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SPORTING LIVES: AN ANALYSIS OF A LIFETIME OF IRISH SPORT

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EXECUTIVE SUMMARY

Brief Summary

This report analyses participation in sport over the lifetimes of the current generation of Irish adults. It reveals strong trends. Compared with older generations, current young adults played more sport as children and are continuing to play more as adults. The mix of sports people play is changing too, with particularly strong increases in individual sports and exercise activities (swimming, gym, jogging etc.) relative to traditional team sports. In particular, Gaelic games are in relative decline – participation is merely steady, while for most other sports it is growing substantially. Looking at participation right across the lifespan also sheds light on the gender and socio-economic gaps in participation. Given similar childhood experience, men and women are as likely to take up or drop out from sport as adults. The gender gap has its roots in childhood, where boys play much more sport from a very young age. Contrastingly, the socio-economic gap also starts young but continues to widen in adulthood. Those of lower educational attainment and income are more likely to drop out and less likely to take up new sports. These differences matter, as the analysis shows that health benefits accrue to those who play sport and to a significant degree are retained by those who used to play but no longer do. Overall, the strong trends identified suggest that sports policy needs to adapt if it is keep up with the changes occurring in grassroots Irish sport.

Objectives

This report, the fifth study conducted by the Economic and Social Research Institute (ESRI) in conjunction with the Irish Sports Council, takes a longer-term perspective on Irish sport. It aims to determine how participation in sport and exercise in Ireland has changed over recent decades and how it varies across the life course, from childhood to later adulthood. Broadly speaking, there are three objectives:

1. To compare the sport played by the current generation of Irish adults with that played by previous generations, both as children and adults, both in terms of the amount of sport played and the sports that have grown or declined in popularity. (Chapters 2 & 3.)

2. To examine the factors that affect whether people participate in sport at different stages of life. (Chapters 4 & 5.)

3. To estimate the health benefits of participation in sport at different stages of the life course. (Chapter 6.)

The implications of the findings for Irish sports policy are then discussed.

Data

The data source is the 2003 *Survey of Sport and Physical Exercise,* a very detailed survey of the sporting activities of a representative sample of 3,080 Irish adults. More specifically, one section of this survey asked a series of questions about people's former involvement in sport – what sports they used to play regularly, what ages they started and stopped playing different sports, what sports they played at school, and so on. From these responses an individual sporting history is constructed for each respondent.

The survey employs a broad definition of 'sport', taken from the Irish Sports Council Act, 1999, which covers all kinds of personal exercise activities, such as swimming, jogging and going to the gym, as well as more traditional field games like soccer and Gaelic games. Recreational walking, with the exception of hill-walking, is not included.

The individual sporting histories provide the basis for the main results contained in the report. Thus, it is reasonable to ask whether the construction of people's individual sporting histories from memory is a reliable method. The clear patterns in the data, the strong similarity between the histories of older and younger adults, the ease with which survey respondents recalled ages and dates, the use of the findings to predict more recent survey results, and comparison with academic literature on recall data, all suggest that the method is reliable. (For discussion see Section 1.4).

Main Findings

Irish people are engaging in a lot more sport and physical exercise for recreation than they used to in previous decades. Roughly speaking, when they were children, the current generation of young adults (those under 30 years) played two-thirds as much sport again as their parents' generation played. Moreover, they have continued to play much more sport as adults. Interestingly, this finding is not associated with the economic growth of the 'Celtic tiger' era. Although there was a consistent rise in levels of participation over time, the largest increase seems to have occurred between the mid-1960s and the early 1980s – well before the rapid economic expansion of the 1990s. The upshot of the results is that the **current young adults are playing much more sport than the current older adults did, and they are, therefore, likely also to play much more sport as older adults.**

There are very distinct patterns in the relative popularity of different sports over time. **Most notable is the relative decline of Gaelic games over several decades and the rapid rise of individual sports, especially personal exercise activities such as going to the gym, aerobics, swimming and jogging.** Of the team sports, soccer, basketball and rugby have grown substantially, but team sports have generally fared less well than individual sports, especially compared with the growth in exercise activities, swimming and golf. These trends are very similar for both genders and occur both within and outside of schools, suggesting that they amount to a broad cultural shift in sporting activity.

The relative decline of Gaelic games is greater for football than for hurling/camogie, but it is important to note that the decline is *relative*. That is, the numbers of people playing Gaelic football and hurling/camogie have not fallen appreciably, rather the numbers playing other sports have grown

rapidly while Gaelic games have largely stood still. To give an example, for adults aged 45-59 years, Gaelic games accounted for over 40 per cent of their childhood sporting experience, more than twice that accounted for by swimming and soccer. Just one generation later (adults now aged 18-29 years), significantly more children were swimming and playing soccer than playing either Gaelic football or hurling/camogie. The overwhelming majority of this change was down to rapid growth in the numbers swimming and playing soccer, especially those swimming.

The increase in the number of people engaged in exercise activities is dramatic and is primarily concentrated in the last 20 years. For the category 'aerobics/keep-fit' (which includes going to the gym, exercise classes and so on), the numbers of young adults participating rose at 12 per cent a year from 1984-2003, far outstripping the growth in any other activity. Second to this is jogging, which increased at 7 per cent per year. Growth in both activities is well ahead of that in other sports. Assuming that these levels of growth continue, the analysis based on individual sporting histories collected in 2003 predicts that the 'aerobics/keep-fit' category should now have become the most popular sporting activity in Ireland. This prediction is confirmed by the recent results from a 2006 Central Statistics Office survey, which are in line with the trends identified here.

Turning to the pattern of playing sport across people's lifetimes, the majority of respondents in the sample were playing some kind of regular sport by age 12 years. Participation peaks at age 15 years, when some 61 per cent were playing regularly (78 per cent in the most recent generation). There is then a drop in participation during the late teenage years followed by a much more gradual decline throughout adulthood. This pattern of participation has remained largely stable across generations, albeit at a higher general level for more recent generations. However, there are distinct differences by type of sport, gender and socio-economic background.

The fall-off in sporting activity in the late teens and on into adulthood is almost entirely due to people dropping out from team sports. Individual sports are played much later into adulthood and the proportion playing them does not decline much with age, if at all. The result is that 76 per cent of all adult (i.e. over 18 years) sport consists of individual rather than team sport; the most popular individual sports being aerobics/keep-fit, swimming, golf, cycling and jogging.

The pattern of activity across the lifespan is very different for the two genders. A large gender gap in participation opens up in very young children, well before the age of 10 years. The gender gap closes somewhat during the second-level school years when more girls take up sport, but the team sports they are introduced to at that age tend not to appeal and to be given up again very quickly. In the sample, by age 20 years, 66 per cent of male respondents were playing sport compared with just 36 per cent of females. However, turning to the behaviour of adults, the behaviour of men and women is much more similar. Women who play sport as adults are no more inclined to drop out than men. Moreover, women with equivalent sporting histories at age 20 years are equally likely to take up a new sport. In other words, the behaviour of men and women towards sport as adults is indistinguishable in the data – they take the same

decisions regarding taking up and dropping out from sport. The gender gap seems to arise solely from the different experiences of sport as children. **The findings defy the simple explanation that females are simply less interested in sport, since their behaviour as adults is not consistent with this. Instead, the data suggest that the different treatment of young girls opens up a sporting gender gap that never closes.**

The impact of social disadvantage, as measured by low educational attainment and low income, is also apparent from a very young age. But, **unlike the gender gap, the socio-economic gap strengthens across the life course.** Belonging to higher income and educational groups makes individuals far less likely to drop out of sport in young adulthood and much more likely to take up a new sport. The gap is also enhanced by the fact that people in professional occupations are more likely to take up new sports as adults, even after educational attainment and income have been controlled for. The socio-economic gap is particularly wide in popular individual sports, where participation among higher socio-economic groups does not peak until well into people's thirties.

These inequalities with respect to participation in sport and exercise across the life course contribute to inequalities in health. Indeed, the use of individual sporting histories as a tool of analysis allows the impact of sport and exercise on health to be studied in a novel way. People who participate in sport and exercise generally experience better physical and mental health. We estimate that regular participation in sport is equivalent, in health terms, to being 14 years younger. But the methods employed here also allow us to look at the impact of playing sport earlier in life (i.e. net of whether individuals currently play). Given that one of the ways sport may be good for future health is that playing simply increases the likelihood that someone reimains active in future, this is actually a very demanding test of the impact of sport on health, because that advantage is ruled out – the test is purely the direct impact of participation some time in the past. Nevertheless, the effect appears to be significant, at least for more physically demanding sports. We estimate that the health difference between someone with low past participation and someone with high past participation is equivalent to being three years younger. Thus, **playing sport improves people's health, but having played sport in the past means people are more likely to enjoy good current health too.**

Overall, participation in sport in Ireland appears to be subject to strong trends. The current generation of young people is likely to enjoy more sport further into adulthood than previous generations, and to reap the subsequent health benefits. This generation is also choosing to participate in different sporting activities from its predecessors, especially with respect to the steep rise in individual sports and exercise activities.

Policy Implications

As this is the fifth in a series of research reports, the policy implications of the research reported in its main chapters should be read in conjunction with those of the previous reports. Fahey *et al.* (2004) outline general policy principles and expectations for increasing adult participation in sport. Delaney and Fahey (2005) present conclusions regarding how sports policy fits into wider social policy, specifically with respect to enhancing social capital. Fahey *et al.* (2005) offer ways that policy can improve the quantity and quality of school sport. Lunn (2007a) provides potential policy

solutions for increasing participation in sport among the disadvantaged, having concluded that sports policy is currently regressive (it transfers resources from the less well-off to the better-off). The policy implications offered below are intended to be complementary to these previous pieces of research.

1. Adding the current analysis to the body of research on Irish sport that has now accumulated, it is plain that sports policy needs to change if it is to be brought into line with the available evidence. To some degree, it is inevitable that policy reform lags behind available research and policy should not slavishly follow the twists and turns of the latest findings, nor necessarily change until the evidence that informs it becomes weighty enough to be considered reliable. It is to the credit of past sports policy that a body of research has been funded and reliable evidence on participation in sport is now available to inform policymakers. Nevertheless, given that body of evidence, collected from three separate data sources between 2003 and 2006, the point has surely been reached whereby the evidence demands change. In particular, relative to the research findings that have emerged from these surveys, current policy appears to be out of step in terms of two broad themes. First, considering the kinds of sport and exercise activities that we now know to be undertaken in Ireland, policy has too great an emphasis on traditional team sports. Second, policy relies very heavily on the provision of facilities to increase participation in sport, yet an accumulation of evidence now suggests that reliance on facilities is unlikely to yield the best returns. **There is a real danger that Irish sports policy remains stuck in a former era and fails to adapt to an Ireland in which people's expectations of maintaining higher degrees of health and fitness throughout their lives have changed. Policy urgently needs to be updated in light of its evidence base, with which there is currently a clear disjunction.**

2. It is common to suggest that one reason for the rise in levels of obesity and overweight, especially in children, is that fewer people are engaging in regular physical activity. Great emphasis is frequently placed on sport, especially school sport, as a potential solution to this problem. Previous research (see Fahey *et al.*, 2005) has suggested that, while sport and exercise have undoubted health benefits, their potential contribution to reducing obesity and overweight is modest in comparison with potential changes in diet. Further to this, the present findings show that levels of physical activity associated with playing sport are climbing substantially and have done so for at least a generation – current Irish children and adults play much more sport than previous cohorts. **Policymakers should, therefore, recognise that the current problems of obesity and overweight cannot be the result of people doing less sport and recreational exercise, because people are doing more sport and recreational exercise.** This is not to say that overall levels of physical activity are necessarily rising, nor that sports policy has no role to play in encouraging less sedentary lifestyles. But it is important that sport not be blamed for causing a topical and high-profile health problem when, in fact, the evidence suggests that an increase in sport-related activity is contributing to significant improvements in health for many adults.

3. The Sports Capital Programme (SCP) is the flagship policy for grassroots sport. It distributes the majority of resources devoted to non-elite sport. It is not possible to measure the returns to this investment precisely, in terms of numbers participating and the associated benefits. Nevertheless, in the absence of accurate assessments of such returns and ignoring, for present purposes, the fact that research suggests providing more facilities is unlikely to be the best way to increase participation in sport, if large amounts of public money are to be spent on facilities, the projects chosen ought at least to reflect levels of use and potential future use. This linkage was clearly identified as important by the recent expenditure review of the SCP, which called for reliable data on levels and trends in participation (see Chapter 1). Research has now delivered the requested data. **The data show that the Sports Capital Programme currently devotes the lion's share of the available resources to sports that have relatively low and declining popularity, especially Gaelic games.** Gaelic games account for over one-third of all grants under the scheme, thereby receiving much more funding than other sports that are already more popular and are continuing to grow in popularity. Generally, the SCP also has a strong bias towards team sports. If funding for facilities through the SCP does increase participation then it ought to be possible to detect rising levels of involvement particularly in those sports most generously supported. This is not the case. Instead, the distribution of funding is at odds with levels and trends in participation. Assuming that some of these issues will be dealt with by the forthcoming National Facilities Strategy, there is an obvious need for the strategy to make extensive use of the newly available participation data. Included in this should be the data available from the QNHS (2006) sample that matches the long- and medium-term trends found in the present analysis. The QNHS data show that what demand there is for facilities appears to be concentrated on swimming pools, walkways and fitness centres, in line with the trends identified here.

4. One of the reasons for the current distribution of resources through the SCP is that the scheme responds to applications made and is, therefore, biased towards those sports that have the pre-existing organisational capacity to take advantage. As has been highlighted by Delaney and Fahey (2005), the GAA is unsurpassed as a model of social organisation in sport, accounting for the largest part of sport-related volunteering. Many other sports could learn much from its model. The disproportionate share of the SCP money acquired by GAA clubs in part reflects this success and longevity in organisation. Similarly, albeit on a smaller scale, the Irish Sports Council needs to examine the degree to which its financial support and promotional activity is distributed across the different sporting activities. **If the aim of policy is to increase participation in sport, then policy needs to find a way to channel a larger share of funding to new sporting enterprises and to growing ones in particular.** In a changing environment, pre-existing established organisations are bound to reflect the patterns of the past. Instead, policy needs to adjust to support faster-growing sports.

5. Given the findings presented, it is highly likely that today's children and young adults will play more sport as older adults than today's older adults play at present. The vast majority of the increase in participation, at least outside second-level school, relates to individual (as opposed to team) sports. Thus, there is likely to be a further expansion of the more popular individual sports. **Sports policy needs to recognise the trend towards individual sports such as swimming, fitness training (of several different sorts) and jogging, and to devote a greater share of its efforts to promoting and supporting these increasingly popular activities.**

6. That said, there is one serious danger associated with the trends identified with respect to the relative popularity of sports, namely that it may exacerbate the association between social disadvantage and playing sport. Although it still awaits full multivariate analysis, a univariate examination of the QNHS (2006) data suggests that these popular and expanding activities are being adopted disproportionately by the better-off in society. With respect to fitness centres, classes and gyms in particular, there is an important question regarding the affordability of participation. **Sports policy needs to address affordability, promotion and access issues surrounding increasingly popular personal exercise activities, if it is to prevent a further increase in socio-economic inequality in sporting participation.** This issue presents something of a challenge to policymakers, as many of the providers of opportunities in these areas are not voluntary sports clubs, but private companies. Thus, deciding on an appropriate mechanism for public policy to support greater participation in this area will require careful deliberation.

7. Despite an equivalent interest between adult men and women in sport and physical exercise, as children, girls fare poorly in terms of participation relative to boys. Furthermore, the gender gap appears at such a young age that it is not credible to argue that this pattern reflects the natural interests of girls and boys. By prioritising sport for boys, schools and parents allow girls to lag behind and this gender gap is never made up, with all the associated implications for future health and other benefits that sport can bring. **Sports policymakers need to work with primary schools and sports clubs to ensure that young girls are given the same sporting opportunities and encouragement as young boys.**

8. The development of the gender gap is particularly striking during the second-level years, where there is a sharp rise in girls playing team sports followed by an equally sharp fall just two or three years later. It is clear from the data that the sports offered to girls at second-level are largely unappealing to them. Note that the pattern does not reflect a general disenchantment with sport and exercise on behalf of teenage girls, since their participation in individual sports continues to rise during this period. **Sport and education policy-makers need to look at ways to improve the range of sports offered to girls at second level and, in particular, to provide opportunities to engage with individual sports that are more appealing to girls at this age.** This is an area where more data and

research is required, although it is clear that a broader range of individual sports and exercise activities will be part of a more appealing mix of activities for teenage girls.

9. The extra evidence on the relationship between sport and social disadvantage provided in this report is consistent with the analysis and ten policy implications presented and derived in Lunn (2007a). However, the evidence provided in Chapter 5, based on sport across the whole life course, offers some further insights. Assuming that there has not been a very radical change within the current generation of schoolchildren, social disadvantage affects the amount of sport played by children from well before the age of 10 years. This finding is strongest in respect of individual sports and goes well beyond the negative effect of attending a designated 'disadvantaged' school, which was identified in the previous work. It, therefore, extends the finding of striking inequalities in sport to children, including very young children. **In order to tackle the impact of social disadvantage on participation in sport, policymakers need to consider the problem for children as young as 5-10 years of age. There is, therefore, a strong case for redirecting greater resources to schools and sports clubs that welcome and attract young children from less well-off backgrounds.**

10. Despite some of the challenges facing sports policy outlined above, there are plenty of reasons for optimism. The amount of sport being played has grown strongly. The timescale over which the increase has occurred and the nature of the activities that are growing most in popularity strongly suggest that many individuals understand the benefits of sport and exercise, and act so as to take advantage of them. Meanwhile, our understanding of the current state of participation in sport has improved greatly and is now fairly comprehensive – a major advance on just a decade ago. However, our understanding of the forces of change is more sketchy. A large proportion of adult sport is taken up after the age of 20 years, because many adults drop out from playing regular sport, while many others take it up, often for the first time. Thus, a better understanding of the forces that lead people to make these transitions might allow policymakers to increase further the flow of new participants into sport and to stem the flow out. **Policy formation would benefit from future research that focuses more on the routes individuals take into and out of sport, the information available to them at the time, and the factors influencing their decisions.** Our understanding of the overall picture of participation is now quite good, but our understanding of the individual brushstrokes that combine to produce it could improve greatly.

1. INTRODUCTION

1. 1 Sport in Changing Times

Sport is ingrained in modern culture. A large majority of people play sport at some point in their lives, while others take an interest, as applauding spectators, willing volunteers, or encouraging parents. Sport is a staple of the media diet – the subject of newspaper supplements, books and documentaries. Sport acts as a cultural centre of gravity; it attracts conversation, entices passion and creates identity. With such a central role in our culture, it would be surprising if sporting activity were not subject to substantial change over time. Culture does not stand still, but develops.

There are a number of medium- and long-term trends in Irish society that have the potential to affect sporting activity significantly. Most obviously, little seems unaffected by the remarkable economic transformation of the last decade and a half. Higher incomes and investment offer greater opportunities to engage with sport and a greater choice of sporting activities. But non-economic trends matter too. In recent decades, Ireland has become more multicultural, its media has turned multi-channel, while its people have obtained more degrees, travelled more extensively and become more health conscious. Each of these trends may, to a greater or lesser degree, alter the sporting landscape.

1.2 Objectives

This report is the fifth research study on Irish sport carried out by the Economic and Social Research Institute (ESRI) in conjunction with the Irish Sports Council. While the data source, the *Survey of Sport and Physical Exercise* (SSPE) is the same as for previous reports, the present investigation employs a unique methodology and novel analysis. The research findings are based on a specific section of the survey that collected recall data, recording active involvement in sport throughout people's lifetimes. It would, naturally, be preferable to have historical data on sporting participation that could be compared with current data, as the recall method is limited by the accuracy of people's recollections – an issue discussed more fully in Section 1.4. But in the absence of historical data, the recall data in the SSPE seems to work well in practice, producing strong patterns. The findings offer a consistent picture of the variety of sporting activity undertaken in Ireland in recent decades, how that activity varies across people's lifetimes, and what factors contribute to participation in sport.

By permitting quantitative analysis of individual sporting activity over a considerable period of time, recall data can be used to examine a range of issues that cannot be addressed using conventional cross-sectional surveys. Consequently, this report covers a greater breadth of research questions than its predecessors. Specifically, the analysis addresses the following questions:

(1) Does the current generation of Irish adults play more or less sport than its predecessors?
(2) Did the current generation of Irish adults play more or less sport as children than previous generations?
(3) Which sports have increased in popularity over recent decades and which have declined?
(4) What are the trends regarding the amount and range of sport offered by schools?
(5) How does the playing of sport vary across people's lifetimes?
(6) What factors determine whether people play sport at different life-stages?
(7) Have these factors changed across generations?
(8) Is there a relationship between the amount of sport people play and their health?
(9) Does the amount of sport people have played in the past contribute to their current health?
(10) What are the policy implications of trends in the playing of sport in Ireland?

A relatively clear answer to these questions emerges from the statistical analysis.

1.3 Relationship to Previous Research

There is a body of knowledge accumulating about participation in sport in Ireland. To date, this research is centred around two face-to-face participation surveys conducted by the ESRI's Survey Unit in 2003 and 2004, and more recently the *2006 Quarterly National Household Survey* (QNHS) module on sport and physical exercise. From 2008, data will become available from a new survey dedicated to sport, the Irish Sports Monitor, with an annual sample-size of over 9,000. The first existing data source, the *2003 Survey of Sport and Physical Exercise* (SSPE), which also underpins the present analysis, surveyed a nationally representative sample of 3,080 Irish adults. This survey asked an extensive range of detailed questions about people's engagement with sport, past and present, and has proven to be a rich source of research findings.

These findings relate to a broad definition of sport, which is derived from the Council of Europe's 1992 *European Sports Charter* and was adapted and established in the Irish context through the Irish Sports Council Act of 1999:

"recreational sport" means all forms of physical activity which, through casual or regular participation, aim at expressing or improving physical fitness and mental well-being and at forming social relationships;
(Irish Sports Council Act, 1999, Part 1, Sect. 2(1))

Under Part 1, Section 6(1)(b) of the same act, one of the statutory functions of the Council is to develop strategies for increasing participation in recreational sport, as defined. In effect, the above definition is adopted throughout this report. Thus, in addition to traditional competitive games, doing non-competitive exercise activities, such as going to the gym, attending fitness classes or swimming, is counted as 'playing sport'. Moreover, playing sport casually among friends is given the same status as playing organised sport in a club setting. The one departure from the above definition is that recreational walking is not included in the present analysis (although hill-walking is included). Recall data on walking are not available

in the SSPE. Furthermore, because recreational walking is such a popular activity, variation in walking tends to dominate any variation in other activities and so the previous reports in the series have in any case analysed walking separately.[1]

Fahey, Layte and Gannon (2004) outlined baseline figures for participation, derived from the SSPE. They recorded that 43 per cent of the adult population had participated in some kind of sport (excluding recreational walking) in the previous 12 months and that 33 per cent participated more regularly than once a month. Fahey *et al.* also found that those who do not play sport are likely to cite lack of time, interest or physical ability as reasons for not playing. One notable result is that lack of facilities is not considered by non-participants to be an important issue for them. Fahey *et al.* found strong patterns regarding who plays which sports. Based on the SSPE, the most popular sports in Ireland in 2003 were, in order: swimming, golf, aerobics/keep-fit, soccer, cycling and GAA football. Participation is lower among women and older people. There are also trends in participation across the life course. Younger people tend to play high-intensity team sports, such as soccer, GAA or basketball, but usually give up these sports in early adulthood. Continued participation in sport depends on whether they switch to the kinds of sports older adults are likely to play, such as swimming and golf. Lastly, this initial study found a strong relationship between sport and health. Across age groups, but especially among older ones, those who participate in sport have better physical and mental health.

The *2004 Survey of Schoolchildren's Sport* involved over 3,000 primary school pupils and 3,000 second-level pupils from a nationally representative sample of 137 primary schools and 80 second-level schools. Pupils filled out questionnaires about participation in sport, both within their school and outside. The information gathered was supplemented by questionnaires completed by school principals. Fahey, Delaney and Gannon (2005) record high levels of participation based on this survey. Although second-level pupils take part in an average of only 69 minutes of PE classes per week, well below the recommended two hours, 70 per cent of second-level students participate in extra-curricular sport at least once a week, while the same proportion also participate in sport in clubs outside school. Just 16 per cent of second-level pupils play sport outside of PE classes less than once a week. Turning to primary school pupils, Fahey *et al.* (2005) recorded a similar pattern, but with more regular sport being played away from school. Some 62 per cent of pupils do extra-curricular sport at least once a week, while 81 per cent play with a club outside school.

Following the reporting of these baseline figures for participation, greater attention has been focused on what determines whether people participate – who is likely to play sport and who is not. In the studies above, priority was given to gender differences. Men play more sport than women. A gender gap first appears in the primary school data but becomes wider, particularly towards the end of second-level school.

[1] According to the SSPE, walking is an important component of recreational physical activity, especially for older people. When recreational walking is included in the definition of sport, participation over a 12 month period climbs from 43 per cent to 78 per cent. In an ideal world, the current report would analyse individual walking histories, just as it does sporting histories. Data on walking histories are, however, not available.

Lunn (2007a) found that age and gender were not necessarily the strongest determinants of whether an individual played sport as an adult. In multivariate analysis, socio-economic status is at least as strong a determinant of playing sport, with the impact of educational attainment being particularly striking. Indeed, combining the effects of educational attainment and income, an individual with third-level qualifications who is in the top income quartile (i.e. the richest 25 per cent of the population in terms of household income) is over five times more likely to play sport than an individual of the same age and gender who has only lower secondary qualifications and an income in the bottom quartile (i.e. the poorest 25 per cent). In other words, social disadvantage has a very large impact on the likelihood that an adult plays sport. More detailed analysis in Lunn (2007a) reveals that social disadvantage greatly lowers the chances that someone will take up an individual sport of the sort that is likely to be continued as an older adult. Those from less advantaged backgrounds who do play sport when young are, therefore, likely to drop out.

Both Fahey *et al.* (2004) and Lunn (2007a) compared participation in sport in Ireland with participation in other countries. Although international comparisons are difficult, as methodologies and definitions of 'participation' change across surveys, there is reason to believe that participation in Ireland lags well behind some other nations (most notably Finland, Canada and Australia), and that not all countries have the same disparity between socio-economic groups.

Other important factors influencing adult participation are whether an individual's parents played sport, whether they have access to transport, and whether they are in good health. Lack of background data makes the same analysis difficult for children's sport. Nevertheless, there is sufficient data to reveal that children in primary schools classified as 'disadvantaged' play less extra-curricular sport and are offered less opportunity to engage with a broad range of sports at school. Lunn (2007a) found no equivalent evidence that children at 'disadvantaged' second-level schools play less sport, although this may reflect the fact that the official definition of 'disadvantage' covers a much higher proportion of second-level schools.

In late 2007, the Central Statistics Office (CSO, 2007) released headline figures from its 2006 QNHS module. This data source has the advantage of a very large sample (40,000) relative to previous surveys, although at the time of writing the microdata is yet to be released by the CSO and subjected to multivariate analysis. Still, one particularly interesting result emerges from the headline figures. First, the most popular sport (excluding walking) recorded by the survey was not swimming, as in the SSPE, but aerobics/keep-fit. Thus, either a significant change has occurred in the relative popularity of sports in recent years, or some kind of methodological difference must account for the different result.

Summarising the previous findings,[2] a large majority of people play sport as children, but this reduces to a substantial minority in adulthood. There is

[2] What follows is a brief summary relating only to the issue of active participation. There are in-depth analyses of a variety of issues relating to sport in Ireland in these previous studies, including volunteering, attendance at sports events, membership of sports clubs, the proven benefits of physical activity, the social and economic value of sport (Delaney and Fahey, 2005), as well as detailed policy implications arising from the analysis.

a transition from playing team-based sports when young to more individual sports in adulthood, especially swimming, golf and aerobics/keep-fit. There may in fact be considerable change in the popularity of different sports over time. Of the range of factors influencing participation, social disadvantage (especially educational attainment), gender and age appear to be the most significant. Of these, social disadvantage, as measured by income and educational attainment, appears to reduce the chances of playing the types of individual sports that people are most likely to play long into adulthood.

There remain, however, many outstanding questions about the forces driving participation. The findings are limited by the fact that they are based on cross-sectional data; that is, a snapshot of participation in sport at a single point in time. Looking across the available data sources, there is a suggestion that the relative popularity of sports may have undergone, indeed be undergoing, pronounced change. Meanwhile, the data imply that moving from school to the workplace or to college, or from young adulthood into middle-age, tends to have an impact on whether people play sport and which sports they are likely to play. In short, transitions matter. To study individual transitions, longitudinal data that record the status of individuals at several points in time would be preferable. Research on sport is not unique in this regard. The absence of such data is a constant refrain in social science, where cross-sectional data limit the scope for investigation. But because participation in sport seems to be closely tied to the life cycle, and because the issue has only been of strong interest to social scientists in recent years, the absence of data is likely to conceal more in this area than in most.

For example, consider the relationship between participation and age. The data show clearly that older people are considerably less likely to play sport than younger people. But this could be for one of (at least) two reasons. First, it may simply be that as people get older, they lose interest or fitness and so playing sport becomes, on average, less attractive to them. Alternatively, getting older may be less of an issue than the generation in which people are born, or what social scientists would call their 'cohort'. That is, the current cohort of young adults may have had greater opportunities to play sport than their parents' cohort. Thus, they may play more, not because they are younger, more able or interested, but because they have had the opportunity. This could be particularly true for women, as attitudes to gender roles have changed strongly in recent generations. It is entirely possible that by the time today's young adults become middle-aged, they will still be playing much more sport than middle-aged people are today. In short, we do not know whether the current fall-off in participation with age is an 'age effect' or a 'cohort effect'.

