A Secondary Analysis of Irish Adolescent Physical Activity Participation in and out of school

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Under the supervision of Dr. Philip Curry

Declaration

I declare that this thesis is entirely my own work. It has not been submitted to this or any other institution for degree or publication.

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Abstract

Irish physical activity participation is annually increasing and attracting more public attention. Since engagement in sport and exercise during adolescence is important for later participation, this study focuses on the levels of intra-curricular and extra-curricular physical activity at the post-primary stage in Ireland.

Quantitative methods are employed in this study. The data comes from the study of the Children's Sport Participation and Physical Activity (CSSPA), which is a national level survey conducted in 2009. Comparisons of different levels of physical activity participation are mainly based on demographical indicators including gender of participants, age, area of residence and school type.

This study explores the typical participation pattern of Irish adolescents and specific physical activity engagement in and out of class. It also analyses the relationship between intra-curricular and extra-curricular participation to determine if curricular physical education is related to the voluntary sporting habits of students.

Findings suggest that Irish adolescent regular engagement in sport and exercise needs improving. Physical activities provided in class are varied greatly in gender and age terms. In addition, a higher percentage of participation in class is not being maintained in their extra-curricular times. It is argued that a lack of systematic implementation of the physical education curriculum causes poor habits in physical activity participation.

Key words: *Physical activity participation, Physical education, Extra-curricular physical activity, Post-primary, Ireland*

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Chapter One: Introduction

This study was born out of my personal experience in China, where the health issues of children attract increasing attention. In China, perspectives on sports participation are poorly developed by both parents and children. They tend to minimise physical activities in case of getting hurt in the context of the one-child policy. Meanwhile, in order to achieve good results in the exam-oriented education, more time is devoted to extra-curricular academic learning. The third reason also comes from a lack of uniform policy and educational resources, where teachers are short of professional physical education training (Liang, Walls & Lu, 2005). The most recent obesity examinations reported that the overweight and obesity of children in Shanghai (one of the largest cities in China) reached 22.6% in terms of BMI and the relevant statistics in Beijing was also over 20% (Lu, Shi, Luo, Zhou, Yu, Guo, & Wu, 2013; Shan, Xi, Cheng, Hou, Wang & Mi, 2010).

Sedentarism may lead to a risk of death and annual mortality is over 2,000,000 (Enright and Tindall, 2010). An improvement of physical education in China was proposed as a remedy. At governmental level, a straightforward practice is to increase the quality of curricular physical education which was deemed effective in minimising the deteriorating health condition of children and providing enjoyment in their childhood. Researchers found that students' participation in physical activities is largely associated with their attitudes and understanding towards the sport or exercise they take part in, indicating that students develop a positive habit in movement through an active and meaningful cognition of the event (Subramaniam and Silverman, 2007). Therefore, it is necessary to design a high quality physical education for adolescents.

Owing to my current study in Ireland and its annually increasing participation in physical education and physical activity, this study aims to outline the general

contents of the physical education curriculum in Ireland and its place within the Irish education system. So the hypothesis established in this study is that physical education will be reasonably implemented which results physical activity in daily life. For example, in the fifth and sixth year in Ireland, nearly 90 percent pupils participated in sports (Lunn, Kelly & Fitzpatrick, 2013), which could provide a positive reference for Chinese physical education policy. So in this study, I will focus on intra-curricular physical education at secondary level, not only because it is directly related to the levels of physical activity of adolescents but it also results in long-term benefits (Whitaker, Wright, Pepe, Seidel & Dietz, 1997). Besides, extra-curricular sport habit and environmental factors are also linked to regular physical activity involvement of adolescent student.

The aim of this study is to investigate adolescent involvement in physical activity and to further discuss the relationship between the curriculum implementation and extracurricular physical activity participation. Specifically, my research questions are surrounding, (1)the implementation of physical education in Irish secondary schools, (2)forms of physical activities in class, (3)types of extra-curricular physical activities and adolescent participation, and (4)determinants of participation in sporting behaviours.

Chapter Two begins with an examination of relevant literature to the study, including the definition of physical activity and sport, perspectives of implementing curricular formal physical education, Irish policy on physical education and governmental engagement in improving public sports participation. In the meantime, previous reports and research on Irish physical education or previous use and results of the CSPPA dataset was taken into consideration

Chapter Three outlines the methodology employed in this study. Firstly, the research questions are specified and the protocol of search procedure is also presented. It then argues the choice of quantitative methods, followed by an overview of data source

and a focus on the post-primary level. In addition, the validity of the variables used in my study is also discussed. Ethical issues and limitations will finally be addressed.

Chapter Four shows the findings and analysis procedure. Firstly it provides typical physical activity participation among adolescents and a measurement of the typicality. The following section concentrates on the curriculum by examining the types of sports and duration of class. This section also presents regular extra-curricular sporting behaviour participation. Following that a link between the curriculum and regular participation will be explored.

Chapter Five discusses the findings and reflects on what was found in the literature and the present analysis. Furthermore, it tries to explore the possibility of implying Irish experience into another society context. An implication to following up my study will be also suggested in this chapter.

In conclusion, the purpose of this study derives from a lack of professional physical education in China and an intention to improve the poor health conditions of children. Under such circumstances, it will analyse regular physical activity participation in Ireland and Irish physical education curriculum implementation through quantitative methods. All the study findings will be provided in a systematic structure responding to the literature.

Chapter Two: Literature Review

Introduction

This study discusses Irish adolescent's participation in physical activity and attempts to explore what factors are correlated with their inside-curricular and outside-curricular participation. The aim of this study is to uncover the Irish school-based physical education and to describe the setting of the physical education curriculum and its correlation with adolescent's regular involvement in physical activity. This section presents basic definitions of physical activity and sport and literature on the topics surrounding the aims of the study.

2.1 Defining physical activity

In order to define physical activity, a distinction should be made between physical activity, recreation and sport as many people deem physical activity as simply sport or leisure activities. Generally speaking, recreational activities relax people through activity such as walking, jogging and relaxing games, where all the exercises were undertaken discretionarily (Corbin, Pangrazi & Franks, 2000). Sport, narrowly, is competitive and it can be both a type of recreation and a valuable educational end (Capel and Whitehead, 2012). In research and practice, however, sport is often defined in a broader meaning and governmental agencies often use the term 'sport' standing for 'physical activity' as well. Nicholson, Hoye and Houlihan (2010) said that, 'Sport is a vehicle for creation of social capital and the associated benefits of social inclusion, social connectedness, community strengthening, community wellbeing, improved local governance and greater civic participation and volunteerism.'

Physical activity is different from the general concept of sport and recreational activities. World Health Organisation (WHO, 2014) gives a definition of physical activity as 'any bodily movement produced by skeletal muscles that requires energy expenditure'. In this case, physical activity is an umbrella term containing exercise, sport, leisure activities, and dance, which are grouped by the contents and intensity of sporting behaviours (Corbin, et al., 2000).

Why physical activity matters

Physical activity is crucial in daily life and moderate to vigorous physical activity is considered necessary for children due to its multiple benefits. Global recommendations for regular physical activity participation among children and adolescents from 5 to 17 years old are suggested to accumulatively exercise at least 60 minutes per day, and more activeness will lead to further physical benefits (WHO, 2010). The Department of Education and Science of Ireland also recommends a weekly 2-hour physical education for students (Woods, Tannehill, Quinlan, Moyna & Walsh, 2010). Walking, cycling, or sporting behaviours are recommended as regular moderate to vigorous physical activities by WHO (2014).

Although the relationship between physical activity and health is also mediated by personal habits such as smoking and diet, regular exercise is well-documented to be effective in promoting blood lipid levels, body composition and lower blood pressure (Lunn and Layte, 2008). Concerning its achievements, physical activities are comprised with 'values, norms and rituals, and practices that shape the behaviour of its participants' (Thorlindsson and Bernburg, 2006). Therefore, positive development of physical activity participation habit in childhood and adolescence is necessary and affects lifelong physical active behaviour (Cale, 2000). Studies also showed that those who are overweight in their adolescent period are more likely to continue to be overweight and may get worse in adulthood (Whitaker et al., 1997; Lunn and Layte, 2008).

Briefly, the main subject of this study is physical activity, which is more than sport and recreation and contains a broad range of activities. It is focused on health-related benefits and moderate to vigorous physical activity which is essential for adolescent health.

2.2 Formal physical education

Physical education consists of physical activities containing a wide range of recreational and sporting activities, which could be either vigorous or light, which have an educational purpose. For that reason, the study of physical education is a broader concept. Physical education belongs to the whole education system, a fact often ignored or misunderstood by both educators and students. In general concept, it emphasises movement and physical development:

> *'Physical education is a learning process that focuses on knowledge, attitudes, and behaviours relative to physical activity.' (Darst, Pangrazi, Sariscsany, & Brusseau, 2013; P7)*

Meanwhile it is also 'an integral part of total education process' (Bucher 1983; p13) which is responsible for educating children to perform socially and develop enjoyment in physical activity. Darst et al. (2013) indicated that physical education can be taught through many ways including school, family or by a coach.

This study concerns formal physical education taking place at secondary school level. In school, physical education is designed for systematically educating students to learn physical skills and build a healthy body by a well-trained teacher. According to Camliguney, Mengutay and Pehlivan (2012), physical education is regarded as a primary platform for students to receive physical activities in school. It provides space and time for students to access sporting behaviours and exercises, and to some extent

develops a habit of engaging in physical activities (Zask, van Beurden, Barnett, Brooks, & Dietrich, 2001; Culpepper, Tarr & Killion, 2011).

Why formal physical education matters

It has been claimed that curricular physical education has educational effects including self-discipline development and emotional control, which are regarded as a part of school-based socialisation (Bailey, Armoue, Kirk, Jess, Pickup & Sandford, 2009). Physical activity has proved to be psychologically beneficial, enhancing mental health and reducing stress, anxiety and depression (Svoboda, 1994; WHO, 1998; Bailey et al., 2009). Researchers stated that a qualified physical education can effectively build healthy values and avoid deviant behaviours of adolescents (Thorlindsson and Bernburg, 2006). With regards to academic performance, Irish reports (Lunn et al., 2013) showed that students were likely to get a better Leaving Cert score if they engaged in more extra-curricular activities.

A good physical education not merely teaches children physical skills but also helps children to foster physically active habits and encourages them into types of exercise. Zask et al. (2001) noted that the successive effect of physical education in school is so important that if students are not provided proper opportunity to participate in sports or exercise in the class, they are less likely to be active in exercise out of school. Furthermore, physical education programme is also designed to help young people to establish a type of healthy lifestyle and encourage them to be sportive in adult life (Bailey et al., 2009; Capel and Whitehead, 2012; Darst et al., 2013). The better the physical education curriculum provided in school, the more sporting behaviours they will regularly attend when they are growing up, which will reduce the risk of obesity.

Contents and principles of physical education

In a physical education class, students are usually taught what to play and how to play. Detailed contents depend on many factors such as school facilities, budget, geographical area, grade level, departmental ethos and staff expertise (UK. OFSTED,

1995; Culpepper et al., 2011). Previous reports indicated that team sports are most welcome in Irish class (Lunn and Layte, 2008; Lunn et al., 2013). According to the guidelines from Irish Department of Education and Science (2008), 11 space requirements for sport are defined in its handbook, where basketball hall is the detailed recommended and playing court for gymnastics or athletics is not mentioned. It suggests a biased implementation in curriculum even in the policy level.

Like normal education, learning ability is an essential concept in physical education (Bailey et al., 2009; Zhu, Chen, Ennis, Sun, Hopple, Bonello, Bae & Kim, 2009). Zhu et al. (2009) pointed out that cognitive knowledge, psychomotor ability, and affective character were the three basic tasks in physical education class, indicating that physical education is more than a command of physical skills and participation in physical activity, and is an understanding of reasons and mechanisms of physical activities and health-related knowledge. Bailey et al. (2009) indicated four benefits of physical education: physical benefit, social benefit, affective benefit and cognitive benefit. Cognitive benefit was defined as an emphasis on addressing learning skills to students and improving scholastic performance through participation in physical activity.

Physical education is important for improving health of children and levels of physical activity while different types of physical education may lead to different outcomes (Culpepper et al., 2011). Activity-based models are the most common form of physical education in the curriculum (Kelly and Melograno, 2004; Culpepper et al., 2011). Students are encouraged to take part in physical activities in class. With regard to content, the most popular types of physical education can also be divided into three categories of exercise: fitness, game/sport, and skill themes. According to Culpepper et al. (2011), the fitness model was a class delivering fitness concepts including flexibility, muscular strength and muscular endurance and so on. In a game/sport model class, children were taught the skills of sports and encouraged to participate in more aggressive games/sports. Compared to game/sport model, skill theme model

emphasised track and field, including running, jumping and throwing which were basic movements. Among these three models, the sport/game class was the most vigorous and far more intensive than skill themes class and fitness class (Culpepper et al., 2011).

Teaching approach

The most popular approach in physical education class targets skill development (the promoting physical activity approach), which emphasises allowing students to be involved in physical activity and learning physical skills (Darst et al., 2013). Activities in the skill development approach class are rich and sports taken in each class are usually more than one form or one dimension of sporting behaviours. In terms of types of events, sports can be simply classified as team sports, lifetime sports (i.e., golf, tennis), dance, fitness activities, recreational games (i.e., table tennis, shuffleboard), outdoor adventure activities (i.e., cycling, rock climbing), aquatics (i.e., swimming, diving or water sports) and non-traditional activities (i.e. Ultimate Frisbee and disc golf, martial arts, cooperative activities) (Darst et al., 2013). The choice of sports for each class is generally varied based on knowledge of each teacher and interest of students. The socio-cultural background of students' needs also to be considered in teaching. Citing Ireland as example, Gaelic sports, such as hurling and Gaelic football, are two common types of activities in class.

Another approach is called sport education and concentrates on the sport experience of students. It generally provides opportunities for students to get involved or experience achievement in games and activities, no matter in which physical skill and ability level the targeted student is (Sidentop, Hastie, & van der Mars, 2004; Bulger, Mohr, Rairigh, & Townsend, 2007; Darst et al., 2013). Contents in these classes are full of games and matches, which are well-organised and unbiased, encouraging students to be competent and enthusiastic through games. A key factor in this approach is a formal organisation of games (like a league), where students are members of teams and the curriculum is more like seasons than units.

Similarly, the tactical game approach is also based on games. Compared with the skills-oriented approach, the tactical approach lays more emphasis on cognitive ability, which is first to understand game play and then a command of skills. Games requiring solutions to tactical problems are more involved in this class and they can be divided into four groups: invasion games (i.e., soccer), net/wall games (i.e., tennis), target games (i.e., golf) and striking/fielding games (i.e., baseball) (Darst et al., 2013). To achieve a positive cognitive result, interaction between teachers and students is essential in each class and discussion will occur on any movement and strategy choice of student.

The knowledge concepts approach is another type of physical education and interaction between learner and the content is essential under this approach (Zhu et al., 2009). The task in this class is to develop academically oriented skills to better understand the rules, strategy, knowledge concepts, history of a sport or a physical activity and the fitness education approach is an example of this approach (Darst et al., 2013). In a fitness education class, a concern is placed on life-term health and an effect on future lifestyles where students are taught to know the importance of fitness and physical activities in their lives. A less mentioned approach in physical education is the personal and social responsibility approach. In this case, the physical education class is to be a platform to gain sociable skills and students in the class are taught to be socialised. Students will be encouraged to discuss their behaviour in games and teams developing their self-reflection, sharing ability and responsibility (Darst et al., 2013).

