	1

NOTES; 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; L-I = Light-intensity physical activity; N = number of cases; (r) = correlation coefficient; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed), (p) = probability value; Pearson correlation (r) .n= strong correlation (absolute value > 0.7).

Table C: Relationship between average MVPA time in lunch break and the five subscales of MPAM-R overall.

Overall	Pearson Correlation	Sig. (2-tailed)	Valid Numbers
Enjoyment / MVPA 1 tp.	.146	.669	17
Enjoyment / MVPA 2 tp.	.386	.240	17
Competence / MVPA 1 tp.	-.034	.920	17
Competence / MVPA 2 tp.	.651*	.041	17
Appearance / MVPA 1 tp.	.356	.283	17
Appearance / MVPA 2 tp.	.049	.893	17
Fitness / MVPA 1 tp.	-.163	.633	17
Fitness2 / MVPA 2 tp.	.352	.318	17
Social / MVPA 1 tp.	.339	.308	17
Social2 / MVPA 2 tp.	.695*	.038	17

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table D: Relationship between average MVPA time in lunch break and the five subscales of MPAM-R by gender.

Boys	Pearson Correlation	Sig. (2-tailed)	Valid Numbers
Enjoyment / MVPA 1 tp.	.389	.517	8
Enjoyment / MVPA 2 tp.	.228	.713	8
Competence / MVPA 1 tp.	.054	.932	8
Competence / MVPA 2 tp.	.994**	.006	8
Appearance / MVPA 1 tp.	.351	.562	8
Appearance / MVPA 2 tp.	.172	.828	8
Fitness / MVPA 1 tp.	-.106	.865	8
Fitness2 / MVPA 2 tp.	.324	.676	8
Social / MVPA 1 tp.	.548	.339	8
Social2 / MVPA 2 tp.	.684	.316	8
Girls	**Pearson Correlation**	**Sig. (2-tailed)**	**Valid Numbers**
Enjoyment / MVPA 1 tp.	-.164	.757	9
Enjoyment / MVPA 2 tp.	.589	.219	9
Competence / MVPA 1 tp.	-.122	.818	9
Competence / MVPA 2 tp.	.582	.226	9
Appearance / MVPA 1 tp.	.553	.255	9
Appearance / MVPA 2 tp.	.458	.361	9
Fitness / MVPA 1 tp.	-.228	.664	9
Fitness2 / MVPA 2 tp.	.481	.334	9
Social / MVPA 1 tp.	.314	.544	9
Social2 / MVPA 2 tp.	.904*	.035	9

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table E: Relationship between average light-Intensity physical activity time in lunch break and the five subscales of MPAM-R overall and by gender.

Overall	Pearson Correlation	Sig. (2-tailed)	Valid Numbers
Enjoyment / L-I 1 tp.	.441	.067	17
Enjoyment / L-I 2 tp.	.395	.204	17
Competence / L-I 1 tp.	.291	.241	17
Competence / L-I 2 tp.	.387	.240	17
Appearance / L-I 1 tp.	.343	.164	17
Appearance / L-I 2 tp.	-.519	.102	17
Fitness / L-I 1 tp.	.206	.412	17
Fitness2 / L-I 2 tp.	-.017	.962	17
Social / L-I 1 tp.	.278	.265	17
Social2 / L-I 2 tp.	.401	.222	17

NOTES: L-I = Light-intensity physical activity: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table F: Relationship between average light-Intensity physical activity time in lunch break and the five subscales of MPAM-R by gender.

Boys	Pearson Correlation	Sig. (2-tailed)	Valid Numbers
Enjoyment / L-I 1 tp.	.719*	.029	8
Enjoyment / L-I 2 tp.	.816	.092	8
Competence / L-I 1 tp.	.603	.086	8
Competence / L-I 2 tp.	.946	.054	8
Appearance / L-I 1 tp..	.322	.398	8
Appearance / L-I 2 tp.	.142	.858	8
Fitness / L-I 1 tp.	.492	.178	8
Fitness2 / L-I 2 tp.	.163	.837	8
Social / L-I 1 tp.	.516	.165	8
Social / MVPA 2 tp.	.719	.281	8
Girls	**Pearson Correlation**	**Sig. (2-tailed)**	**Valid Numbers**
Enjoyment / L-I 1 tp.	.064	.871	9
Enjoyment / L-I 2 tp.	.229	.621	9
Competence / L-I 1 tp.	.048	.902	9
Competence / L-I 2 tp.	.144	.759	9
Appearance / L-I 1 tp.	.123	.753	9
Appearance / L-I 2 tp..	-.581	.171	9
Fitness / L-I 1 tp.	-.163	.675	9
Fitness2 / L-I 2 tp.	-.103	.826	9
Social / L-I 1 tp.	-.131	.736	9
Social2 / L-I 2 tp.	.309	.500	9