There are a range of related questions that cannot easily be addressed with cross–sectional data. We can see that having a diploma or degree increases the likelihood of playing sport, but the data do not reveal much about why. To learn more about the impact of third-level education on playing sport, we would like to be able to record an individual's participation before going to college, while they are there, and after they have left. Similarly, cross-sectional data can tell us which sports are most popular and which least, including among which social groups, but they cannot tell us which are on the rise and which in decline. Consider also the relationship between sport and health. The data show that playing sport is

associated with better health, but this may be because playing sport improves health or because having better health makes it easier for people to play sport. If we had data recording participation in sport over a long period of time, then we could compare past participation with current health status and thereby be more confident that any relationship present reflected the impact of sport on health, not vice versa. To conclude, the inability of cross-sectional data to record how participation changes over time limits the inferences that can be drawn.

However, the 2003 SSPE contained a questionnaire section that can, in part, make up for the lack of longitudinal data. It asked respondents to describe in some detail any sports that they used to play on a regular basis. Looking at the responses, most interviewees seemed to have little difficulty in recalling dates and experiences relating to their active participation in sport. These responses were transformed to resemble a longitudinal data set, recording how much sport each individual had played during each year of their life – an individual 'sporting history'. Using this technique, some of the questions outlined above come within range. Individual sporting histories allow us to compare the level of participation at different points in the life cycle, to examine the factors that influence participation at each stage, and to relate past participation to present participation and health status.

It is this transformation of the data which forms the basis for the current report, allowing the analysis to reach beyond the scope of previous studies and providing original findings with respect to participation in sport. Nevertheless, although recall data resemble proper longitudinal data, they rely on memory over an extended period. There are issues to be considered, therefore, surrounding accuracy and interpretation.

1.4 Sporting Histories Data

The *Survey of Sport and Physical Exercise* (SSPE) interviewed a random sample of individuals' aged 18 years and over drawn from the Irish electoral register. The sample was re-weighted by gender, age and region to comply with Census 2002. This data set and its associated methodology has been described extensively in three previous reports (Fahey *et al.*, 2004; Delaney and Fahey, 2005; Lunn, 2007a), so the discussion here is limited to factors relevant to transforming the data to construct individual sporting histories.

The relevant section of the SSPE presented survey respondents with an almost exhaustive list of sporting activities and asked them to state whether they had ever played any of them "on a regular basis"[3]. If so, it recorded what the sport was, the age at which the respondent starting playing the sport, whether they played the sport at primary school, whether they played the sport at secondary school, the age at which they stopped playing, and the reason why they stopped. The same questions were also asked of any sport that the respondent was still playing at the time of the interview. Hence, it is possible to use these responses to construct a reasonably comprehensive sporting history for all individuals in the sample of 3,080.

[3] Respondents were not given a precise definition of 'regular'. Doing so would probably have made recollection more difficult. Previous sections of the survey dealing with current playing of sport defined 'regular' as 'at least once a month'.

For every year of each individual's life, until the time of the survey, the individual sporting history records how many sports (if any) they were playing at that age and which sports they were.

There are, however, three potential pitfalls associated with this transformation of the data. First, there is a question over what to do with cases where recall is incomplete. Second, there is the possibility of measurement error being introduced by inaccurate recall. Third, there is an issue surrounding sampling. Each requires some discussion.

Of the full sample, there is sufficient information in 94 per cent of cases for an individual sporting history to be compiled. Where recall is incomplete, it is invariably because the respondent opted for "don't know" when asked for the starting or stopping age relating to a particular sport, rather than because they could not remember whether they had played sport or which sports they had played. Those who could not recall are simply discarded from the analysis. This has the impact of slightly reducing all reported participation rates, because 21 per cent of respondents had never played any sport and the 6 per cent who could not recall were all people who had at least played some sport at some stage. The more important issue is whether there is any kind of bias introduced by dropping this 6 per cent from the sample. Cross-tabulations reveal that there is no statistically significant relationship between being one of this 6 per cent and gender, educational attainment, whether a person still plays sport, or team versus individual sports. There are some small biases, however. Those in the top income quartile are slightly more likely to be in this 6 per cent who failed to provide a complete sporting history (the effect is marginally statistically significant), possibly because they tend to have played more sports and so had more information to recall. There is also a slight age effect, whereby those under the age of 30 years are less likely to be in the 6 per cent (although, perhaps surprisingly, there is no difference in ability to recall between different ages above 30). Overall, then, participation rates may be slightly lowered by recall error, except in the under-30s, where recall error is lower. But the effects are small, fairly evenly spread across the sample subgroups and unrelated to the type of sport played.

Accuracy of memory also underlies the second data problem, which is whether the responses can be considered accurate. This is, of course, a problem with all surveys regarding lifestyle activities, because the information asked for relates to behaviour in the past. Yet, in this case, the time-period over which people are asked to describe their behaviour is not a week, a month, or even a year, but decades. There is, indeed, some clear evidence in the data that respondents made some approximations. The starting and stopping ages, particularly in adulthood, tend to clump a little around notable ages, such as 30, 40 or 65. This may be partly explained by people actually being more likely to change aspects of their lives on reaching a prominent age, but most likely it reflects an estimation of when the change occurred. Nevertheless, again, the data do not indicate that these approximations introduce a bias towards any one social group or type of sport.

There is also pre-existing research in other fields that can shed light on the likely accuracy of the SSPE responses. Recall data has previously been used to examine various research questions in economics and sociology; for instance, factors influencing unemployment, educational attainment and

health service usage. Two separate meta-analyses of these recall studies (Bound *et al.*, 2001; Dex, 1991) reach the same conclusions regarding factors affecting reliability of recall. Recall data seem to be subject to less error when the recall period is shorter, when the activity being measured is salient, and when the behaviour is habitual and lasts for a long period. Participation in sport may hence be suitable for analysis using recall data, since periods of playing regular sport tend to cover periods of years and involve salient events. Furthermore, the evidence considered by Dex (1991) suggests that face-to-face surveys and aided recall (lists of prompts) further improve accuracy. The SSPE employed both face-to-face interviews and an extensive list of possible sports.

Overall, the results reported here must be treated with a degree of caution, because they are based on people's recollections. But there is little if any indication of systematic biases within the recall data. Moreover, analysis of other recall studies indicates that the method has worked for other research topics, that it may be well-suited to studying sport, and that the survey questions in the SSPE were framed in a manner likely to assist accurate recall. Thus, where large and statistically significant differences between social groups, types of sports, and other variables are found, it is very unlikely that they are the product of poor or faulty recollection.

The third and last data issue is the possibility that transforming the data in this manner could introduce a sampling bias. For example, based on the sporting histories compiled from the SSPE, peak age for playing sport is 15 years old, at which point 61 per cent of the sample was playing some kind of sport. For the youngest member of the sample, who is 18 years old, this statistic is, therefore, derived from a recollection of behaviour three years previously, in the year 2000. But the median-age respondent, who is 44 years old, was aged 15 in 1974. The potential problem here is that a random cross-section of Irish 44 year-olds in 2003 may not be a random sample of 15 year-olds in 1974. Some people die, others emigrate, new people arrive. If death and migration are correlated with the likelihood of playing sport, or a particular kind of sport, biases will be introduced.

Dealing first with emigration, an examination of the patterns of emigration from Ireland reveals two significant emigration peaks in living memory, one in the late 1950s and the other in the late 1980s (Fahey, Fitz Gerald and Maître, 1998). Both waves primarily involved young labour-market entrants. The recent boom has led many of those who left in the second wave to return. Thus, sample bias is more likely to be a problem with those who left in the 1950s and so it concerns the data collected from older respondents. This, of course, is also the age group most influenced by sampling error due to deaths. By definition the sample only deals with survivors and it is quite likely that those who live longest tend to be more physically active. To control for these possible sources of sample bias, much analysis in the chapters that follow is limited to those who were under the age of 60 at the time of the survey. Furthermore, where analysis involves those over 60, the robustness of the result has been checked by conducting it separately for those under 60 only.

In summary, because the data refer to behaviour decades prior to the survey, there is potential error in the form of false recollections and sample biases. However, efforts have been made to control for these errors and, in

any case, many of the findings reported are so consistent and strong that it is very unlikely that they are the result of such errors.

1.5 Historical Context

The volume of academic research on participation in sport has grown substantially in recent times, partly driven by better understanding of the health and social benefits sport can bring. From this accumulating body of research, we know that participation is greater among males, younger people and higher socio-economic groups, especially as defined by educational attainment and income (Farrell and Shields, 2002; Stratton *et al.*, 2005; Stamm and Lamprecht, 2005; Lunn, 2007a). Yet there is very little rigorous, published analysis on long-term trends in participation.

The advantage of collecting recall data, like that generated by the SSPE in 2003, is that it permits useful comparisons of how much sport was played and which sports were played as far back as four decades ago. There is little in the way of pre-existing theory to guide us regarding what trends to expect over this kind of time span. Nevertheless, given the influences that have been identified from current data, it is possible to construct some hypotheses regarding historical changes that might have shaped the playing of sport during the period in question.

Most obviously, economic development is likely to play a significant role. As individuals become richer their opportunities to engage in sport expand accordingly. Higher income makes it easier to afford subscriptions to sports clubs, pay-per-use fees, clothing, equipment and transport. Higher potential earnings also mean that individuals may make different choices regarding the balance between work and leisure. Meanwhile, economic growth is likely to be associated with greater investment in sporting infrastructure, giving many more people access to facilities and to a broader potential range of sporting activities. Given the very high rate of Irish economic growth since the early 1990s, one straightforward test of the hypothesis that economic growth drives greater participation in sport is to examine whether the 'Celtic Tiger' era saw an acceleration in participation.

On the other hand, the relationship between income and participation in sport, or between investment in facilities and participation, may not be constant as income and investment rise. In particular, there may be diminishing returns to investment in physical sporting infrastructure. Facilities, from state-of-the-art sports centres to simple open spaces, are a prerequisite for playing most sport. But a reasonable presumption is that investment in facilities at an earlier stage of economic development, for example, where the aim is to provide each school with access to a basic multi-use indoor space, is likely to have a greater impact on the level of participation than investment at a later stage of development, where the aim is to upgrade the quality of pre-existing facilities that are already extensively used. Consistent with this logic of diminishing returns, just 1 per cent of adult non-participants in sport in 2003 cited lack of facilities as a reason why they did not play any sport (Fahey *et al.*, 2004). Thus, while availability of facilities no longer seems to be an important barrier to participation in sport, at least in adulthood, it may have been so in past decades. The recall data allow us to test this hypothesis by looking for commonalities among those sports that have grown most significantly in popularity. If sports that require similar facilities grew in popularity over the same period of time, then this would constitute evidence that facilities

were an important factor. Furthermore, by looking at the shape of the trends over time, it may be possible to examine when the pace of change was at its greatest and, hence, to see whether the pattern is consistent with the idea that returns to investment in facilities have diminished.

While it is hard to envisage higher incomes and investment reducing participation, there are potential negative aspects of economic expansion that could have a downward impact. Rather than facilities, one of the main reasons given by survey respondents for non-participation in sport is lack of time. It is often claimed that the greatly increased employment opportunities offered by economic expansion have changed lifestyles. One hypothesis is that higher labour market participation, longer commuting times and pressures of work might lead Irish adults in 2003 to have less leisure time for activities such as sport than, say, two or more decades previously. However, this common perspective on leisure time is not clearly supported by data. According to the *Living in Ireland Surveys*, from 1994 to 2000, which was a period of very high growth, employment expansion and satisfaction with leisure time remained unchanged for both men and women (McGinnity, Russell and Smyth, 2007).

Another negative trend associated with economic growth, one much easier to substantiate with data than problems of work-life balance, is the sharp rise in traffic. Traffic could potentially reduce participation in a number of ways. For example, safety concerns may affect the willingness to cycle. Greater congestion could also reduce the available public space for informal playing of sport – in anecdotal terms, you see less football played in the street. More obviously, traffic may make it harder to get to sports venues, although this must be balanced against the simple fact that higher car ownership means that more people have access to transport in the first place.

Overall, when considering the impact of economic development on participation in sport, the rise in incomes and investment associated with economic growth may be important, but so may the stage of economic development at any given point in time, and the side effects of economic growth on lifestyles and the built environment.

Two other reasons, in addition to lack of time, featured prominently when non-participants in the survey were asked why they did not play any sport: lack of interest and poor health or fitness. If these are consistent reasons for non-participation, one might hypothesise that participation in sport is likely to have increased in recent decades. With respect to interest, recent decades have produced an explosion of media coverage of sport, driven by the rapid technology-driven diversification of media and the mutually reinforcing financial relationship between the media and professional sport. With respect to health, Irish people are, on average, living longer, healthier lives, which should translate into higher levels of fitness for longer stretches of adulthood. Furthermore, there is a case to be made that Irish people have, at least since the 1980s, developed better health awareness, a cultural change in itself related to communication through the media (Layte, Nolan and Nolan, 2007). Again, this hypothesis is one that the present data can test, as a link between better health awareness and participation in sport ought to lead to greater increases in those sports that are most beneficial to personal fitness, particularly since the 1980s.

Research on current participation also shows that time spent in full-time education, with its easy access to facilities, playing partners, organised teams, clubs and societies, and opportunities to try new activities, has a strong impact on participation throughout later life (Lunn, 2007a). This strong association between educational attainment and participation leads to the hypothesis that the significant increase in educational attainment enjoyed by Irish people in recent decades will be reflected in greater participation in sport. Coolahan (1981) characterises the period from 1960-1980 as a special time in the development of education in the Irish State. He documents a significant change in public attitudes and political focus with respect to education. The result was higher investment in school buildings and a successful drive to increase enrolment at second level. The government began to award school capital grants in 1964, introduced the 'free education scheme' in 1967, and raised the mandatory school leaving age to 15 years in 1972. Although Coolahan makes no reference to sports facilities, given the higher level of investment, including in new schools, and increased enrolments at second level, it is virtually certain that a steadily greater number of children would have had the opportunity to play sport during this time. Furthermore, following the expansion in second level, the 1980s saw a sharp increase in the proportion of students completing senior cycle and going on to third level. Again, this extension of the period that individuals spent in full-time education would have been very likely to increase the sporting opportunities of those who benefited.

Thus, looking at the historical context, there are many potential factors likely to have influenced participation in Irish sport over the past fifty years, most of which appear likely to have boosted participation. Meanwhile, much contemporary commentary assumes that the level of physical activity in the population is falling. The problem again, however, is the absence of longitudinal data. The National Taskforce on Obesity (2003) argued that less physically demanding work, automated transport, technology in the home and more passive leisure time, all contribute to lower levels of physical activity. In support of this theory, the taskforce compared data for 1998 with similar data for 2002 and found some decline in activity among particular age groups, but not for the adult population as a whole. Furthermore, it is entirely possible that overall levels of physical activity might fall in a period when participation in sport rises. Any increase in playing sport could, in principle, be more than offset by a decline in activity for the purposes of transport, at work and so on. Moreover, with fewer people engaged in physical activity as part of daily routine, an increase in the proportion of the population playing regular sport could coincide with an increase in the proportion that is sedentary, while fewer people fall in between. Nevertheless, if there has been an increase in participation in sport, then the decline in physical activity in other areas would have to be all the greater for assertions about decreasing physical activity levels to be true.

Given the historical context, one general hypothesis to be tested is that the level of participation in sport has increased over the period. Beyond this, there are many possible reasons why participation might increase or decrease and it is difficult to disentangle the various hypotheses regarding specific influences. Nevertheless, as we will see, the data do support some of the specific factors listed above more strongly than others.

1.6 The Link Between Sport and Health

The over-riding logic of public support for sport is that it confers health and social benefits for participants and communities. Much international academic literature supports this contention and it is explicitly recognised by Irish sports policy and public health policy. With respect to the question of health benefits, the research method employed in the present report allows the issue to be addressed in a novel way.

It is well-documented that people who play sport are healthier and that physical activity is associated with reduced risk of various serious diseases. Fahey *et al.* (2004) provide detail and references. Briefly, there is good evidence, for example, that increased levels of exercise can improve blood lipid levels, improve body composition and lower blood pressure leading to a reduced risk of stroke and myocardial infarction. Exercise can also promote bone density and boost the immune system as well as having beneficial effects on mental health.

Still, the relationship between regular exercise and health is not simple. The impact of exercise may be mediated by other factors such as diet and smoking. Moreover, just as low levels of exercise are associated with worse health, extremely high levels can have their problems too. For example, young women athletes can suffer from menstrual dysfunction and musculoskeletal disorders, although such negative outcomes from high levels of exercise are likely to be a tiny fraction of exercise-related disease when compared to the contribution of inadequate exercise to heart disease, diabetes and stroke. The health benefits may also depend on the type of exercise, or the level of exertion. Do people receive a benefit from undertaking even light exercise? Until the late 1970s, the official position of both US and European health protection agencies was that health 'fitness' depended upon rather high levels of commitment and exercise. For example, even in 1980 the American College of Sports Medicine was recommending training 3-5 days a week using hard effort for up to 60 minutes per session to receive physical benefits. However, since then an important distinction has been made between physical activity as it relates to health and to physical fitness. Although fitness may require high levels of effort, it has now been shown that individuals can obtain health-related benefits from more moderate activities carried out for around 20 minutes for three or more days a week (US Department of Health and Human Services, 1996). The current advice of the World Health Organisation is that at least 30 minutes of moderate intensity physical activity five days per week is a minimum level required to promote and maintain health (World Health Organisation, Europe, 2005).

One of the difficulties in studying the connection between exercise and health is that it is difficult to discern the direction of the relationship. Does playing sport improve health, or are healthier people more able to play sport? By measuring each individual's sporting history within the SSPE sample, it is possible to examine the link between people's current health status and their past involvement with sport. In doing so, we can be more confident that any relationship uncovered by the analysis results from the impact of sport on health, rather than vice versa. Moreover, it is possible to separate and compare the impact on health of playing sport in the past with the impact of playing in the present.

The link between sport and health is one of the primary justifications for spending public money on sport. The strength of the relationship determines the potential return on the public spending and is, therefore, an important research topic. However, the crucial assumption that is also required for this justification to hold is that the public money spent increases the level of participation in sport.

1.7 Policy Context

The policy context surrounding sport has been extensively described in the previous reports in this research series, with specific reference to public health (Fahey *et al.*, 2004); volunteering and social capital (Delaney and Fahey, 2005); sport in schools (Fahey *et al.*, 2005) and social disadvantage (Lunn, 2007a). Because of the wide scope of the present investigation, which covers both sport played as an adult and as a child, much of this previous analysis is relevant to the results to be presented.

The essential structure of sports policy has remained unchanged since the establishment of the Irish Sports Council (hereafter 'the Council') in 1999, although the overall amount of public money devoted to sport has risen considerably. The large majority of this budget, which amounts to €311 million in 2008 (Department of Finance, 2008), is administered by the Department of Arts, Sport and Tourism (DAST). Table 1.1 provides a breakdown of anticipated expenditure in 2008.

Table 1.1: Planned Public Expenditure on Sport for 2008

	2008 Pre-budget Estimate (€ million)
Sports Capital Programme	56.0
Local Authority Swimming Pools Programme	20.0
Irish Sports Council	57.3
Sports Campus Ireland	6.7
Lansdowne Road Stadium	93.0
Horse and Greyhound Racing Fund	76.6
Grants to support sport in disadvantaged areas	1.5
Total	311.1

The current stated goal of DAST is:

> *To formulate and oversee the implementation of policies for the promotion and development of sport and to encourage increased participation in sport and recreation, particularly by disadvantaged communities.*[4]

Excluding the Horse and Greyhound Racing Fund and the once-off project funding for Lansdowne Road and Sports Campus Ireland,[5] we are left with €135 million to provide support for playing sport among the wider public, or 43 per cent of the total budget. Although less than one per cent of overall public expenditure, this represents more than a three-fold increase (in nominal terms) in the funding of grassroots sport since the year 2000 – well in excess of the growth of public expenditure as a whole.

[4] http://www.dast.irlgov.ie/sport/organisation/default.html, November 2007.
[5] This major project is for the development of a National Sports Campus on a single site at Abbotstown in Dublin.

The Sports Capital Programme (SCP), which has been in operation since 1979, has seen a very substantial increase in funding over the past decade. The programme awards grants to sports clubs, community groups and some other local organisations (but not schools and colleges) to invest in assets – pitches, halls, changing rooms etc. The effectiveness of the SCP in raising participation in sport rests on the assumption that improved facilities will increase the numbers who play. As stated above, just 1 per cent of non-players cite lack of facilities as a reason for non-participation (Fahey *et al.*, 2004). International research on policies to increase participation in sport suggests that investment in human and social capital is likely to be more effective in enticing new players than investment in physical capital (see Lunn, 2007a, for an overview).

Nevertheless, even if evidence suggests that the impact of the SCP on participation is likely to be marginal, this policy undoubtedly improves the experience of playing sport for those who use the facilities it supports. How efficiently it does so must depend on which projects receive funding. An important question, therefore, is whether the SCP provides grants that are in keeping with the sports that people play. That is, do sports that attract more players receive greater support? Furthermore, because capital investment provides facilities that last for years or even decades, the effectiveness of the SCP will also depend on whether it supports sports that are growing in popularity. In other words, is the funding consistent with *trends* in playing sport? These two questions were recognised in the most recent expenditure review of the SCP (Department of Arts Sport and Tourism, undated). Examining grants for the period 1999-2002, the review found that Gaelic games received 33 per cent of all funding under the programme. GAA clubs also had the highest success rate for applications at 52 per cent. The next highest funding shares were for community/mixed-use facilities (27 per cent) and then soccer (19 per cent). No other sport received more than 5.5 per cent of the funding. This pattern appears to have changed somewhat since the expenditure review. DAST lists 935 grants awarded in 2007 amounting to €85 million. GAA clubs account for €32 million of this total, or 37 per cent. Soccer clubs were awarded 12 per cent and rugby clubs 8 per cent.[6] (Note that swimming pools are supported through the separate capital programme listed in Table 1.1. In 2007, this fund amounted to €18 million, or a little more than half the funding received by GAA clubs.)

Observing the strong pattern in the distribution of funding, the expenditure review states that:

> *There is an urgent need for basic up to date information on participation rates in the various sports as well as trends indicating potential areas of growth to help adopt a more strategic approach in targeting specific needs among sports at all levels.* (p.39)

[6] It is difficult to derive a total for mixed-use facilities without access to the individual grant applications, because it is not clear which sports ultimately benefit from bids organised by community groups. Also, the total of €85 million for 2007 appears high relative to the SCP budget. This reflects a time lag in the processing and awarding of grants, such that the figure may include grants accounted for in previous years spending plans.

From a combination of the SSPE (2003) the QNHS (2006), we have a good idea of the relative participation rates for different sports, albeit with a discrepancy over the popularity of aerobics/keep-fit. As regards trends in the rates of participation, there is currently little or no information. But the transformation of the SSPE data to create individual sporting histories presents an opportunity to relate current levels of participation to past trends and hence to address the need identified by the expenditure review. However, the analysis is limited by the sample-size of the SSPE, such that it is only possible accurately to discern such levels and trends for the most popular sports.

Two other policy developments are noteworthy in this context. First, there is an ongoing commitment by government to develop a Sports Facility Strategy at a national level. This includes a national audit of local sports facilities. Second, the Council has commissioned the Irish Sports Monitor, the largest ever survey of sports participation in Ireland, which entered the field in 2007. With a sample-size of approximately 9,000 per year, this survey will provide better data on participation levels for individual sports than has existed previously. First findings are due to be published in mid-2008.

The remaining substantial allocation of public funds is administered by the Council. The use of this budget has been described in some detail in Fahey *et al.* (2004) and Lunn (2007a). The Council's spending is divided fairly evenly between support for grassroots participation, such as through Local Sports Partnerships, the Youth Field Sports initiative, the Women in Sport initiative and the Older People in Sport initiative, and support for elite sportspeople. A substantial proportion of the budget is further disseminated to the National Governing Bodies (NGBs), each of which also divides its funding between grassroots and high performance sport. It is therefore difficult to give a precise figure for the proportion of the budget that is devoted to programmes specifically designed to increase participation in sport, but a rough estimate based on 2006 figures would be below half of the Council's total budget. In that year, the Council adopted an explicit target of increasing the level of participation in sport by 3 per cent over three years (2006-2009).

1.8 Report Structure

The SSPE data have been subject to very extensive descriptive analyses at this stage (Fahey *et al.* 2004; Fahey *et al.* 2005; Lunn, 2007a), which provide breakdowns of participation in all its forms (playing, volunteering, club membership, attendance) by socio-economic group, gender, age and so on. In addition, Lunn (2007b) offers an accessible short summary of these previous reports. Hence, this basic descriptive analysis is not repeated here, and the reader is refered to these earlier publications.

The rest of this report is structured as follows. Chapter 2 examines the pattern of participation in sport over the life course and how it is changing in more recent generations. Chapter 3 looks at which types of sport and which specific sports are driving these trends in participation. Chapter 4 looks at the large difference in participation by gender and how it develops during the life course. Chapter 5 performs the equivalent analysis by socio-economic group. Chapter 6 analyses the contirbution to health of sport played throughout the life course. Chapter 7 concludes and describes the policy implications of the findings.

2. SPORT ACROSS THE GENERATIONS

2.1 Introduction

This chapter provides an initial description of the distinct pattern of playing sport across people's lifetimes, and how that pattern has changed between recent cohorts of Irish children and adults. It assesses how likely people are to play sport at different ages, what types of sports people are most likely to play, and how the pattern is changing with successive generations.

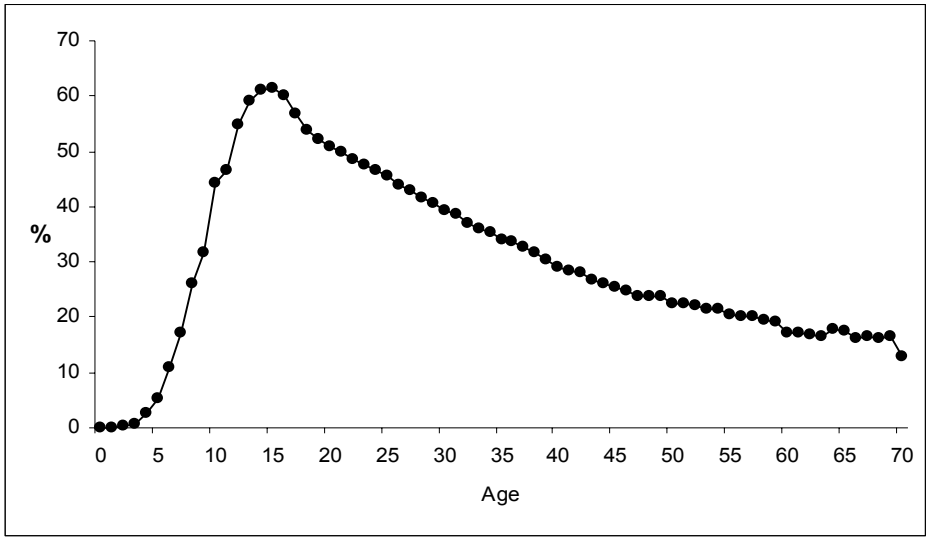
2.2 The Sport Hill

The transformation of the data from the 2003 *Survey of Sport and Physical Exercise* (SSPE) into individual sporting histories makes it possible to describe people's experience of regular sport for each year of their lifetimes. We can, therefore, examine the likelihood that people play sport at each age and see what type of sport they are most likely to play.

The pattern of playing sport across the life course is straightforwardly depicted using what we have termed the 'sport hill', which is shown in Figure 2.1. The graph shows the likelihood that people play regular sport at each age. It is important to understand that this graph does *not* describe the proportion of people who are currently playing regular sport by age (c.f. Fahey *et al.*, 2004). After all, there are no people in the sample who are currently under 18 years of age. Instead, the sport hill is constructed by combining all of the individual sporting histories across the whole sample. For example, the high-point of the hill is at age 15 years. It shows that 61 per cent of the sample were playing regular sport when they were 15 years of age. Indeed, for all the years up to and including 18 years, the proportion who were playing sport at that age is calculated from the whole sample, but after the age of 18 years the sample-size begins to fall. This is because some people in the sample are yet to reach the age concerned. The percentage given in the graph, therefore, refers to the proportion of those people in the sample who have reached a given age who were playing regular sport at that age. For example, we have complete sporting histories for 1,521 people in the sample who were over the age of 40 years at the time of the survey. Of those, 443 were playing regular sport at age 40 years, giving us a figure of 29 per cent.[7] In short, then, the sport hill can be thought of as the likelihood that an individual will play regular sport at each age.

[7] This technique for analysing data on playing sport by age is adapted from a standard and accepted method of 'survival analysis', which is used to estimate survival rates by age from disease etc. (Kaplan and Meier, 1956).

Figure 2.1: The 'Sport Hill' – the Proportion of the Sample Who Reached a Given Age Who Were Playing Regular Sport at that Age



The sport hill shows that there is a clear pattern to participation in sport across the life cycle. There is a rapid take-up of sport among young children until, by age 13 years, a majority of them are playing some kind of regular sport. There are certain key 'transition points' in early life. One occurs at age 11 years, where there is the kink in the hill which seems to indicate that people are unlikely to take up sport in the last year of primary school, but are more likely to do so on arrival at second-level school. The proportion playing regularly then peaks at 15 years before falling quite sharply during the late teenage years. There is another transition point at age 18 years, where another kink in the hill coincides with an age when many people would experience a change in their lives; perhaps leaving school, joining the workforce, or going to college. Thereafter, there is a slow but steady decline in the likelihood of playing sport as people get older. Finally, there is some curvature associated with this decline, as the hill flattens somewhat around the age of 50 years. This may well reflect a period when, firstly, adults rediscover some free time after children have grown up and, second, for some, retirement or reduced working hours become possible, although it may also be due to the type of sports played at that age (see below).