Changes and innovation of physical education

Physical education is a basic curriculum in the whole education system, which also generates some arguments. A traditional debate between physical education and academic education argues that physical activities have the potential to distract concentration of students from books and lower their performance in the academic

area. Capel and Whitehead (2012) illustrated that traditional physical education merely placed on emphasis on physical activities taking place in field, gym or any specific place. People tended to ignore opportunities for physical activity, even practical things like walking from place to place. In this case, walking and cycling are exercise but are not seen as sport. Besides, physical educators often place too much attention on coaching children physical skills rather than motivating children to take up sport.

Evans and Clarke (1988) pointed out two innovations of contemporary physical education implementation. One was 'teaching games for understanding', which focused on the understanding of game strategy instead of simple command of game skills. Here, the emphasis was on children as players, which was at the core of the skill-focussed approach. Children were not expected to play as an adult does, but they can enjoy the success of a game and the game should be modified to suit the children (Bunker and Thorpe, 1982). A health-related fitness perspective asserted that vigorous physical activities helped to avoid sedentary lifestyle problems and minimise the risk of obesity, coronary heart disease and stress (Kirk, 1992). Kirk (1992) clarified the fitness-oriented teaching approach which was conducted by science-based knowledge and physical measurement of body fat, height, weight along with some other basic information of personal physical fitness.

To sum up, curricular physical education offers resources to promote adolescent body shape, develop sportive habit, and it also promotes their future healthy lifestyle and encourages people to be more active in physical activities. Different types of principles such as cognitive-oriented or skill-oriented perspectives decide ways of educating in physical education class. Here are presented the five most common teaching approaches in physical education. Game-based approaches are mainstream and the skill development approach is the most popular one targeting physical skills promotion and providing sports or games for students. However, the physical education approach needs improving and its focus should be transferred from

traditional skill development into cognitive ability and psychological achievement, the core principle of which is to promote the learning ability of children. The main task of physical education nowadays should become an awareness of health issues related to weight and to avoid sedentary lifestyles.

2.3 Extra-curricular physical activity participation

This study also emphasised extra-curricular physical activity since it is discovered a clear relevance to physical education and regular physical engagement. The 'extra' here is literally beyond the limitation of formal physical education and extra-curricular physical activity also has both distinctions and interactions with intra-curricular education. It is evidenced that extra-curricular sports and activities mirror what is taught from the curriculum and effectively promote children's physical activity, even resulting in lifelong benefits (Fairclough, Stratton & Baldwin, 2002).

Why extra-curricular physical activity matters

Due to the time limitation of physical education, extra-curricular physical activities are seen as remedy or supplementary for students, regardless of the fact that secondary level school students were found less physically active than pupils at primary level (Culpepper et al., 2011). It is as important as curricular physical education for adolescents since it reflects students' regular involvement in sports and exercises (Daley and Leahy, 2003; De Meester, Aelterman, Cardon, De Bourdeaudhuij & Haerens, 2014). Only if students take part in more extra-curricular activities will they reach the suggested weekly guidelines for physical activity. Sport also establishes a positive interaction between adolescents and their parents, where parents can be role models for their children (Cleland, Venn, Fryer, Dwyer & Blizzard, 2005). Parents support on sport participation of children is highly correlated with sportive frequency and percentage value. The more parents support their children, the more frequently children will exercise and they will show more intense interest in

their physical activity (Pinar, Ozdol & Ozer, 2012).

According to De Meester et al. (2014), after-school is the main opportunity for students (especially for pupils at primary level) to get involved in sports, of which there are two main forms of extra-curricular movements: school-based and community-based. The former choice is much cheaper and more convenient than outside school places because students are already inside school and there is no need to pay for extra expenses like the field (De Meester et al., 2014). Children are also more familiar with their peer groups in school and it is easy to choose their teammates and make friends.

Contents in extra-curricular physical activity

Students are commonly encouraged to choose from a variety of physical activity and sport in their extra-curricular time. A programme in Britain named 'Move It' was delivered in students from 11 to 14 years old and discovered a finding that their priority to extra-curricular physical activity participation was relaxing and having fun while coaches were more likely to concentrate on more skill-led and competitive activities (Blair and Capel, 2013). Blair and Capel (2013) thus indicated that under an inappropriate approach those who were not into the competitive games would potentially lose their interest in participating regular physical activity.

Leyshon (2011) argued that support for extra-curricular physical education was limited in both facilities and educating resources terms. As a supplementary for formal physical education, extra-curricular physical education is suggested to provide activities such as martial arts and jodo, which are not included in the curriculum. Those who take part in those physical activities are attributed to their lack of confidence in intra-curricular sport or they are influenced by their parents (Leyshon, 2011). But in fact, extra-curriculum activity provision is often traditional with few creative attempts (Leyshon, 2011; Blair and Capel, 2013).

In summary, extra-curricular time is important for children to engage in physical activities due to the time limitation of the physical education curriculum. Furthermore, after-school time is a most popular opportunity for students to take part in sports because of its regional convenience and lower expense. Aerobics-like activities are recommended to be popularised instead of traditional team sports. Reasons for student's extra-curricular physical activity choice are consistent with their intra-curricular experience and family influence.

2.4 The link between formal physical education and extra-curricular physical activity

The relationship between intra-curricular physical education and extra-curricular physical activity participation is interesting. An Irish survey found that boys were more frequently participating in physical activities in extra-curriculum time than girls as inside curriculum, while another report explored that Irish young males and females shared similar behaviours in physical activity if they leave school (Enright and Tindall, 2010; Lunn and Layte, 2008). Moreover, there was a study showing the fact that the physically active level of children would be increased with a positive physical activity provision by school outside its curriculum (De Meester et al., 2014).

Fairclough et al. (2002) conducted a survey among secondary school level students in the Merseyside area of England and found that lifetime sports were less frequently provided than team games for the students in the formal education context. However, it was also found that outside the curriculum, boys attended with more lifetime activities than inside curriculum whereas, more or less, girls were provided more lifetime activities, which is considered as contributing to lifelong physical benefits (Fairclough et al., 2002).

Moreover, those who were not attracted to curricular team games were less likely to

get involved in extra-curricular activities. This is because extra-curricular physical activities are usually dominated by team sports, such as soccer and basketball (Blair and Capel, 2013). But these competitive sports can hardly be kept in their lifelong experience and 'lifestyle activities' (e.g. mountain cycling, aerobics, etc.) are suggested in extra-curricular time (Griffiths and Rainer, 2009).

Howells, Wellard, and Woolf-May (2010) discussed physical education and its influence on English children's physical activity habits. Although this was only based at primary level and the sample was only from one school, the study is highly correlated with my study and its research approach can be referenced to some extent. Findings showed that those who had physical education in the last 60 days were comparably more sportive, especially on the days with a physical education class. Boys were more active than girls when compared by their mean time in sporting activities, and only boys in the fifth year reach the UK governmental suggested level for physical activity. Year groups individually were not significantly different from each other as other researchers stated but the interaction between year group and type of days (PE or non-PE) turned out to be significant.

Regular physical activeness is highly associated with effective implementation of curricular physical education in school and sufficient extra-curricular sport participation. This is because both have an educational role in children's physical activity involvement, they provide opportunities to keep fit and healthy and the combined effects not only develop current health but also contribute to lifelong benefits (Blair and Capel, 2013).

In summary, there are several arguments about the relationship between intra- and extra-curricular physical activities, indicating that curricular physical education can have either a positive or negative correlation with extra-curricular physical activity participation. Those who experienced negatively in team games inside the class are potentially to lose their interest in regular participation. All in all, participation in both

physical activities seeks to develop a healthy sporting lifestyle since childhood.

2.5 Determinants to physical activity participation

Previous researchers have discovered several significant indicators including age, gender, class duration of physical education, regional sport tradition, and other socio-economic factors as correlated with physical activity participation.

Age

Age is a most important factor in sport participation and the difference in levels of physical activity varies during each period of life course (Lunn and Layte, 2008; Hovemann and Wicker, 2009). The clear relationship between physical activity involvement and age is considered to be due to the fact that older people lose energy and interest in sports with their growing age, and present young people have more opportunities to access sports resources than the older generations (Musch and Grodin 2001; Lunn and Layte, 2008) and with the increasing age, people drop out from sports and exercises. Enright and Tindall (2010) asserted that both boys and girls in secondary level were less likely to take part in sport than those in primary level. Moreover, age has similar effect on competitive behaviour in sport as with academic performance, where the younger students are the less competitive in sport and academics (Musch and Grondin, 2001).

Gender

Gender is influential in the worldwide context. In European countries, it was reported that males were usually more physically active than females (Gratton and Taylor, 2000; Scheerder, Vanreusel, Taks & Renson, 2002). Gender also played a significant role in a cross-cultural investigation of sport participation in China and America (Yan and McCullagh, 2004). Regardless of nationality of the participants of the survey, they performed similar gender patterns where boys were more competitive motivated

and girls were more socially focused. Class time is found to be the first factor contributing to a decision of physical activity in class and it is generally based on different gender groups. When teachers prepare the contents of class, they usually take gender as priority. According to Culpepper et al. (2011), boys were monitored to obtain much more steps (2302.88/837.89) than females (1820.7/50.01) in class and females were reported more inactive.

Some researchers also indicate that gender pattern does not seem to be as crucial as age does (Lunn, 2007; Hovemann and Wicker, 2009). Higher percentages of women in the Netherlands and Denmark were participating in sport in 2004 (Hovemann and Wicker, 2009) and Lunn (2007) also indicated that there was no apparent gender difference in sport participation. If looking back to the data of Lunn's research, however, gender gap is significant in the very early part of life span. Sport participation habits are mainly developed in school, especially at secondary level (Lunn and Layte, 2008).

Area of residence

Few researchers explore the relevance between size of the residence and sport participation of inhabitants because it is highly associated with other factors such as public infrastructures and local governmental capital investment in sport facilities. Erlinghagen, Frick and Wagner (2006) conducted an investigation in Germany and discovered that people under 17 years old in a higher populated town were less likely to get involved in sport. On the contrary, in the research of Hovemann and Wicker (2009), most European citizens from a bigger city participated in sport more often than those who dwelled in smaller places. Leyshon (2011) also indicated that region's are highly associated with gender, socio-economic status as well as language of the school. The contradictions will be further analysed in this study.

Socio-economic factors

Social inequality is another contributor to different levels of physical activity

engagement. Those who are from upper social classes receive more sport resources than those who come from lower social classes. Low educational attainment and low income create disadvantage for students from a very young age, and can further influence their future sporting behaviour, and this social-economic gap is even widened in individual sports (Lunn and Layte, 2008). However, Leyshon (2011) argued that the maintenance of long-term physical activity participation does not vary in terms of socio-economic status became, although, it may lead to an initial difference. For example, those from lower social classes may gravitate towards more traditional widely available sport whereas children in a higher social class have more opportunities to access golf. The initiative is also largely influenced by their parents, community and locality and it could be caused by social deprivation.

Cultural influence

Motivational culture and environment is essential for sport participation as well (Zhu et al., 2009; Cuevas, Contreras & Garcia-Calvo, 2012). It is comprised of the teaching approach, contents inside class and organisation of the sporting events. In this study, is majorly discussed the interaction of content and duration of physical education class and children's general participation in sport and exercise is considered. Cultural variation cannot be overlooked in activity motivation. For instance, Yan and McCullagh (2004) argued that American adolescents were likely to take part in more competitive team sports and improve their physical skills whereas Chinese students paid more concern to fitness and recreational activities. With regard to the Irish context, it needs more examination and it will be discussed in this study. Furthermore, the relationship between physical activity participation and national identity was discussed by Houlihan (1997) who argues that sport provides platform for cultural elements which are necessary for developing cultural identity.

Briefly, age, gender, location, socio-economic factors are to different extent correlated with adolescent physical activeness. Age and gender are generally considered the most influential factors. The younger people are more sportive than the older

generations. Despite the Dutch exception, the traditional gender pattern shows that boys are more physically active than girls in Ireland. Family socio-economic background is also associated with frequency and choice in sport participation. Broadly speaking, students from a higher social class family are more physically active. There is no general conclusion on how regional difference affects sport participation, but it is possible that population of the area may correlated with public sporting behaviours.

2.6 Irish context

This study focuses on Irish adolescents not only because the location is convenient, but due to the fact that the Irish are very active in sports and are famous for taking part in both Irish traditional events and general modern sporting behaviours. Nowadays, over 2.1 million people are involved in sporting activities annually and there are more than ten thousand sports clubs covering all of Ireland (Federation of Irish Sport, 2014). Concerning traditional sport, Irish people are well-known for their efforts in promoting Gaelic football overt soccer-like activities as part of the anti-colonial struggle (Houlihan, 1997). This section seeks to outline the Irish context.

General picture

Individual physical activities such as swimming, running and cycling attract public attention ever-increasingly than team activities in Ireland (ISM, 2011). There was a clear drop in late teens participating in team games and 76% of adult sport was individual (Lunn and Layte, 2008). The participation in exercises, especially swimming, running and cycling soared at least 40% from 2007 to 2011 whereas soccer, GAA and hurling participation remain the same (ISM, 2011). Multi-sport participation was growing and 17% of people were reported to take part in at least one type of sporting behaviour, which was 10% higher than in 2009 (ISM, 2011).

The most recent sporting trend released by ISM 2013 showed participation of people aged 16 to 19 reduced slightly from 80% (2011) to 75% (2013) in total and similar trends happened in both genders. However in percentage terms, more people took part in more intensive sporting activities and less people were sedentary overall. Surveys also showed that health benefit was the most accepted reason for physical activity among Irish people.

Irish Sport Related Policy

This dataset was conducted in 2009 so policy before 2009 will be mainly discussed in this section.

Physical activity and its health-related benefits were formally emphasised as a part of health strategy in Ireland in 1995 (Ireland. Department of Health and Children, 1995; Fahey, Layte and Gannon, 2004). Its main aim was to attract adults to participate 30% more in sporting activities by 2000 but failed to reach the objective according to the 2003 research said by ESRI (Fahey et al., 2004).

Policies were made to promote adult's sport participation with high association with physical education in school. Physical education is not compulsory in Irish post-primary level, but in practice most children from 4 and 18 years are taught physical education in school (Fahey, Delaney & Gannon, 2006; MacPhail, O'Sullivan & Halbert, 2008). Mac Donncha (2002) indicated that Ireland had a tradition of participating in sports in schools but was poor in its academic approach, where sporting theories were insufficiently delivered. Although it was emphasised and related policies had been carried out at national level since 2003, the following studies found problems such as lack of systematic implementation of the curriculum as well as insufficient implementation of physical education remained still (Fahey et al., 2004; Lunn, and Layte, 2008).

Governmental investment in sport is growing annually. The meaningful funding for

sport began at the year of 1997 by the Federation of Irish Sport and both current and capital projects were funded to improve levels of sport participation and popularisation at social level (Federation of Irish Sport, 2014). The Sports Capital Programme was established to provide resources for sports clubs, community sports and some other local organisations except schools and colleges. However, it proved not to result in more sport participation in the Irish population (Lunn and Layte, 2008). The Sport Council was founded in 1999, which aimed to conduct a long-term strategy to increase Irish public participation in sport and physical activity. It organises the annual Irish Sports Monitor report to observe the trend of sport participation in Ireland, which is helpful for this study to better understand statistical trends in recent years.

School based physical education is mainly funded by the Department of Education and Science, but there are few individual documents directly targeting physical education strategy and it is mostly mentioned as a part of the whole educational system. As for each school, funding provision is based on curricular time and recruitment of the professional teachers, along with cultural and political factors (MacPhail et al., 2008).