NOTES: L-I = Light-intensity physical activity: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table G: Relationship between daily average MVPA time and the five subscales of MPAM-R overall.

Overall	Pearson Correlation	Sig. (2-tailed)	Valid Numbers
Enjoyment / MVPA 1 tp.	.338	.309	17
Enjoyment / MVPA 2 tp.	.329	.324	17
Competence / MVPA 1 tp.	.498	.119	17
Competence / MVPA 2 tp.	.483	.158	17
Appearance / MVPA 1 tp.	.202	.551	17
Appearance / MVPA 2 tp.	-.360	.306	17
Fitness / MVPA 1 tp.	.190	.575	17
Fitness2 / MVPA 2 tp.	.334	.346	17
Social / MVPA 1 tp.	.348	.295	17
Social2 / MVPA 2 tp.	.210	.587	17

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table H: Relationship between daily average MVPA time and the five subscales of MPAM-R by gender.

Boys	Pearson Correlation	Sig. (2-tailed)	Valid Numbers
Enjoyment / MVPA 1 tp.	.021	.973	8
Enjoyment / MVPA 2 tp.	-.134	.830	8
Competence / MVPA 1 tp.	.183	.769	8
Competence / MVPA 2 tp.	.530	.470	8
Appearance / MVPA 1 tp.	.197	.751	8
Appearance / MVPA 2 tp.	.090	.910	8
Fitness / MVPA 1 tp.	-.543	.344	8
Fitness2 / MVPA 2 tp.	.556	.444	8
Social / MVPA 1 tp.	.365	.546	8
Social2 / MVPA 2 tp.	.173	.827	8
Girls	**Pearson Correlation**	**Sig. (2-tailed)**	**Valid Numbers**
Enjoyment / MVPA 1 tp.	.566	.242	9
Enjoyment / MVPA 2 tp.	.528	.281	9
Competence / MVPA 1 tp.	.657	.157	9
Competence / MVPA 2 tp.	.449	.372	9
Appearance / MVPA 1 tp.	.254	.627	9
Appearance / MVPA 2 tp.	-.456	.363	9
Fitness / MVPA 1 tp.	.448	.373	9
Fitness2 / MVPA 2 tp.	.286	.563	9
Social / MVPA 1 tp.	.410	.419	9
Social2 / MVPA 2 tp.	.206	.740	9

NOTES: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table I: Relationship between daily average light-Intensity time and the five subscales of MPAM-R overall.

Overall	Pearson Correlation	Sig. (2-tailed)	Valid Numbers
Enjoyment / L-I 1 tp.	.303	.222	17
Enjoyment / L-I 2 tp.	.127	.695	17
Competence / L-I 1 tp.	.296	.234	17
Competence / L-I 2 tp.	.226	.504	17
Appearance / L-I 1 tp.	.365	.136	17
Appearance / L-I 2 tp.	.154	.651	17
Fitness / L-I 1 tp.	.395	.105	17
Fitness2 / L-I 2 tp.	.169	.620	17
Social / L-I 1 tp.	.263	.310	17
Social2 / L-I 2 tp.	.161	.637	17

NOTES: L-I = Light-intensity physical activity: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table J: Relationship between daily average light-Intensity time and the five subscales of MPAM-R by gender.