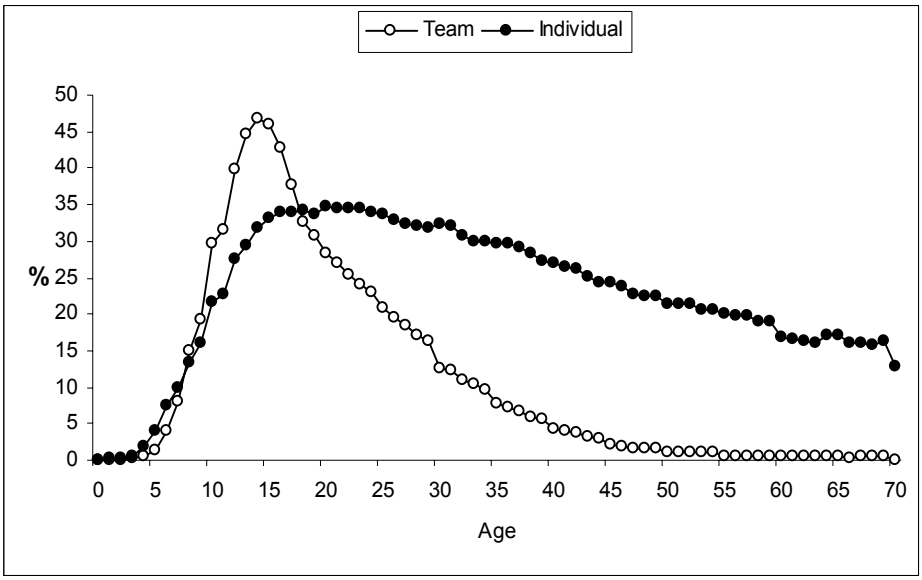
2.3 Team Versus Individual Sports

The sport hill only shows the likelihood of playing any regular sport across the life cycle; it does not say anything about which sports are involved at each age. For each individual it could be any of more than 60 possible sports. Which particular sports are most popular will be addressed in the next chapter, but there is a distinct pattern to be observed at a broader level. Fahey *et al.* (2004) observed that when people are young they tend to play team sports (GAA, soccer, basketball etc.), but that as they get older they are more likely to participate in individual sports (swimming, golf, tennis etc.).[8] The sport hill allows us to gain a more complete

[8] The distinction is obviously not perfect, as almost all sports *can* be played as team games and people can practice or play scaled-down versions of team games at an individual level. We define a 'team' sport as one that is *in essence* a team game.

understanding of this observation. Figure 2.2 provides separate sport hills for team and individual sports, such that each line gives the likelihood of regularly playing a team or individual sport respectively, at each age.

Figure 2.2: Sport Hills for Team and Individual Sports



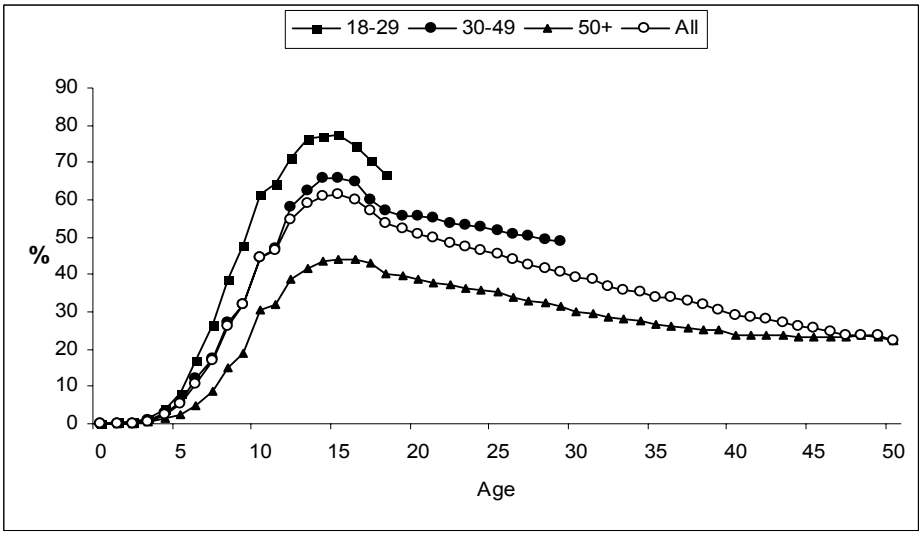
The difference in the shapes of the two hills is striking. Both team and individual sports are played by children, although from age 10 years onwards a higher proportion are playing team sports, which undergo a strong surge during the second-level school years. This advantage is short lived, however. Many people rapidly drop out of the team sports they play as teenagers, so that by age 18 years more people are playing individual sports than team sports. Meanwhile, participation in individual sports continues to rise and peaks in the early twenties, only declining very gradually thereafter. Participation in team sports falls away fairly rapidly during adulthood. There could be a number of reasons for this, including the level of fitness team sports require, the willingness of older adults to engage in contact sports, the requirement of time committment to a team, or simply the choices people make as autonomous adults, when what they do is more likely to reflect their own preferences than those dictated by parents, schools or traditions. The data cannot determine which of these explanations, or which combination of them, is right. But the pattern is clear and has an important implication. The large majority of sport played by adults is not the traditional team sports that perhaps most easily spring to mind, but consists of individual sports, such as swimming, golf, jogging, personal exercise activities, racquet sports, and so on. Indeed, from the two hills in Figure 2.2, it is possible to calculate that 69 per cent of all sport is individual sport, but that this figure rises to 76 per cent of all adult sport (i.e. aged 18 years and over). Indeed, the fall off in team sport in young adulthood is so severe that for people over the age of 30 years, fully 90 per cent of all sport consists of individual sport.

2.4 Is Participation in Sport Rising or Falling?

The construction of individual sporting histories allows us to compare the experiences of different generations, at least up until the age they were at the time of the survey in 2003. Thus, it is possible to assess whether the amount of sport people play is increasing or decreasing, and to see whether the pattern of playing sport as people get older is changing. Did the most recent generation of Irish children play more or less sport than their parents' generation? If so, have they continued to do so as adults?

To answer these questions, Figure 2.3 plots the sport hill separately for three different age cohorts: 18-29, 30-49 and 50+ years. Of course, for the younger cohorts the hill has to be truncated, because we only have data up to the age people were in 2003. Nevertheless, the picture could not be clearer. There has been a very significant increase in participation in more recent generations. According to the data, consistently throughout childhood, getting on for twice as many of the current generation of young Irish adults were playing regular sport, compared with what can loosely be thought of as their parents' generation and older. The middle, 30-49 years cohort, lies somewhere in between. Consider again the peak of the hill, at age 15 years. Among those who were aged 18-29 years in 2003, some 78 per cent were playing regular sport at age 15 years, compared with 66 per cent of those aged 30-49 years, and 44 per cent of those aged 50 years or over. This is a dramatic increase. Multivariate analysis in Appendix A confirms that this increase is significant even having controlled for the higher educational attainment and incomes enjoyed by more recent cohorts.

Figure 2.3: Sport Hills by Age Cohort



As discussed in Chapter 1, it has to be borne in mind that the analysis is based on recall data. Is it therefore possible that older people simply cannot remember some of the sport they played? This alternative explanation of the pattern in Figure 2.3 is highly unlikely. The overwhelming majority of older people in the sample found it as easy to provide starting and stopping dates for playing each sport as their younger counterparts. But, perhaps more convincing, there is no indication of 'noise' in the data for the older cohorts, relative to the younger one, as one would expect if the data were subject to recall error. The shapes of the separate hills very closely mirror one another, right down to the kinks at ages 11 and 18 years. Furthermore,

as we will see, there are strong and consistent patterns associated with particular sports that underlie the different hills. It is hard to construct an argument that such consistent patterns reflect some systematic errors of human memory. A much more likely explanation of the findings is that younger generations are playing far more sport, as the balance of historical factors outlined in Chapter 1 suggested.

In addition to the strong rise in participation across cohorts, there is a second important point for policymakers that emerges from Figure 2.3. It is a standard research finding that participation in sport declines with age, which indeed it does. But Figure 2.3 shows that the impact of getting older is exaggerated by the usual comparison of current participation rates by age. To a considerable extent, older people do not play less sport because they are older, but because they belong to a different generation – it is not an 'age effect' but a 'cohort effect'. Thus, for example, looking at the graph, it is very unlikely that the amount of sport played at age 40 years by the oldest (50+ years) cohort will be a good guide to the amount of sport the two younger cohorts will play at age 40 years. They have already played more sport throughout every part of their lives thus far and the chances are that they will continue to do so. This is a key point for policymakers. If younger cohorts continue to participate in sport at a higher rate than their predecessors, then the amount of adult sport, especially older adult sport, is set to increase strongly over the coming decades. Policy should, therefore, increase its focus on the sports these adults are likely to play.

2.5 What Type of Sport is Driving the Increase?

Successive generations are playing more sport, but is the increase in participation an increase across the board, or is it stronger among particular kinds of sport? Figure 2.4 provides separate sport hills by cohort for team and individual sports. The story revealed by this graph can be told in three parts: primary school age, second-level school age and adulthood.

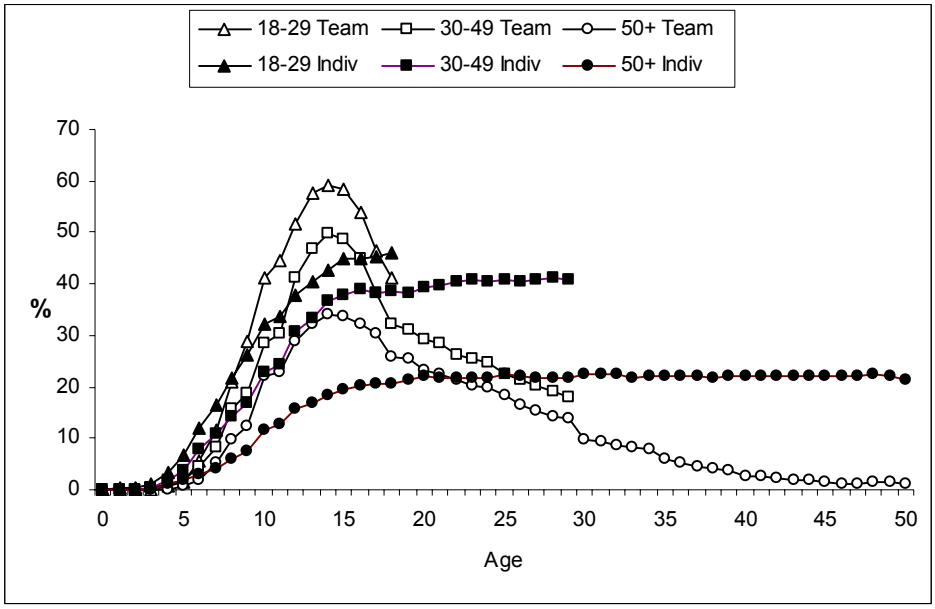
At primary school age, the increase between cohorts is greater for individual sports than for team sports – the curves with the solid data-points fan out more quickly. The most popular individual sports, which are increasingly participated in by young children, are: swimming, athletics, cycling, racquet sports, martial arts and horse-riding. But one of the notable aspects of the data is the range of individual sports played in the youngest cohort. For the sample as a whole, more than 20 different individual sports registered as having been played regularly by the age of 10 years.

At second-level school age, the curves for team sports fan out too, such that the differences in levels of participation between cohorts are similar for both team and individual sports. However, this similarity does not extend into adulthood, where the curves for team sports converge again, while those for individual sports retain much greater separation. This more consistent influence of cohort on individual sports is confirmed in the multivariate analysis presented in Appendix A.

Thus, the increase in participation in sport across generations has occurred in both team and individual sports, but the increase for team sports only matches that for individual sports during the years of second-level school. The much greater proportion of the increase in participation for adult sport is the result of more people playing individual sports. That

said, this pattern is more striking with respect to the comparison between the older two cohorts.

Figure 2.4: Sport Hills for Team and Individual Sports by Cohort



A final aspect of Figure 2.4 to note is the shape of the hills for individual sports. Once split into cohorts, the hills up to at least the age of 50 years are completely flat. That is, there appears to be no decline in participation in individual sports with age for the majority of adulthood. The moderate decline observable in Figure 2.2 above is therefore the result of a cohort effect – those born more recently play more individual sport. But there is no tendency, at all, for participation in individual sport to decline with age itself. This strongly implies that where people take up individual sports it is much more likely to have a lasting impact far into adulthood. It may also explain the flattening of the sport hill at around age 50 years referred to above. Once people are playing individual sports, participation levels hold up more strongly.

2.6 Conclusions

The likelihood that people participate in sport follows a definite pattern across the life course. It rises to a peak in the mid-teenage years, when the clear majority of people play some kind of sport, and falls sharply in the late teens. At age 18 years, participation stabilises somewhat and then falls slowly and steadily throughout adulthood. Underlying this sporting life course are two distinctive and separate patterns associated with team and individual sports respectively. Participation in team sports is the main cause of the peak in teenage years, but falls away sharply during early adulthood. Participation in individual sports continues to grow until the early twenties and only falls away very gradually thereafter. The result of these separate patterns is that team sports account for less than one-quarter of all adult sport.

Participation in sport is increasing because successive generations are playing more and more sport. The difference between the participation level of the current generation of young adults and their parents' generation is of the order of one-and-a-half to two-fold – a dramatic increase in the

amount of sport played. This applies to the sport they played as children and the amount they play as adults. The modern generation is simply playing much more sport. This is an arresting result in a context where it is repeatedly suggested that levels of physical activity are falling. Of course, it remains possible, in spite of the data presented here, that levels of physical activity are indeed falling. But, if so, then there must be a very significant decrease in forms of physical activity other than sport and exercise – at work, for transport, in the home, and so on.

The increased participation of more recent cohorts is the main reason why there is such a strong relationship between age and participation, and it should change our understanding of the impact of getting older on the chances that people will play sport. It is not the case that each individual becomes much less likely to play as they continue to get older. Rather, older people currently play far less because they belong to a generation that always played far less. According to the data, the only fall-off in adult sport as individuals age is caused by the relatively rapid drop-out from team sports in early adulthood. Any given adult is as likely to play some kind of individual sport at age 50 years as they are at age 20 years.

These patterns have significant policy implications. When young adults in the current generation become older adults, they are likely to play much more sport than the older adults in the current generation. This is obviously a trend that policy can and should support.

3. WINNERS AND LOSERS

3.1 Introduction

This chapter changes the focus from players to sports. Comparing across the whole sample of individual sporting histories permits us effectively to reconstruct the recent history of Irish participation in sport. Thus, it is possible to analyse changes in the popularity of sports across a period of about 40 years. Has the dramatic increase in playing sport been uniform across the range of sports during this period, or has the growth been specific to certain sports? If so, which sports are growing most in popularity? The trends in Irish sport over the past four or so decades turn out to be surprisingly strong.

3.2 Yardsticks

To make such comparisons between sports requires us to select an appropriate measure for the total amount of sport played and the amount accounted for by different specific sports. The primary measure that we adopt is the number of 'sport years' played during a particular period of life. This measure equates to the total number of years of regularly playing, counted separately for each sport, over the duration of the life-stage in question. For example, when looking at the under-18 years period, suppose we have an individual who started playing GAA football from age 8 and stopped when they were 14 years, and also played regular soccer from 12 years right through to adulthood. This person is counted as having played 12 'sport years' as an under-18 (6 years GAA football and 6 years soccer). Thus, where a person is playing two regular sports, each year counts two and so on.

For the sport years analysis, we concentrate on two periods of life, under-18 and age 19-29 years, described as 'children' and 'young adults' respectively. By calculating the number of sport years accumulated by each individual during these periods of life, we compute the average number of sport years per person and compare this figure across different cohorts. Then, we calculate the proportion of total sport years that is accounted for by each sport, and compare this across cohorts. Put simply, this gives us a measure of how much of the total amount of sport played by children or young adults is down to each different sport, and we can see how this has varied for successive generations.

We focus on three cohorts defined by age in 2003: 18-28, 30-44 and 45-59 years. The analysis is not conducted for the generation above age 60 years because of the danger of sample bias due to death and emigration (see Chapter 1), which could have a differential effect on different sports. The aim is to compare the total amount and the composition of sports played by each of these three cohorts when they were children, and then to

repeat the exercise for the sport played by the two older cohorts when they were young adults.

This analysis, comparing the sport years accumulated by different cohorts, gives a clear idea of the trends in participation in Irish sport over about four decades. Roughly speaking, the results below reveal how the composition of sporting activity has changed for children between the 1960s and the turn of the century, and similarly for adults between the 1970s and the turn of the century. This is, therefore, a *long-term* comparison. It compares sporting eras – what has changed since the days when televisions were black-and-white and miniskirts were fashionable for the first time.

Because the measure we use, sport years, is a very complete description of the activity of every individual over at least a twelve year time span, it captures the maximum amount of variation in the data and reveals many large and highly statistically significant effects. However, we are also interested in more recent changes, such as how the composition of sporting activity has changed between the early 1990s and 2003. Thus, following the two long-term comparisons of cohorts, one for children's sport and one for young adult's sport, we employ a different technique to look at more recent *short-term* changes. This third analysis is more simple. It uses the individual sporting histories to gradually wind back the clock, just one year at a time, from 2003. For each year back to 1984, we calculate the proportion of adults aged between 20 and 39 in that year who were playing each sport. Because the data points are compiled for just single years, rather than averaged over a time span, as for the long-term analysis using sport years, the margin of error is much greater and fewer of the trends are statistically significant. Nevertheless, we do uncover significant trends, including some that are very striking, such that this short-term analysis adds considerably to the two long-term ones.

3.3 Trends in Children's Sport

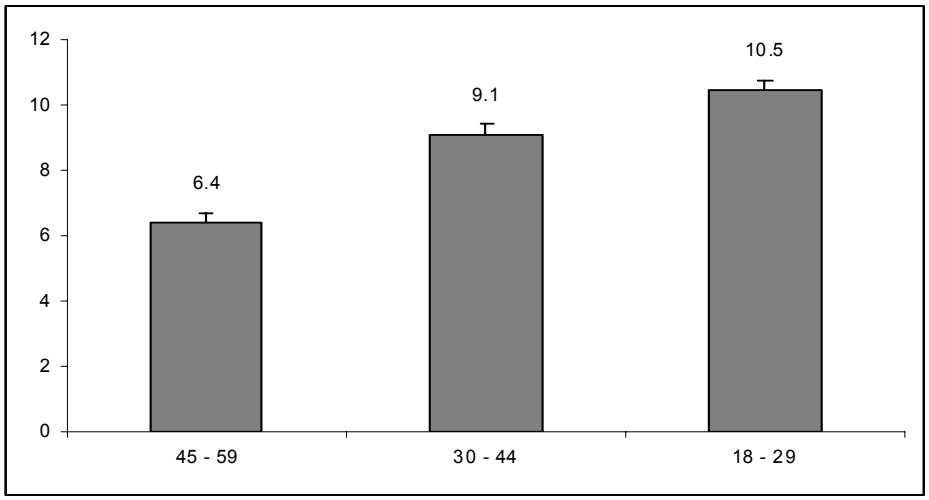
It is helpful to start by thinking of each of the three cohorts and the periods of their lives under scrutiny in terms of dates. For example, when considering the sport that the oldest (45-59 years) cohort played as children, someone in the middle of that cohort was aged 52 in 2003, and so was aged 15 in the year 1966. A person in the middle of the second oldest cohort (30-44 years) was aged 15 years in 1981, while an individual in the middle of the youngest (18-29 years) cohort was 15 years in 1995. Thus, the charts in this section compare children's sport between, roughly-speaking, the mid-1960s, the start of the 1980s, and the mid-1990s.

Figure 3.1 shows the mean number of sport years played by members of each cohort before the age of 18. Error bars represent the standard error.[9] As would be expected given the analysis of the previous chapter, there has been a highly significant increase in the amount of sport being played by children, from an average of 6.4 sport years for the oldest cohort up to an

[9] The 'standard error' quantifies by how much, on average, the data-point is likely to deviate from the 'true' value. When comparing two data-points, error bars based on the standard error allow us to apply a useful rules of thumb. Where error bars for data-points overlap, the difference between them is unlikely to be statistically significant, but where there is a large gap between data-points, even taking into account the error bars, it is very likely that the difference is statistically significant.

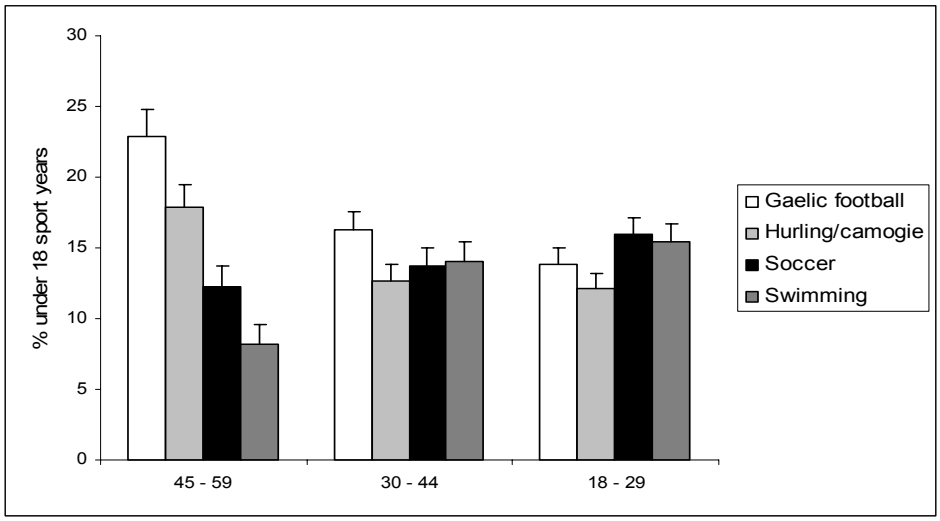
average of 10.5 sport years for the most recent one. This is, in fact, a more refined analysis than the comparison of the sport hill by cohort depicted in the previous chapter, because the sport hill only equates to the proportion of people playing any sport at each age, whereas the present comparison accounts for people playing more than one sport in a given year. More recent generations may be more likely to play sport and more likely to play more sports.

Figure 3.1: Mean Sport Years Played as Children (Under 18 years) by Cohort



The comparison in Figure 3.1 represents a major change in the level of sporting activity. Interestingly, the larger part of the increase in participation in children's sport over this four-decade period arises between the two older cohorts; roughly between the 1960s and the beginning of the 1980s. Still, the central message is that when the current generation of young adults were children, they played two-thirds again more sport than their parents played as children.

Figure 3.2: Comparison of Four Most Popular Children's Sports by Cohort



There are four particular sports that dominate the under-18 years scene, making up well over half of all the children's sport played by all three cohorts. These are: Gaelic football, hurling/camogie, soccer and swimming. Figure 3.2 compares the proportion of sport years accounted

for by each of these four sports during the childhood of each of the cohorts. The degree of change is eye-catching. For members of the oldest cohort, combining football and hurling/camogie, Gaelic games accounted for over 40 per cent of all the sport they played as children, roughly twice the combined strength of soccer and swimming. Gaelic football was comfortably the most popular of all sports and hurling/camogie the second most popular. But for the 18-29 years cohort, a generation or so later, both Gaelic games had been overtaken by swimming and soccer. In the space of one generation, the near dominance of children's sport by Gaelic games disappeared.

Again, it is noteworthy in view of the potential historical factors identified in Chapter 1, that the change was greatest between the two older cohorts. Thus, the trumping of Gaelic games by soccer and swimming was no 'Celtic Tiger' phenomenon, since it was at its most severe at least a decade before that economic beast was born.

It must be borne in mind that the apparent decline of Gaelic games in Figure 3.2 may be no such thing, because the comparison presented is *relative*. It only shows that Gaelic football and hurling dropped away in terms of their share of all sporting activity. Consequently, the pattern in the chart could be produced either by children participating less in Gaelic games, or by children playing more of other sports. Recall that across these cohorts the total amount of sport played increased strongly, so it could be that while other sports benefited from this period of sporting expansion, Gaelic games simply carried on as before.

Figure 3.3: Increases in Participation in the Twelve Most Popular Children's Sports Between the 45-54 and 18-29 Years Cohorts

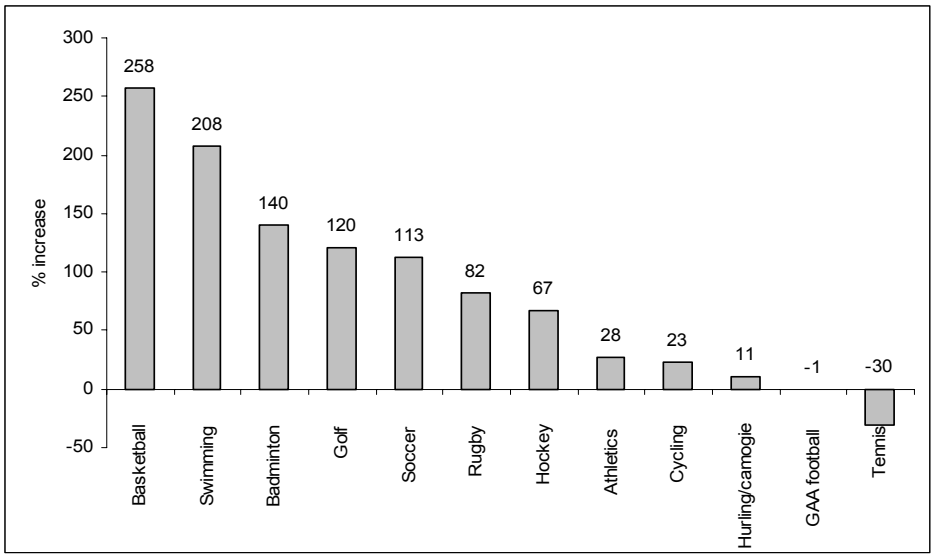


Figure 3.3 suggests that this interpretation is largely correct. The chart shows degree of growth in participation between the oldest (45-54 years) and youngest (18-29 years) cohorts in the total number of sport years devoted to each sport, with the analysis expanded to cover the twelve most popular children's sports over the whole period. In keeping with the general rise in participation, almost all sports experienced growth over the period. However, looking first at the comparison of Gaelic games with

swimming and soccer, the swimming grew by over 200 per cent (i.e. over three-fold) between these two generations, while soccer grew by over 100 per cent. These strong performances contrast greatly with the very modest growth in hurling/camogie and no growth at all in Gaelic football (where the very small recorded decline is not statistically significant, so it is better to think of it simply as displaying no growth).

Looking now across the entire group of sports, only tennis experienced a statistically significant decline in the number of sport years played. The more general pattern across the sports in Figure 3.3, in particular the very strong performance of basketball and badminton, in addition to swimming, reveals that the three activities to experience the strongest growth are sports that can be and usually are played indoors. For clarity, when dealing with so many sports, the middle cohort is left out in Figure 3.3, but for most of these sports the greater change in participation levels occurred between the older two cohorts. Again, the particularly strong growth of indoor sports is not the product of the Celtic Tiger. Recall from Chapter 1, instead, the very significant expansion in education that began in the 1960s, both in terms of the numbers staying on longer in second-level school and greater investment in schools. A more likely explanation for the growth in indoor sports is the combination of schools gaining access to (or building) indoor facilities, children remaining for longer in second-level education, and perhaps local clubs also benefiting from access to the same indoor sports facilities.

Still, this cannot be the whole explanation for the observed pattern, because it is also very noticeable that, in contrast to Gaelic games, there are outdoor sports that grew dramatically over the period in question, notably the non-GAA team sports and golf. Soccer led the pack in this regard, rising to be the most popular children's sport, but rugby and hockey also experienced strong growth. Given that these sports have similar requirements for pitches and equipment, it is difficult to devise an explanation for the disparity based on the type of facilities involved. Perhaps the period from the 1960s onwards saw a more relaxed attitude towards what some people referred to as "foreign sports", resulting in many more children trying alternative team sports. A second factor, which may well have interacted with such attitudes, at least with respect to the strongest growing outdoor team sports, soccer and rugby, is that the period also saw a consistent expansion of sport on television.

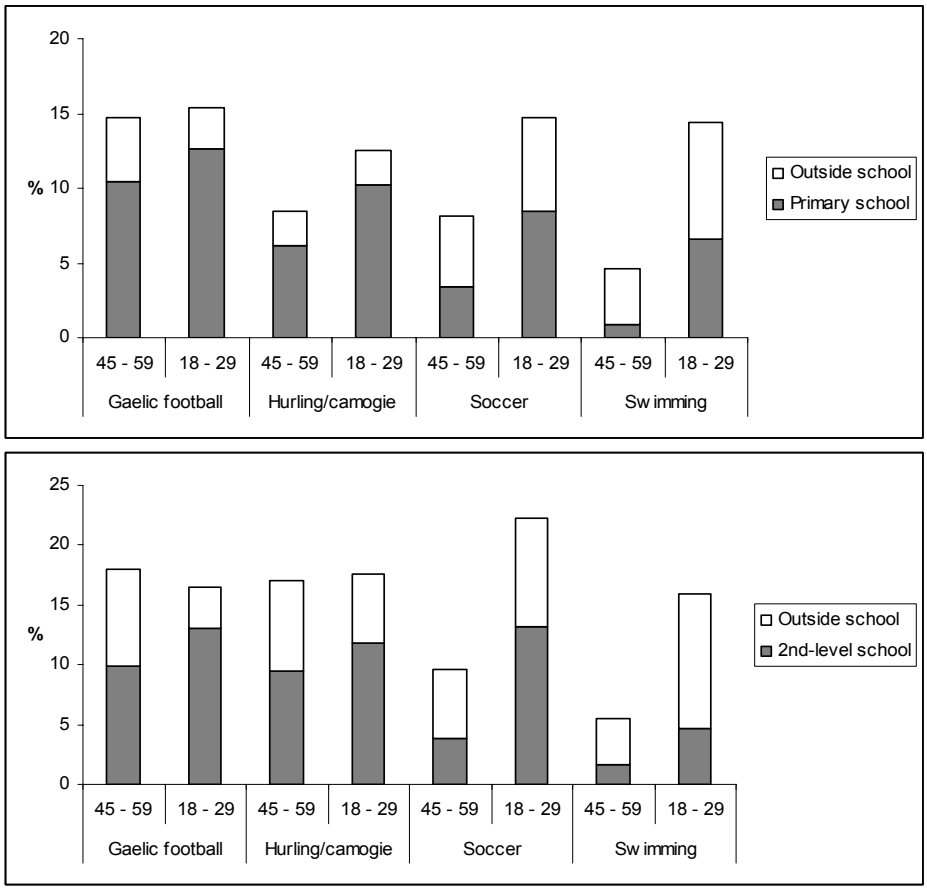
3.4 The Role of Schools

When considering any strong trends among children it is always tempting to look first to the policies and practices of schools. Are the striking changes in the pattern of participation across sports the result of changes in the sports offered at school? The recall data allows us to test this hypothesis, since the survey asked whether the respondents had played each of their regular sports at school.