In short, levels of Irish public sport participation are rising steadily and individual events attract more public interest. Participation in team sport slumps with age in late secondary school level and most adult sporting habits are individual activities. Adolescent engagement in sport and exercise has downturned in recent years. In sport-related policy, physical education in Ireland is not compulsory in the curriculum but is still widely conducted in schools. Furthermore, Irish policy makers are making efforts to increase public sport participation which can be presented in capital investment and public infrastructures development.

2.7 Previous research in Ireland

The ESRI had released a series of reports on Irish sport participation at a macro social level. In 2008, Lunn and Layte investigated Irish sport participation during lifetimes based on the dataset of 2003 *Survey of Sport and Physical Exercise*. Findings showed that there was a clear growth of sport participation of current young adults under 30 than the generation of their parents. A pattern of sport participation across a lifetime could be presented as a 'sport hill' where adolescents around 15 years old reach the peak. Sport participation rocketed after 5 years old, and stably declined after 20 years old (Lunn and Layte, 2008). There was a weak difference in team sport participation among higher, middle and low educational levels but a very large difference in individual exercise where those who received less education were dramatically different in terms of their physical activity, even at a very young age (Lunn and Layte, 2008). Lunn and Layte (2008) indicated that school and college provided enough opportunity to participate in sport and those who leave education earlier had fewer chances to be physically active. Traditional Irish sports playing such as football has declined to some extent, especially among young adults. Lunn and Layte (2008) also indicated that current young people were more likely to experience health-related benefits from different types of sporting behaviours than their parents.

A report (Woods et al., 2010) based on the Children's Sport Participation and Physical Activity (CSPPA) study presented analyses on different topics including children's involvement in sports, intra-curricular physical education in different year groups, extra-curricular activities, by simply counting the number (or percentage) of schools. There was lack of demographical and socio-economic indicators when making the analysis. It was a study targeting a broad range of topics that paid brief attention to post-primary school individually and merit further analysis. Instead, analyses were based on five categories: general physical activity, physical education, extra-curricular physical activity, active travel and sedentary behaviour. It also offered several recommendations for improving the level of sport participation.

Lunn et al. (2013)'s research emphasised the determinants attracting people to participate in sports and exercise. It employed three datasets: the Children's Sport Participation and Physical Activity Study (CSPPA), conducted in 2009; the 2007 School Leavers' Survey (SLS); and the Irish Sports Monitor (ISM), from 2007 to 2009. It provided more comprehensive results of Irish sport participation across the life span from childhood to adulthood. This research was also policy-oriented and provided several recommendations to promote sport-related policies. Throughout the report it paid close attention to people's attitudes, especially those of adult's towards sport, and frequency and preference in sport participation so they mainly employed socio-economic indicators through their research. For secondary level students, they tried to control variables such as school year, gender, social class and interactions of gender and class with school year to meet the needs of their study.

In summary, previous reports on Irish sports participation were only focused on Irish experience and how school students in the fifth and sixth year and secondary level, participated in sports. Issues such as how physical education was conducted and whether the duration and contents of the curriculum had an effect on regular sport participation of students are not involved in the study. Moreover, there is no relevant research to discuss whether the implementation of the class can be applied in another social context.

Overall this literature review presents an introduction to the importance of physical activity and also illustrates the link between intra-curricular physical education and extra-curricular physical activity participation. This study is based on Irish context, so it takes local policy and Irish cultural elements into consideration. The main tasks for this study are to describe Irish regular physical activity participation and explore factors that influence it. Data source and analysis methods will be introduced in the following chapter.

Chapter Three: Methodology

Introduction

This chapter begins with an introduction of the study aims and general questions. This is followed by an account of the search protocols and data analysis methods. This study is a secondary analysis study based on the dataset of the Children's Sport Participation and Physical Activity (CSPPA) study. Quantitative analysis will be used to investigate how physical education was implemented in different schools. Basic independent variables in the study were gender (boy or girl), age (12 to 18) and geographical area (village, town or city, and so on). The frequencies of physical education class per week, duration of each class, game class, and inside-school physical activities were analysed in the study.

3.1 Study aims

This thesis intends to explore the implementation and effects of physical education in Ireland.

Generally speaking, this study aims to:
(1) Examine the implementation of physical education class in Ireland at secondary level. This mainly discovered the frequency and duration of the class.
(2) Explore the forms and content of physical activities in class.
(3) Explore types of extra-curricular sport and children's participation. It also compares extracurricular physical activity and intra-curricular performance.
(4) Explore determinants of students' participation in sports.

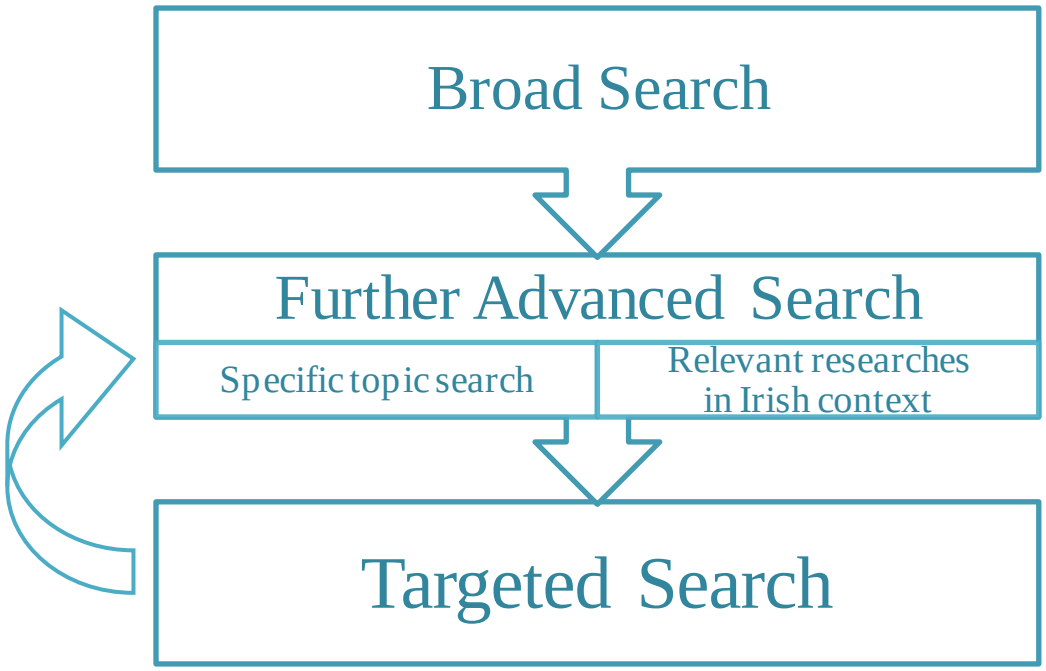
Apart from these data-based analyses, this study also seeks to discuss the strength and

weakness of Irish physical education implementation and to discuss the possibility of applying the Irish experience into another society in which physical education is poorly implemented.

3.2 Literature search

Definition of the topics for this study is difficult and core terms such as sport and physical activity used in articles have different explanations due to its various contexts. To fully discover relevant discussions on this topic, synonyms of some words should not be neglected. For instance, the participation in physical activity is often simplified as sport participation in many studies.

Figure 3.2.1: Literature search protocol



The first step was a broad search of topics surrounding physical education and levels of adolescent physical activity. When it came to a clear outline for this study, the literature search procedure moved on to a further advanced search. There were two

separate lines in this procedure. One was called specific topic search, where I focused on the definition of physical education, contents and teaching approaches inside physical education class, factors influencing people's participation in physical activities and any other related concept definition. The other advanced search was designed to look for reports or research on Irish sport and physical activity participation. It also sought to explore previous perspectives on the CSPPA dataset. Then was used to create an archive of literature and select relevant concepts and contents for this research. The following stage was to make a more detailed search based on my research design, and revised previous search procedure. If more information was required on the research, I repeated the advanced search to reach the literature aims of the study.

3.3 Quantitative research

Quantitative surveys have prominent merits such as the possibility of massive sampling size, causality and statistical controls to help test the possibility and relationship between variables (Balnaves and Caputi, 2001; De Vaus, 2001). Standardisation is the centre of survey research which allows researchers to repeat the same questions in every interview or questionnaire (Sapsford, 2007).

The larger sampling size enables a more comprehensive overview through a scientific strategy to reach the representativeness. Otherwise, some bias may arise from any sampling limitations (Balnaves and Caputi, 2001). In this survey, target candidates to some extent varied due to the deliverers and their different demographical background of the area of residence, but owing to its quantitative nature and large-scale sample size, biases are considered being greatly minimised. Furthermore, concerning the sampling strategy and analysis methods in this study, it uses inductive reasoning to conclude the findings. For example, attitude exploration is missing in the dataset, instead, focus turns to the relationship between class duration and frequency of

general participation in physical activity, which indirectly reflects children's attitudes towards physical education class. The logic fashion is that if a student experienced more physical education class and he also self-reported to take part in regular sport very often, suggesting the fact that the class to some extent contributes to his typical sport participation.

Besides, quantitative methods have strengths in precision focus on distinct knowledge, which is different from the in-depth-oriented qualitative research (Balnaves and Caputi, 2001). Quantitative research can present the result in a most simple and direct way, where charts and tables can easily give the reader the first impression of the phenomenon. The next sections will outline the original dataset and validity of measurement of this study in detail.

3.4 Data source: an overview of CSPPA

The whole analysis was based on the dataset of the Children's Sport Participation and Physical Activity (CSPPA) study. The CSPPA study was a national level research programme conducted in 2009, following up the 2005 published research 'School Children and Sport in Ireland'. It supplemented several questions which were missing in the last survey and became more comprehensive than its predecessor. The CSPPA was funded by the Irish Sport Council and was carried out by Dublin City University, University of Limerick and University College Cork. Supervised technically, the whole data collection procedure could be considered reliable and valid.

The CSPPA was a multi-centred cross-sectional survey, targeting physical education, physical activity, sport participation, active transport, sedentary behaviour and youth sport. It applied a cluster sampling strategy and used a self-reported questionnaire, interviews, and physical health protocol. The study thus involved a mixed method data collection procedure. Candidates were from both primary and post-primary

schools aged from 10 to 18.

For this research, I mainly focused on the physical education section and its related sections including contents of physical activities, regular sport participation and demographical information to realise my study aims. Physical education class is the main platform for this study because it is easy to measure and analyse. Moreover, since this study was also policy orientated, the result of analysing physical education can be easily applied into another social context. Besides, I controlled the samples for my research and selected the dataset responded by students from post-primary schools. One of the strengths of this choice is that adolescent respondents were regarded as having better understanding than those who were at primary level. Another reason was that more detailed and comprehensive information was collected in the post-primary level questionnaires such as area of residence and physical activities in a typical week. The CSPPA survey for post-primary level also had a wide coverage of physical activities over 43 items which were divided into three categories: sports and dance, exercise, and general physical activities.

3.5 Data analysis

Data analysis took place through the use of the statistical analysis package, IBM SPSS Statistics 21. Parts of the analysis were converted from SPSS to Microsoft Excel to make a second cross-sectional comparison and create a graphical charts and tables to be better presented for this paper.

Reweighting is difficult to realise in this dataset because some socio-economic indicators were collected inconsistently with census population (referring to the study of Lunn et al., 2013). Instead I controlled some significant independent variables such as gender and school year to minimise the imbalance as my predecessors did because they were proved important in physical participation. I also tried to control school

type coded in terms of whether the school was DEIS (meaning of DEIS will be fully explained below) or non-DEIS. Furthermore, the gender of student was another crucial part in my study. Since this thesis focuses on the in-school curriculum, it was even more important to think of school profile rather than a single focus on gender of our respondents.

Comparisons are mainly applied in the analysis procedure due to its cross-sectional and quantitative nature. So the internal validity of the confounding variables will be discussed in the following section.

Validity of measurement

Internal validity

Internal validity is to test the relationship between confound variables (Balnaves and Caputi, 2001; De Vaus, 2001). In this study, dependent variables are selected to measure the content and time of the class, extra-curricular physical activity, and the typicality of physical activity participation. Independent variables are chosen based on previous studies including basic demographical information.

a) Dependent variables

This study seeks to explore the correlation between physical education and level of physical activities. Dependent variables employed in this study mainly originate from Prochaska (2001)'s survey including asking the typical physical active days and physical active days one week before responding to the questionnaire. A followed up European survey on physical activity also used these questions. In the CSPPA, similar questions were included. In detail, the participation in physical activity in the past 7 days is considered to obtain higher reliability than the regular weekly participation (Liu, Wang, Tynjälä, Lv, Villberg, Zhang & Kannas, 2010). So a comparison between regular participation and participation in the past 7 days will be taken in the following analysis.

Many questions in this survey such as the items of physical activity inside curriculum directly copied the questions of its precedent survey on sport played by school children in 2005. Furthermore, in order to further examine the general physical activities, exercise and general physical activity were supplemented to measure regular physical activities. The average duration of physical education class was also inherited from the previous study.

b) Indicators

As is said in the literature, many researchers have discovered physical activity has a high correlation with gender and age. In Fahey et al. (2006)'s research, gender and year group are the main indicators in the description of students' involvement in physical activities. Since gender contains three types of compositions including single-boys, single-girls and mixed-sex, this indicator is controlled in some way to explore curricular physical education implementation in different sex of schools instead of simply gender variance.

Area of residence is measured to test the hypothesis that location size and physical activity participation are correlated. From the literature, location size can either be positively or negatively related to sport involvement, so it needs further analysis.

In this study, the school type (DEIS or non-DEIS) is controlled as a socio-economic indicator to compare the difference in adolescent choice of physical activity in their typical sporting life. DEIS stands for Delivering Equality of Opportunity in Schools (Ireland. Department of Education and Science, 2005), which was a policy created to provide more opportunities for children from educational disadvantage communities. So DEIS reveals something of the socio-economic situation of the respondents.

External validity

According to the school code in the database, 4122 students from 122[1] post-primary schools responded to this self-reported survey. There were 1955 boys (47.5%) and 2161 girls (52.5%) responded to this survey. DEIS school students accounted for 16.3% (n=670) and the other 3452 students (83.7%) were studying in non-DEIS schools.

With regard to the sampling strategy, participants were mainly from 13 to 14 years old (mean=14.61, median=14, mode=13, SD=1.6). In attempt to make the statistics more evenly distributed and ease the calculating procedure, I regrouped them into three age groups: 12-13 years old (n=1296, 31.5%), 14-15 years old (n=1433, 34.9%), and 16-18 years old (n=1381, 33.6%) in part of my analysis.

Geographical information was another basic variable in this study. Area of residence was divided by population according to the original questionnaire and it was also applied in this study. Participants from big cities with over 70,000 residents contained 5.6% (n=229). A town with 20,000 to 70, 000 inhabitants was categorised into suburbs, large town or outskirts of city (SLO) and there were the most respondents for the CSPPA study which was up to 1340 (32.5%). Those places with less than 20,000 inhabitants and more than 3,000 inhabitants were named as town. 984 participants (23.9%) came from this type of area. Villages were the least populated places with less than 3,000 dwellers and they had 1569 participants (38.1%).

A majority of respondents studied in co-educational schools which included 2237 (54.3%) participants. 1159 participants (28.1%) were from all-girls schools. The fewest participants came from boy schools who were only 726 people (17.6%). One thing should be highlighted was that 65% schools of post-primary level were mixed sexed according to a 2012 report from ESRI (Leonard, 2012). Regardless of annual fluctuation, the imbalanced sampling (in this case, fewer mixed schools than we

[1] These statistics were based on the recent received dataset of CSPPA, which was inconsistent with the description of Lunn et al. (2013). It is mainly because Lunn et al.'s research used the demographical information of Woods et al.'s presentation in the 2010 fifth Physical Education, Physical Activity and Youth Sport (PE PAYS) forum, which only presented a small portion of the total samples.

would expect) may harm the reliability of the study, so this indicator would be carefully used in the following analysis.