Boys	Pearson Correlation	Sig. (2-tailed)	Valid Numbers
Enjoyment / L-I 1 tp.	.237	.540	8
Enjoyment / L-I 2 tp.	-.686	.201	8
Competence / L-I 1 tp.	.240	.533	8
Competence / L-I 2 tp.	-.001	.999	8
Appearance / L-I 1 tp.	.462	.211	8
Appearance / L-I 2 tp.	-.959*	.041	8
Fitness / L-I 1 tp.	.522	.149	8
Fitness2 / L-I 2 tp.	.902	.098	8
Social / L-I 1 tp.	.201	.604	8
Social2 / L-I 2 tp.	-.633	.367	8
Girls	**Pearson Correlation**	**Sig. (2-tailed)**	**Valid Numbers**
Enjoyment / L-I 1 tp.	.433	.245	9
Enjoyment / L-I 2 tp.	.367	.417	9
Competence / L-I 1 tp.	.446	.229	9
Competence / L-I 2 tp.	.376	.406	9
Appearance / L-I 1 tp.	.128	.742	9
Appearance / L-I 2 tp.	-.366	.419	9
Fitness / L-I 1 tp.	.385	.307	9
Fitness2 / L-I 2 tp.	.203	.662	9
Social / L-I 1 tp.	.389	.301	9
Social2 / L-I 2 tp.	.180	.699	9

NOTES: L-I = Light-intensity physical activity: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table K: Relationship between motor competence domain of physical literacy the five subscales of MPAM-R overall.

Overall 1st tp.	Motor competence	Enjoyment	Competence	Appearance	Fitness	Social
Motor competence	1	(r) .488* (p) .047	(r) .556* (p) .020	(r) -.340 (p) .182	(r) .388 (p) .124	(r) .299 (p) .243
Enjoyment	N=17	1	(r) .937** (p) . 000	(r) .129 (p) .609	(r) .789** (p) .000	(r) .697** (p) .001
Competence	N=17	N=17	1	(r) .179 (p) .477	(r) .851** (p) .000	(r) .726** (p) .001
Appearance	N=17	N=17	N=17	1	(r) .389 (p) .111	(r) .522* (p) .026
Fitness	N=17	N=17	N=17	N=17	1	(r) .690** (p) .002
Social	N=17	N=17	N=17	N=17	N=17	1
Overall 2nd tp.	**Motor competence**	**Enjoyment**	**Competence**	**Appearance**	**Fitness**	**Social**
Motor competence	1	(r) .697* (p) .025	(r) .572 (p) .084	(r) .058 (p) .873	(r) .651* (p) .041	(r) .329 (p) .354
Enjoyment	N=17	1	(r) .935** (p) .000	(r) .372 (p) .260	(r) .782** (p) .004	(r) .812** (p) .004
Competence	N=17	N=17	1	(r) .455 (p) .159	(r) .812** (p) .002	(r) .831** (p) .003
Appearance	N=17	N=17	N=17	1	(r) .585 (p) .059	(r) .520 (p) .123
Fitness	N=17	N=17	N=17	N=17	1	(r) .505 (p) .136
Social	N=17	N=17	N=17	N=17	N=17	1

NOTES: L-I = Light-intensity physical activity: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May ; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table L1: Relationship between motor competence domain of physical literacy the five subscales of MPAM-R by gender (boys).

Boys 1st tp.	Motor competence	Enjoyment	Competence	Appearance	Fitness	Social
Motor competence	1	(r) -.062 (p) .884	(r) -.193 (p) .646	(r) -.879** (p) .004	(r) -.745* (p) .034	(r) -.401 (p) .324
Enjoyment	N=8	1	(r) .854** (p) . 003	(r) .205 (p) .596	(r) .465 (p) .208	(r) .785* (p) .012
Competence	N=8	N=8	1	(r) .399 (p) .287	(r) .586 (p) .098	(r) .865** (p) .003
Appearance	N=8	N=8	N=8	1	(r) .791* (p) .011	(r) .642 (p) .062
Fitness	N=8	N=8	N=8	N=8	1	(r) .592 (p) .093
Social	N=8	N=8	N=8	N=8	N=8	1

Boys 2nd tp.	Motor competence	Enjoyment	Competence	Appearance	Fitness	Social
Motor competence	1	(r) .035 (p) .978	(r) .073 (p) .953	(r) .470 (p) .689	(r) .530 (p) .645	(r) -.294 (p) .810
Enjoyment	N=8	1	(r) .880 (p) .120	(r) .682 (p) .318	(r) -246 (p) .754	(r) .972* (p) .028
Competence	N=8	N=8	1	(r) .264 (p) .736	(r) .222 (p) .778	(r) .757 (p) .243
Appearance	N=8	N=8	N=8	1	(r) -.768 (p) .232	(r) .789 (p) .211
Fitness	N=8	N=8	N=8	N=8	1	(r) -.463 (p) .537
Social	N=8	N=8	N=8	N=8	N=8	1

NOTES: L-I = Light-intensity physical activity: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May ; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Table L2: Relationship between motor competence domain of physical literacy the five subscales of MPAM-R by gender (girls).