Figure 3.4 breaks down the proportions of children who played each of the four most popular sports by whether they played the sport at primary school and at second-level school. Each bar gives the proportion of children who played the sport concerned up to the age of 11 years (top panel) and for ages 12-18 years (bottom panel). The grey section of the bar represents the proportion of children who played the sport at school. Thus, we can see the increase or decrease in participation between the oldest and

youngest cohorts, for each sport, and also how much of the change was connected with playing at school.

Figure 3.4: Participation Rates for Four Most Popular Children's Sports, at School and Outside School, for Primary and Second-Level Age Children



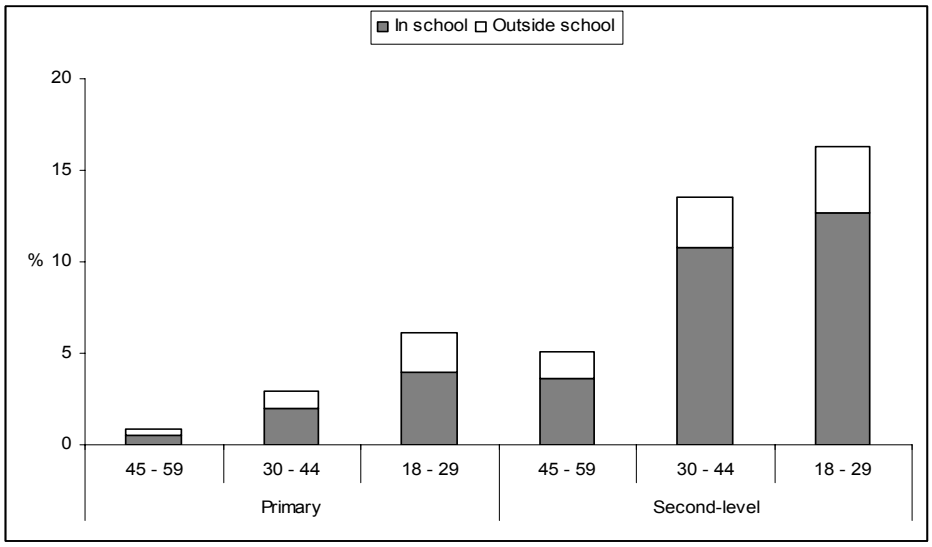
Looking first at Gaelic football, between the two different cohorts, the proportion playing this sport increased slightly for children under 11 years and decreased somewhat for children aged 12-18 years. But comparing the grey parts of the bars, it is clear that at both primary and second level, a higher proportion of children played Gaelic football at school. Thus, we can conclude that the relative decline of this sport relative to others appears largely to have been due to fewer children playing Gaelic football outside of school. A similar pattern applies to hurling/camogie, where the proportion who played outside school remained fairly static for under 11s and declined for 12-18 year-olds, while the proportion of children playing at school increased appreciably. This pattern is in marked contrast to that for soccer and swimming, for both of which the proportion of children playing in school and outside school increased appreciably between the cohorts.

Thus, schools are not the primary force behind the changes in the most popular children's sport over the past four decades, though to some degree sport in school reflects those changes. In recent years, substantially more children have participated in soccer and swimming at school, but Gaelic games were still the biggest school sports, especially at primary school, for the cohort of people who are currently young adults. The bigger difference

seems to have occurred in playing sport outside school, where many more children in the most recent cohort got involved in soccer and swimming, while the number playing Gaelic games fell. In short, schools do not appear to be substantially responsible for the changes in the most popular sports Irish children play.

However, as identified in the previous section, two other indoor sports in addition to swimming, namely badminton and basketball, experienced very high growth in children's participation. The sample of badminton players is too low to perform a break down of playing inside and outside school, but the sample of basketball players is sufficiently high. A more detailed analysis for this single sport is given in Figure 3.5. The sharp growth in basketball is in keeping with the hypothesis above regarding the expansion of education following the 1960s. The majority of basketball is played within schools and the majority of the growth in the sport occurred in schools also, especially in second-level schools and mainly between the older two cohorts. This constitutes evidence that schools, while not being responsible for the large swings in the popularity of the four most common children's sports, may nonetheless have contributed strongly to the growth in indoor sports requiring the use of sports halls.

Figure 3.5: Participation Rates for Basketball, at School and Outside School, for Primary and Second-Level Age Children, by Cohort



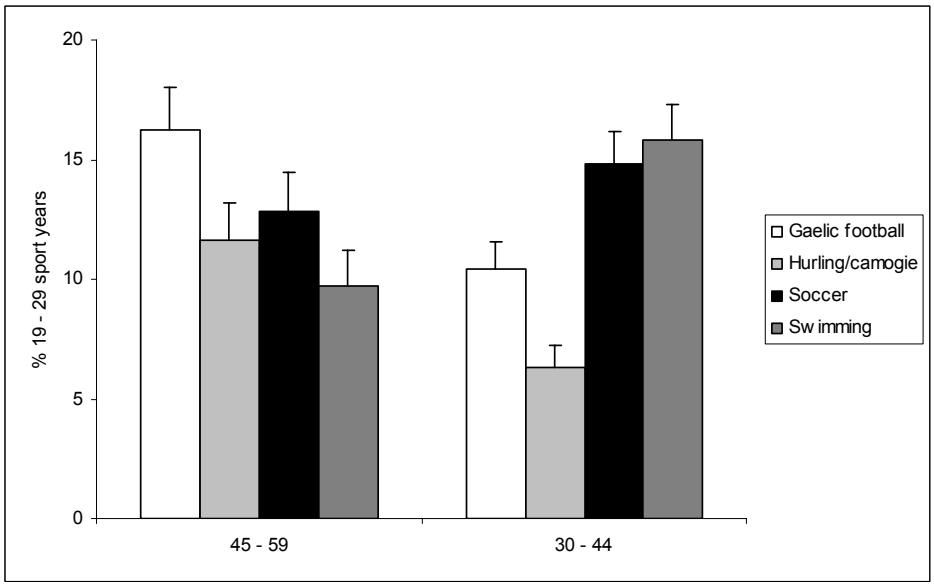
Overall, it is perhaps not the particular trends identified within children's sport that are most striking, but rather the strength of those trends. In just a single generation there has been a really pronounced change in the sports that children play, with Gaelic games experiencing a sharp relative decline in popularity, while other team sports and, in particular, indoor sports, have thrived.

3.5 Trends in Young Adult Sport

Have the changes in children's sport fed through to the behaviour of young adults? To answer this question we first apply exactly the same analytical technique to the playing of sport by adults aged 19-29 years, namely comparing the number of sport years accounted for by each individual sport between the ages concerned. In this case, it is of course only possible to compare the 30-44 and 45-59 years cohorts, as the younger cohort has not yet completed the period of their lives in question.

The mean number of sport years played by the 45-59 year cohort was 6.7, while the average for the 30-44 year cohort was 8.4 (both with a standard error of 0.35). Thus, the increase in participation in children's sport between these cohorts also fed through to an increase in the sport they played as adults. The four most popular sports for people of this age were again Gaelic football, hurling/camogie, soccer and swimming. Figure 3.6 compares for the two cohorts the proportion of total sport years, played between ages 19-29 years, devoted to each of these sports. Calculating the dates concerned, roughly speaking, the comparison is between what sports young adults played in and around the late 1970s, with what young adults played in the 1990s.

Figure 3.6: Increases in Participation in the Four Most Popular Sports for Young Adults (19-29 years) Between the 45-54 and 18-29 years Cohorts



The picture for young adults is even more arresting than that for children. Both Gaelic football and hurling/camogie experienced a severe decline in the proportion of total sport they accounted for, while soccer and particularly swimming climbed significantly in popularity. Note that the rate of change for young adults appears to be considerably faster than was the case for children's sport, since the difference between the two cohorts being compared in Figure 3.6 is roughly half a generation, rather than a full generation. It is, unfortunately, not possible to examine the less popular sports for adults aged 19-29 years in the same way as was done for children in Figure 3.3 above, since the sample-sizes of players are lower, the time period shorter, only two cohorts are involved, and adults play a broader variety of sports.

3.6 Recent Trends in Adult Sport

The previous sections looked at long-term trends using the level of participation in the 1960s or 1970s as the base level for children's and young adult's participation respectively. By summing sport years across a particular life-stage, the analysis aimed to use as much variation between different sports as the data allowed. However, summing across so many years of life has the disadvantage that comparisons are only possible over such long time-periods. To evaluate more recent trends, an alternative method is needed.

Instead of examining the number of sport years, it is possible to select an age range and then examine the composition of sports being played by this age group, stepping back in time one year at a time from 2003. This method of analysis is akin to asking what the picture would have looked like had the cross-sectional survey been carried out on the same sample of people one year previously, one year prior to that, and so on. As discussed in Chapter 1, there is a danger that the data from those in the sample aged over 60 years could be biased by death and migration, so there is a limit to the age range that can be covered by this analysis and, consequently, how far back the clock can reliably be wound. On the other hand, the larger the age range selected, the more accurate will be estimates of the popularity of individual sports, as the larger the sample. Balancing these two factors, the method we employ is to record the proportion of people aged 20-39 years who were playing sport for every year between 1984 and 2003. Thus, for the year 1984, the data tell us what those people in the sample aged 40-59 years in 2003 were doing twenty years previously; for 1994, it records what those aged 30-49 years in 2003 were doing ten years previously, and so on.

Figure 3.7: Trends in the Proportion of Adults Aged 20-39 Years Playing Different Sports (1984-2003)

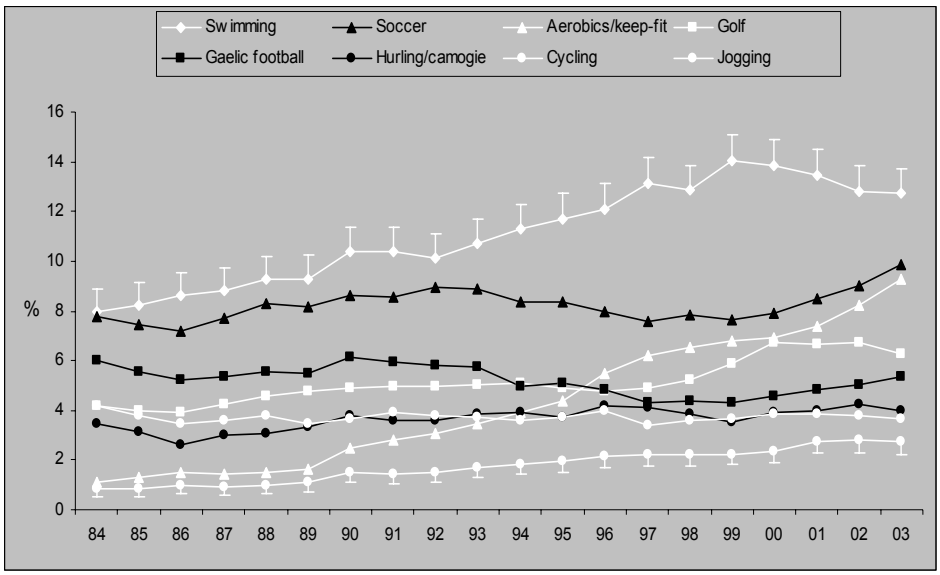
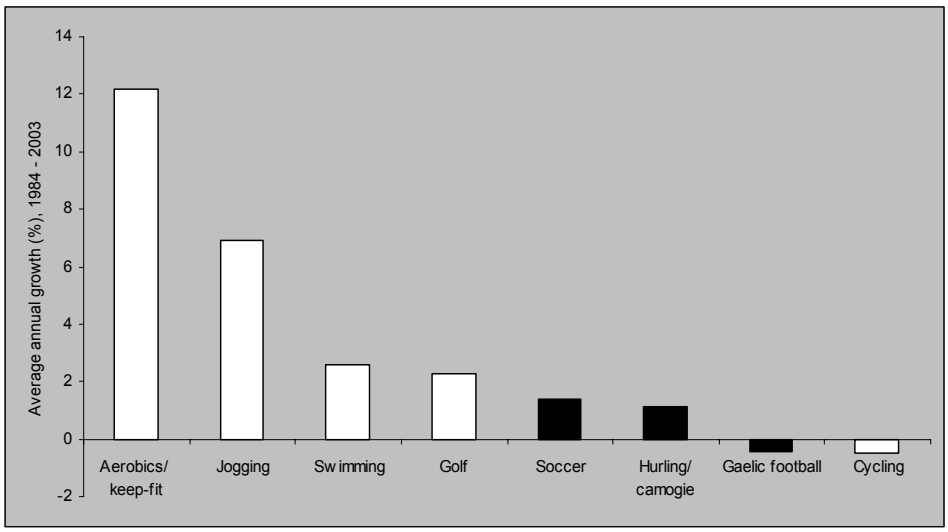


Figure 3.7 gives the basic results of this exercise for the eight most popular sports in 2003, charting the proportion of adults aged 20-39 years in each year that played each sport. The white lines are individual sports, the black ones team sports. The error bars on the top line (swimming) and those on the bottom line (jogging) represent standard errors.[10] Of the five individual sports, only cycling has not experienced a statistically significant rise in popularity over the past two decades. The high proportion of adults swimming regularly and the sharp increase in the popularity of swimming are telling, although the increase may have flattened off around the turn of the millennium. Meanwhile, aerobics/keep-fit and jogging have grown very strongly from a low base in 1984 (see below for detail). The shape of the curve for golf is particularly interesting, as the sport appears to have

[10] As can be seen from the chart, the standard errors are much lower on the smaller proportion. They have only been included for the top and bottom lines for clarity within the chart.

experienced something close to a step-jump in the late 1990s. Given the expense involved in playing golf, this sudden increase in popularity may well reflect the sharp rise in personal incomes during that time, coupled with the higher investment in golf courses that accompanied the period. (It is very likely that this sharp rise would appear even stronger if adults over the age of 40 years could have been included in the analysis). Of the three team sports, soccer has increased significantly in popularity, but the picture is less promising for Gaelic football and hurling/camogie. In the case of Gaelic football, the proportion of adults playing the sport may actually have declined – the drop is borderline statistically significant. As regards hurling/camogie, the marginal increase over the period also borders on statistical significance. Thus, this different method of analysing the data confirms that the relative decline of Gaelic games also applies to adults aged 20-39 years in more recent times.

Figure 3.8: Average Annual Growth Rates (1984-2003) for Participation in the Most Popular Eight Sports in 2003

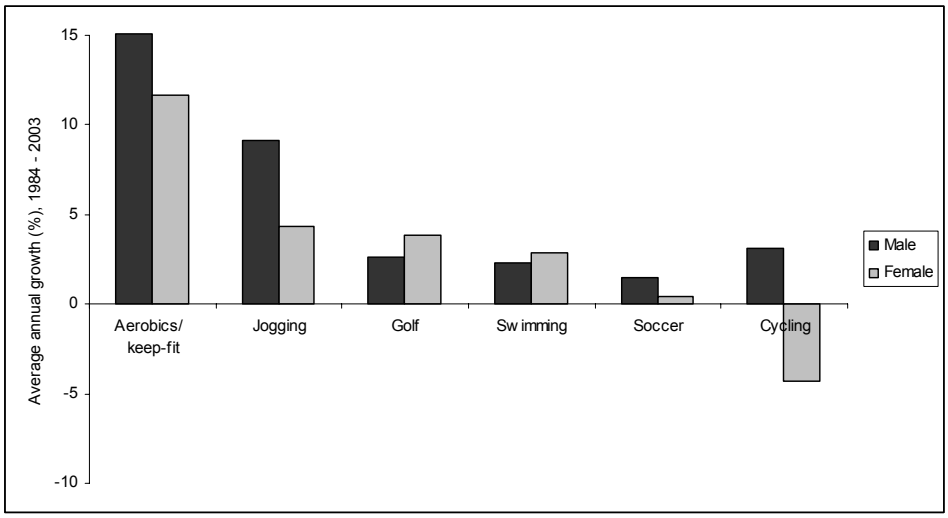


Another way to view the data is to transform it into average annual growth rates for the period 1984-2003. This is done in Figure 3.8 and reveals the true disparity between individual sports (white bars) and team sports (black bars). The growth rate in aerobics/keep-fit is remarkably steep, with the number of adults aged 20-39 years who participate increasing by more than 12 per cent a year. The overall picture provided by Figure 3.8 is that sports that could loosely be termed 'personal exercise' activities have taken off. In fact, so steep is the growth in aerobics/keep-fit, that it may explain the discrepancy highlighted in Chapter 1 between the SSPE and QNHS estimates of the popularity of sports. If this rate of growth continued after 2003 then it is genuinely possible that, in just the three years (2003-2006) between the two surveys, aerobics/keep-fit surpassed swimming and became the most popular activity. The first year's data from the *Irish Sports Monitor*, collected in 2007, should be able to confirm whether this is indeed the case.

One possible response to the data in Figure 3.8 is to hypothesise that gender might have played a large role in the growth of particular sports, especially perhaps aerobics/keep-fit. Figure 3.9 provides average annual growth rates in different sports separately by gender. Gaelic football and

hurling/camogie are not included because, out of the sample of 3,080 people, the number of adult females playing these sports is too low for reliable growth figures to be calculated. In fact, as the chart shows, the growth pattern across the sports is generally consistent for both genders, including in the aerobics/keep-fit category. It's worth noting at this point that the SSPE questionnaire did not provide respondents with a separate category for what is often referred to as "going to the gym" or "working out". Male respondents who regularly worked out could either select the 'aerobics/keep-fit' category or the 'weightlifting' category, but given that the latter sport showed no strong presence in the data, it seems likely that they were inclined to categorise their activity as 'aerobics/keep-fit', despite the strong gender associations of 'aerobics'.

Figure 3.9: Average Annual Growth Rates (1984-2003) for Participation in Six Popular Sports by Gender



There is one strong gender difference that stands out in Figure 3.9, which is the changes with respect to cycling. Women have become markedly less likely to cycle, while men's participation has risen quite strongly. The data do not offer a ready explanation for this, but one possibility is that it reflects different reactions to the dangers of cycling on the roads during a period when traffic has mushroomed.

The overall message is clear. For both genders, activities that are primarily associated with personal exercise rather than traditional competitive sport, such as going to the gym or a fitness class, jogging and swimming, have experienced dramatic growth among adults over the past twenty years, much faster growth than traditional team sports. Only golf has kept pace. It may well be the case that these changes reflect changed attitudes to the benefits of taking exercise, as discussed in Chapter 1.

3.7 Conclusions

The comparison of levels of participation in specific sports across recent decades reveals surprisingly strong patterns and trends. The most consistent finding, for both children's sport and adult sport, is the relative decline of Gaelic games. In a single generation, or even more quickly for adult sport, Gaelic games have lost their position of dominance in Irish sport. Gaelic football and hurling/camogie remain popular sports, but no

longer top the table of sporting participation as they did just a few decades ago.

The forces behind these major changes do not include a sharp drop in the number of people playing Gaelic games, although hurling/camogie has fared better than Gaelic football in managing to maintain or marginally increase participation, while the number playing the latter may have marginally fallen. Rather, the relative decline of Gaelic games is down to the failure to match the large increases in participation apparent in other sports. This pattern does not appear to be the result of changes in the sports offered at school, as it is most apparent for children's sport played outside school and also for adult sport. It is, therefore, more likely to reflect the combination of a wider choice of sports available and individuals choosing to exercise that choice. These findings regarding trends in the popularity of different sports are highly relevant in the context of Irish sports policy, which consistently grants a much greater share of available funding to GAA clubs than to other sporting organisations.

The data show that children's participation in indoor sports climbed substantially in recent generations, particularly in the period following the 1960s. Nevertheless, non-GAA team sports and golf also grew in popularity, in some cases more than two-fold. These changes pre-date the 'Celtic Tiger' and are, therefore, not the product of the large increases in income and investment that characterised that time. The expansion of education following the 1960s is likely to have been a major factor behind the growth of indoor sports such as basketball and badminton.

Turning to adult sport, the pattern is similar to that for children's sport, only the changes, including the relative decline of Gaelic games, are more pronounced. The other outstanding trend is the very strong growth in fitness activities, particularly those categorised as 'aerobics/keep-fit' in the SSPE, which include going to the gym or other kinds of working out. From the mid-1980s onwards, these activities have grown at an average of 12 per cent a year, far ahead of all other activities. If this trend has continued since the date of the survey, such personal exercise activities may well be the most popular kind of sporting activity among adults, at least those under the age of 40 years. Jogging, swimming and golf have also risen sharply in popularity over the period. With the exception of golf, these trends again predate the economic expansion of the 1990s and so we must look for other causes. Changed attitudes to personal exercise are a strong candidate.

4. GENDER AND SPORT RE-EXAMINED

4.1 Introduction

This chapter presents a more detailed analysis of the relationship between gender and participation in sport, which turns out to be much more subtle than the standard analysis of gender and participation might suggest. Standard analysis shows that women are less likely to participate in sport than men (Fahey *et al.* 2004; Farrell and Shields, 2002). This fact is usually interpreted as suggesting that women are less interested in playing sport than men and, to generalise, this certainly appears to be a common perception. The evidence of this chapter, however, suggests that this common perception needs to be at least refined and perhaps radically changed.

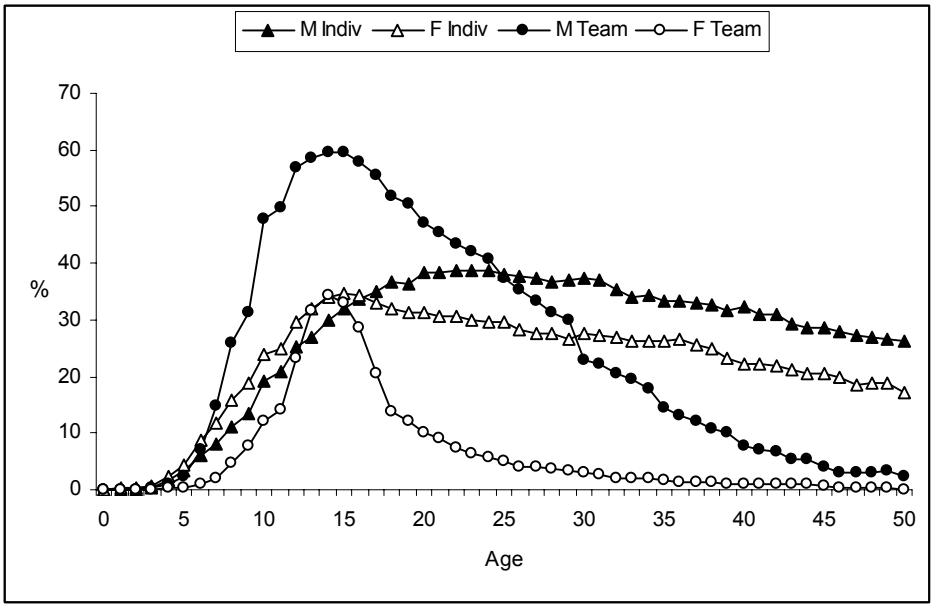
4.2 Gender and Type of Sport

Figure 4.1 shows the sport hill for team and individual sports separately for males and females. It reveals that the gender gap is very large and, for the SSPE sample, began in early childhood. It is almost entirely due to levels of participation in team sports. In fact, girls were more likely to play individual sports than boys up to the age of 17 years. The gender gap for individual sports opened up only after this age and widened through people's twenties, but then narrowed somewhat from age 30 years. Across all ages, the gap is much narrower than is the case for team sports.

This picture is confirmed by the multivariate analysis provided in Appendix A. Boys were some five to ten times more likely to have played a team sport at age 10 years and, although this gap decreased at second-level school age, it had increased again by age 20. It is clear that girls took up team sports in considerable numbers at second-level, helping to close the gender gap, but they quickly abandoned those team sports again and so did not continue them into adulthood.

The multivariate analysis also reveals a strong role for parents in the sport their children played; a role which is itself strongly gendered. If, during the period when an individual was at school, one or (especially) both of their parents were playing regular sport, then the individual was more likely to have played regular sport themselves. However, there is an interaction between which parent played sport and the type of sport the child played. For team sports, whether the father was playing regular sport has a significant impact on the likelihood of participation, but whether the mother was sporty does not. Contrastingly, for individual sports, the stronger effect is whether the mother was playing regular sport, especially at primary school age. The father's participation is still statistically significant, but only at older ages.

Figure 4.1: Sport Hills for Team and Individual Sports by Gender



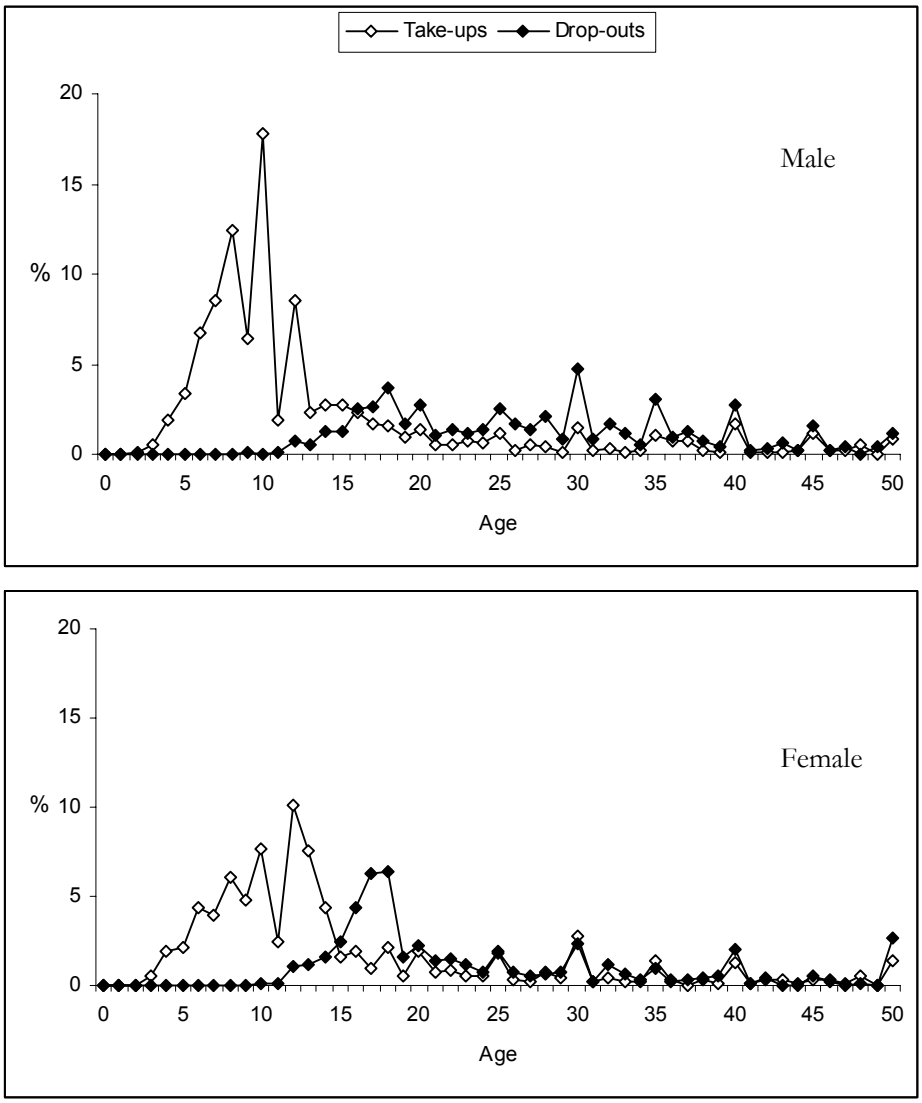
4.3 Take-up and Drop-out by Gender

The sport hill gives the proportion of individuals at each age who were playing regular sport at that age. Thus, it does not tell us how often people were taking up sports and dropping out of them. More insight into the different experiences of the two genders can be had from examining the proportion of people each year who took up a new sport or gave up one they were playing regularly.

Figure 4.2 presents these two proportions separately for males and females. Common to both charts is the importance of the primary school years, during which more sport is taken up than at any other time of life. Also, there is a greater degree of change during the teenage years. The gender differences, however, are again very striking. There are three to note in particular. First, this chart reveals the full extent of the head start in sport that the males in the sample enjoyed as boys. The proportion of boys who took up a sport is very much higher than that for girls in every year up to the age of 10 years. Second, the girls did some catching up between the ages of 12 and 14 years, presumably associated with the early years of second-level school. During these years, girls took up more new sports than boys, although it must be borne in mind that part of the reason for this is that many of the boys were playing the same sports already – they had just started them several years earlier. Third, while there is a noticeable jump in the number of drop-outs during the teenage years for both sexes, it was much more prominent for girls.

Beyond age 20, gender differences are less striking. Marginally more men dropped out of sport than women as young adults, but then there were more men playing sport who were in a position to drop out. We will return to take-up and drop-out among adults in Section 4.5.