3.6 Ethical issues

As the current study was based on the dataset of CSPPA study, I have already received the permission for access to the dataset by the Irish Social Science Data Archive (ISSDA) during my research period from June 2014 to August 2014. The original CSPPA study had received ethical approval by the Research Ethics Committee at Dublin City University, University of Limerick and University College Cork. The ISSDA dataset excluded some detailed variables such as school name in the original questionnaire to maintain the confidentiality.

The participants of the survey signed a consent form authorising use of their information through voluntary basis and also confirmed an informed consent form from their parents or guardian. The research ethical application of my study was discussed and approved by the board of Ethics Committee of the School of Social Work and Social Policy, Trinity College Dublin in June 2014. This was a secondary analysis study analysed with no direct contact with the adolescents. In order to maintain the confidentiality and anonymity, participants would not be individually and specifically identified in any stage of this study.

3.7 Limitations

There exists several methodological limitations related to this study. Since it is a secondary analysis, there remain some inconsistencies between the original questionnaire and the aim of this study. The original questionnaire asked several different types of sports and activities in an unsystematic fashion. For example, there was no general definition or specific section asking about regular sport and exercise

participation. Options of events participated inside physical education curriculum were not exactly uniform with those outside the curriculum, so it requires a careful consideration to select items to compare within the context.

Secondly, the CSPPA study was completed in 2009 but physical activity participation in Ireland has since increased as the annual Irish Sport Monitor shows. Therefore, adolescent engagement in sporting behaviours has already varied from the statistics in 2009 and the general participation tendency is potential to grow. This hypothesis requires conducting another follow-up survey to test.

Having examined the aims of the study and full ethical issues, along with the reliability of applied variables, I will then present my analysis of the dataset of CSPPA.

Chapter Four: Analysis

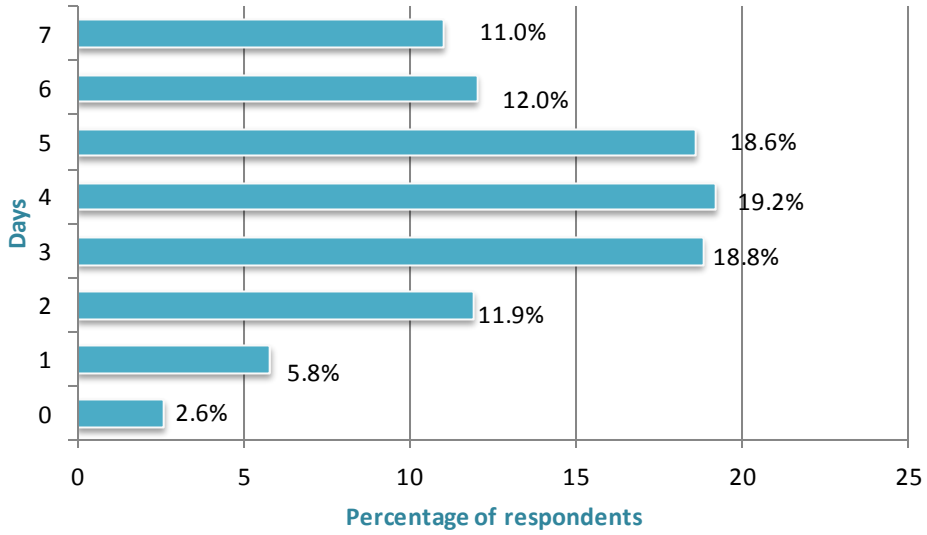
Introduction

This chapter provides the findings of Irish adolescents participation in physical activities by use of bivariate and univariate analysis, as well as correlation, comparison of means, tables and charts. It firstly describes a general picture of Irish adolescent habit of participating in sporting behaviours. It next examines curricular physical activity provision and participation, followed by an examination of class duration. It also identifies extra-curricular physical activities and attempts to explore their relationship with four socio-demographic indicators. Finally it offers an exploration of the relationship between physical education and extra-curricular participation.

4.1 Overview of physical activities habits of Irish adolescents

The first concern of the study focuses on participation in physical activities among children from different demographic background. The main measurement employed was based on sports participation in the past 7 days before their responding to the CSPPA questionnaire and it was also compared to normal participation of adolescents so as to figure out the typicality of their involvement in physical activities. This step seeks to examine the awareness from the literature that the recent 7 days participation is more representative as regular participation and the result will be taken into further analysis.

Figure 4.1.1: Weekly frequency of participants who were physically active for a total of at least 60 minutes a day.



The variable of how many days the participants were usually physically active for a total of at least 60 minutes per day in a week was explored to present a regular sportive pattern. Broadly speaking, a majority of students (n= 2309, 56.6%) spent at least 60 minutes in physical activities for 3 to 5 days per week, hereinto around 19.2% respondents (n=783) spent 4 days engaging in physical activities over 60 minutes (See figure 4.1.1). Those who spent at least 4 days in sporting behaviours accounted for 60.8%.

In order to establish the generality of the finding, a comparison of typical physical activity participation and their sports involvement in the previous 7 days before responding to the questionnaires was then analysed. It was found that 37.1% participants (n=1520) spent more than 2 hours in activities in weekdays and 28.9% adolescents (n=1174) were physically active in weekends (See table 4.1.1). On average, there were 32% (n=1301) respondents took part in exercise or sports over 60 minutes at least 4 days in the past week, which represented a drop compared to regular involvement stated in the previous finding.

Table 4.1.1: Average time spent in physical activities in the past 7 days.

Intensity		None	Up to 30 minutes	Between 30 minutes and 1 hour	Between 1 hour and 1.5 hours	Between 1.5 hours and 2 hours	Greater than 2 hours
Mon - Fri	Valid (%)	2.5	8.3	17.1	19.5	15.5	37.1
	Missing (%)	0.5					
Sat - Sun	Valid (%)	5.2	11.1	17.3	20.1	17.5	28.9
	Missing (%)	1.4					

It turned out that students in the past 7 days were likely to be less physically active than their common sportive life style. Up to 70% participants (n=2864) claimed to behave as usual. 22.1% students (n=898) admitted that they were less active in the past week and they would do more exercises in a typical week. The other 7.2% students (n=294) indicated that they usually were less active.

In this section, a regular sportive pattern of Irish adolescents was presented. It could be seen from the results that a typical range of weekly frequency of moderately to vigorously sporting behaviour was 3 to 5 days. Students were relatively less active in physical activities one week before responding the CSPPA questionnaire and only over 30% respondents engaged in physical activities at least 60 minutes more than 4 days in that week. The influential factors highly associated with sportive habits of Irish post-primary students would be examined in the next analysis.

Factors associated with students' habits in physical activities

There were several indicators highly associated with different levels of adolescent students' involvement in sports or exercises according to previous researches. In order to figure out existing differences, socio-demographic variables including gender, school background, area of residence, age of respondent will be examined. Results were given in the following table 4.1.2.

Table 4.1.2: Typicality of the amount of physical activity participation in the last 7 days.

		As usual		Usually do more		Usually do less	
		percentage	Std. Residual	percentage	Std. Residual	percentage	Std. Residual
Gender	Boys	73.2	1.3	21.1	-.9	5.6	-2.6
	Girls	68.4	-1.3	22.9	.8	8.7	2.5
Age group	12-13	72.9	1.0	19.5	-2.0	7.6	.4
	14-15	69.5	-.6	23.4	1.1	7.1	-.2
	16-18	69.9	-.4	23	.8	7.1	-.2
Area of residence	Big city	73.4	.5	18.0	-1.3	8.6	.7
	SLO	68.5	-.9	23.3	.9	8.2	1.2
	Town	72.1	.6	20.0	-1.4	7.8	.7
	Village	71.0	.2	23.1	.8	5.9	-2.0
Schooltype	DEIS	71.1	.1	19.4	-1.5	9.5	2.1
	Non-DEIS	70.5	-.1	22.7	.6	6.8	-.9

Girls and boys had significantly different habits of participants in physical activity [t (4062) =13.0, p<0.01]. Boys were more active in physical activities than girls reflected in the frequency they took part in activities in a week. They spent 4.4 days in 60-minute physical activities (n=1930, SD=1.7) whereas girls spent only 3.7 days (n=2136, SD=1.8). Apart from that, boys were more likely to perform as usual in the past 7 days when they took part in the survey where girls' performance transformed largely, which inferred that boys seemed to be more stable in sports participation (See table 4.1.2).

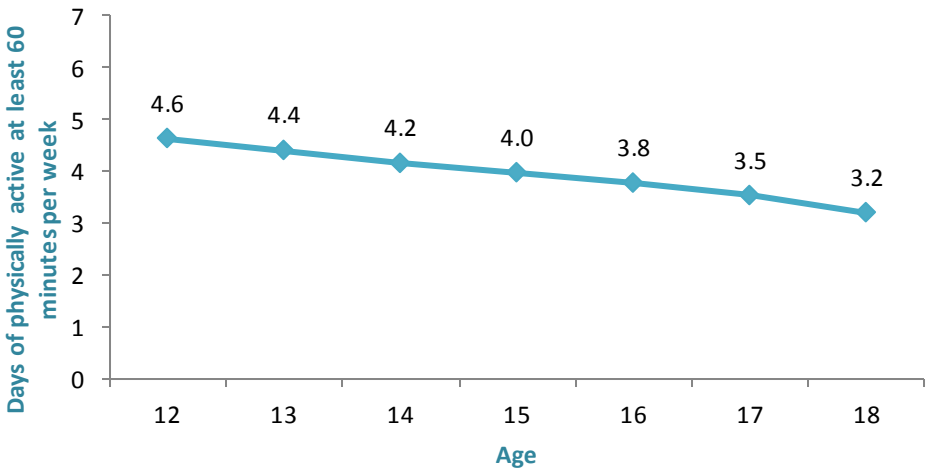
Location partly contributed to adolescent physical activity participation because it varies between some groups (See table 4.1.2). Respondents from big cities preferred to behave regularly in exercises or games whereas students from suburban areas were the least likely to be sportive stably. A one-way ANOVA was conducted to establish a slightly significant difference [F (3) =2.6, p<0.05] between location groups. Students from the most populous places spent the least 3.96 days (SD=2.0) in physical

activities and suburban students spent the most 4.17 days (SD=1.8). Those from a town or a village separately spent 4.02 days (SD=1.8) and 4 days (SD=1.8). Post hoc test was employed to show that suburban participants especially differed from those who came from villages. But no matter whether the respondent was in a big city or a rural area, boys were always more physically active than girls (See appendix A).

School type did not have a large influence on the typicality of sport participation. Although DEIS schools were predicted to provide less opportunities for students to take part in sports stably, the independent t test [t (868) =0.355, p>0.05] showed that students in DEIS schools (M=4, SD=2.0) had similar stable sport habits as those non-DEIS school students (M=4, SD=1.8). This may be because DEIS schools receive resources through the DEIS program, at which level, they had stable opportunities to take part in schools.

Similar results occurred in the variable of age category. It implied that students might have developed a comparably stable sportive lifestyle in their daily life in adolescent period [F (2) =0.922, p>.05]. However, weekly frequency of engagement in sporting behaviours of adolescents went gradually downwards with increasing age (See figure 4.1.3).

Figure 4.1.3 Average days of participating in physical activity at least 60 minutes per week.



ANOVA was computed to show the significance of the difference between age groups [F (6) =27.9, p<0.01]. Post hoc comparisons using the Tukey HSD test indicated that 12 and 13 year-old students were statistically similar in sport habit, whereas students in 14-15 and 16-18 age groups also shared similar intra-group habit in sport participation, corresponding to the age group suggested .

Table 4.1.3: Factorial analysis of the relationship between regular physical activeness and four indicators

	F	df	Mean Square
Model	5.2***	101	15.304
Gender	27.16***	1	79.860
Age	7.16***	6	21.054
Area of residence	0.78	3	2.290
School type	8.34**	1	24.516
Gender * Age	.62	6	1.829
Gender * Area of residence	1.20	3	3.538
Gender * School type	.09	1	.259
Age * Area of residence	.69	18	2.017
Age * School type	1.60	6	4.698
Area of residence * School type	.45	3	1.330
Gender * Age * Area of residence	1.63*	17	4.807
Gender * Age * School type	2.75*	6	8.073
Gender * Area of residence * School type	.71	3	2.079
Age * Area of residence * School type	1.04	17	3.048
All	1.49	10	4.371

***p<.001; **p<.01; *p<.05

R Squared = .117 (Adjusted R Squared = .095)

A two-way ANOVA test was measured to explore the impact of basic demographical indicators (gender, age, area of residence, school type) on regular days spent in physical activities. Gender, age and school type had individually significant main

effects (shown in the table 4.1.3). According to Cohen's (1988)'s guidelines, age performed a medium effect size (partial eta^2 = .011) and the interaction between gender, age and area of residence also presented an effect size of .015, but all the other effect sizes are small (partial eta^2 <.01). The following Tucky HSD test presents significant differences in mean scores between age groups broadly suggesting that the older the students, the less physically active they were in daily life.

To sum up, sex was a highly influential factor for general sport participation of adolescence, and boys were usually more physically active than girls. The sportive habits in different age groups were stable in each age category but the amount of weekly participation dropped greatly with the increasing age. Location had limited relationship with adolescent sport engagement. Those who came from suburban areas were the most physically active among the four residences and they were significantly inconsistent with sport habits of village students. School type did not present any difference in regular weekly physical activity involvement. Moreover, both the interaction of gender, age and location as well as the interaction of gender, age and school type were highly associated with regular participating in physical activity.

4.2 Physical education class

This section examines physical education lessons and explores the relationship between content in physical education and demographical differences. The main dependent variable I used was the variable of types of activity the participants were taking in the curriculum in the past twelve months before they responded to the survey.

Table 4.2.1: Contents in physical education class and a comparison with participation percentage of gender and age.

	Events	Total	Gender			Age groups			
			Male	Female	P	12-13	14-15	16-18	P
1	Adventure activities	24.2	22.1	26.1	.003	20.4	27.6	24.1	.000
2	Aerobics	24.5	17.2	31.1	.000	21.0	26.5	25.7	.002
3	Athletics	43.3	38.4	47.7	.000	47.1	47.5	35.3	.000
4	Badminton	45.9	38.1	52.9	.000	35.3	50.6	51	.000
5	Baseball or rounders	46.7	34.9	57.4	.000	47.5	51.6	40.9	.000
6	Basketball	55.8	47.5	63.3	.000	53.5	60.0	53.4	.000
7	Camogie	8.0	3.8	11.0	.000	10.1	8.2	5.9	.000
8	Cross country running	14.5	12.7	16.1	.000	19.5	16.1	8.2	.000
9	Dance	24.0	11.7	35.2	.000	25.7	25.3	21.1	.009
10	Gaelic Football	29.4	31.9	27.2	.001	31.3	29.5	27.7	.125
11	Gymnastics	27.8	20.7	34.2	.000	31.6	30.6	21.3	.000
12	Handball	22.1	23.5	20.8	.037	19.6	23.8	22.8	.024
13	Hockey	27.4	20.1	34	.000	23.0	31.6	27	.000
14	Horse riding.	4.1	3.3	4.8	.013	5.3	4.0	3.0	.011
15	Hurling	11.5	14.6	8.7	.000	10.6	12.4	11.4	.317
16	Martial Arts	6.4	5.3	7.5	.005	5.7	4.9	8.8	.000
17	Rugby	23.2	26.3	20.4	.000	17.7	26.4	25.1	.000
18	Soccer	53.8	62	46.3	.000	48.7	58.8	53.4	.000
19	Squash	6.2	6.1	6.3	.837	6.5	6.0	6.2	.87
20	Swimming	14.5	14	15	.352	15.0	15.1	13.5	.427
21	Tennis	23.1	16.8	28.8	.000	20.8	23.7	24.7	.043
22	Weight training	10.6	14.1	7.3	.000	7.9	8.5	15.0	.000
23	Any other sport	6.3	22.1	26.1	.003	9.2	5.3	5.9	.000

Table 4.2.1 offers a comparison of types of physical education experienced in the past year and the gender of participants. It can be seen from the table (a more direct graph

can be seen in the appendix B) that girls took part in a much wider range of physical activities in their physical education class than boys did. Only in soccer, rugby and weight training events, boys performed in a relatively higher level. It inferred that the contents in girls' class was richer and more varied since they were provided with wider choices in class. In other words, physical education for boys had gone into paradigm in which they were likely to be given access to soccer-like vigorous team games and other events such as dance and aerobics were ignored by curriculum designers. There was no information on whether those students in co-educational schools were taught in separate gender class or not, so there is no conclusion on this factor.