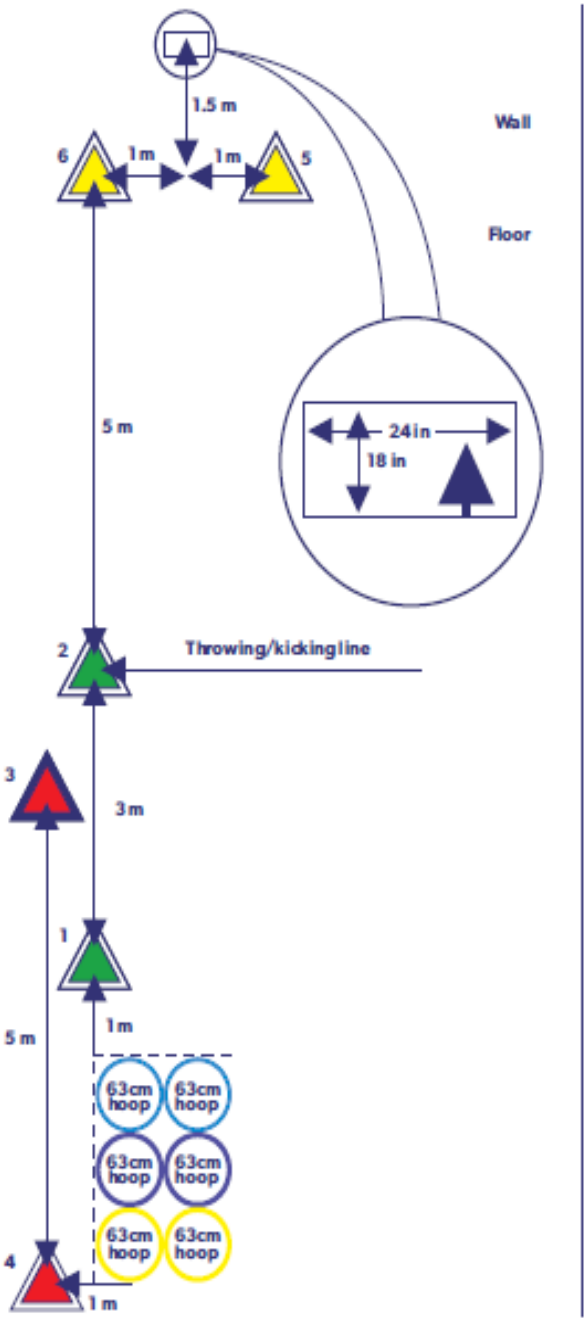
Girls 1st tp.	Motor competence	Enjoyment	Competence	Appearance	Fitness	Social
Motor competence	1	(r) .878** (p) .002	(r) .902** (p) .001	(r) .217 (p) .574	(r) .957** (p) .000	(r) .812** (p) .008
Enjoyment	N=9	1	(r) .992** (p) . 000	(r) .006 (p) .987	(r) .940** (p) .000	(r) .646* (p) .060
Competence	N=9	N=9	1	(r) .045 (p) .908	(r) .936** (p) .000	(r) .691* (p) .039
Appearance	N=9	N=9	N=9	1	(r) .133 (p) .733	(r) .500 (p) .171
Fitness	N=9	N=9	N=9	N=9	1	(r) .799** (p) .010
Social	N=9	N=9	N=9	N=9	N=9	1

Girls 2nd tp.	Motor competence	Enjoyment	Competence	Appearance	Fitness	Social
Motor competence	1	(r) .784* (p) .037	(r) .754 (p) .050	(r) .263 (p) .569	(r) .678 (p) .094	(r) .747 (p) .054
Enjoyment	N=9	1	(r) .976** (p) .000	(r) .470 (p) .287	(r) .913** (p) .004	(r) .861* (p) .028
Competence	N=9	N=9	1	(r) .581 (p) .171	(r) .953** (p) .001	(r) .909* (p) .012
Appearance	N=9	N=9	N=9	1	(r) .715 (p) .071	(r) .700 (p) .122
Fitness	N=9	N=9	N=9	N=9	1	(r) .898* (p) .015
Social	N=9	N=9	N=9	N=9	N=9	1