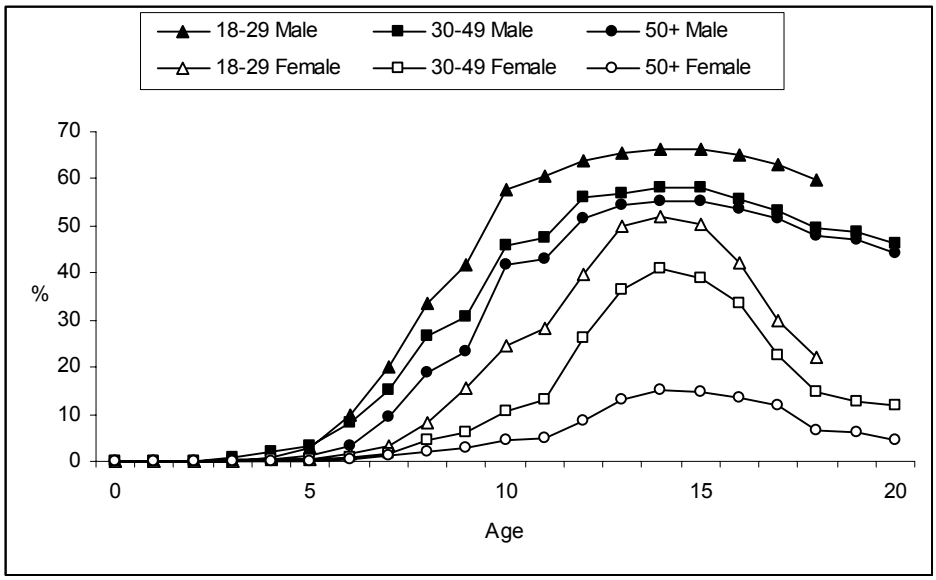
Figure 4.2: Take-up and Drop-out by Gender



4.4 Gender and Generation

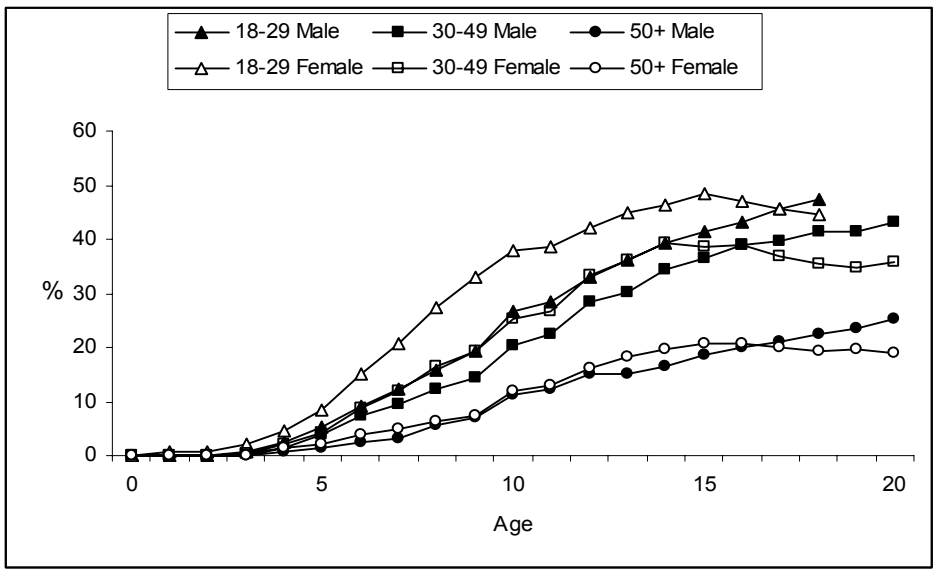
Multivariate analysis in Appendix A reveals that some of the developments in sporting participation that have occurred across recent generations are not consistent across both genders. This can be seen in Figure 4.3, which depicts the sport hill for team sports up to age 20 years, for three cohorts and by gender. There has been a dramatic increase in the amount of team sport being played by girls, especially during the period when they are second-level school age, although for the most recent generation there was a substantial increase at primary school also. Roughly speaking, the women who are currently young adults played about four times more team sport as children than the women in their parents' generation. However, this apparent mushrooming of girls' team sport turns out to be short-lived as, unlike the boys, only a small fraction of girls continue to play past their teenage years. Thus, in more recent generations, more girls are being successfully introduced to team sport in childhood, but they do not seem to get enough out of it to continue playing. The increase in participation in team sports for males, meanwhile, is less dramatic, more consistent, and continues into adulthood.

Figure 4.3: Sport Hills for Team Sports by Gender and Cohort



Turning to individual sports in Figure 4.4, the proportions who played regular sport as children are much more stable across gender and cohort. There has been a large and significant increase in participation for both genders throughout childhood, which sustained into adulthood. In all three cohorts, females played more individual sport than males until around age 17 years. However, as well as the different nature of the gender gap, the crucial point to note here is that the severe drop in participation during the late teenage years is absent for individual sports. There appears to have been a slight decline in participation among females after age 15 or 16 years in each cohort, but it is marginal in terms of statistical significance. Certainly, it does not approach the pattern for team sports.

Figure 4.4: Sport Hills for Individual Sports by Gender and Cohort



This difference in the patterns between the two types of sports is telling. The assertion that girls lose interest in sport as teenagers is only half-true. They lose interest in playing team sports. This finding also chimes with survey findings on attitudes to sport among school children, which appear also to be related more to team sports. Fahey *et al.* (2005) found that the

most negative attitudes to sport among second-level girl students were dislikes of being out in bad weather, of getting sweaty and dirty, and of the possibility of getting hit or knocked over.

In summary, the very significant increase in the amount of sport played by children in more recent generations is also characterised by a distinct gender pattern. A sizeable part of the rise in participation has occurred for girls playing team sports. However, the involvement of girls in team sports is short-lived.

4.5 Gender and Adult Sport

As is clear from the rate of take-up and drop-out from playing regular sport across the lifespan (see Figure 4.2 above), the pattern of participation in adult sport is less driven by key transition points and ages than is the case for children's sport. Instead, for each year of life, a small proportion of those who play sport drop out and a similar proportion of those who do not play take up sport. On balance, a slightly higher number drop out and so the proportion of adults playing sport declines slowly with age. In most years of adulthood, the proportion of the sample who changed their status, from playing to not playing or vice versa, was just 2-3 per cent.

Nevertheless, over the decades, this steady rate of transition means that the composition of people playing can change considerably. Figure 4.5 shows the proportion of adult regular players at each age who took up playing regularly from age 20 years onwards. By age 40 years, more than half of the sport being played was accounted for by sport taken up after age 20 years. Thus, to gain an understanding of why participation varies across the life-span as it does, we can examine what factors influence the rate of take-up and the rate of drop-out. This current section looks at the role of gender in take-up and drop-out. The next chapter will consider other important factors. The results presented are based on a full multivariate 'survival analysis', which is provided in Appendix A.

Figure 4.5: Proportion of Adult Sport Taken Up After Age 19 Years

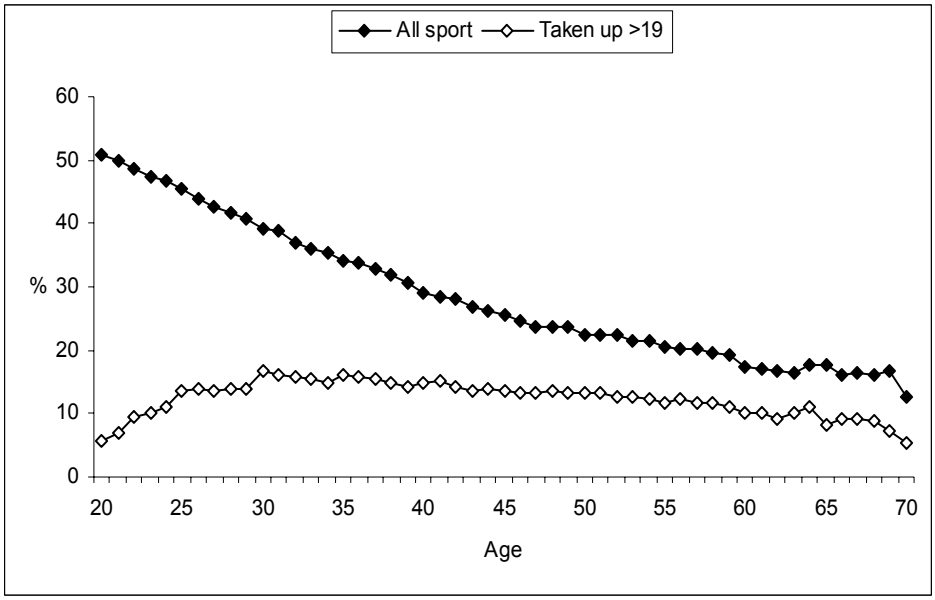


Figure 4.6 shows the sporting path taken by people who were playing regular sport at age 20 years, up to the age of 60 years. In these 'survival curves', the lines depict the proportion of players who had reached at least the age concerned at the time of the survey that still played regularly at that age, i.e. the survivors. Provided an individual continued to play at least one sport, they are counted as a survivor. To become a non-survivor, or dropout, an individual had to cease playing regular sport altogether.[11] Note that the survival curve is not the same as the sport hill, because it includes only those people who were playing sport at age 20 years, whereas the sport hill includes everyone. The general shape of the survival curves allows us to conclude that by roughly age 50 years, about half of those who played regular sport at age 20 years had dropped out. Note, however, that this statistic is only true of those who were over age 50 years at the time of the survey. The analysis of Chapter 2 shows that more recent generations are playing individual sports and therefore dropping out at a slower rate, a finding confirmed in the multivariate analysis in Appendix A. Thus, these survival curves are very likely to be flatter for the current generation of young adults.

Figure 4.6: Survival Curves by Gender, Showing the Rate at which Regular Players at Age 20 Years Subsequently Drop Out from Playing Regular Sport

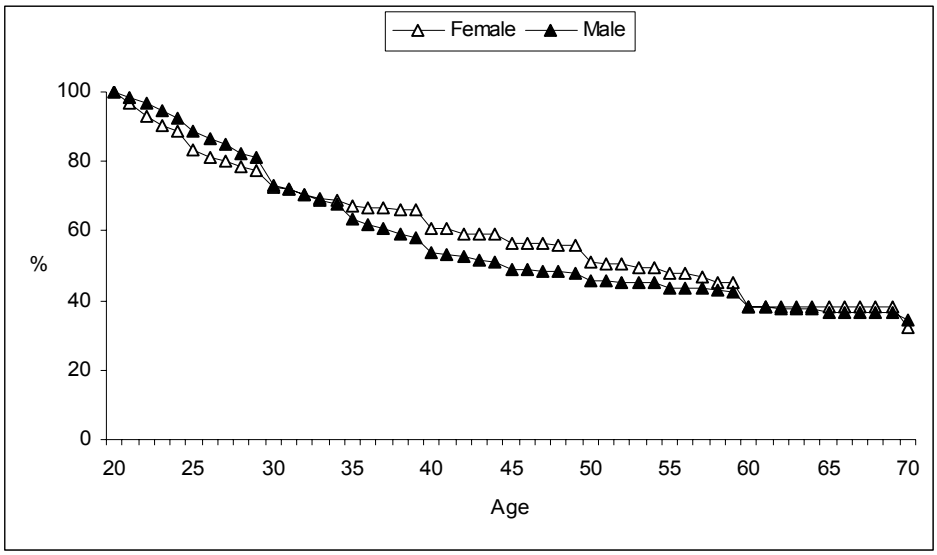


Figure 4.6 provides separate survival curves by gender. Comparing the curves during people's twenties, marginally more women dropped out from sport than men. However, from age 30 years onwards, this effect reverses such that between ages 35 and 60 years there were more women survivors in sport than men. The difference between the shape of these survival curves is statistically significant, but from the comparison we cannot conclude that either gender is more likely to drop out from sport as an adult. It depends which life-stage is considered. A fair overall description is that, while the pattern of drop-out across the life-span differs by genders, across adulthood as a whole, there is little difference in the rate at which men and women drop out.

[11] Once a person drops out, they are not then reinstated if they take sport up again. However, in practice, there are few gaps, whereby people play regular sport, drop out, and then take sport up again, so the analysis remains broadly the same.

What about the take-up of new sports? Figure 4.7 shows the proportion of people who had taken up a new sport from the age of 20 years onwards. It is, in effect, an inverted survival curve. The chart includes not only those who were not playing a regular sport, but also those who were – the question is only whether a new sport was subsequently taken up after age 20 years. By age 60 years, roughly 30 per cent of adults in the sample had started playing a new sport regularly. Again, however, more recent generations are taking up sport more quickly, so we can expect that the curve will turn out to be steeper for the current generation of young adults.

Figure 4.7: 'Inverted' Survival Curves Showing the Proportion of People Who, by Each Age, Have Taken Up a New Sport after the Age of 20 Years

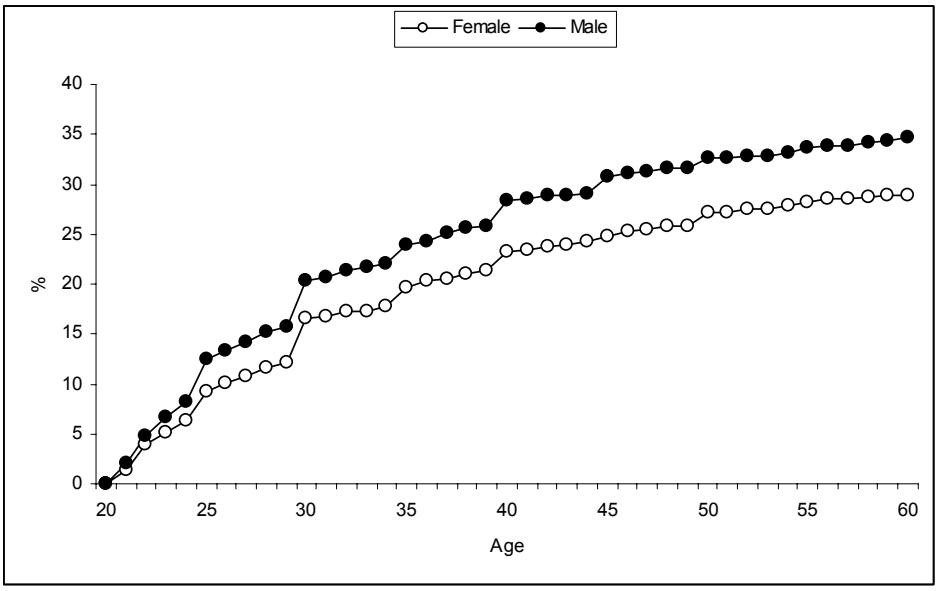
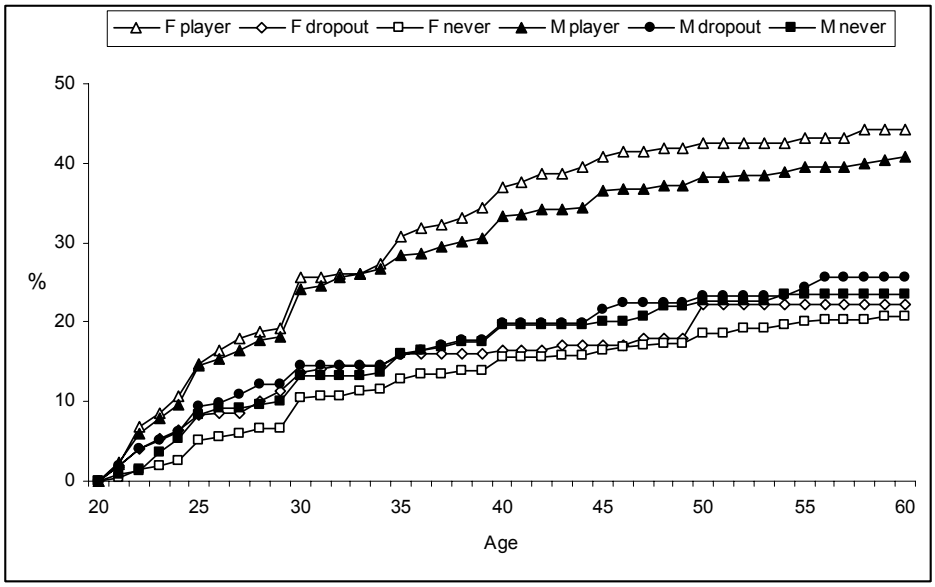


Figure 4.7 splits the curves for take-up by gender. There is a difference between the curves for men and women – the former take up new sports at a higher rate. The difference is not large, but it is statistically significant. Initially, therefore, we might be inclined to conclude that men have a greater propensity to take up new sports. However, because the curves include both people who already played regular sport at age 20 years and those who did not, and because by age 20 years more men already played regular sport, it is possible that the difference between the curves reflects the likelihood that someone who already played a sport took up another one, rather than a difference in the willingness of men and women to take up sport. Indeed, the multivariate analysis in Appendix A shows that this is the case. When the sample is further separated into those who already played a sport at age 20 years, those who had never played a sport by age 20 years, and those who had previously played but dropped out by age 20 years, the impact of gender ceases to be significant. This finding is depicted in Figure 4.8, which again provides curves for taking up a new sport, this time separated both by gender and sporting status at age 20 years.

Figure 4.8: The Proportion of People Who, by Each Age, Have Taken Up a New Sport after the Age of 20 Years, by Gender and Sporting Status at Age 20 Years



There are some slight differences apparent in the curves. It looks as if women who already played sport at age 20 years were slightly more likely to take up another sport, while perhaps women who had dropped out or had never played by age 20 years were marginally less likely. In fact, the differences between these curves for men and women are too small to be statistically significant. The main message is, therefore, that the behaviour of men and women towards taking up a new sport is very similar once previous experience of sport is taken into account. Men and women with equivalent experience up to age 20 years are just as likely as each other to take up a sport after age 20 years.

The findings of the multivariate analysis and the associated picture in Figure 4.8 provide a subtle and important twist to the relationship between gender and participation in sport. The interpretation initially suggested by Figure 4.7, that men might be more interested in taking up new sports than women, does not bear closer scrutiny. Men are only more likely to take up a new sport because they are already more likely to be involved in sport. Once we compare women and men with the same experience of sport prior to age 20 years, they are as likely as each other to take up a new sport.

The conclusion to be drawn from this analysis of adult participation in sport by gender, is that men and women display very similar sporting behaviour as adults, both in terms of dropping out from sport and taking up new sports. This is in stark contrast to the situation in children's sport, where the gender effects are very large indeed. What differences there are in sporting behaviour during adulthood appear to have their genesis, not in the inclination of men and women toward sport, but the different experience of sport they had as children.

4.6 Conclusions

The data-analysis of this chapter challenges the common perception that males are simply more interested, for whatever reason, in sport.

The gender gap for active participation in sport is greatest at primary school age. Boys play far more team sport than girls at this age, while girls play marginally more individual sport. Parents appear to be strongly influential in these patterns. The combination of the very young age at which the gender gap opens up, the fact that it is limited to team sports, and the important role of parents regarding the sports their children play, is thought-provoking. Is it credible to believe that the gender gap is caused by boys and girls having different interests or personal preferences? Or are the interests and preferences involved those of parents, schools and society more broadly?

More recent cohorts have seen the narrowing of the gender gap in sport. This is largely, although not entirely, due to girls being introduced to team sports at second-level school. However, these sports do not prove popular and the large majority of girls give them up in their late teenage years.

The picture is radically different in adulthood, when the choice of sports and decision to participate are more firmly in the control of the individual. Men and women appear to have the same propensity to drop out from sport or take up new sports. The continuing gender gap in participation by men and women, therefore, appears to reflect the continuing influence of their experience of sport as children; the strong or weak association with playing sport it endowed them with.

It is, therefore, difficult to avoid the conclusion that girls and, by extension, women, have been and probably continue to be short-changed by their sporting experiences as children.

5. INFLUENCES ON PARTICIPATION

5.1 Introduction

Lunn (2007a) found that social disadvantage, measured by low educational attainment or low income, had at least as strong an impact as gender and age on the active participation in sport of adults. From the analysis of Chapter 2, it appears that age actually has a weaker impact than was previously thought, because much of the reduction in participation reflects the generation in which people were born not their age – current young adults are likely to play much more sport as older people than current older people. In addition to socio-economic status, gender and cohort/age, coming from a sporting family also has a strong influence on whether children play sport.

This chapter uses the individual sporting histories data to examine the processes underlying these other influences on participation in sport. At what age does socio-economic status impact most on participation? What kinds of sports does it affect? Does the influence of coming from a sporting family extend beyond childhood? Are there any previously unidentified factors that influence sport across the life course?

5.2 The Role of Education

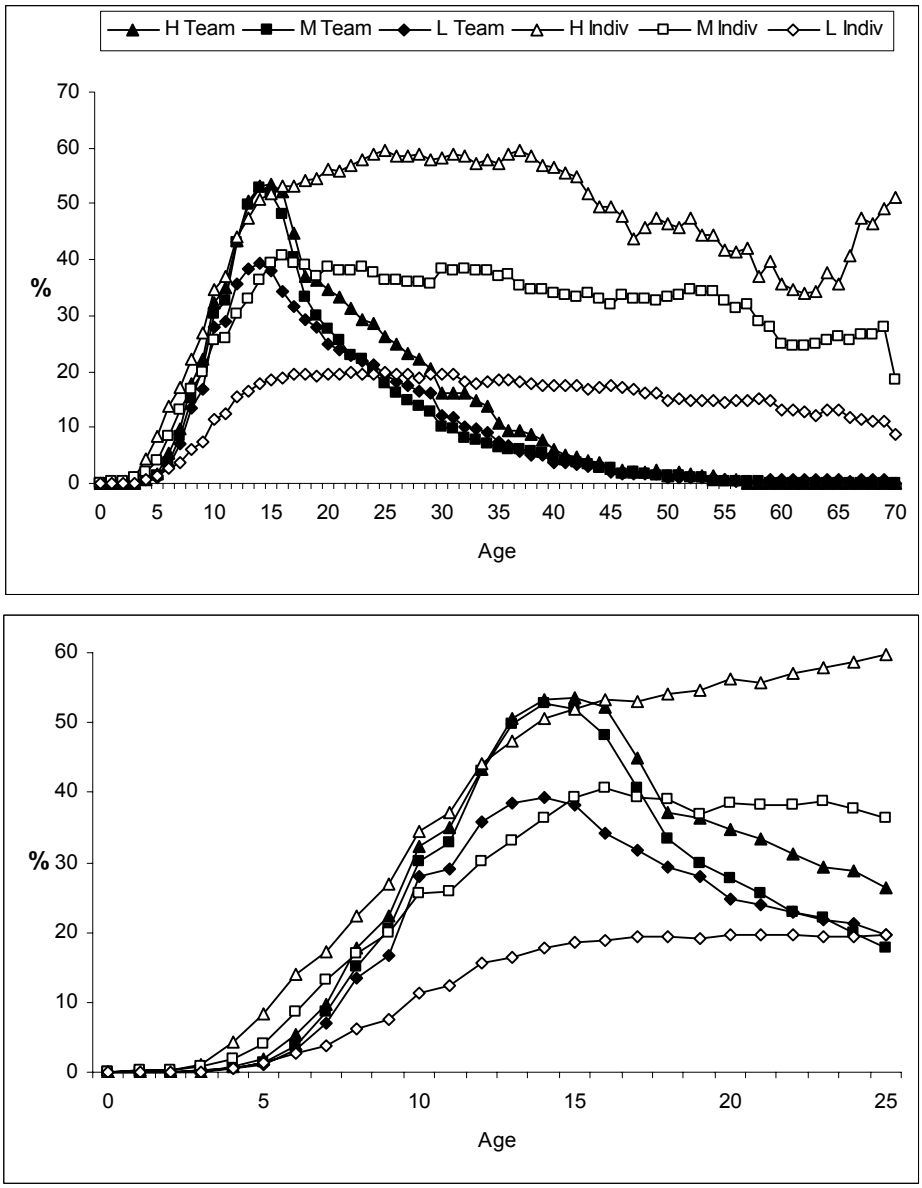
In the sample of 3,080 adults involved in the SSPE, educational attainment is the single biggest factor in determining whether an individual plays sport (Lunn, 2007a). Thus, understanding how low levels of education affect sport is a key issue for any policies aimed at increasing adult participation.

Figure 5.1 provides the sport hill broken down by educational attainment, separately for team and individual sports. The sample is categorised into three levels of attainment: lower second-level qualifications or below (low), higher second-level (medium) and third-level (high). Because the sport hills are difficult to separate visually at young ages, a separate panel (bottom) is provided that includes the same data only for ages 0-25 years.

Although the strong impact of educational attainment is immediately striking in this chart, the use of just three categories somewhat underemphasises the true effect. For example, the multivariate analysis employs five categories and finds significant differences within the 'low' educational attainment category (between those who have no second-level education and those who have lower second-level qualifications) and in the 'high' educational attainment category (between those who have a diploma or degree and those who have a postgraduate qualification). Still, for the

purposes of inspecting the data visually, three categories is sufficient to communicate the main relationships.

Figure 5.1: Sport Hills for Team and Individual Sports by Educational Attainment



The outstanding message of Figure 5.1 is that educational attainment primarily affects individual sports and that its influence lasts a lifetime. Those of higher educational attainment in the sample were much more likely to play individual sports as children, young adults and older adults. The gap in participation by education opened up at a very young age, well before 10 years old. Educational attainment is strongly correlated between parents and children and so this early advantage is likely to have reflected the education of respondents' parents more than of respondents themselves, whose level of educational attainment would not in any case be determined for another decade or more.

Still concentrating on individual sports, the charts make clear the advantage of going on into third-level education. The peak age for playing individual sports among those who left education following completion of

second-level was 16 years, after which a slow and steady decline occurred. Contrastingly, going on to college gives a further boost to participation. Educational attainment to third-level is one of the strongest determinants of taking up new sports during adulthood and also has some influence on whether people drop out from sports once they leave school. The rise in individual sports for the high attainment group continued right through their early twenties and then sustained for a considerable period of adult life. Furthermore, those with high educational attainment who eventually dropped out from individual sport during adulthood were more likely to participate again following retirement. (The severity of the retirement effect depicted for the high attainment group should be treated with some caution, as the sample size of highly educated over-65s is small and the possibility of bias resulting from migration is greater for this group. Nevertheless, the effect is statistically significant.)

Turning to team sports, the differences by educational attainment are much weaker, but two statistically significant effects are worth highlighting. First, the low educational attainment group was less likely to play team sports during their teenage years. Multivariate analysis in Appendix A confirms that this effect is confined to those who did not attain any second-level qualifications, many of whom did not attend second-level school at all and did not, therefore, experience the sporting opportunities it offers. Second, there is a definite and noticeable kink in the curve at age 18 years for those of high educational attainment. This might be partly caused by attendance at college prolonging people's involvement in team sports, but the multivariate analysis in Appendix A suggests that the more important influence on team sports comes from the fact that those with higher educational attainment also have higher incomes and are more likely to go into professional occupations (see below).

Finally, the pattern shown in Figure 5.1 is consistent across cohorts. The picture would look the same if it were plotted separately for each generation, although general participation levels would be lower for the older cohorts. The strong effect of educational attainment on playing sport has existed for more than one generation and is apparently not changing over time.

5.3 The Importance of Income

At one level, finding strong income effects on participation in the historical data, especially at young ages, ought to be quite surprising, since the household income data related to income in 2003. For someone in the sample of average age, this means that their income was recorded almost 30 years after the peak of the sport hill. Of course, household income tends to be strongly correlated across people's lives and between successive generations of the same family. Nevertheless, any strong income effects operating over this timescale are testimony, first, to the lack of social mobility during the period under study and, second, to the power of income to influence participation in sport.[12] If the data included household

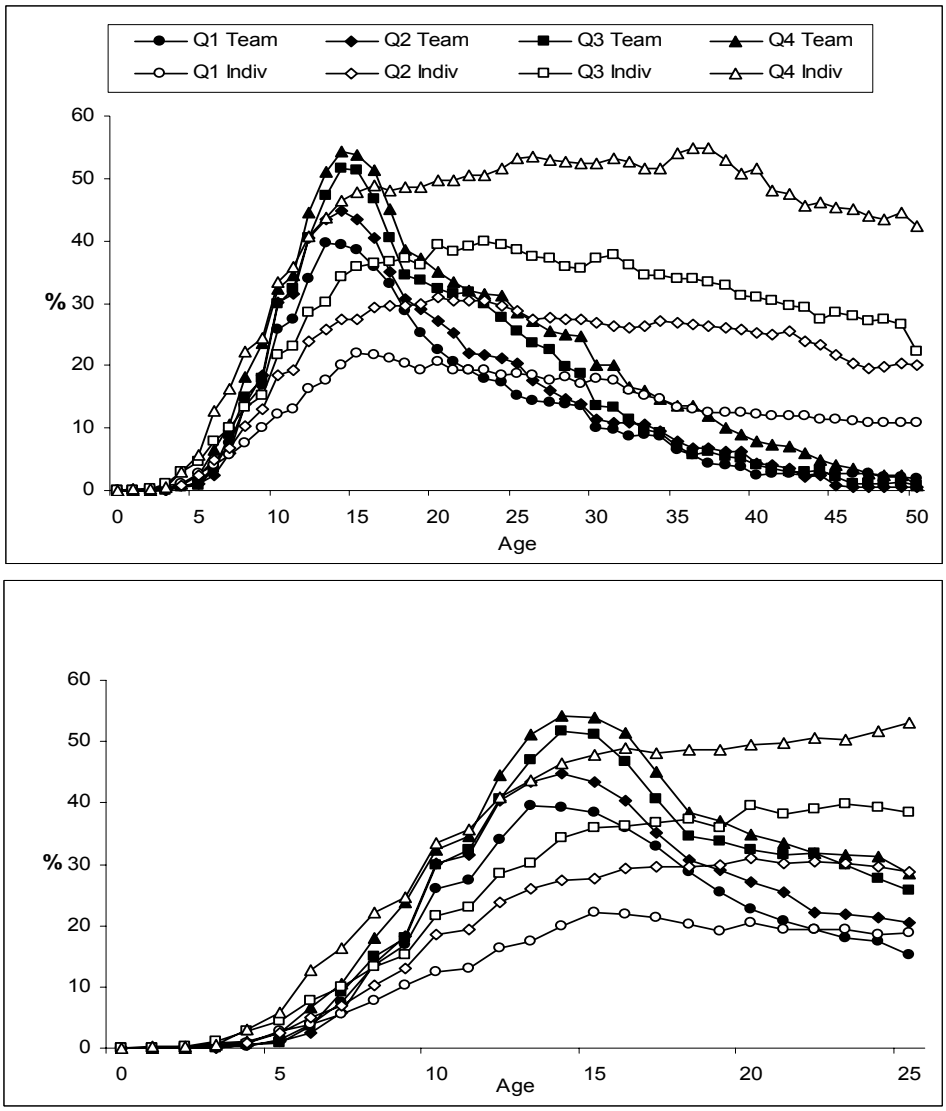
[12] One other possibility is that the causality runs in the opposite direction – that playing sport when young increases your income later in life. While there could easily be some truth to this, the scale of the effects reported here makes this an unrealistic explanation of the findings.

income measured separately at each stage of the life course, the effects reported below would doubtless be considerably stronger.