Age presented a different pattern with the result of out-school performance of adolescents and there was no clear linear tendency between age growth and amount of sport engagement in class. It can be found from the table 4.2.1 that there were several apparent upward trends in badminton, tennis and weight training with the increasing age whereas participation in camogie, cross country running, dance, gymnastics and horse riding was inversely proportional to the age. It can hardly be concluded that the downward trend was due to intensity of the event or popularity because people who were playing Gaelic football, hurling, squash and swimming were stable, and some of the selected events were highly attractive and some else were not. But it could be seen that students in 14-15 years old group were the most physically active and in 10 of the items they were the most participants. Less academic pressure and a stronger body shape can partly account for the result.

Table 4.2.2: Contents in physical education class and a comparison with participation percentage of area of residence and school type.

	Events	Area of residence					School type		
		City	SLO	Town	Village	P	DEIS	non-DEIS	P
1	Adventure activities	29.7	25.5	24.8	21.9	.022	23.1	24.4	.477
2	Aerobics	25.3	29.2	22.5	21.7	.000	19.4	25.5	.001
3	Athletics	38.0	46.3	40.8	43.0	.016	33.9	45.1	.000
4	Badminton	47.2	47	46.6	44.2	.424	34.2	48.1	.000
5	Baseball or rounders	37.1	51.0	44.7	45.7	.000	30.1	49.9	.000
6	Basketball	48.5	58.1	55.0	55.3	.042	50.4	56.7	.003
7	Camogie	7.4	7.8	8.8	7.7	.735	10.0	7.6	.038
8	Cross country running	14.0	14.0	14.6	14.9	.896	13.7	14.6	.546
9	Dance	24.5	28.2	19.3	23.3	.000	17.2	25.3	.000
10	Gaelic Football	17.5	24.7	29.1	35.4	.000	19.1	31.4	.000
11	Gymnastics	32.3	31.6	25.8	25.2	.000	24.0	28.5	.017
12	Handball	20.1	18.7	24.3	24.0	.001	19.7	22.6	.095
13	Hockey	21.0	28.5	28.6	26.6	.079	16.4	29.5	.000
14	Horse riding.	7.4	4.0	5.2	3.0	.002	6.9	3.5	.000
15	Hurling	10	9.7	13.4	12.0	.033	11.6	11.5	.899
16	Martial Arts	8.3	7.8	7.2	4.5	.001	7.2	6.3	.396
17	Rugby	10.5	24.2	23.4	24.2	.000	11.5	25.5	.000
18	Soccer	40.6	51.7	56.4	55.8	.000	46.1	55.2	.000
19	Squash	6.1	5.9	7.2	5.9	.520	6.4	6.2	.808
20	Swimming	20.1	14.9	15	13.1	.037	20.4	13.4	.000
21	Tennis	17.9	26	21.7	22.2	.010	15.4	24.6	.000
22	Weight training	11.8	9.2	13.9	9.4	.001	10.7	10.5	.859
23	Any other sport	8.3	6.9	6.3	6.6	.729	10.0	6.1	.000

Although location did not present as many significant differences in sports participation as gender and age did, it showed a few interesting trends as well (See table 4.2.2). The number of students who were playing Gaelic football turned out to be less in a lower populated place, and those who lived in a more crowded place had more opportunities to be involved in gymnastics and martial arts. The phenomenon in

Gaelic football and gymnastics behaviour contributed to the conclusion that space requirement is an important factor associated with choice of activity in different residential area. More students taking part in martial arts in cities indicated that they were given more opportunities to experiences more types of sports.

Generally speaking, students in non-DEIS schools were likely to get involved in more types of physical activities inside class. See back to the table 4.2.2, there were 11 events where adolescents in non-DEIS schools participated more than those who came from DEIS schools. This difference was largely associated with socio-economic reasons. Since physical education programme resources in DEIS schools were mainly governmentally provided, sporting events in DEIS schools were understandably more limited than non-DEIS schools.

In brief, gender of students appeared significant in physical education class. Boys were provided with more traditional masculine sporting events but girls were given more choices in activities in class. There was no linear rule for students participating in physical activities in class but those who were in the 14-15 age group were more active compared to the younger and elder groups. Location diversity in class contents was largely related to field requirement of the sport and acceptability of new events. Students in non-DEIS schools could access more types of sports and exercises than DEIS school students. Only one activity, squash playing, remained stably low according to the responses. Regardless of gender, age, area of residence or school type, adolescent interest in squash varied limitedly.

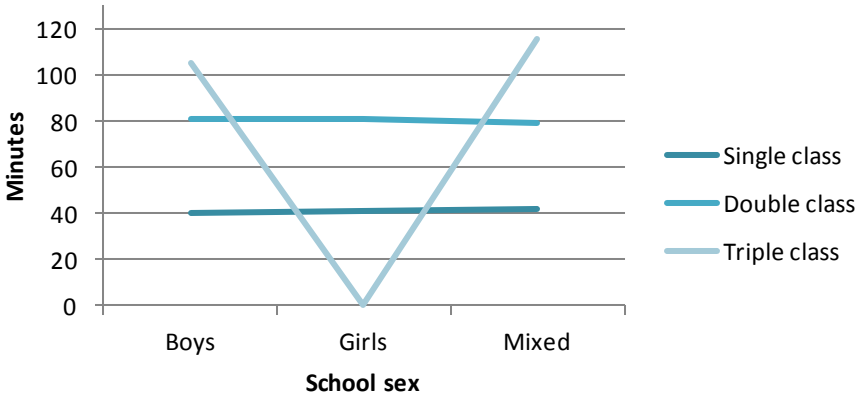
Class duration

To further the study inside class, I mainly compare class duration and its relationship with gender of students, location of participants, types of school and other factors which were thought to be associated with the duration of physical education class. And how the duration of physical education class affected the frequency of regular physical activity participation will be examined afterwards.

There were three types of duration of each physical education class: single, double and triple. Each single class was controlled between 35-45 minutes and most of the students had a 40-minute physical education class. Duration of a double class was generally 80 minutes and a triple class lasted between 105 minutes and 120 minutes. Based on adolescent tolerance, students had no more than one triple class per week, and accordingly triple physical education class was the least listed on their course timetable.

Gender of students was first put into analysis. As reported by previous researchers, gender is usually highly correlated with physical activities and teachers usually have separate teaching approaches conducting their students from different gender groups. Since the main task of this part of the study was to estimate distinctions of physical education class duration, sex in school level instead of sex of individuals was initially taken into account. Average physical education class in boys schools was 86.7 minutes (SD=15.9), 71.8 minutes in girls schools (SD=21.4), and 84.3 in a mixed school (SD=23.3). The result of one-way ANOVA test and its post hoc test indicated that duration of physical education class in different gender of student was significantly different from each other [F (2) =151.45, p<.001].

Figure 4.2.1: Duration of each physical education class and its difference in sex of school.



Furthermore, students from either boy schools, girl schools or mixed-sex schools experienced similar course duration in single and double physical education class (See figure 4.2.1). Triple class was not provided for girl schools but only for boy and co-ed school students. Concerning the interaction of class duration and frequency (See appendix C), most participants had a double physical education class per week, although girls in their single-sex school had much less physical education classes in amount than those from boy schools and co-ed schools.

Table 4.2.3 Average duration of physical education class in each age.

Age	Mean	SD	N
12	84.65	19.58	201
13	81.93	22.64	1095
14	79.64	21.64	950
15	85.91	19.19	447
16	83.56	23.78	679
17	74.18	24.28	453
18	74.20	19.58	94
Total	81.17	22.47	3919

Table 4.2.3 presented the general picture of physical education duration in each year. Pearson correlation tests suggested that the class duration was correlated with age ($r=-0.65$, $p<.001$). Age accounted for 41.6% of the variance of class duration, implying a highly correlation (Cohen, 1988). The linear regression model was then constructed and the equation for the model would be:

$$\textit{Duration of a PE class} = 94.79 - 0.94 * \textit{Age}$$

However an exception was that adolescents in 15 year-old age range were found to have the longest physical education class responding to previous findings that students in that age group had already built a strong body figure and had enough time for physical activities in school.

In terms of residential area, a general pattern was that the smaller the population, the

more time students would experience in their physical education class. Respondents spent on average 78.1 minutes in a big city (SD=26.1), 80.4 minutes (SD=21.6) in the second most populous region, 80.8 minutes (SD=23.2) in a town and 82.6 minutes (SD=22) in the village. The one-way ANOVA test showed a significant distinction between duration of a physical education class and where the respondent came from [$F(3) = 4.1$, $p<.001$]. However, class duration in a big city and a suburban area had limited difference from each other and town, but greatly inconsistent with that in a village, where class duration was the longest among these four location categories.

An independent t test was employed to compare the relationship with school type (DEIS or not) and class duration. Result was corresponding to the previous findings that there was no significant difference [$t(1045) = 0.558$, $p>.005$] of physical education provision for students from either DEIS schools (M=81.6, SD=19.5) or non-DEIS schools (M=81.1, SD=23.0). It suggested that government had made effective efforts to promote the equality of educational resources, especially in physical education curriculum. However, samples here was largely unequal, only 16.6% respondents (n=653) were from DEIS schools indicating that it required further data collections and more related information within the comparison.

Table 4.2.4: Factorial analysis of the relationship between class duration and four indicators

	F	df	Mean Square
Model	5.7	101	2549.8
Gender	10.7**	1	4823.1
Age	3.0**	6	1351.7
Area of residence	0.4	3	159.3
Schooltype	0.0	1	14.0
Gender *Age	0.7	6	297.8
Gender * Area of residence	1.3	3	585.3
Gender * Schooltype	0.0	1	18.7
Age * Area of residence	1.3	18	574.5
Age * School type	4.7***	6	2141.4
Area of residence * Schooltype	4.7**	3	2123.8
Gender * Age * Area of residence	0.8	17	362.4
Gender * Age * Schooltype	1.5	6	675.2
Gender * Area of residence * School type	1.6	3	713.7
Age * Area of residence * School type	1.2	17	550.2
All	1.0	10	450.9

***p<.001; **p<.01; *p<.05

R Squared = .130 (Adjusted R Squared = .107)

The two-way ANOVA analysis showed a relationship between class duration and four basic indicators. Age and gender in its own main effect were as significant as usual (both partial eta^2 <.01, which have very small effect size). The interaction of age and school type (partial eta^2 <.01) is interesting where students in non-DEIS schools had stable time of physical education class no matter they were in their first year or the last year in the post-primary school (See appendix D). But those who were from non-DEIS schools varied a lot. It suggested that DEIS school resources provided to physical education class was not as stable as in non-DEIS schools. Besides concerning school type and location (partial eta^2 <.01) students from non-DEIS

schools in a big city were likely to experience the longest class duration compared to other three regional types while village students in DEIS schools had the longest duration and DEIS students in a big city had the least (See appendix E). DEIS schools in a big city seemed to insufficiently organise their class duration than the rural area counterparts.

To sum up, the four basic indicators were not as highly associated with class duration as they did in previous findings. In regular single and double classes, there was no difference in school sex. But girl school did not provide triple class for the students. Engaging in physical education class went downwards with the growing age, only 15-year-old was an exception when students were provided more classes. With regard to area of residence, participants from villages and rural areas were likely to experience much more time in physical education curriculum. Adolescents from DEIS schools had similar class duration with those from non-DEIS schools thanks to relevant policy implementation.

4.3 Physical activeness outside physical education class

Designers of this questionnaire prepared options including 26 sports items, 8 sorts of exercises and 9 general physical activities (the 'other' option was not included here) in order to present children's choices of activities in their daily life outside physical education class (See table 4.3.1).

Table 4.3.1: Sports participation outside physical education class (with gender).

	Total	Male	Female	P
Sports & dance				
Athletics	33.4	33.4	33.5	.970
Badminton	11.8	10.4	13.0	.008
Basketball	31.5	31.0	32.1	.460
Boxing	11.5	15.8	7.6	.000
Cricket	3.5	4.4	2.6	.002
Cue games (pool and snooker)	31.4	42.2	21.6	.000

Cycling (mountain biking, road racing)	33.4	39.5	27.7	.000
Dance (irish, ballet, modern, etc.)	24.9	8.2	39.9	.000
Dancing (social, recreational)	28.7	12.9	42.9	.000
Gaelic football	34.1	43.4	25.8	.000
Golf/pitch 'n' putt	15.3	22.9	8.5	.000
Gymnastics, trampoline	33.0	25.2	39.9	.000
Hockey	7.2	6.3	8.0	.038
Hurling/camogie	21.3	26.4	16.8	.000
Judo	2.7	3.7	1.7	.000
Karate	4.9	5.6	4.3	.050
Skating (ice, roller, in-line, skate boarding)	11.6	10.7	12.4	.106
Skiing (downhill, cross-country, water)	4.5	5.1	3.8	.040
Soccer	54.7	74.7	36.7	.000
Softball/rounder	17.9	15.5	20.1	.000
Squash	6.2	7.5	5.1	.002
Swimming	30.6	31.0	30.3	.633
Tennis	18.3	17.7	18.9	.328
Rugby	17.7	28.1	8.4	.000
volleyball	7.4	5.6	9.0	.000
Water sport	7.7	8.3	7.1	.130
Other	20.5	20.6	20.5	.899
Exercise				
Aerobics/aerobic dancing/step aerobics	17.7	5.8	28.5	.000
Push-ups, sit-ups, jumping jack	61.4	70.8	53.0	.000
Jogging	63.7	69.3	58.8	.000
Skipping	27.1	18.1	35.4	.000
Swimming laps	22.8	25.1	24.0	.057
Walking for exercise	57.9	44.3	70.2	.000
Weight lifting/weight training	23.1	37.2	10.4	.000
Exercise machine: cycle, treadmill, rower, climber	27.7	30.8	24.9	.000
Other	8.4	8.9	8.0	.277
General physical activities				
Bicycling	39.9	49.3	31.5	.000
Hiking	10.1	10.7	9.4	.166
Walking to get places	82.3	81.7	82.7	.401
Water play: in pool, lake, or ocean	23.2	22.1	24.1	.126
Outdoor chores: mowing, raking, gardening	37.7	45.1	30.9	.000
Indoor chores: mopping, vacuuming, sweeping	62.3	52.5	71.2	.000

Physically demanding part-time work: staking shelves, newspaper round	17.6	19.9	15.5	.000
Play guitar/drums etc.	26.9	26.4	27.2	.603
Free running/parkours	28.3	30.7	26.2	.001
Other	7.4	7.9	6.9	.227

* Other tables in appendices (Appendix F, G and H).