NOTES: L-I = Light-intensity physical activity: 1st tp. = first timepoint, October; 2nd tp.= second timepoint, May ; * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed); Pearson correlation: .n= strong correlation (absolute value > 0.7)

Appendix 8 CAMSA Layout

CAMSA Layout



Instructions for the Participant

Script & actions for demonstrations

	Actions	Scripts
1.	Begin standing stationary in front of the right hand side **yellow hoop**.	*"When you are ready to go, I will say ready, set, go."*
2.	Complete three 2-foot jumps (in the illustration the jumps would be from the **right yellow hoop** to the **right purple hoop** to the **right blue hoop** and then out past the **blue hoop**). Run to cone #1 and then turn sideways to face appraiser #1.	*"When I say "go" you jump on both feet together through the hoops."*
3.	Slide sideways to cone #2 and touch the cone. Then reverse direction (remain facing the appraiser) to slide back to cone #1 and touch that cone.	*"The next part is sliding sideways. You should be facing this side so you can see the appraiser."* *"Slide sideways and touch the **green cone**, then slide back, still facing the same way, and touch the other **green cone**."*
4.	Start to run toward the throwing line, catch the ball as it is thrown by the appraiser, and throw it at the target at any point before the line.	*"After you finish sliding, I will throw the ball to you. Catch it and run up to the line and then throw it at the target before you cross the line."*
5.	Run across the line and around cone #2 to reach the outside of cone #3. Skip from cone #3 to cone #4 before running around cone #4 and going back to the hoops.	*"After you throw you go around the **green cone** and run to the outside of the **red cone**. When you come to the **red cone** skip all the way to the second **red cone**. Do your best athletic skipping. Skip around the **red cone** and then run back to the hoops."*
6.	After reaching cone #4 and making sure you go around it, you come to the hula hoops and begin 1-foot hopping in each hula hoop.	*"This time you have to land in all of the hoops by hopping on 1-foot. You can do the hoops in any order, but you have to land on the same foot in each hoop."*
7.	After landing in the last hoop, run to the kicking line and kick the ball toward the target.	*"After you land on 1-foot in the last hoop just run to the soccer ball and kick it between the 2 **yellow cones**. You don't need to aim the ball at the target on the wall, which is just for the throwing. Once you kick the ball you are done."*

From Healthy Active Living and Obesity Research Group (2017) *Canadian Assessment of Physical Literacy Manual for Test Administration* Second Edition.

Appendix 9 SOPLAY Observation form

School ID : ___ ___
Date: __ __/__ __/__ __
D8 D9 D10 D11

SOPLAY

(System for Observing Play and Leisure Activity in Youth)

Obs. ID #: ___ ___ Reliability: 0. No 1. Yes Temp: ___ ___F Period: **1.** BS **2.** L1s1 L1s2 **3.** L2s1 L2s2 **4.** L3s1 L3s2 **5.** AS1 **6.** AS2 **7.** AS3

START TIME	AREA	CONDITION					GIRLS				BOYS			
		A	U	S	O	E	S	W	V	Act.	S	W	V	Act.
__ __: __ __	**1**	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	____	____	____	____	____	____	____	____
__ __: __ __	**2**	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	____	____	____	____	____	____	____	____
__ __: __ __	**3**	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	____	____	____	____	____	____	____	____
__ __: __ __	**4**	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	____	____	____	____	____	____	____	____
__ __: __ __	**5**	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	____	____	____	____	____	____	____	____
__ __: __ __	**6**	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	____	____	____	____	____	____	____	____
__ __: __ __	**7**	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	____	____	____	____	____	____	____	____
__ __: __ __	**8**	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	0. N 1. Y	____	____	____	____	____	____	____	____

Activity Codes: 0=No identifiable activity 1=Aerobics 2=Baseball/Softball 3=Basketball 4=Dance 5=Football 6=Gymnastics 7=Martial Arts
8=Racquet sports 9=Soccer 10=Swimming 11=Volleyball 12=Weight Training 13=Other playground games 14=None of the above

SOPLAY Recording Form 1/10/06 SJM