Figure 5.2 performs the equivalent analysis for household income as conducted for educational attainment in Figure 5.1. Separate sport hills are provided for team and individual sports for each of four income quartiles (Q4 is the richest 25 per cent of the population, Q1 the poorest 25 per cent). To a degree, the pattern mirrors that for educational attainment, in that the influence of income is stronger for individual sports than for team sports. Nevertheless, it is noticeable that income has a more powerful effect on team sports than does educational attainment, particularly during second-level school years and after leaving school. Looking at the bottom panel, the kink in the curve at age 18 years for participation in team sports is apparent for both the top two quartiles, Q3 and Q4.

Turning to individual sports, the influence of income is again apparent from a very young age and develops into a sustained difference throughout adulthood. Multivariate analysis in Appendix A reveals that income is a particularly strong determinant of taking up a new sport during adulthood. This fact is reflected in the peak of participation for the richest quartile (Q4) which does not occur until 37 years of age.

Figure 5.2: Sport Hills for Team and Individual Sports by Income Quartile



Lastly, there appears to be an interaction between income and gender for adults. Although this interaction is difficult to show graphically, the influence of income on rate of drop-out from sport as adults is greater for men than for women. Higher income men, in particular, are less likely to drop out from sport as adults. However, this finding may be down to genuine differences in the importance of income for males who play sport, or it could result from the fact that the measure of household income is likely to be a fairer reflection of male rather than female spending power, especially perhaps in older cohorts.

5.4 Professional Status

Previous analyses of the cross-sectional data from the SSPE have indicated that occupational status does not have such a strong relationship with participation in sport as does educational attainment or income (Lunn, 2007a). Once education and income are controlled for, adults in any one type of occupation seem to be similarly likely to be participants. Still, the transformation of the data into individual sporting histories allows for more sensitive tests that are specific to type of sport and certain periods of the life course. Although not as big a factor as either educational attainment or income, there does turn out to be a benefit from belonging to a professional occupation; that is, being a member of a highly skilled profession.

Figure 5.3: Sport Hills for Team and Individual Sports by Professional Status

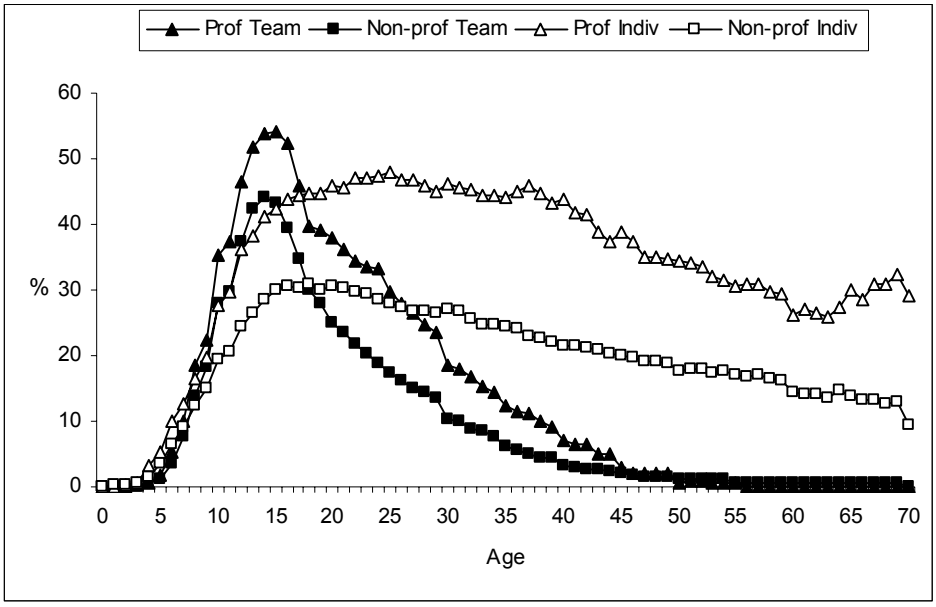
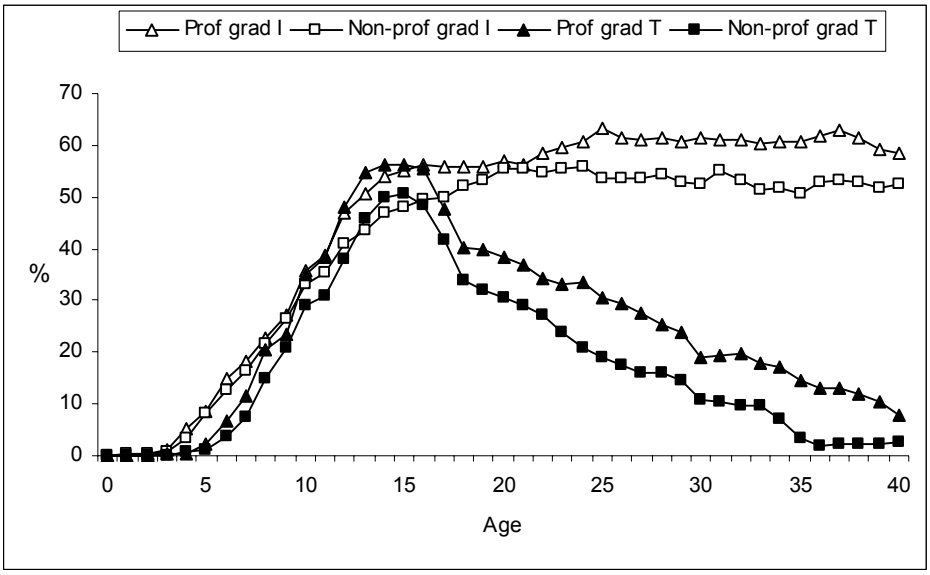


Figure 5.3 presents sport hills for team and individual sports by whether an individual was in a 'professional' occupation at the time of the survey. The hills look similar to those by educational attainment and income, which given the strong correlation between these variables is not surprising. Indeed, 57 per cent of professionals have a third-level qualification. However, multivariate analysis reveals that there is an effect of being in a professional occupation over and above the associated education and income. Specifically, controlling for educational attainment and income, professionals have twice the odds of playing a team sport at age 20 years and are significantly more likely to take up new sports as

adults. There is more than a hint of this in the size of the kink for team sports at age 18 years in Figure 5.3 and the gap between professionals and non-professionals that opens up thereafter.

The result is unlikely to be due to the fact that those in less skilled occupations do more physically demanding work, and may hence be less keen to engage in additional physical activity, since there is no equivalent effect for non-professional yet non-manual workers. The suggestion here is, rather, that association with a workplace containing people with high socio-economic status, who are more likely to play sport, increases the likelihood of participation. Figure 5.4 tries to tease apart this workplace effect by simultaneously controlling for education. The chart only includes graduates, i.e. those with a third-level qualification. Separate sport hills are then supplied for graduates with professional occupations and those without, for team and individual sports. There is something of a gap in participation during childhood, perhaps because graduates who go on into professional occupations are more likely to have slightly higher socio-economic status or income. But the key point is that the gap between the curves, for both types of sports, clearly widens during adulthood. The effect is not large, but it is significant – workplaces seem to matter too.

Figure 5.4: Sport Hills for Graduates by Professional Status

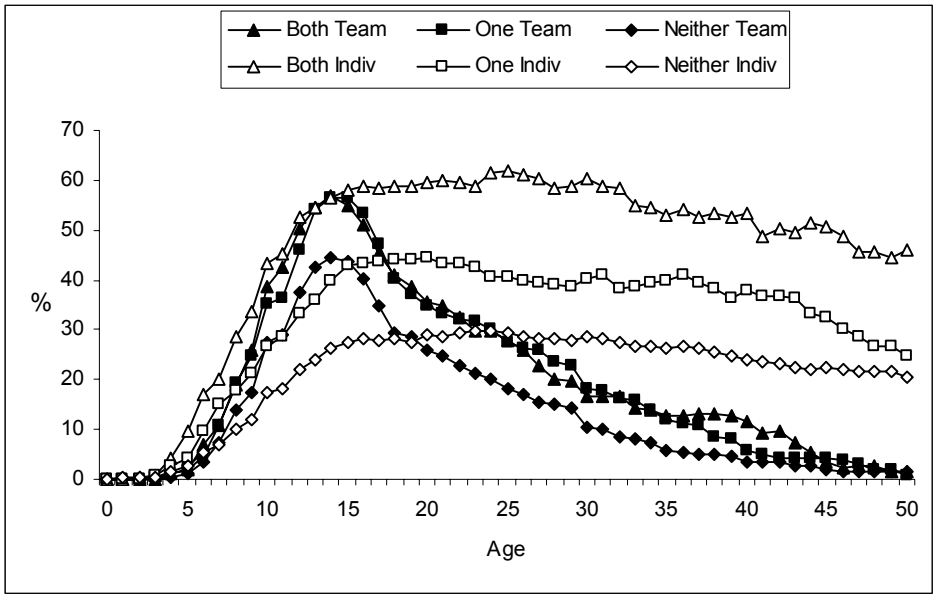


5.5 Sporty Families

Figure 5.5 presents sport hills by whether, during the time they were at school, an individual's parents were playing regular sport. People with sporty parents are more likely to play themselves, but the effect varies by types of sport and by how many parents play sport. As revealed in the previous chapter, sporty mothers seem to have a strong influence on children playing individual sports, while sporty fathers have a strong influence on playing team sports and also some influence on individual sports. Figure 5.5 complements this story. First, it shows that the effect of sporty parents is greater for individual sports generally and that this effect lasts across the life course. Second, it shows that the impact on playing individual sports is particularly strong where both parents are sporty. The multivariate analysis in Appendix A reveals that one particular reason for this is that women are very much less likely to drop out of sport, even late into their adult years, if their mothers were also active participants. Note

that these effects of coming from a sporty background are not just the result of sporty families being more likely to be members of advantaged groups, as both educational attainment and income are controlled for in the analysis.

Figure 5.5: Sport Hills for Team and Individual Sports by Parents' Involvement in Sport



5.6 Quantifying the Effects

The last finding of the previous section exemplifies a general trend. Participation in sport during adulthood displays strong persistence. Once a person becomes a regular participant, the chances that they will accumulate many years of regular participation are quite high. This persistence of sporting behaviour allows a particular kind of statistical analysis to be used. 'Survival analysis' is a method for estimating people's likelihood of making transitions from one state to another, depending on a range of factors, such as social background, age, previous history and so on.

Multivariate survival analysis (described in detail in Appendix A) is employed to generate a statistical model of the factors that influence sporting decisions taken by adults after age 20 years. Specifically, two models are created. The first model isolates factors affecting the likelihood that individuals who play regular sport at age 20 years drop out from sport. The second model examines factors associated with the likelihood of taking up a new sport after age 20 years.

To get a feel for this analysis, consider Table 5.1, which presents results derived from the model for dropping out from sport. (The pattern of dropping out is different for males and females and so results for each are presented separately.) The figures in the table are estimates of the relative risk of dropping out from sport for people with different backgrounds, all of whom play regularly at age 20 years. The numbers express the risk of dropping out relative to a reference case, which takes the value 1.0. Consider the first column. This tells us that, in any given time period, people who play team sport at age 20 years and have never played an individual sport, are about four times more likely to drop out from sport than people who play individual sports. An alternative, yet equivalent, way

of describing this relationship is to say that the rate of drop-out for those who play team sports (and have never played individual sport) is four times faster than it is for those who play individual sports. This is the simplest comparison – players of only team sports versus players of only individual sports. Two other categories are considered in the next two columns: people who play only team sport at age 20 years but have previously given up an individual sport and people who play both types of sport at age 20 years.

Table 5.1: Relative Rates of Dropping Out from Sport for Players at Age 20 Years, by Gender, Sporting History and Other Statistically Significant Variables

	Sporting History			Other Variables		
	Team (never Individual)	Team (previously Individual)	Plays Both	Postgraduate	Income (Inter-Q range)	Mother Played
Female	4.37	6.96	0.45	0.41	n.s.	0.31
Male	3.95	4.00	n.s.	0.54	0.67	n.s.

n.s. = 'not statistically significant'
Reference case is a graduate who plays individual sport at age 20 years.

For men, the impact of sporting history prior to age 20 years on whether they drop out is straightforward. The rate of drop-out is simply four times higher if they play only team sports and there is no statistically significant difference between those who play individual sports and those who play both kinds of sport. However, in line with the analysis of the previous chapter, previous sporting experience has a bigger impact for women. If a woman plays team sport but has already given up an individual sport by age 20 years, she is seven times more likely to drop out from sport. Meanwhile, women who play both team and individual sports by age 20 years drop out at less than half the rate of those who play only individual sport. Thus, while the overall rate of drop-out is similar for men and women (see previous chapter), the sporting experience of women prior to age 20 years has a bigger impact on their chances of staying with sport.

Moving to the right-hand side of the table, there are other factors that influence the likelihood of dropping out from sport after age 20 years. Postgraduates drop out at only half the rate of graduates (less still for women postgraduates). For men, those on higher incomes drop out significantly more slowly. The income difference between the 25th and 75th percentiles of the income distribution is associated with dropping out from sport at two-thirds the rate. For women, those whose mothers played sport drop out at just one-third the rate of those whose mothers did not. This is a strong and interesting finding – a lasting impact of parental behaviour that is specific to females.

Only variables that had a statistically significant effect on dropping out are included in Table 5.1. No effects were found for other comparisons of educational attainment (e.g. graduates vs. non-graduates), or for whether an individual's father played sport, or for the year in which people were born. Thus, rates of drop-out from adult sport are not changing over the generations, once education, income and sporting history prior to age 20 years are controlled for.

Overall, while Table 5.1 reveals gender differences and some further impacts of educational attainment, income and parental involvement in sport, the main message of the analysis is that the likelihood that people drop out from sport is strongly dependent on what kind of sport they play and, for women, experience of sport prior to age 20 years. Individual sports display greater persistence. Those who participate are much more likely to continue to do so later into adulthood.

Table 5.2 provides a similar analysis for the rate of take-up of new sports after age 20 years. Here, there is no difference between the genders, so the results are presented for both. Reading from left to right, there are a series of interesting effects which reveal an overall pattern: socio-economic circumstances have a particularly strong effect on taking up new sports as adults.

Table 5.2: Relative Rates of Taking-up a Sport from Age 20 by Statistically Significant Variables

Already Plays a Sport	Born Decade Later	Graduate	Income (Inter-Q range)	Professional	No Car
1.42	1.29	1.46	1.42	1.28	0.62

*Reference case is a non-player with Leaving Certificate.

People who already play a sport are more likely to take up another one – further evidence of the persistence of participation. The second column shows the extent of the cohort effect. People born one decade later are almost 30 per cent more likely to take up a new sport in any given time period. Note that this is not because they are younger, as the analysis compares the behaviour of both older cohorts and younger cohorts from age 20 years onwards. Adults in more recent generations are simply taking up more sport.

Turning to the socio-economic influences, graduates take up sports some 46 per cent faster than non-graduates. A person in 75th percentile of the income distribution is 42 per cent more likely to take up a sport in any given time period than someone in the 25th percentile. Those in professional occupations take up sports 28 per cent faster than non-professionals. Having no access to a car makes people more than one-third less likely to take up a sport. Each of these socio-economic effects is estimated while accounting for the others, so they are multiplied for those who possess several of the advantages specified. Hence, measured throughout adult life, we estimate that high-income graduate professionals take up new sports at over two-and-a-half times the rate of low-income non-graduate non-professionals.

5.7 Conclusions

The relationship between high educational attainment and playing sport begins at a very early age, well in advance of age 10 years, suggesting that the education of parents has a strong influence on the sport played by young children. The other obvious influence on the sport played by young children is school. Lunn (2007a) found that children in primary schools designated as 'disadvantaged' played significantly less sport and engaged with a narrower range of sports. But the social gradients in sporting

participation at primary school age displayed here suggest that the impact of social disadvantage on children's sport is much greater than the negative impact of attending one of the minority of designated disadvantaged schools. The very large gaps, especially for individual sports, indicate a strong relationship not just between schools, but also within them. Children from more highly educated families who will go on to third-level education play much more sport and the impact lasts throughout adulthood.

Educational attainment is strongly correlated with household income, which also exerts a strong influence on participation over and above that of educational attainment. Income too has a stronger impact on individual sports, but seems also to affect the likelihood of continuing with team sports, around age 18 years when many people leave full-time education. Belonging to higher income and educational groups makes individuals less likely to drop out of sport in young adulthood and much more likely to take up a new sport. Over and above these effects, belonging to a professional occupation also increases the likelihood of participation in both team and individual sports. Thus, the overall picture is one where the head-start granted to those with more socially advantaged backgrounds is apparent in early childhood, but lengthens with every significant transition point on the path to middle-age, and is particularly strong with respect to the likelihood of taking up new sports.

Coming from a sporting family also has an impact, which is again stronger for individual rather than team sports, especially where both parents play sport. But there are also differences in the parental influence by gender, such that women with sporting mothers are particularly likely to continue to play sport well into adulthood.

It is notable, looking across all the social factors that influence participation, that an individual's background is particularly relevant to whether they will take up an individual sport, either as a child or as an adult. Those who play an individual sport by age 20 years are many times more likely to continue playing well into adulthood than those who play only team sports.

6. THE SPORTING LIFE COURSE AND HEALTH

6.1 Introduction

Each year the Irish government spends a large amount of tax payers' money promoting healthier lifestyles, one aspect of which is higher levels of physical exercise. Yet is more physical exercise at the individual level associated with better health? Investigating this question is the primary aim of this chapter. However, we also examine a less frequently asked question: to what extent does past participation in sport contribute to current health net of subsequent sports participation?

Previous research (see Chapter 1) would suggest that we should see a clear relationship between participation in sport and health status as measured by the physical and mental health component scales used in this chapter (which for convenience we refer to as 'PCS' and 'MCS' throughout). However, although this may be true, we should be wary of jumping straight to the conclusion that better health status is due to higher levels of activity. It could also be for instance that those who have a better health status are more likely to take part in sport, perhaps simply because they are physically able to. This would be particularly true of those who have chronic or disabling conditions that limit their mobility. Increasing age brings more health problems and a worse health status and this is likely to impact on participation. Nonetheless, given the findings of previous research, we would expect that taking part in sport and exercise would improve health status. Although we cannot conclusively show a causal relationship, evidence of a positive relationship here would strengthen the general conception that sport and exercise improve health.

6.2 Conceptual Model

The central focus of this chapter is the relationship between past participation in sport and current health status *net* of the current level of participation. That is, even if a person no longer participates in sport, does having previously taken part in sport and the level at which one participated have an influence on current health? This is a rather more complex issue both conceptually and empirically than whether participation has a beneficial effect overall. In the medical literature there is considerable interest in the level of sport and exercise across the lifetime as a possible contributor to the risk of osteoporosis (c.f. Ulrich *et al.*, 1996; Brahm *et al.*, 1998), but this literature does not attempt to develop a conceptual model of the relationship between exercise and health. Health economics on the other hand has, since the early 1970s, had an explicit model of 'health investments' over the lifetime. This conceptual model was largely developed by Michael Grossman in his paper on health capital and the demand for health (Grossman, 1972). In this economic model, health is considered to be a commodity or 'good' that can be viewed as a durable

capital stock that produces a flow of services over time, depreciates and can be increased with investment. Exercise and sport are such investments with more sport and more intensive sport leading to improved health. However, once an individual stops playing sport their level of health will depreciate over time, all else remaining equal. It is important to remember that this is a simplified model of the actual physiological relationship between sport and health. More intensive sport does not necessarily bestow greater health and indeed, can be harmful (e.g. sporting injuries). For a more detailed discussion of the 'health capital' model see Appendix B.

6.3 Participation Intensity

Before we can examine the relationship between previous sports participation and current health using the SSPE, we first need a set of expectations or 'hypotheses' about what we expect to find, which we can turn into a set of measures and test. The general theoretical framework outlined above predicts that exercise in the past will lead to higher current health, but also predicts that the benefit of that exercise will decline once participation ceases. This means that the longer the period between an individual last exercising and their interview for the survey, the smaller the benefit observed for current health.

There are several issues that need to be addressed here before we can turn this theory into a set of hypotheses and begin analysis. First, the theory is expressing a general relationship between exercise and health, whereas we are interested in sports participation and health. Although sport more often than not entails exercise, the reverse is not necessarily true as many people will exercise as part of their occupation or as part of their daily life. Our measure of sports participation is not a total measure of the person's level of exercise. Second, the theory says nothing about the importance of the level of exercise undertaken. This has implications for how we measure the impact of participation, since we have the choice of using either a unitary measure of the number of years with any participation, or a measure based on the number of years playing sports of different intensities. A great deal of research (c.f. Fahey *et al.*, 2004) suggests that the largest health differences occur between people who do at least some exercise and those who do none at all. In other words, people who do more exercise are generally healthier, but there are diminishing returns for health as the level of exercise increases. We know this finding applies to current participation, but it may not hold for past participation. In the analyses to come, therefore, we use variables that express the number of years playing sport at different levels of intensity.

The theory also says nothing about variation in the impact of participation depending on when it occurs in the life course. It could be, for instance, that participation in sport or exercise at specific points in life, or between certain ages, may be partciularly crucial for later health. Unfortunately, this hypothesis is hard to test in a general population survey since, by definition, only those who have lived through these periods can supply data for the theory to be tested. Using older age groups alone reduces the data available and produces statistical problems since statistical power is directly proportional to the number of individuals in the analysis. Using the whole sample leads to paradoxical conclusions since the individuals with the best health (i.e. those who are younger) also tend to be those who have less years in those periods. To avoid these problems we choose to base analysis on the whole sample and use the number of years

that the person has participated in sport across their whole life, but avoid paradoxical results by standardising the measure so that the variable expresses the person's number of years participating relative to those of the same age/sex group. This means that we are comparing the impact of the number of years that someone has participated in sport to others of the same sex and roughly the same age.

Rather than assume that all sports participation has the same effect on health we constructed three variables to measure the standardised number of years at different levels of sports intensity. In the survey, information on the intensity of the sport played was only collected in relation to sports people currently played. We use this information to create proxy intensity variables for sports played in the past. The median intensity of current playing for each different sport is used to categorise sports as either 'high', 'moderate' or 'low' intensity.[13]

Lastly, the theory does not specify the rate at which the beneficial effects of participation depreciate or whether this depreciation is greater at different ages. It could be that the benefit depreciates at a constant rate over time reducing to zero at some point. On the other hand, depreciation could be steep at first, but plateau out thereafter, so that there are lingering long-term benefits irrespective of the intervening period. Any number of different patterns could hold in reality; indeed, it could even be that the pattern of depreciation varies depending on other factors such as age, sex and the intensity of participation. These are difficult effects to model statistically, particularly given the number of individuals available to us for study, so here we use three variables that measure the number of years since the person has participated at a given level of intensity (levels 1 to 3).

6.4 Measuring Health

Measuring the 'health' of a population is problematic. The World Health Organisation defines health as: "…state of complete physical, mental and social well-being, not merely the absence of disease or infirmity". This definition makes it clear that 'Health' is not just the absence of disease, although the absence of disease or injury should clearly be taken into account. The opposite also applies, i.e. the absence of disease does not necessarily imply 'health'. The definition also makes it clear that a person's self-assessment of their health or broader well-being is important too.

Actually measuring such a complex concept is difficult. In social survey research a number of different approaches have been taken. One approach has been to ask a single discrete question about the person's health. These questions can be broken down into those that ask about global subjective health (e.g. "How would you rate your health…?"), those that ask about deviation from some physiological norm (e.g. "Do you have a chronic illness…?") and those that ask about functional difficulties (e.g. "Are you hampered in your daily activities…?"). A second approach has been to ask multiple questions and then combine the results into a single measure of health or "health related quality of life". The rationale for this approach to health measurement is that any one question will produce a flawed measure

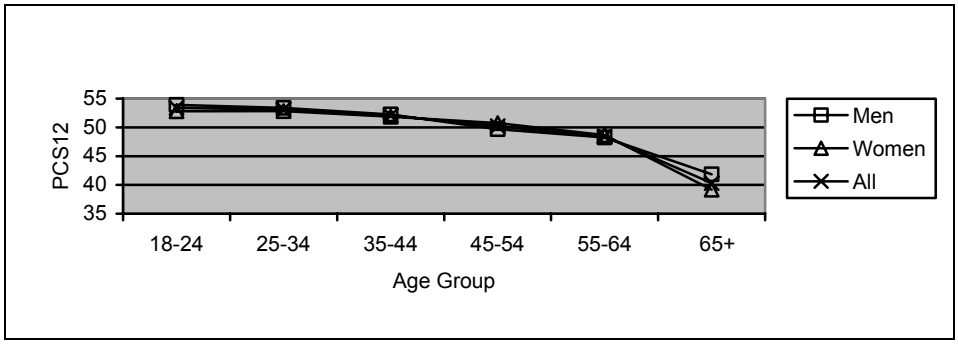
[13] It may be that the intensity at which sports are played and thus its effect on health varies considerably due to differences in age and health, etc. Age and health are both controlled for in our multivariate analyses (see Appendix B).

of an underlying concept that is 'health'. By combining a number of questions we will better approximate the real concept and so have more effective measures. This approach has yielded a number of different measures (see Jenkinson and McGee, 1998) including the Short-Form 12 (SF-12) which is the measure that we will be using in this chapter. As the name suggests, the SF-12 consists of 12 questions covering both physical and mental health. It produces two scales, known as 'component scores', one a measure of physical health and the other a measure of mental health (Ware *et al.*, 1994). The SF-12 is an extremely well validated and tested measure that has been used in a number of countries (Layte and Jenkinson, 2001; Jenkinson and Layte, 1997). It has been shown to be a useful measure of population health. The SF-12 is not designed to distinguish between the 'healthy' and the 'sick', but rather is based on the notion that health status is a continuum ranging from the extremes of ill health on one side to very good health on the other. The 'component scores' from the SF-12 which are labelled the Physical Component Score (PCS) and the Mental Component Score (MCS) try to reflect this continuum. They measure health on a scale from 0 to 100 where 100 equals perfect health, but the average is set to a score of 50 with a standard deviation of 10. This means that there is no particular threshold that can be used as an indicator below which the person is seen to be in 'ill health'. Rather, the measure is sensitive to subtle differences in health across the population and thus should differentiate between groups well.

6.5 MCS and PCS Measures

Before we examine the influence of sports participation on health in the next section, it is first important to understand the patterning of mental and physical health components across the population. Health can vary systematically across the population for a number of reasons other than sports participation and this will be evident in the SSPE data. For example, older people are more likely to have a chronic health condition and so we would expect that older age groups would have a lower score on the PCS scale than younger age groups. Mental health is not so directly linked to chronic illness thus the pattern by age is likely to be less distinct, but there may nonetheless be a relationship. Figure 6.1 shows that the expected relationship between PCS and age does emerge.

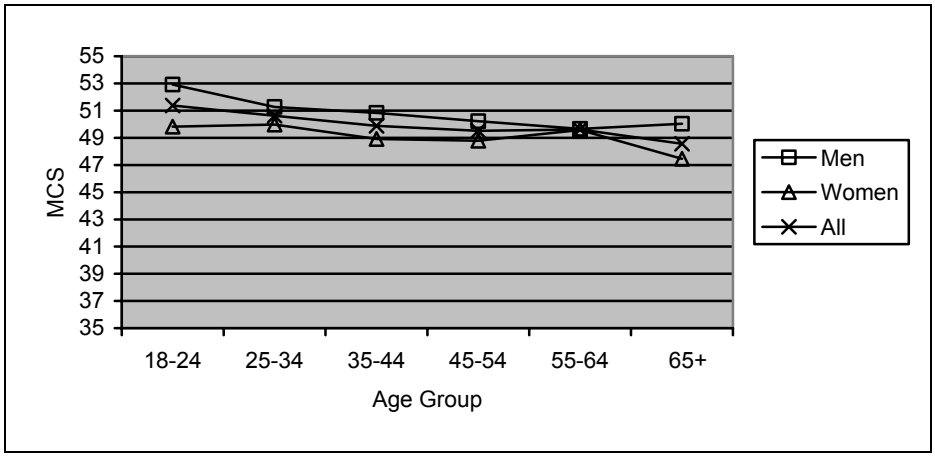
Figure 6.1: PCS12 Scores by Age Group and Sex



The PCS score is highest for the youngest age group in our sample, those aged 18 to 24 years and lowest for the oldest (aged 65 years or more). As age rises, the decrease in physical component scale becomes steeper with the decline for the oldest age group particularly pronounced. For most of the age range men tend to have a higher health status than women,

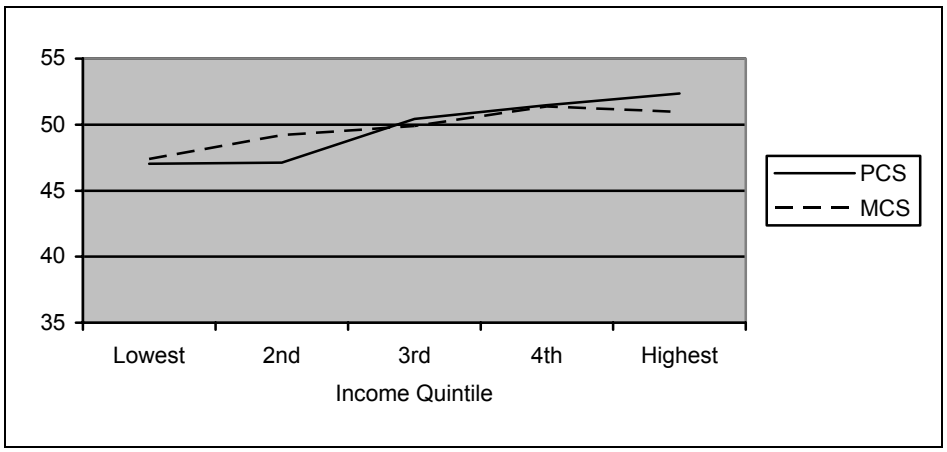
although this pattern is reversed in late middle age when the score for women rises above that for men.