Under these selections, boys and girls had significantly different levels of engagement with physical activities. In terms of sports and dancing, girls participated more in badminton, dances, gymnastics, hockey, and volleyball, whereas boys took part more in 13 other items. Only 7 items including athletics, basketball, karate, skating, swimming, tennis and water sport, equally attracted both gender groups. Similar proportions repeated in exercises and general physical activities part where boys' physical activity participation was usually greater than girls in percentage. Comparatively, girls appeared to be more engaged in individual activities such as aerobics, walking for exercise and indoor chores.

Percentage of adolescents' participation in physical activities usually reduces with increasing age. On the sports field, all the sports except boxing were significant following this rule and boxing participation was steady around 12% among adolescents. In exercise, engagement in activities such as push-ups, sit-ups, or activities using exercise machines (cycle, rower, etc.) varied little with age. Looking at general physical activities, there was a stable amount of participation in walking and indoor chores since these needed little extra energy. It could be argued that with the growing age, people focused more on other things such as academics or part-time jobs. It could be verified from the fact that nearly all the events keeping stable with the increase of age were indoor activities (except walking to get places, but it was not purposive and needs few requirements for field or equipment). Although there was a balanced percentage of participation in swimming, water sport, swimming laps and water play, it suggested that boys and girls had similar opportunities to take part in aquatics.

The relationship between sport participation and location was much more complicated than age. It was difficult to conclude whether or not students from a higher populated place was more sportive than those who from a lower populated place because it was dependent on each sport. Percentage of participation in racing cycling, jogging, rugby, outdoor chores, physically demanding part-time jobs increased with the descending of population size. Apart from that, Irish traditional sports, such as Gaelic football, hurling or camogie, spread to some extent wider in lower populated area than in higher populated area. On the other hand, participation in aerobics, aquatics (including swimming, swimming laps and water play), dance, karate, skating, and tennis went upwards in larger area.

Simply looking at events themselves, there were several explanations for those phenomenon. With regard to Irish traditional sports, it can be concluded that they were more effectively popularised and well conserved in rural areas than in cities. Children in higher populated places were more likely to accept fresher events and more alternatives of sport activities partly contributed to their distraction from traditional sports. Furthermore, some sports or exercises such as rugby required larger space, discouraging students' participation in a crowded city. Special place requirements may also account for the ascending trend in fewer populated places. For example, mountain cycling or jogging required large open environments which were limited in crowded cities. Similarly, special space requirement of aquatic sports, karate, skating and tennis was the reason why they were more popular in bigger cities than fewer populated places. It can hardly to conclude that people in rural areas were more likely to get a part-time job than those who were in higher populated places, but such inference is suggested to be taken into consideration in future related studies.

School type was the least significant factor influencing sporting behaviours of adolescents and it left limited impact on exercise participation of adolescents. Students from DEIS schools attended more in swimming laps and weighting training than non-DEIS students. Merely looking at the statistics, students from DEIS schools

were more likely to try different types of physical activities. Among participation in these 26 sport events, 11 of them performed insignificant in the comparison between DEIS schools and non-DEIS schools. Only in dance, Gaelic football, gymnastics, and hurling and camogie, those who came from non-DEIS schools were more active. In general physical activity events, however, participants from non-DEIS schools were self-reported to be more active in household works and part-time jobs.

In a word, distinctions in physical activity participation outside class were to different extent correlated with all the four basic indicators. Gender was a most influential factor and boys and girls had largely different experience in sports and exercises. Generally, Irish boys were more sportive and they were likely to take part in different types of activities according to a typical gender pattern. Age was another significant contribution to adolescent engagement in physical activities, which usually reduced with the increasing age. Location difference was explored as associated to the space requirement of the event. Another finding was that Irish traditional sports seemed to be protected better in more rural areas. School type was the least influential factor among these four indicators. Comparatively, DEIS school students were likely to try more types of sports and exercises than those non-DEIS school students.

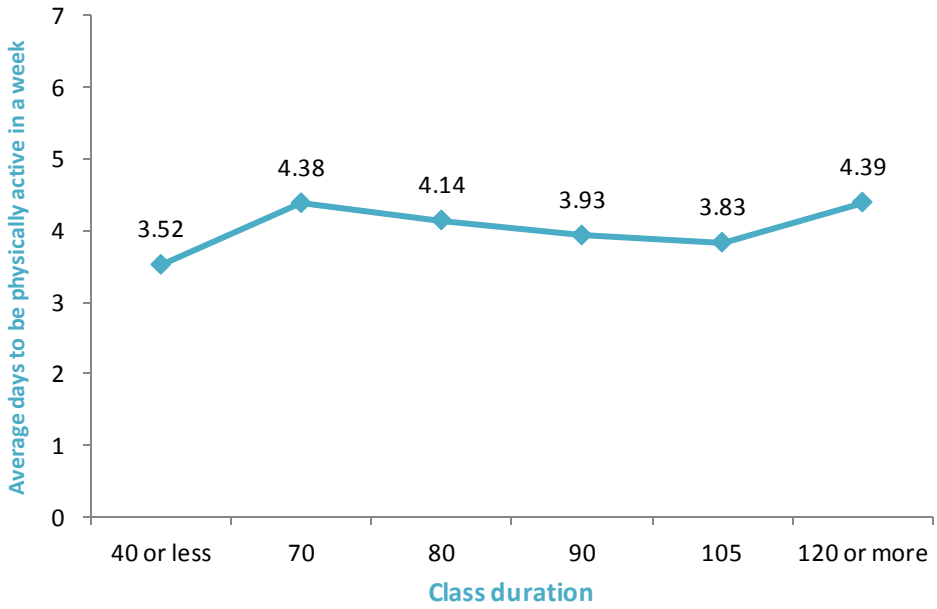
4.4 The relationship between formal physical education and physical activity outside school

Another factor which needs analysing is whether the duration of physical education can leave an impact on children's participation in their regular physical activities. Firstly, I compared the total time of physical education in a week and days of students' weekly participation in physical activities.

A Pearson product-moment correlation coefficient was computed to assess the relationship between the variable of days of physically activity from Monday to

Friday in the past 7 days, and the days of movement in Saturday and Sunday in the past 7 days, along with weekly time spent in formal physical education. The more time students experienced in their physical education class, the more time they spent in weekly physical activities, both in weekdays (r=.061, p<.001) and weekends (r=.037, p<.05). Regular participation was also significant at 0.01 level where pearson's r was .091, suggesting a higher correlation.

Figire 4.4.1 The relationship between class duration of weekly physical education and weekly physically active days.



In broader terms, students who spent more time in physical education class may develop a better habit in sport participation in a week, although it did not perform that significant in linearity. It can be seen from the figure 4.4.1 that those who experienced the least time of weekly physical education were likely to be the least inactive but we cannot conclude a linear relationship between class duration and regular physical activity participation (more detailed descriptive graphs are in the appendix I). A One-way ANOVA was conducted to examine the levels of participation and it found a significant difference [F (9) = 8.85, p<.001]. The Tuckey HSD test indicated that the students, who had longest class duration would take much more physical activities

than those only took 40 minutes or 105 minutes. Those who experienced 70 or 80 minutes physical education were also more sportive than those who took 40 minutes. Especially, those 70-minute participants had almost the same sporting habit as those who had the longest class duration. It suggests that the total physical education class controlled around 70 minutes (a double class or two single classes) is the most effective in practice. This kind of time period seems to be neither too intensive nor too light for adolescents. It can be concluded from the quantitative results that a reasonable schedule of physical education curriculum is necessary for developing the enthusiasm of adolescent sport participation.

Activity comparison

This final part of the analysis compares activities organised inside curriculum and the participation in extra-curricular experience. In the CSPPA questionnaire, there were 13 items measured in extracurricular time directly corresponding to what learnt in class, which are aerobics, athletics, badminton, basketball, Gaelic football, gymnastics, hockey, rugby, soccer, squash, swimming, tennis and weight training. So in this section, comparison resulted from these activities.

Table 4.4.1 presented four categories around physical activity participation. The first column counted the number of students involved in either intra-curricular, extra-curricular or both time. The second column showed percentage of students only taking part in the activity inside school and the third one provided percentage of those who only took part in outside school time. The last column was percentage of those who engaged in both opportunities.

Table 4.4.1: Physical activity participation inside and outside school.

	Number involved	Inside school	Outside school	Both in and out of school
Aerobics	1450	49.7%	30.3%	20.0%
Athletics	2380	42.1%	25.1%	32.8%
Badminton	2079	76.7%	9.0%	14.3%
Basketball	2770	53.1%	17.1%	29.8%
Gaelic football	2013	30.1%	39.7%	30.2%
Gymnastics	2010	32.4%	43.0%	24.6%
Hockey	1293	77.2%	12.8%	12.1%
Rugby	1395	47.6%	31.3%	21.1%
Soccer	3044	25.9%	27.2%	46.9%
Squash	470	45.3%	45.5%	9.1%
Swimming	1616	21.8%	62.9%	15.2%
Tennis	1411	46.6%	32.5%	20.9%
Weight training	1196	20.2%	63.6%	16.1%

Irish adolescent physical activity participation seemed to be inconsistent with intra-curricular and extra-curricular time. Among these 13 activities, 7 of them were much less attractive to students outside curriculum, which were aerobics, athletics, badminton, basketball, hockey, rugby and tennis. It suggested that social support for these activities was not as sufficient as school. In another word, these activities are popular in curriculum, indicating that school is designed as the main platform for providing these activities for adolescents in Ireland. A significantly higher participation in swimming and weight training in the only extra-curricular time suggested that educational resources for these two activities were not enough in school. Specifically seen from this table, it can be found that students participated in soccer the most and students were likely to join in a soccer team in both physical education class and extracurricular time. On the contrary, squash participation was the least in total and the least participants engaged in both inside and outside school time.

In conclusion, physical education in school definitely has an impact on adolescent physical activeness. Generally speaking, the more opportunities they were given to get involved in sports in class, the more likely to be active in regular physical

activities. However the most efficient class duration is around 70 minutes per week. Respondents received physical education class in this amount was the most physically active outside class. In terms of activity, fewer students took part in both intra-curricular and extra-curricular time compared with those who individually attended in activities in school and out of school. Only soccer participation presented a consistency.

This chapter mainly presents Irish adolescent general participation in physical activities, activities in the class and class duration, activities in extra-curricular time, and finally explores a relationship between activities attended in class and its impact outside school. In addition, class duration and regular physically activeness is also analysed. The next chapter will discuss the findings and connect them to literature reviews.

Chapter Five: Discussion and Conclusion

5.1 Discussion

5.1.1 Typical physical activity participation

Students thought they were physically active three to five days a week for at least 60 minutes regularly, although their identified hours in weekly physical activity was far less than their participation in the recent 7 days. Liu et al. (2010) indicated that response of the physical activity participation in the past 7 days was more reliable suggesting that students are likely to overstate their engagement in sporting behaviours. One-tenth of the respondents self-reported to meet the guideline by WHO (2010) that recommended adolescents to be physically active up to 60 minutes per day suggesting room for improvement in Ireland.

Literature states that boys are more active in participating in sports and exercises than girls (Gratton and Taylor, 2000; Scheerder, Vanreusel et al., 2002; Lunn and Layte, 2008). Irish adolescent involvement adheres to this gender pattern. This study also found a higher stability of participation in boys group, 73 percent of whom performed physically active as usual whereas girls were 5 percent lower and a larger amount of girls did more or less.

Physical activity participation seems stable among Irish adolescents in terms of age groups but engaging days in each year varies significantly. For example, those who were in 12-13, 14-15 and 16-18 age groups had similar participation habits in each groups but the level of participation dropped with the increasing age, which corresponding to the findings by previous researchers that students participated in physical activity less with growing age (Lunn and Layte, 2008; Hovemann and Wicker, 2009).

Frick and Wagner (2006) and Hovemann and Wicker (2009) reported separate conclusions for the relationship between location size and tendency of sport participation among adolescents. In Ireland, post-primary students from city show a more stable habit in participation but at the lowest active level and those who came from suburban areas are the most active in physical activity.

Since this study places focus on post-primary level, it cannot test the lifelong results. But the results partly disagree with what Lunn and Layte (2008) asserted that students would be disadvantaged in sport from their lower socio-economic background. In fact, students from these two types of schools shared similar participation habits, but different in resources determining their choices in sports and exercises. These findings suggest that sport habit does not vary in terms of socio-economic background. Leyshon (2011) argued that the main difference was on their choice of sport which was socially deprived at their family and community level.

5.1.2 Formal physical education

Although a cognitive teaching approach is recommended by many scholars (Evans and Clarke, 1988; Bailey et al., 2009; Darst et al., 2013), Irish implementation put more focus on traditional sport/skill-oriented approach. This is reflected by the finding that among the five most popular activities inside physical education class (basketball, soccer, baseball, badminton and athletics) athletics is the only fitness-oriented item. The other four events are skill-oriented, three of which are team games. It is inconsistent with the findings from Lunn and Layte (2008) that Irish young people nowadays experience more fitness and individual activities. Indeed, sport is still mainstream in content of physical activity among Irish adolescents.

Literature informs us that schools tailored policy to suit the school ethos and sport tradition (UK. OFSTED, 1995; Culpepper et al., 2011). According to Department of Education and Science in Ireland, schools are recommended about the frequency and duration of physical education class, but in terms of its non-compulsory nature, no

examination is required in post-primary level which allows a diversity of implementation (MacPhail et al., 2008). More specifically, a majority of respondents received basketball and soccer, which are recommended in the curriculum guidelines, but in terms of the following most taught activities including baseball, badminton and athletics, only badminton was highlighted in the playing court list. The inconsistent implementation partly reflects the previous conclusion that contents of physical education class varied widely by teacher and school (Fahey et al., 2006; MacPhail et al., 2008). Traditional sports such as soccer and basketball are the easiest choice because they are spread so widely that there is no need to establish special playground (which may lead to additional budget) and teach new skills to the students (which requires additional educational resources).

In terms of gender, girls were provided more alternatives and access to more non-traditional activities in curricular physical education while soccer and rugby were more popular in boys' class. Boys experienced longer classes and more opportunities to double and triple class followed by students from co-ed schools. Physical education class designed for girls in single sex schools was the shortest which conformed with the traditional gender sport pattern that boys are more sportive and engage more in physical activities. Lunn and Layte (2008) asserted that sport participation habit is developed at the post-primary level. Although the gender difference of participation in physical activity in adulthood is not as significant as that in adolescence, the gender appetite is considered to be established in the very early age. If boys are only provided opportunities to engage in masculine sporting activities in schools, they are likely to be more interested in this field in their future life. Team games demands more teamplayers and energy expenditure which can hardly be sustained as long as lifelong individual sport, which leads to a drop of male participation in regular physical activity in adulthood.

Age is always considered to be paramount for participating in sport. Younger children are less competitive than elder adolescents in many sports while the younger are yet

more engaged in physical activities (Musch and Grondin, 2001; Lunn and Layte, 2008; Enright and Tindall, 2010). In my study, it does not explore the competition between age groups but an examination in sport involvement. Data shows that physical activity participation in class does not present a general significant downward trend as previous researcher stated but it performs meaningfully different in a majority of sport items. The trend is difficult to generalise suggesting different school ethos or age fashion. Those who were 14 to 15 years old appears to be the most physically active among all the age groups in many activities and they also experienced the longest physical education class, corresponding to the previous findings that 15-year-olds are the most physically active in life course (Lunn and Layte, 2008). It suggests a combination effect including academic pressure and body development on the 15 year-old group reaching the 'sport hill'.