Figure 6.2: MCS Scores by Age Group and Sex



A downward trend by age is also evident for the mental component score, but the trend is not as uniform as for the PCS. For men the line becomes more shallow after age 34 years and turns upward in the oldest age group. For women on the other hand we see lower scores between the ages of 35 and 55 years before the line falls steeply among the oldest age group.

Figure 6.3: MCS & PCS Scores by Income Quintiles



Health varies by a large number of other factors aside from age and sex. It has been shown repeatedly both in Ireland and elsewhere for example, that health varies inversely with income, education and class and any number of other measures of disadvantage (Acheson *et al.*, 1998). That is, those who are poorer, have less education or are in a lower social class will have a worse health status. This pattern is confimed in Figure 6.3 which gives the PCS and MCS scores by income quintiles or 'income fifths'.[14] Figure 6.3 shows that the lowest 20 per cent of the population have both the lowest PCS and MCS and that scores rise fairly uniformly for both scales with income, although the PCS is rather flat for the first two quintiles

[14] These are constructed by ranking the population by income and then dividing it into five equally sized groups. The mean PCS and MCS of each group is used.

and there is a slight decline between the 4th and highest quintiles on the MCS.

This demographic and socio-economic patterning of health is important because we will need to control for such differences across groups when estimating the impact of current and past sports participation.

6.6 Health and Participation in Sport

Our primary interest in this chapter is the relationship between participation in sport and health over the life course. The extensive literature on the positive relationship between exercise and health would suggest that we should see a clear relationship between participation in sport and health status as measured in our survey.

Figure 6.4: PCS Score by Age Group and Whether Participate Regularly in Sport

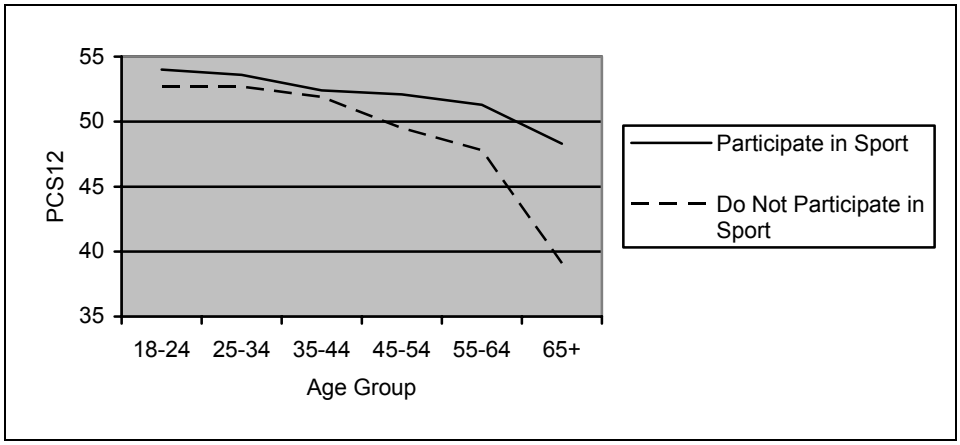
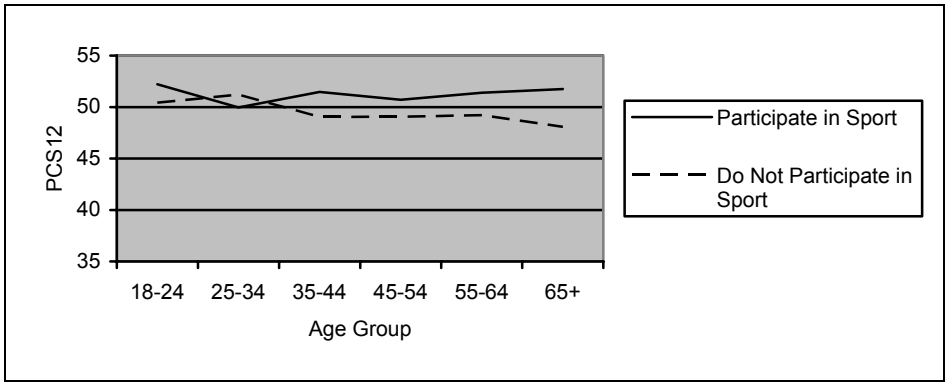


Figure 6.4 shows the PCS scores by age group for two groups: those who report regularly participating in sport at the time of interview and those who do not. Participating 'regularly' here is defined as participating in a sport twelve or more times a year or, roughly speaking, at least once a month. Figure 6.4 shows that although the lines for those who participate and those who do not are fairly close together in the youngest age groups, after the age of 35 years the lines diverge and the physical health of those who do not participate drops more steeply than those who participate. We should emphasise here that we are presenting current participation, not participation across the individual's life, so those who are participating after age 60 years for instance may never have participated in sport before age 60 years. The PCS value is the mean across the population at each age. It could be then that those 60 year olds who have been regularly participating for forty years already will have a PCS score similar to those of a much younger age.

Figure 6.5 shows the same information, but this time for the MCS or mental component score. This presents a very different pattern to the PCS scores with participants and non-participants changing places in the youngest age groups before adopting different trends with participants trending upward and non-participants downward. The two trends are not constant for either group, but by age 65 years participants actually have better mental health than at any age after 25 years and non-participants are at the lowest point across the whole life course. These results suggest that sports participation is very strongly associated with better mental and

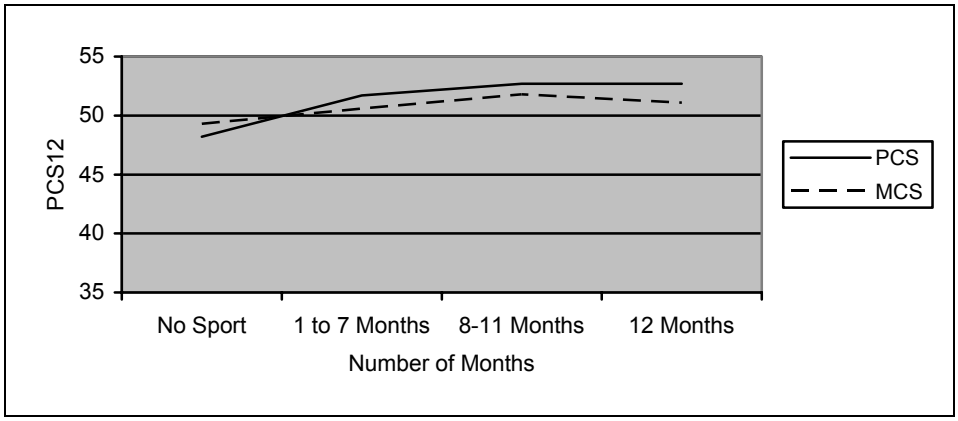
physical health with very different patterns evident for participants relative to non-participants over the life course. If the relationship between participation and health were causal, these results would provide strong evidence for concerted programmes aimed at increasing participation, but caution is necessary as these results are merely associations and could largely reflect the factors that allow people to participate in sport that we discussed earlier.

Figure 6.5: MCS Score by Age Group and Whether Participate Regularly in Sport



Does the frequency of sport played regularly have a health impact? Figure 6.6 shows the relationship between the number of months spent participating each year and the two health measures and shows that the main difference is between those who do no sport and those who do play, but even among the latter there is a rise in health as the number of months per year increases. For mental health there is a fall for those participating for 12 months of the year. It is important to remember here that we are not controlling for the distribution of other characteristics.

Figure 6.6: Physical Health Component Score by Number of Months Participating Per Year



6.7 Health and Participation in Sport Across the Life Course

The last section showed that the PCS and MCS measures are strongly associated with the level of sports participation undertaken by individuals, but to what extent does past participation still contribute to present health? It could be, as discussed under the framework of health capital, that sport in the past improves health, or at least offsets the health damaging effects of ageing and that the greater the amount of sport played in the past, measured both as years and as intensity, the larger this effect. As stated in

the model, health slowly depreciates once sport participation ceases, but it still leaves a residual positive effect until depreciation reduces this to zero.

To detect these effects from past participation we will need to control for present exercise, since the association with having played in the past and currently playing means that measures of past participation will seem positive simply by association. Controlling for being a current regular participant will also not be enough since we do not want to fail to differentiate between the benefits of light intensity sport currently and high intensity sport in the past. In the analyses to come we control for being a regular participant, the level of intensity of the sport (on a four point scale) and the number of days per week on which sport is played. This then gives us a measure of both the frequency and intensity of current sport participation and we will be investigating the impact of past sports participation net of this.

We begin the analyses by getting a descriptive idea of the relationship between health and participation, both past and present. Figure 6.7 shows the average level of health for the four possible combinations of past participation and current participation (neither participated in the past nor does so currently, participated in the past but does not do so currently, participantes currently but did not do so in the past, participates currently and also did so in the past). Here 'past participation' means participation at some point during the five years prior to the most recent year (so as not to count current participation). If previous participation has an impact on current health we would expect to see a gradient in health. Those at no stage participating will have the worst health; followed by those who did so in the past but do not currently; followed by those currently participating but who did not in the past; while, finally, those who participated in the past and do so currently should have the best health.

Figure 6.7: Mean PCS by Participation Past and Present

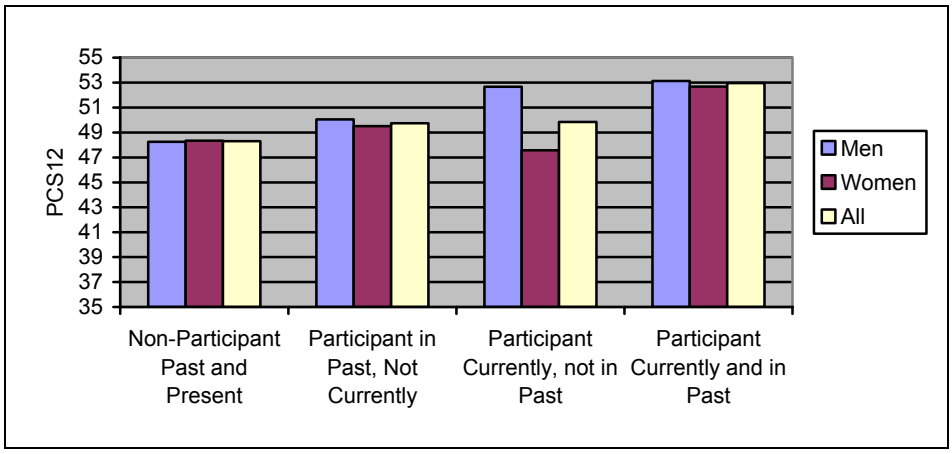


Figure 6.7 shows that this is exactly what we see for men at least. Here the level of health increases left to right in much the way predicted, although there is a very marginal difference between those participating currently, but not in the past and those participating in both periods. This could suggest that, although past participation has an effect, it is quite small when compared to the impact of current sports participation. The pattern for women is not as straightforward. The PCS for women who participate currently but did not do so in the past is lower than that for women who did participate in the past but do not currently. This is a difficult pattern to

explain if we assume that current participation has more impact on current health than past participation. But, once again, we should be wary of drawing conclusions without controlling for other factors that may confound the relationship.

Figure 6.8: Mean MCS by Participation Past and Present

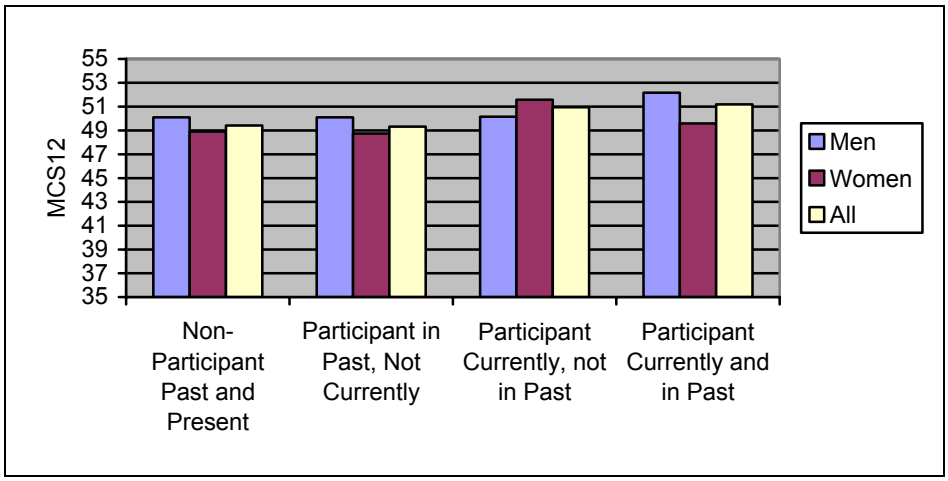
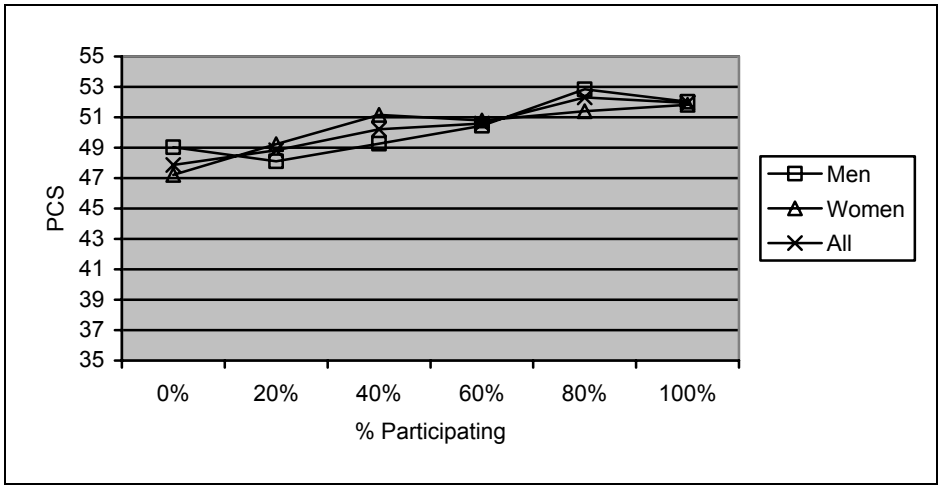


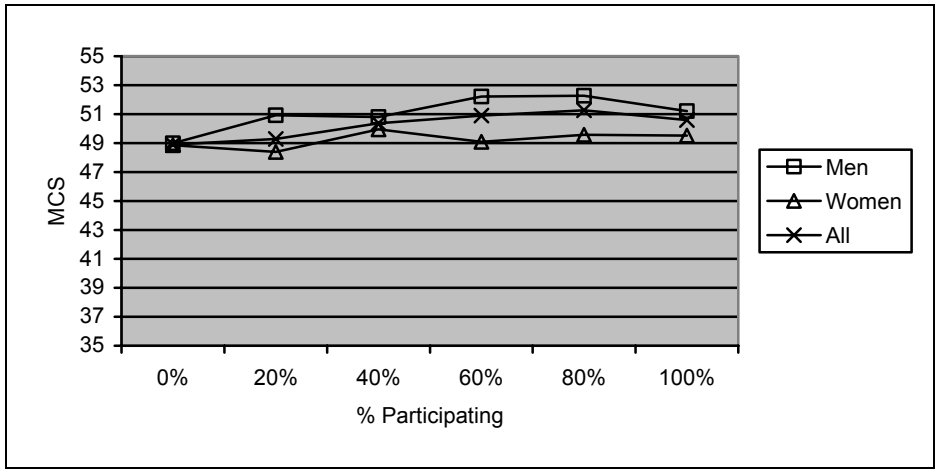
Figure 6.8 shows the same relationships, but this time for the MCS measure of mental health. Here again there is a generally upward trend left to right with current participation having a positive influence on mental health. Past participation appears to have a limited impact overall, but this disguises pronounced differences by sex. For men the significant difference is between those who participate both currently and in the past and all others. Among women, on the other hand, those who participate currently but did not do so in the past have a higher level of health than those who participated in both periods.

Figure 6.9: PCS Score by Sex and Proportion of Life Participating in Sport



Figures 6.7 and 6.8 reveal some relationship between past participation and health, but the patterns are complex and vary by sex. This could be because we are looking only at the last five years and not a longer period of people's lives. We rectify this in Figure 6.9 which shows the PCS score by proportion of person's life participating in sport. Here we see an upward trend between proportion of life participating and physical health for both men and women, although the pattern is not constant and we see falls for men and women at different points.

Figure 6.10: MCS Score by Sex and Proportion of Life Participating in Sport



The pattern for mental health by proportion of the person's life participating shown in Figure 6.10, is not as simple as that found for the PCS measure. Tests show that there is a linear relationship here that is positive and statistically significant for men, but no significant relationship for women. The complexity of the relationship between participation in sport and health may stem in part from the impact of other factors that we do not take account of in these analyses. Aside from the person's age, sex and their current sports participation, we have no control over other important factors, such as income and education, which we know to have an impact on physical and mental health. To get a better view of the impact that past participation has on health status we need to 'extract' the effect of these other factors and in so doing uncover the underlying effect of past participation. We do this using a simple statistical model called an 'ordinary least squares' (OLS) regression. We estimate the person's PCS and MCS scores separately. Because OLS regression assumes that the dependent variable is continuous and not necessarily positive, we transform the PCS and MCS variables, the original forms of which vary between zero and one hundred. We transform them into a 'z-score', where the mean is taken from each person's PCS/MCS and each is then divided by the standard deviation. We estimate PCS/MCS using:

***Socio-economic variables**:*

- Age (in this case the person's age divided by 10).
- Whether they are female.
- Education (Primary or less, Junior Certificate, Leaving Certificate, degree, postgraduate).
- Household equivalised (Modified OECD) income (logged[15]).

***Current sports participation variables**:*

- Whether they play sport regularly (at least once a month).
- The intensity of sport played (no effort, low, medium, high intensity).
- Days per week playing sport.

[15] The income variable is 'logged', i.e. statistically transformed to facilitate statistical analysis.

Past sports participation variables:

- Number of Years playing low intensity sport (standardised within age/sex groups) over life course.
- Number of Years playing moderate intensity sport (standardised within age/sex groups) over life course.
- Number of Years playing high intensity sport (standardised within age/sex groups) over life course.
- Years since participated in sport at three different levels of intensity.

The full results from these models can be found in Appendix B. Here we discuss the main results and illustrate their implications using more accessible charts.

6.8 Physical Health

Before we turn to the impact of participating in sport across the life course it is first useful to look at the effect some of the other variables had on health controlling for other factors. The results showed that being younger, better educated and having a higher income were all strongly associated with higher levels of both physical and mental health, irrespective of the person's level of participation either currently or in the past. As expected, being a regular participant in sport also had a significant and positive influence on physical and mental health, although the size of the effect for mental health was smaller and only marginally statistically significant, if at all[16]. The relationship between current participation and physical health differs by the intensity of participation. In the model, only low intensity participation is found to be a significant and positive influence on physical health. Higher levels of intensity do not appear to be related to higher levels of health. We'll return to the interpretation of this unexpected result shortly.

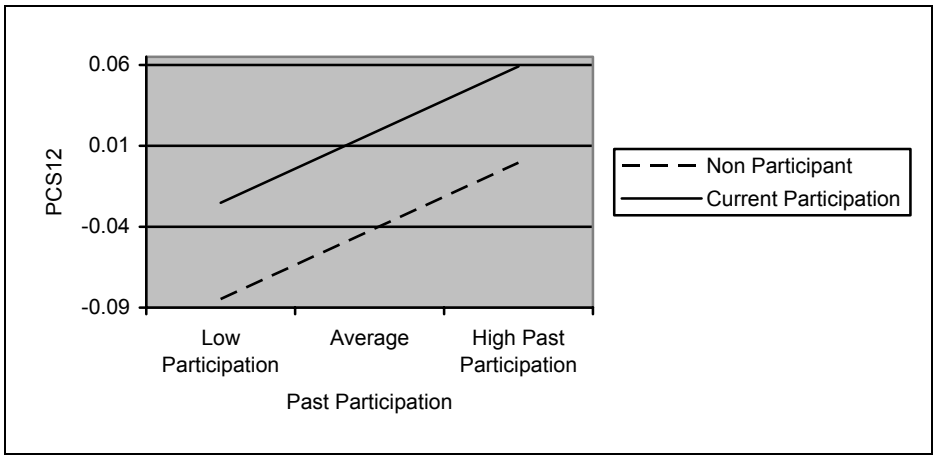
Turning to the relationship between health and past participation in sport, the pattern with respect to intensity changes. For past participation, he number of years playing high intensity sport has a positive and significant relationship to current physical health (the PCS measure), even controlling for current participation. A past history of moderate or low intensity sport does not seem to have any bearing on current physical health. This finding contrasts with that for current health, where the main influence seems to be from low intensity sports. Three other variables were included in the model to measure the effect of depreciation in health since sport was last played at a given level. Only the variable representing the number of years since low intensity sport was played was found to be significant and this had a negative effect, i.e. as the number of years since sport was played increased, the level of health decreased. However, this negative effect emerged only after we controlled for a significant interaction between past participation and number of years since participation in low intensity exercise. This result confirms our hypothesis that stopping playing sport would be associated with a significant decrease in health status (for full results see Appendix B, Tables B1 and B2).

[16] Only the variable indicating that the person was a regular participant was marginally significant (P=0.052) and this significance disappeared when the intensity of the sport was controlled for (no significant interactions were found).

The measures of past participation were not as effective at predicting the MCS measure. None of the measures proved to be a significant addition to the model. Overall, the model of the MCS measure performed worse than that for the PCS measure suggesting that many other processes influence mental health than those specified in our models.

It is easier to understand the influence of past participation if we use the OLS models estimated to predict the health status of groups of individuals with given characteristics. The models allow us to predict the health status of men and women of average age, education and income who have different levels of past participation and either do or do not currently participate. An example of this prediction is shown in Figure 6.11. Here we predict the health of men of average age, education and income, but with varying levels of current and past participation. This shows that those who are current participants have higher levels of health irrespective of their past participation and so their line lies always above that for those who do not currently participate.[17] For both groups, however, a larger number of years participating in the past leads to a higher level of health. It is hard to quantify precisely how much health benefit is associated with having played higher levels of sport in the past. However, we can compare the effect of past sports participation to ageing to get a sense of the size of the effect. Using a standardised coefficient[18] for both age and past sports participation we find that having played a high level of sport in the past rather than a low level is akin to gaining around a third of a decade's worth of health. This is not an insignificant gain in health terms, but it is much less than the health gain associated with participating regularly at the time of the survey. Currently participating regularly has the same health effect as losing around 14 years of age. Analysis of the depreciation effect shows that health drops an amount equal to 2 years of age for each five-year period since participating.

Figure 6.11: Predicted PCS by Past and Present Sports Participation



[17] No significant interaction was found between currently participating and past participating and so none was specified. With a larger number of cases it would be possible to model this relationship.

[18] In statistical models the impact of age would be measured in decades whereas sports participation is measured in individual years. A 'standardised coefficient' allows us to directly compare a unit increase of 'age' to one of 'sports participation'.

6.9 Conclusions

This chapter has examined the relationship between participation in sport and health and in particular, the relationship between past participation in sport and current health status. There has been some work in the medical literature on the impact of past levels of exercise, but this work tends to have been on specific conditions such as osteoporosis and has not developed a conceptual model of the value of sport for health across the life course. The health economics literature on the other hand has had an explicit model of the relationship between exercise and health since the early 1970s in the form of the Grossman model of 'health capital'. Although simple, this model sets out a formal model of the relationship between past levels of sport/exercise and health that we used to guide our analyses. Our results showed that those individuals who are currently participating in sport have a significantly higher self-assessed health than those who do not. This is true for both mental and physical health, although more sophisticated analyses showed that once we control for factors such as age, sex, education and income, regular participation is only weakly associated with better mental health. Analysis of the effects of participation on physical health showed that participation, even at a low intensity, was most important. Indeed, the results showed that there was no additional value from moderate and high intensity sport. It is necessary to reiterate the caveat here that the data used in this chapter is cross-sectional in nature (i.e. it was collected at a single point in time) and this means that it is not possible to exclude the possibility that low levels of participation are a direct result of poor health, rather than the reverse.

The 'health capital' model hypothesizes that past sports participation will improve current health, but that the positive impact of this participation will depreciate the longer the period since participation ceased. Our results confirmed both these effects, but only for physical health. No effects for past participation were found for mental health. Higher levels of past sports participation were associated with better physical health at interview, but only the extent of high intensity sport in the past was significant. This is a paradoxical result given the finding that low intensity participation currently is more strongly associated with current health, but it may be that there is a subtle relationship occurring here between current and past participation. High intensity sports do produce higher levels of cardiovascular health, amongst other benefits, but analyses earlier in this report showed that those playing team sports such as GAA, soccer and rugby (which also tend to be high intensity) are much more likely to drop out of sport altogether after age 20 years than those who take part in individual sports (swimming, aerobics etc). Given this, the overall level of health benefit conferred by high intensity sports over the lifetime may actually be lower than that from low intensity sports, thus producing the paradoxical effects of current and past sports participation.

Analysis of the depreciation effect on the other hand showed that current health does decrease, the longer the period since last participation. However, once again, we found this effect only for low intensity exercise. Translating these statistical effects into a form that is readily understandable presents problems since we have no physiological analogue to the PCS scale (e.g. what does a three point increase in the PCS scale mean in practice?). However, we can compare the effect of participation, to a certain extent, to that found for age. Doing this we found that if we could magically transform someone who had a low level of participation in the

past into someone with a high level of participation, this would lead to an improvement in their health akin to making them just over three years younger. This is a significant result, but it should be put in the context of the impact of current participation, which has a much greater effect. Results showed that this was associated with an increase in health akin to a 14-year decrease in age.

Taken together, these results suggest that encouraging and facilitating participation in sport should be a priority for policymakers who would like to improve population health. Not only is more sports participation associated with better health, but it is clear that even low intensity sport can have a large positive effect on health. Moreover, our results would also suggest that taking up a sport will have a significant effect irrespective of past sports participation.

7. CONCLUSIONS

7.1 Ten Questions, Ten Answers

Chapter 1 listed ten research questions that this report set out to address. The transformation of the 2003 SSPE data into individual sporting histories has allowed each question to be addressed, although some have been more comprehensively answered than others.

(1) Does the current generation of Irish adults play more or less sport than its predecessors?

The answer to this questions seems unequivocally to be 'more'. The current generation plays more sport than its predecessors; in fact, very much more. It is of course possible to argue that the methodology employed here placed too great a reliance on individual's memories. However, the small number of respondents who explicitly failed to recall their sporting past, the consistency in the pattern of participation across the life-span, and the pronounced changes in the patterns for different sports suggest that the data and the associated findings are valid.

(2) Did the current generation of Irish adults play more or less sport as children than previous generations?

Again, the answer appears to be 'more'. Roughly speaking, the current generation of young adults played two-thirds as much sport again as under-18s than their parents' generation did. In the case of both adults and children, the largest increase in participation predates the Celtic Tiger era.

(3) Which sports have increased in popularity over recent decades and which have declined?

The biggest changes here are the relative decline of Gaelic games over several decades and the sharp rise in activities categorised as 'aerobics/keep-fit' since the mid-1980s. For adults aged 45-59 years in 2003, Gaelic games accounted for over 40 per cent of their childhood sporting experience, more than twice that accounted for by swimming and soccer. Just one generation later, more children were swimming and playing soccer than playing either Gaelic football or hurling/camogie. This is a dramatic change in the sporting landscape. Furthermore, the relative decline of the GAA among adults is even more pronounced.

It is important to note that the decline of the GAA is *relative*. It reflects a failure to keep pace with the growing popularity of other sports, rather than an absolute decrease in the numbers playing. Nevertheless, the relative decline is sharp. Within a single generation Gaelic games have gone from being the clear front runner to somewhere back in the pack, lagging well behind swimming, soccer, golf and aerobics/keep-fit. The growth in the latter is truly impressive, amounting to 12 per cent a year extended over

two decades. Although this growth performance far outstrips that of any other sport, it is nevertheless indicative of a more general trend, whereby individual sports, especially personal fitness activities, also including jogging and swimming, have grown faster than team sports.

(4) What are the trends regarding the amount and range of sport offered by schools?

To a large degree, sport being played at school has mirrored rather than driven the changing pattern of participation across sports. That is, provision of sport in schools is not the main reason behind the changes in popularity of different sports. There are exceptions to this, however, notably the increase in participation by children in indoor sports such as basketball and badminton. This increase occurred primarily between the 1960s and 1980s and probably resulted from the expansion of Irish education during that period and the improved access to indoor sporting facilities that accompanied it.

(5) How does the playing of sport vary across people's lifetimes?

The proportion of individuals who participate regularly in sport climbs steeply during childhood and peaks at age 15 years. There is a substantial fall during the late teenage years, followed by a more gentle decline across the decades of adulthood. However, the link between participation and age identified by previous research has been exaggerated by the fact that the amount of sport played has increased in more recent cohorts. To a large extent, older people play less sport not because they are older, but because they belong to a generation that has played less sport throughout the life course. Once this effect is accounted for, the fall-off in participation with age is much less severe. Apart from the general participation increase, however, the pattern of participation across the life course has remained stable over recent decades.