Class duration is more associated with location size. It is found that students from rural areas took longer physical education class than those urban students. Their intra-curricular sport experience was comparably linked to the playing court requirement and rural students had more opportunities to access events requiring larger space such as Gaelic football whereas urban students were more likely to take gymnastics instead.

School type clearly divides student from different socio-economic backgrounds in participating in physical education. In this study, those non-DEIS school students were offered more choices largely due to rich school resources, further corresponding to the conclusion by Lunn and Layte (2008) that those who from lower economic background have disadvantages in sport participation. However physical education as schooling part and the DEIS nature, DEIS school students shared similar class duration, got a similar amount of exercise and less varied with those from non-DEIS schools, suggesting a governmental support in curriculum of DEIS schools.

5.1.3 Extra-curricular participation

Literature suggests that regular physical activity requires children be active in many platforms other than formal physical education and that extra-curricular physical activity allowing greater amount of participants is more effective in improving personal physical activeness (Leyshon, 2011; De Meester et al., 2014). In terms of participation percentage outside curriculum, only soccer participation is over 50% among sports followed by Gaelic football, cycling, athletics, gymnastics, basketball and swimming, which receive over 30% participants. Exercises are more welcomed general activity alternatives, where jogging, walking, push-ups-related activities are all received around 60% participants. Indoor chores and commuter walking are also most experienced general fitness. Simply looking at extra-curricular statistics among 43 events detected outside school, 15 events receive over 30% participation, where 12 of them (athletics, jogging, hiking etc.) are individual and 3 of them (basketball, Gaelic football and soccer) are team games, which verifies the literature that individual activities nowadays become popular in Ireland (ISM, 2011; Lunn and Layte, 2008).

More specifically, the gender pattern is reproduced in extra-curricular participation where boys are more physically active than girls in many sporting fields and girls are comparably more likely to take part in traditional girlish activities such as dances, hockey, aerobics and indoor chores. This reflects the argument that boys are more sport-focused than girls (Yan and McCullagh, 2004; Enright and Tindall, 2010).

Age difference in sport is also similar to that in the curriculum but in exercise and general physical activity, age varies not as significant in the sport items indicating that positive regular physical activity participation largely rely on exercise and general physical activities. But adolescents from different socio-economic backgrounds share similar exercise and general physical activity participation habits.

This study also examined each specific sporting activity and discovered the relationship between participation and the playing court requirement. For instance,

mountain cycling was far more popular among rural area students than citizens. In broader terms, however, there is no relationship between location size and moderate to vigorous level of physical activity participation. Indeed, there is a combination effect from location and other determinants as gender and school type, which aligns with Leyshon (2011)'s findings that location individually scarcely associated with physical activity participation. Although there was an interesting finding for aquatic activities, gender had no impact on aquatics but it happened to be welcome in a higher populous place, suggesting that big cities provide more facilities and resources for aquatics.

There are several sport events such as skating, skiing and judo adolescents engaged only in extra-curricular time but not inside class. Literature informs us that the reasons for those who are active in these non-traditional curricular physical activities originate from their dislike of soccer-like games provided in extra-curricular time at school or a lack of confidence in participating in these games (Leyshon, 2011).

5.1.4 The relationship between curricular and extra-curricular participation

One hypothesis to this study is that there exists a positive relationship between formal physical education and regular physical activity participation, which is approved by correlation coefficient results that those who have longer curricular physical education are more likely to be involved in sport and exercise. However, it is not a purely linear relationship between class duarion and physical activity engagement. An ideal class setting is a double physical education class or two single classes conducted in a week.

We can see Irish adolescents have a lot of choices in their curricular physical activity, but it does not lead to a corresponding amount of engagement in sporting performance in their daily life. Some of activities such as badminton and squash are merely popular in class whereas swimming and weitht training is more welcome in extra-curricular time. There are a few explanations to answer why there is a drop or inconsistent result in typical engagement. Lifetime sport is important for lifelong physical activity

participation, but it is not sufficiently delivered in class (Fairclough et al., 2002). One suggestion is to put more focus on lifelong individual activities in class so as to improve regular participation.

5.1.5 Issues pertaining to Irish traditional sports

Irish traditional sports have attracted much public attention nowadays so it will be also discussed in this study. There are four events measured in the survey: Gaelic football, handball, camogie and hurling. An interesting thing is that camogie and hurling are one type of game played and named separately for females and males. However in the responses, there were several adolescents not familiar with the definition and there were quite a few of boys ticked they played camogie, vice versa, which indicates that students were not taught properly in both social and family level where school educators were especially responsible for the neglecting (or probably they knew the difference but they did not respond accurately and just for joking or not paying attention). Thinking of the innovative teaching approach, physical education is not only a skill-led class, but a platform to introduce the national traditional heritage as well (Evans and Clarke, 1988; Zhu et al., 2009; Darst et al., 2013).

The most popular and successfully developed Irish traditional sport is Gaelic football. Especially outside curriculum, Gaelic football is just behind engagement in soccer, exhibiting a high attraction to adolescents, and boys are the major participants. There is no significant difference in age groups in curricular physical education indicating that students in each year have similar opportunity to access Gaelic football. However younger student participants engaged more in Gaelic football than those elder respondents in extra-curricular times following the broad trend. Non-DEIS schools reported higher levels of support for this sport reflecting in both inside and outside curricular participation. It was also found that adolescents from lower populated residence area are more likely to take part in Gaelic football than those who from big cities no matter inside or outside the curriculum suggesting a high correlation with location.

Houlihan (1997) explored the relationship between sport and national identity and argued that sport is a carrier for cultural elements. Therefore, participation in traditional sports can be deemed as an appreciation for traditional culture. Lunn and Layte (2008) asserted there was a decline in Irish traditional sports, which was not found in this cross-sectional study. It requires a further longitude comparison and analysis as Lunn et al. did in 2013. Simply based on this dataset, several Irish traditional sports are to some extent maintained in school education and welcomed by adolescents, which suggests that Irish traditional cultural elements are in protection and continuation, especially in rural area.

5.2 Future research on physical education and physical activity participation

The CSPPA for post-primary students has made a standard measure of physical activity participation which can broadly measure Irish adolescent involvement. However a lack of a correspoding measure for physical activity in and out of curriculum which can directly reflect the difference of participation level and whether curricular acitivity can influence their extra-curricular engagement. For example in the CSPPA, there are 22 items examined inside curriculum and 43 items outside curriculum. Some of activities such as camogie and hurling in curricular section are seperately measured and merged into one item in extra-curricular section, which complicates the analysis. So my suggestion is to create a corresponding measure instead of current separate one. Similarly, a clear division of physical participation inside school and outside school in the questionnaire will be helpful to further analysis. For example, in the last section of analysis, I separate physical activity participation into column of ‘inside school’, ‘outside school’ and ‘both in and out of school’. Although complicated calculation methods can realise the division, but if future questionnaire can provide more clear options would ease the analysis procedure.

This study aims to explore the regular physical activity participation, but for further research on the relationship between physical activity participation and health conditions, a measure of BMI indicator is also necessary for analysis. Health indicator analysis can fully examine the amount of exercise participation and its effect. It can also provide policy-oriented evidence to improve physical education.

As mentioned in chapter one, my motivation of this study originates from the poor condition of phsyical activity participation in China. So I also recommend a corresponding survey in my country which can make a comparison with Ireland and to explore how to improve Chinese physical education curriculum and encourage regular participation.

5.3 Conclusion

This thesis has examined the Irish implementation of physical education and explored adolescent physical activity participation outside curriculum. Overall this study finds that Irish student engagement in regular physical activity needs improving and the average days of physically active at least 60 minutes is far from global recommendations of 7 days. And their typical participation in physical activity is to some extent varied largely to the past 7 days before responding to the survey where the recent weekly engagement is less active than self-reported regular participation.

Typical physical activity participation involves activenes inside formal physical education and extra-curricular time. Sport-oriented events are still attracting the majority of Irish participation inside curriculum although formal physical education offers a wide range of choices for students to take part in. Gender difference and age influence is significant in school suggest a lack of systematic curriculum setting. Location difference is found mainly dependent on space requirement of events. The

Irish curricular physical education to some extent minimise the economic difference in sport and exercise participation in schools and students have equal opportunity to take part in physical activity. In terms of extra-curricular engagement, adolescents put more focus on individual activities. Boys are usually more physically active than girls and extra-curriucular participation declines with the increase of age. Location difference is similar to curricular engagement. Finally, students in different from DEIS and non-DEIS schools usually share similar sport participation habit at post-primary level.

This study found a strong relationship between curricular implementation and typical participation. If students experience longer curricular physical education, they are likely to be more physically active. More specifically, a 70-minute physical education class is the most effective in improving regular physical activity participation. However, this study fails to identify a positive relationship between curricular coaching and its extra-curricular involvement at Irish post-primary level. It found that only soccer participation shows a consistency in and out of school.

One positive finding is that Ireland provide a comparably equal platform for adolescents from different socio-economic backgrounds. But it hopes a more systematic practice in curricular physical education which allows more boys and girls involved in a broader range of physical activities more than soccer-like sport and skill-oriented exercises. The current findings suggests that positive physical education can result in a longer participation in their typical physical activity engagement so elder students should be provided more time in exercises inside school to develop their healthy sportive habit and avoid sedentary problems. Irish traditional sports is widely spread nowadays and statistics shows a encouraging participation but hurling, camogie and handball require more public attention and policy support.

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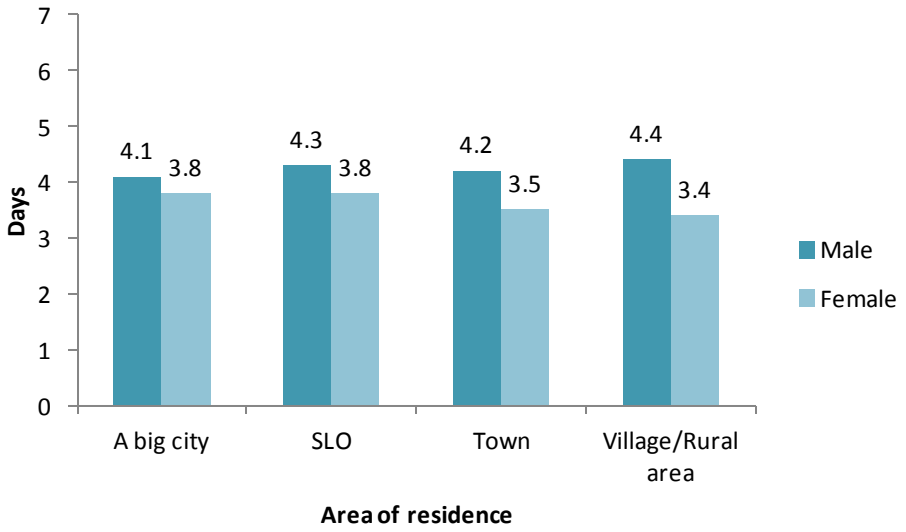
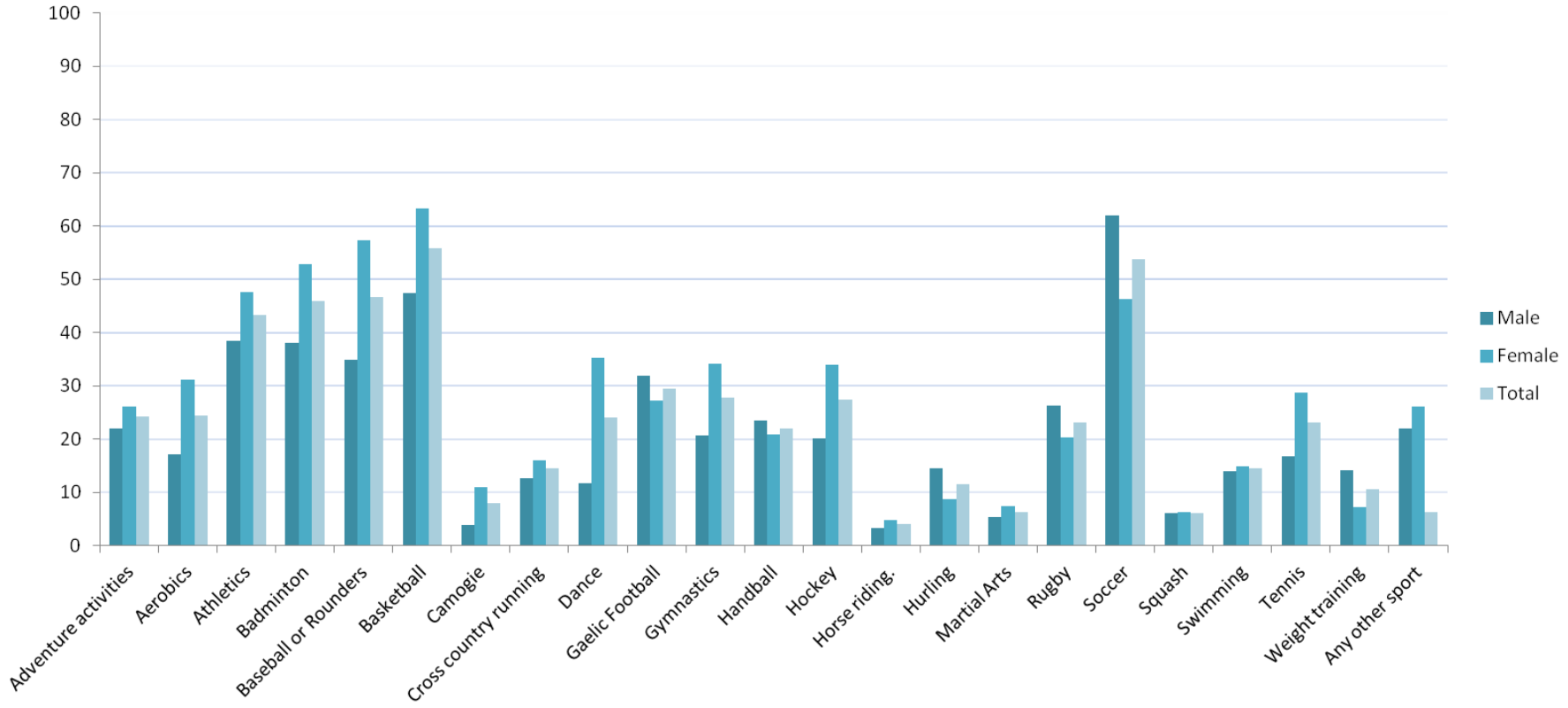
Appendices

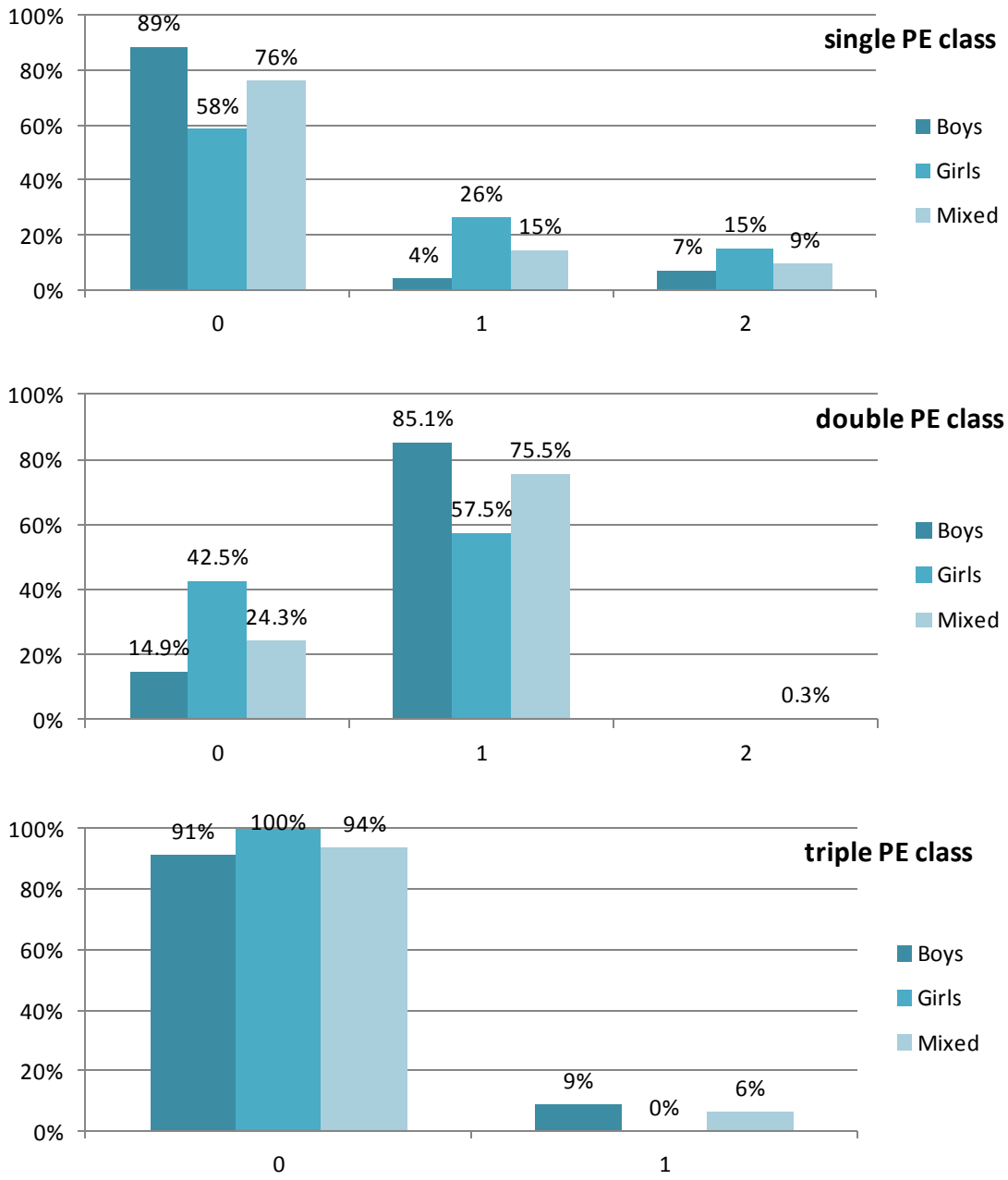
Appendix A: How many days were you physically active for a total of at least 60 minutes a day in the past 7 days? (Area of residence)



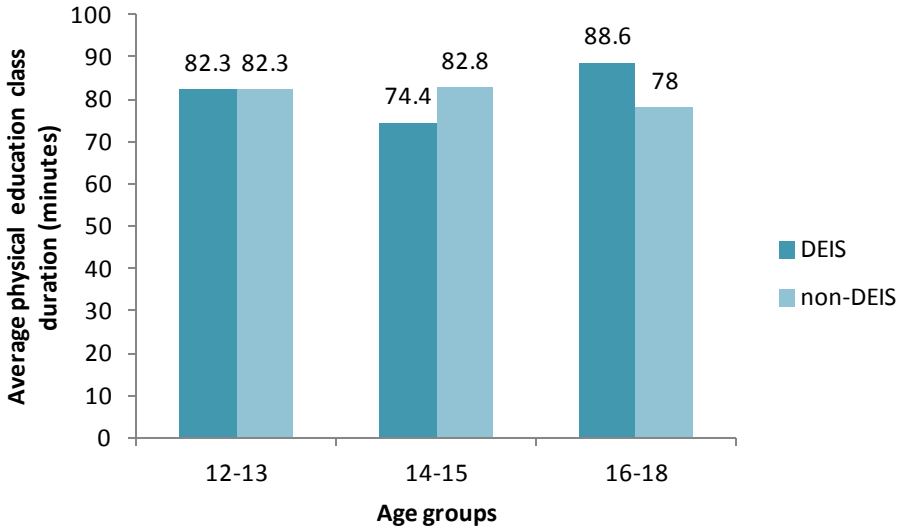
Appendix B: Sports involved in physical education class.



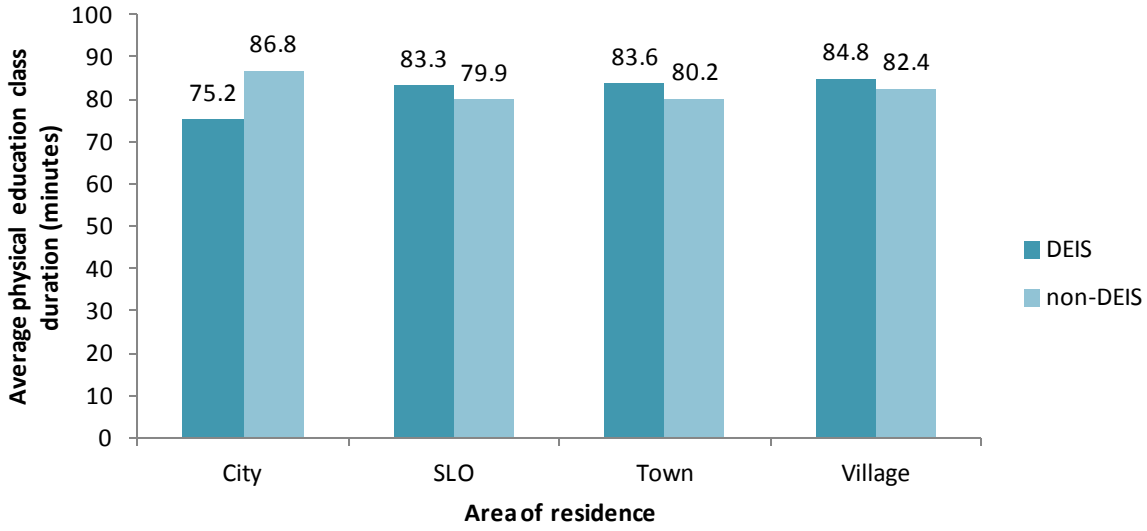
Appendix C: A comparison between school sex and duration of single, double and triple physical education class.



Appendix D: The relationship between class duration and the interaction of age and school type.



Appendix E: The relationship between class duration and the interaction between location and school type.



Appendix F: Sports participation outside physical education class (with age).

	12-13	14-15	16-18	P
Sports & dance				
Athletics	45.1	31.7	24.4	0.000
Badminton	13.0	12.6	9.8	0.019
Basketball	43.1	30.5	21.8	0.000
Boxing	12.4	12.0	10.0	0.104
Cricket	5.5	2.9	2.0	0.000
Cue games (pool and snooker)	34.1	32.0	28.2	0.003
Cycling (mountain biking, road racing)	43.7	34.3	22.7	0.000
Dance (irish, ballet, modern, etc.)	32.6	21.7	20.9	0.000
Dancing (social, recreational)	28.3	23.8	34.0	0.000
Gaelic football	41.6	34.2	27.2	0.000
Golf/pitch 'n' putt	18.6	16.9	10.6	0.000
Gymnastics, trampoline	45.8	33.4	20.5	0.000
Hockey	12.0	6.7	3.2	0.000
Hurling/camogie	21.3	27.5	15.0	0.000
Judo	3.7	2.4	2.0	0.018
Karate	6.4	3.9	4.4	0.007
Skating (ice, roller, in-line, skate boarding)	20.6	8.5	6.2	0.000
Skiing (downhill, cross-country, water)	6.6	5.0	1.9	0.000
Soccer	59.6	57.6	47.3	0.000
Softball/rounder	32.0	14.0	8.5	0.000
Squash	11.3	5.0	2.8	0.000
Swimming	40.5	30.4	21.8	0.000
Tennis	28.9	16.3	10.4	0.000
Rugby	21.1	18.1	14.3	0.000
volleyball	11.5	5.9	4.9	0.000
Water sport	12.3	6.8	4.1	0.000
Other	27.9	19.0	15.1	0.000
Exercise				
Aerobics/aerobic dancing/step aerobics	22.7	15.0	15.9	0.000
Push-ups, sit-ups, jumping jack	62.0	62.3	60.0	0.402
Jogging	71.3	63.2	57.4	0.000
Skipping	39.7	24.4	18.3	0.000
Swimming laps	31.6	22.9	14.3	0.000
Walking for exercise	61.2	57.4	55.5	0.011
Weight lifting/weight training	17.9	22.7	28.3	0.000
Exercise machine: cycle, treadmill, rower, climber	26.9	28.9	27.2	0.442
Other	12.8	8.2	4.4	0.000

General physical activities				
Bicycling	52.0	42.2	26.1	0.000
Hiking	11.0	10.7	8.4	0.042
Walking to get places	81.4	82.5	82.9	0.577
Water play: in pool, lake, or ocean	30.8	24.3	14.8	0.000
Outdoor chores: mowing, raking, garening	41.2	37.1	35.0	0.003
Indoor chores: mopping, vacuuming, sweeping	63.5	61.0	62.6	0.390
Physically demanding part-time work: staking shelves, newspaper round	13.0	13.1	26.6	0.000
Play guitar/drums etc.	28.4	28.4	23.8	0.006
Free running/parkours	39.0	28.7	18.0	0.000
Other	11.1	7.0	4.4	0.000

Appendix G: Sports participation outside physical education class (with location).

	city	SLO	town	village	P
Sports & dance					
Athletics	38.0	35.0	28.8	34.3	0.003
Badminton	24.0	10.1	10.0	12.5	0.000
Basketball	32.3	34.8	30.7	29.1	0.011
Boxing	17.9	10.7	12.9	10.3	0.003
Cricket	4.4	2.8	4.3	3.4	0.218
Cue games (pool and snooker)	27.1	24.8	31.1	37.8	0.000
Cycling (mountain biking, road racing)	29.3	30.4	32.7	36.8	0.001
Dance (irish, ballet, modern, etc.)	34.9	26.2	23.8	22.9	0.001
Dancing (social, recreational)	33.6	31.2	25.3	28.0	0.005
Gaelic football	16.2	26.8	33.1	43.7	0.000
Golf/pitch 'n' putt	10.5	14.5	18.7	14.7	0.003
Gymnastics, trampoline	27.5	33.9	28.6	35.8	0.000
Hockey	5.7	6.9	7.8	7.1	0.680
Hurling/camogie	9.2	15.3	20.6	28.6	0.000
Judo	2.6	2.9	3.3	2.1	0.318
Karate	6.6	6.0	4.8	3.7	0.018
Skating (ice, roller, in-line, skate boarding)	17.0	14.2	11.0	9.0	0.000
Skiing (downhill, cross-country, water)	6.6	5.1	4.2	3.8	0.156
Soccer	50.2	50.4	57.9	57.1	0.000
Softball/rounder	19.2	23.3	13.9	15.7	0.000
Squash	5.7	4.9	5.8	7.7	0.017
Swimming	39.3	31.4	30.8	28.6	0.009
Tennis	21.0	20.7	18.4	15.8	0.005
Rugby	10.5	15.1	19.7	19.8	0.000
volleyball	14.4	7.1	6.5	7.1	0.000
Water sport	12.7	8.1	6.8	7.3	0.021
Other	21.0	18.7	22.0	21.1	0.240
Exercise					
Aerobics/aerobic dancing/step aerobics	22.3	19.6	17.1	15.9	0.016
Push-ups, sit-ups, jumping jack	57.2	61.3	61.3	62.3	0.529
Jogging	56.8	62.5	62.8	66.3	0.014
Skipping	29.7	30.1	23.0	26.8	0.001
Swimming laps	29.3	23.6	22.3	21.5	0.058
Walking for exercise	55.9	56.0	58.5	59.3	0.303
Weight lifting/weight training	27.5	21.0	27.1	21.8	0.001
Exercise machine: cycle, treadmill, rower, climber	26.6	27.1	27.7	28.3	0.883

Other	14.4	8.4	8.0	7.8	0.008
General physical activities					
Bicycling	36.2	36.1	38.7	44.500	0.000
Hiking	10.5	7.2	11.1	11.8	0.000
Walking to get places	86.5	87.5	83.9	76.1	0.000
Water play: in pool, lake, or ocean	27.5	23.6	23.2	22.2	0.347
Outdoor chores: mowing, raking, garening	21.8	31.9	35.6	46.3	0.000
Indoor chores: mopping, vacuuming, sweeping	48.9	64.9	59.6	63.9	0.000
Physically demanding part-time work: staking shelves, newspaper round	8.3	12.2	17.3	23.8	0.000
Play guitar/drums etc.	18.3	26.9	26.9	28.1	0.021
Free running/parkours	36.2	27.8	29.2	27.0	0.031
Other	12.2	6.0	7.9	7.5	0.008

Appendix H: Sports participation outside physical education class (with school type).

	DEIS	Non-DEIS	P
Sports & dance			
Athletics	35.8	32.9	0.148
Badminton	15.2	11.1	0.002
Basketball	40.4	29.8	0.000
Boxing	16.3	10.6	0.000
Cricket	2.7	3.6	0.226
Cue games (pool and snooker)	37.9	30.1	0.000
Cycling (mountain biking, road racing)	35.5	32.9	0.194
Dance (irish, ballet, modern, etc.)	27.0	24.4	0.160
Dancing (social, recreational)	24.6	29.5	0.011
Gaelic football	27.2	35.5	0.000
Golf/pitch 'n' putt	15.7	15.3	0.790
Gymnastics, trampoline	29.3	33.7	0.025
Hockey	6.7	7.2	0.629
Hurling/camogie	13.6	22.8	0.000
Judo	3.1	2.6	0.414
Karate	7.8	4.3	0.000
Skating (ice, roller, in-line, skate boarding)	17.6	10.4	0.000
Skiing (downhill, cross-country, water)	4.8	4.4	0.669
Soccer	60.6	53.6	0.001
Softball/rounder	15.7	18.4	0.096
Squash	8.8	5.7	0.003
Swimming	40.9	28.7	0.000
Tennis	18.2	18.3	0.951
Rugby	15.5	18.2	0.101
volleyball	10.4	6.8	0.001
Water sport	12.7	6.7	0.000
Other	25.4	19.6	0.001
Exercise			
Aerobics/aerobic dancing/step aerobics	17.0	17.8	0.607
Push-ups, sit-ups, jumping jack	60.0	61.7	0.407
Jogging	61.8	64.1	0.254
Skipping	29.6	26.7	0.126
Swimming laps	30.4	21.3	0.000
Walking for exercise	56.6	58.1	0.459
Weight lifting/weight training	29.6	21.9	0.000
Exercise machine:	30.1	27.2	0.119

cycle, treadmill, rower, climber			
Other	13.4	7.4	0.000
General physical activities			
Bicycling	43.9	39.2	0.023
Hiking	10.0	10.1	0.949
Walking to get places	81.0	82.5	0.366
Water play: in pool, lake, or ocean	30.7	21.7	0.000
Outdoor chores: mowing, raking, garening	30.7	39.0	0.000
Indoor chores: mopping, vacuuming, sweeping	50.6	64.6	0.000
Physically demanding part-time work: staking shelves, newspaper round	13.3	18.5	0.001
Play guitar/drums etc.	20.3	28.2	0.000
Free running/parkours	36.6	26.7	0.000
Other	12.2	6.5	0.000

Appendix I: Scatter plot of class duration and physical activity participation.