There are contrasting patterns for team and individual sport. Team sports are largely responsible for the peak at age 15 years and fall away very sharply thereafter. By contrast, participation in individual sports continues to rise until the early twenties and declines only very slowly with age, if at all. The decline is offset by new participants taking up sport as they retire. The result is that 76 per cent of all adult sport is individual sport, rather than team sport.

(6) What factors determine whether people play sport at different life-stages?

The present analysis confirms previous findings regarding the major factors that determine participation in sport. Educational attainment, gender, age, income and coming from a sporting family, stand out as key determinants of playing sport. However, there are marked differences in the way these factors relate to participation at different life stages.

The impact of gender is particularly interesting. Gender is a very strong determinant of sporting behaviour in young children, with boys surging ahead well before 10 years of age. This generates a gender gap in sport that never closes. Large numbers of girls participate in team sports during the early second-level school years, but they quickly drop out and do not

continue participation through to adulthood. Interestingly, however, women who play sport are no more inclined to drop out than men. Moreover, women with equivalent sporting histories at age 20 years are equally likely to take up sport. These findings defy the simple explanation that females are simply less interested in sport, since their behaviour as adults is not consistent with this. Instead, the data suggest that young girls are being denied the same sporting opportunities as young boys and that this different treatment opens up a gender gap that never closes.

The effect of social background is more telling with respect to individual than team sports. Since people participate in individual sports much further into adulthood, this helps to explain why the link between social disadvantage and adult sport is so strong. The impact of social disadvantage, measured by low educational attainment and low income, is apparent from a very young age, but strengthens across the life course. It is enhanced by the fact that people in professional occupations are also more likely to play sport, even after educational attainment and income have been controlled for. Indeed, participation in individual sports among higher socio-economic groups does not peak until well into people's thirties.

(7) Have these factors changed across generations?

The answer to this question seems to be: surprisingly little. There is evidence that the gender gap has narrowed during the second-level school years, but girls' apparent disenchantment with team sports means that the narrowing is short-lived – by age 18 years the gender gap is very wide again.

As regards the relationship between disadvantage and participation, there is very little evidence that it is changing over time. However, there is a danger that, should the recent rising trend in aerobics/keep-fit be sustained, it may lead to a strengthening of the socio-economic bias within sport. The *Quarterly National Household Survey* 2006 (QNHS) data, at least from initial univariate analysis, documents a social gradient among people who engage in these personal fitness activities that is even stronger than already exists across other sports.

(8) Is there a relationship between the amount of sport people play and their health?

Those who participate in sport and exercise experience better physical and mental health. By finding a relationship between the amount of sport played across the life-time and health, we can be more confident that the relationship reflects an improvement in health due to participation in sport and exercise, not just the ability of healthy people to engage in more sport and exercise. We estimate that regular participation in sport is equivalent, in health terms, to being 14 years younger.

(9) Does the amount of sport people have played in the past contribute to their current health?

The short answer again is 'yes', at least for physical health, if not for mental health. The methods employed here allow us to estimate the impact of past playing of sport net of whether individuals currently play. That impact appears to be significant, at least for more physically demanding sports. This, in fact, is a stringent test, because one of the ways playing

sport may be good for people's future health is to increase the likelihood that they play sport in future. This advantage is ruled out by the methodology and still there is a relationship apparent between current health and past participation. We estimated that the difference between someone with low past participation and someone with high past participation is equivalent in health terms to being three years younger.

(10) What are the policy implications of trends in the playing of sport in Ireland?

7.2 Policy Implications

As this is the fifth in a series of research reports, the policy implications of the research reported in its main chapters should be read in conjunction with those of the previous reports. Fahey *et al.* (2004) outline general policy principles and expectations for increasing adult participation in sport. Delaney and Fahey (2005) present conclusions regarding how sports policy fits into wider social policy, specifically with respect to enhancing social capital. Fahey *et al.* (2005) offer ways that policy can improve the quantity and quality of school sport. Lunn (2007a) provides potential policy solutions for increasing participation in sport among the disadvantaged, having concluded that sports policy is currently regressive (it transfers resources from the less well-off to the better-off). The policy implications offered below are intended to be complementary to these previous pieces of research.

(1) Adding the current analysis to the body of research on Irish sport that has now accumulated, it is plain that sports policy needs to change if it is to be brought into line with the available evidence. To some degree, it is inevitable that policy reform lags behind available research and policy should not slavishly follow the twists and turns of the latest findings, nor necessarily change until the evidence that informs it becomes weighty enough to be considered reliable. It is to the credit of past sports policy that a body of research has been funded and reliable evidence on participation in sport is now available to inform policymakers. Nevertheless, given that body of evidence, collected from three separate data-sources between 2003 and 2006, the point has surely been reached whereby the evidence demands change. In particular, relative to the research findings that have emerged from these surveys, current policy appears to be out of step in terms of two broad themes. First, considering the kinds of sport and exercise activities that we now know to be undertaken in Ireland, policy has too great an emphasis on traditional team sports. Second, policy relies very heavily on the provision of facilities to increase participation in sport, yet an accumulation of evidence now suggests that reliance on facilities is unlikely to yield the best returns. **There is a real danger that Irish sports policy remains stuck in a former era and fails to adapt to an Ireland in which people's expectations of maintaining higher degrees of health and fitness throughout their lives have changed. Policy urgently needs to be updated in light of its evidence base, with which there is currently a clear disjunction.**

(2) It is common to suggest that one reason for the rise in levels of obesity and overweight, especially in children, is that fewer people are engaging in regular physical activity. Great emphasis is frequently placed on sport, especially school sport, as a potential solution to this problem. Previous research (see Fahey *et al.*, 2005) has suggested that, while sport and exercise have undoubted health benefits, their potential contribution to reducing obesity and overweight is modest in comparison with potential changes in diet. Further to this, the present findings show that levels of physical activity associated with playing sport are climbing substantially and have done so for at least a generation – current Irish children and adults play much more sport than previous cohorts. **Policymakers should, therefore, recognise that the current problems of obesity and overweight cannot be the result of people doing less sport and recreational exercise, because people are doing more sport and recreational exercise.** This is not to say that overall levels of physical activity are necessarily rising, nor that sports policy has no role to play in encouraging less sedentary lifestyles. But it is important that sport not be blamed for causing a topical and high-profile health problem when, in fact, the evidence suggests that an increase in sport-related activity is contributing to significant improvements in health for many adults.

(3) The Sports Capital Programme (SCP) is the flagship policy for grassroots sport. It distributes the majority of resources devoted to non-elite sport. It is not possible to measure the returns to this investment precisely, in terms of numbers participating and the associated benefits. Nevertheless, in the absence of accurate assessments of such returns and ignoring, for present purposes, the fact that research suggests providing more facilities is unlikely to be the best way to increase participation in sport, if large amounts of public money are to be spent on facilities, the projects chosen ought at least to reflect levels of use and potential future use. This linkage was clearly identified as important by the recent expenditure review of the SCP, which called for reliable data on levels and trends in participation (see Chapter 1). Research has now delivered the requested data. **The data show that the Sports Capital Programme currently devotes the lion's share of the available resources to sports that have relatively low and declining popularity, especially Gaelic games.** Gaelic games account for over one-third of all grants under the scheme, thereby receiving much more funding than other sports that are already more popular and are continuing to grow in popularity. Generally, the SCP also has a strong bias towards team sports. If funding for facilities through the SCP does increase participation then levels of involvement should be rising particularly in those sports most generously supported. This is not the case. Instead, the distribution of funding is at odds with levels and trends in participation. Assuming that some of these issues will be dealt with by the forthcoming National Facilities Strategy, there is an obvious need for the strategy to make extensive use of the newly available

participation data. Included in this should be the data available from the QNHS (2006) sample that matches the long- and medium-term trends found in the present analysis. The QNHS data show that what demand there is for facilities appears to be concentrated on swimming pools, walkways and fitness centres, in line with the trends identified here.

(4) One of the reasons for the current distribution of resources through the SCP is that the scheme responds to applications made and is therefore biased towards those sports that have the pre-existing organisational capacity to take advantage. As has been highlighted by Delaney and Fahey (2005), the GAA is unsurpassed as a model of social organisation in sport, accounting for the largest part of sport-related volunteering. Many other sports could learn much from its model. The disproportionate share of the SCP money acquired by GAA clubs in part reflects this success and longevity in organisation. Similarly, albeit on a smaller scale, the Irish Sports Council needs to examine the degree to which its financial support and promotional activity is distributed across the different sporting activities. **If the aim of policy is to increase participation in sport, then policy needs to find a way to channel a larger share of funding to new sporting enterprises and to growing ones in particular.** In a changing environment, pre-existing established organisations are bound to reflect the patterns of the past. Instead, policy needs to adjust to support faster-growing sports.

(5) Given the findings presented, it is highly likely that today's children and young adults will play more sport as older adults than today's older adults play at present. The vast majority of the increase in participation, at least outside second-level school, relates to individual (as opposed to team) sports. Thus, there is likely to be a further expansion of the more popular individual sports. **Sports policy needs to recognise the trend towards individual sports such as swimming, fitness training (of several different sorts) and jogging, and to devote a greater share of its efforts to promoting and supporting these increasingly popular activities.**

(6) That said, there is one serious danger associated with the trends identified with respect to the relative popularity of sports, namely that it may exacerbate the association between social disadvantage and playing sport. Although it still awaits full multivariate analysis, a univariate examination of the QNHS (2006) data suggests that these popular and expanding activities are being adopted disproportionately by the better-off in society. With respect to fitness centres, classes and gyms in particular, there is an important question regarding the affordability of participation. **Sports policy needs to address affordability, promotion and access issues surrounding increasingly popular personal exercise activities, if it is to prevent a further increase in socio-economic**

inequality in sporting participation. This issue presents something of a challenge to policymakers, as many of the providers of opportunities in these areas are not voluntary sports clubs, but private companies. Thus, deciding on an appropriate mechanism for public policy to support greater participation in this area will require careful deliberation.

(7) Despite an equivalent interest between adult men and women in sport and physical exercise, as children, girls fare poorly in terms of participation relative to boys. Furthermore, the gender gap appears at such a young age that it is not credible to argue that this pattern reflects the natural interests of girls and boys. By prioritising sport for boys, schools and parents allow girls to lag behind and this gender gap is never made up, with all the associated implications for future health and other benefits that sport can bring. **Sports policymakers need to work with primary schools and sports clubs to ensure that young girls are given the same sporting opportunities and encouragement as young boys.**

(8) The development of the gender gap is particularly striking during the second-level years, where there is a sharp rise in girls playing team sports followed by an equally sharp fall just two or three years later. It is clear from the data that the sports offered to girls at second-level are largely unappealing to them. Note that the pattern does not reflect a general disenchantment with sport and exercise on behalf of teenage girls, since their participation in individual sports continues to rise during this period. **Sport and education policymakers need to look at ways to improve the range of sports offered to girls at second-level and, in particular, to provide opportunities to engage with individual sports that are more appealing to girls at this age.** This is an area where more data and research is required, although it is clear that a broader range of individual sports and exercise activities will be part of a more appealing mix of activities for teenage girls.

(9) The extra evidence on the relationship between sport and social disadvantage provided in this report is consistent with the analysis and ten policy implications presented and derived in Lunn (2007a). However, the evidence provided in Chapter 5, based on sport across the whole life course, offers some further insights. Assuming that there has not been a very radical change within the current generation of schoolchildren, social disadvantage affects the amount of sport played by children from well before the age of 10 years. This finding is strongest in respect of individual sports and goes well beyond the negative effect of attending a designated 'disadvantaged' school, which was identified in the previous work. It, therefore, extends the finding of striking inequalities in sport to children, including very young children. **In order to tackle the impact of social disadvantage on participation in sport, policymakers need to consider the problem for children as young as 5-10 years of age. There is, therefore, a strong case**

for redirecting greater resources to schools and sports clubs that welcome and attract young children from less well-off backgrounds.

(10) Despite some of the challenges facing sports policy outlined above, there are plenty of reasons for optimism. The amount of sport being played has grown strongly. The timescale over which the increase has occurred and the nature of the activities that are growing most in popularity strongly suggest that many individuals understand the benefits of sport and exercise, and act so as to take advantage of them. Meanwhile, our understanding of the current state of participation in sport has improved greatly and is now fairly comprehensive – a major advance on just a decade ago. However, our understanding of the forces of change is more sketchy. A large proportion of adult sport is taken up after the age of 20 years, because many adults drop out from playing regular sport, while many others take it up, often for the first time. Thus, a better understanding of the forces that lead people to make these transitions might allow policymakers to increase further the flow of new participants into sport and to stem the flow out. **Policy formation would benefit from future research that focuses more on the routes individuals take into and out of sport, the information available to them at the time, and the factors influencing their decisions.** Our understanding of the overall picture of participation is now quite good, but our understanding of the individual brushstrokes that combine to produce it could improve greatly.

APPENDIX A – DATA TRANSFORMATION AND MULTIVARIATE ANALYSIS OF PARTICIPATION

A1 Introduction

This appendix gives more detail about the transformation of the SSPE data to form individual sporting histories and presents full multivariate models, which provide the basis for selecting and quanitifying the results provided in the main report.

The relevant section of the SSPE presented survey respondents with over 60 different sporting activities and asked them to state whether they had ever played any of them "on a regular basis". If so, it recorded what the sport was, the age at which the respondent started playing the sport, whether they played the sport at primary school, whether they played the sport at secondary school, the age at which they stopped playing, and the reason why they stopped. The same questions were also asked of any sport that the respondent was still playing at the time of the interview. The historical section allowed respondents to describe in detail up to three sports they used to play regularly and four they currently play.

In the data set, details exist for each individual for anything up to seven different sports. A computer programme was generated to order these different sports according to starting age, thereby making each respondent's sporting history chronological. The data were then further transformed such that, for each year of life up to their current age, variables described whether the person was playing regular sport, how many sports, and what type of sport (i.e. team or individual). It is from these year-by-year variables that the sport hills are constructed for the main text, as each can be broken down by educational attainment, gender, age, and so on. Once a year-by-year chronology is available, it is easy to generate variables corresponding to whether respondents played sport at any given age, allowing logistic regression analysis to be conducted for participation specific to that age. Moreover, variables can be created for an initial state at any given age and combined with a length of 'survival' for that state,

accounting for censorship due to current age, all of which are necessary for the multivariate survival analysis.

The multivariate analysis of factors influencing the sport hill employed two types of regression model: logistic regression and Cox regression. The former was used to examine the determinants of playing team and individual sports at age 10, 15 and 20 years. The latter was used to look at the determinants of taking up or dropping out from sport after age 20 years.

This modelling strategy follows from univariate analysis of the sport hill produced from people's sporting histories, which confirms that up to age 20 years there were 'key transition' points in the likelihood that individuals played sport. The sport hill displays kinks in the curve at around age 11 years, coinciding with the transition from primary to second-level school, and again at around 18 years, coinciding with the transition to college or the labour market. From age 20 years onwards, the sport hill consists of a smooth and steady decline. Thus, the shape of the hill dictates different modelling strategies at different ages. Up to age 20 years, the aim is to examine the determinants of playing regular sport at three stages: primary school, second-level, and after leaving school. Logistic regression is an appropriate tool for this job.

From age 20 years onwards, the issue is more one of the likelihood of that adults dropped out or took up regular sport. That is, the *rates* of take-up and drop-out are what matters and the risk factors that affect these rates. Furthermore, some of the observations in the data are censored, according to the age of respondents at the time of the survey. Hence, survival analysis is the appropriate method of multivariate analysis.

A.2 Logistic Regressions

Team and individual sports are modelled separately, owing to the different shape of the sport hill for each. In the six models presented, the dependent variables are whether the individual was playing a regular team sport or individual sport, at each of three ages: 10, 15 and 20 years.

The SSPE offers a long list of potential explanatory variables. The models presented are first produced by backward elimination, removing non-significant explanatory variables, then testing for significant interactions, of which there are several. For each of team and individual sports, any explanatory variable or interaction that is statistically significant for at least one of the three ages is included in the specification presented in this appendix, although, in practice, the results are robust to the inclusion of available background variables.[19] One variable that would be included in an ideal world is the educational attainment of parents, but this is not available in the SSPE. This omission raises the possibility that the variables corresponding to whether parents played sport are partly a proxy for parental education, although this potential confound is limited by the degree to which individual's own educational attainment reflects that of their parents.

[19] In fact, several different modelling strategies have now been adopted to look at this data, including forward stepwise selection, backward elimination and best subsets analysis. The models presented are robust to different specifications.

Most of the variables listed are self-explanatory, but the variable 'decade' has been constructed to examine the impact of cohort. This variable corresponds to the difference between the year of birth and the mean year of birth in the sample, measured in decades. Hence, one unit equates to being born one decade later. The 'income' variable relates to the log of equivalised household income,[20] divided by the interquartile range. Thus, one unit equates to the difference between the 25th and 75th percentile of the income distribution or, in everyday language, the difference between being moderately well-off and moderately badly-off. Of course, the income variable relates to household income at the time of the survey, which although likely to be strongly correlated with income in the past, can nevertheless only act as a proxy for it. Thus, there is considerable measurement error in the measurement of income and the likelihood is that the impact of income is stronger than that detected here. Similarly, variables relating to whether an individual has a professional occupation, owns a car, or lives in a large city are also measured at the time of the survey and are thus only proxies for an individual's past status.

Table A1 presents the three models for playing a team sport at ages 10, 15 and 20 years. The reference case is a non-professional female with lower second-level qualifications whose parents did not play regular sport. For each specification, the coefficient (β), standard error and odds ratio (exp(β)) are given, together with an indication of statistical significance. The odds ratio is a useful way to gain an intuitive grasp of the results. It expresses the odds that a person with the particular characteristic played sport at the relevant age, relative to the reference case.

Gender is a highly significant determinant of whether a person was playing a team sport at all ages, with males being very substantially more likely to play. However, the effect is significantly reduced at age 15 years, relative to ages 10 and 20 years, suggesting that girls were more likely to become involved in team sports at second-level school, but that their involvement did not continue into adulthood. Gender also features in two significant interactions in the models. The negative coefficient on the interaction between gender and cohort implies that while males were much more likely to play regular teams sports, the gender gap closed somewhat in more recent generations, as females increased participation in team sports more than males. The negative coefficient on the interaction between gender and professional status implies that the latter was a bigger factor for women and, in fact, appears not to be significant for men at all. Thus, women who went into professional occupations had more than twice the odds of playing a team sport at age 20 years. In general, however, the gender gap for team sports is very wide. Depending on the pattern of other covariates, employing the odds ratios given in the column exp(β), a male was five to ten times more likely to play a team sport at ages 10 and 20 years and some two to three times more likely to play a team sport at age 15 years.

[20] Income was equivalised using the modified OECD scale – see Lunn (2007a) for more detail.

Table A1: Logistic Regressions for the Determinants of Playing a Team Sport at 10, 15 and 20 Years of Age

	Age 10		Age 15		Age 20	
	ß (s.e.)	Exp (ß)	ß (s.e.)	Exp (ß)	ß (s.e.)	Exp (ß)
Male	2.291*** (0.168)	9.887	1.291*** (0.124)	3.637	2.393*** (0.168)	10.945
Decade	0.169 (0.348)	1.184	1.059*** (0.310)	2.884	0.329 (0.362)	1.390
Income	-0.044 (0.094)	0.957	0.215*** (0.082)	1.240	0.000 (0.093)	1.000
No 2nd level	-0.201 (0.196)	0.818	-0.357** (0.173)	0.700	-0.276 (0.196)	0.759
Leaving Certificate	0.018 (0.156)	1.018	0.187 (0.138)	1.206	0.057 (0.163)	1.058
Degree/diploma	-0.308* (0.173)	0.735	0.058 (0.154)	1.059	-0.010 (0.177)	0.990
Postgraduate	-0.639** (0.276)	0.528	-0.238 (0.245)	0.788	0.107 (0.276)	1.113
Mother played	0.076 (0.161)	1.079	-0.035 (0.146)	0.966	0.076 (0.161)	0.862
Father played	0.231* (0.128)	1.260	0.345*** (0.115)	1.411	0.421*** (0.131)	1.524
Professional	0.401* (0.240)	1.494	0.278 (0.176)	1.320	0.732*** (0.233)	2.080
Male*Decade	-0.257*** (0.087)	0.773	-0.258*** (0.064)	0.773	-0.253*** (0.086)	0.776
Decade*Income	0.043 (0.054)	1.044	-0.114** (0.048)	0.892	0.014 (0.055)	0.987
Male*Professional	-0.328 (0.271)	0.720	-0.235 (0.221)	0.790	-0.612** (0.264)	0.542
Constant	-2.064*** (0.618)	0.127	-2.290*** (0.535)	0.101	-2.511** (0.609)	0.081
Nagelkerke R^2	0.27		0.18		0.27	
N	1,886		1,886		1,821	

(*** $p < 0.01$, ** $p < 0.05$ * $p < 0.10$).

There is also a cohort effect, but it is limited to age 15 years, where being born a decade later increases the odds that an individual plays a team sport by two- to three-fold. This effect is stronger for girls and those of lower income, suggesting that second-level schools have increasingly involved children in team sports who might not otherwise be.

There are a number of effects of different variables relating to socio-economic status on playing team sports, most notably the impact of income on playing at age 15 years and professional occupations on playing at 20 years, but the effects, while significant, are nothing like as strong as the impact of gender. The column exp(ß) gives the odds ratio associated with each variable. Lastly, with respect to team sports, there is a consistent positive impact of having a father who played sport during the period when the individual was at school.

Turning to individual sports in Table A2, the pattern is very different. Gender has a much smaller, though still significant, impact. Girls were more likely to play individual sports at age 10 years, but by age 20 years this slight gender gap reversed. The impacts of cohort and of income are more consistent for individual sports, being strongly significant at all three ages. The likelihood that people born in later cohorts played an individual sport is greater at all three ages, while those of higher income also played substantially more.

Table A2: Logistic Regressions for the Determinants of Playing an Individual Sport at 10, 15 and 20 Years of Age

	Age 10		Age 15		Age 20	
	ß (s.e.)	Exp (ß)	ß (s.e.)	Exp (ß)	ß (s.e.)	Exp (ß)
Male	-0.378*** (0.119)	0.686	-0.156 (0.106)	0.855	0.324*** (0.108)	1.383
Decade	0.172*** (0.044)	1.188	0.134*** (0.037)	1.143	0.116*** (0.038)	1.123
Income	0.321*** (0.088)	1.379	0.317*** (0.078)	1.373	0.246*** (0.080)	1.279
No 2nd level	-0.411 (0.258)	0.663	-0.343* (0.208)	0.710	-0.232 (0.198)	0.793
Leaving Certificate	0.402** (0.168)	1.494	0.692*** (0.144)	1.997	0.683*** (0.149)	1.980
Degree/diploma	0.652*** (0.172)	1.920	0.965*** (0.152)	2.626	1.206*** (0.155)	3.341
Postgraduate	0.763*** (0.249)	2.144	1.010*** (0.233)	2.747	1.280*** (0.238)	3.596
Mother played	0.685*** (0.152)	1.983	0.394*** (0.146)	1.483	0.293* (0.153)	1.341
Father played	0.155 (0.132)	1.167	0.400*** (0.118)	1.491	0.389*** (0.121)	1.475
Large city	0.282** (0.135)	1.325	0.120 (0.125)	1.127	0.324** (0.127)	1.382
Constant	-3.829*** (0.575)	0.022	-3.397*** (0.512)	0.033	-3.172*** (0.524)	0.042
Nagelkerke R^2	0.16		0.19		0.20	
N	1,884		1,884		1,819	

(*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$).

The biggest difference between individual and team sports is the role of educational attainment. Individuals who went further in education were much more likely to play an individual sport at all ages, although this effect strengthens with age. Educational attainment is highly correlated between parents and children, so one possibility is that at age 10 and, perhaps, 15 years, the educational attainment of the parents is also a strong factor. The particularly high odds ratios for those who go on to third-level education reflects the sporting advantages of going to college, as discussed extensively in Lunn (2007a).

Three other aspects of the models for individual sports are noteworthy. First, the importance of parents is greater than for team sports. In

particular, having a sporting mother, over and above a sporting father, increases the odds that a person played an individual sport, especially at the youngest age. Second, there is the effect of geography. Living in a big city increases the odds of playing an individual sport. Third, unlike with team sports, there are no significant interactions for the individual sport models. This is particularly interesting with respect to the interactions with cohort. For team sports, the cohort-gender and cohort-income interactions suggest that the respective impacts of gender and income are weakening over time. There are no equivalent interactions with cohort for individual sports, suggesting that the effects of education, income, gender, parental involvement and geography are more stable over time.

A.3 Cox Regressions

Survival analysis is a way to examine the factors influencing the rate of transition from one state to another. In this case, the transitions in question are: (1) from playing regular sport to playing no sport and (2) taking up a new sport. These are referred to as 'drop-out' and 'take-up' respectively. Thus, survival analysis can be used to look at whether and when adults drop out from regular sport, and whether and when they take regular sport up.

Cox regression is a particular form of survival analysis, formally referred to as 'semi-parametric', that is useful for analysing data where the likelihood of making the transition in question varies appreciably over time. For instance, the sport hill displays a flatter section around retirement age. Unlike many other forms of survival analysis, where there is a need to model all these variations, Cox regressions only require that the factors influencing the transition, such as gender, educational attainment and so on, do so in the same proportion throughout the time period in question. That is, the influences of age, educational attainment, income and so on can vary across the life course, but they must do so in the same proportion relative to each other.

This latter assumption, the 'proportional hazards' assumption, is testable by examining the interaction between each covariate (or the log of each covariate) and time, which in the present case means age (Hosmer and Lemeshow, 1999). For all the models reported below, the proportional hazards assumption is satisfied, according to this test. However, initial work indicated that with the models for dropping out of sport, the influence of gender relative to the other explanatory variables was inconsistent with age. Based on their sporting histories, women dropped out more quickly than men in their early twenties, but more slowly in their thirties (Figure 4.6, main text). Thus, for drop-out, the two genders are modelled separately. The influence of gender on take-up proves to be consistent over time and so gender is included as a covariate in a single model.

Model specification is determined by forward selection and backward elimination, which both produce the same set of significant covariates in each case. The primary influences on adult sport, in line with Lunn (2007a), are educational attainment, gender, age (cohort), income and coming from a sporting family, as measured by whether, while at school, an individual's parents played sport. In the case of the take-up models, professional status and car ownership also turn out to be significant.

To be included in the sample for drop-out, individuals had to be playing a sport regularly at age 20 years. Thus, one important potential factor influencing the likelihood of drop-out concerns the individual's initial state, in terms of which sport(s) was (were) being played at age 20 years. Similarly, for take-up, individuals could, at age 20 years, already be playing a sport, or have previously played one and dropped out, or never have played one. The transition in question is whether and when they took up a new regular sport, over and above any they were already playing. In each case, drop-out and take-up, experience prior to age 20 years may influence subsequent behaviour. Thus, two specifications are reported for each model, one without variables relating to previous experience and one including variables relating to previous experience.

Table A3 presents Cox regressions for males dropping out from sport, having played regularly at age 20 years. Because this model assesses determinants of dropping out, a negative coefficient (β) implies a slower rate of dropping out. In a Cox regression, the exponential of the coefficient, exp(β), equates to the relative risk of dropping out. These relative risks are used to compile Tables 5.1 and 5.2 in Chapter 5. In the left hand model there are three variables that significantly reduce the rate at which the men in the sample dropped out from sport after age 20. Those in more recent cohorts, those with high incomes, and those with higher educational attainment dropped out more slowly.

Table A3: Cox Regressions for the Determinants of Dropping Out from Sport Having Played Regularly at Age 20 years – Males Only

	ß (s.e.)	Exp (ß)	ß (s.e.)	Exp (ß)
Decade	-0.141*** (0.052)	0.868	-0.064 (0.053)	0.938
Income	-0.392*** (0.113)	0.676	-0.395*** (0.113)	0.674
No 2nd level	-0.094 (0.185)	0.910	-0.093 (0.184)	0.912
Leaving Certificate	-0.303* (0.180)	0.738	-0.072 (0.187)	1.075
Degree/diploma	-0.331 (0.204)	0.718	0.006 (0.207)	1.006
Postgraduate	-0.788** (0.348)	0.455	-0.608* (0.350)	0.545
Mother played	-0.214 (0.225)	0.807	-0.284 (0.225)	0.752
Father played	-0.101 (0.152)	0.904	-0.190 (0.153)	0.827
Only ever team			1.373*** (0.226)	3.947
Team dropped individual			1.387** (0.553)	4.004
Individual dropped team			0.023 (0.366)	1.023
Plays both			-0.049 (0.264)	0.952
N		601		601

(*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$).

However, when the variables relating to sporting history are included in the model, the picture changes. There are five possible initial states at age 20 years: only having played a team sport, only having played an individual sport, playing a team sport having dropped an individual one, playing an individual sport having dropped a team one, and playing both. In the model, the reference case is only having played an individual sport. Those who had only ever played a team sport or were only playing a team sport having dropped any individual sports dropped out four times more quickly than people who played an individual sport. There is no significant difference associated with having dropped a team sport or playing both types of sport. Thus, the biggest determinant of dropping out is playing only a team sport. Those who played individual sports were much more likely to continue playing regular sport for longer. Moreover, it is this difference that accounts for the cohort effect. Once these extra variables are included, the 'Decade' variable is insignificant. The difference between the cohorts that was initially evident is the result of more people in more recent cohorts playing individual sports by age 20 years and, therefore, continuing to do so well into adulthood.

Table A4: Cox Regressions for the Determinants of Dropping Out from Sport having Played Regularly at Age 20 years – Females Only

	ß (s.e.)	Exp (ß)	ß (s.e.)	Exp (ß)
Decade	0.059 (0.079)	1.061	0.097 (0.081)	1.102
Income	0.118 (0.143)	1.125	0.158 (0.133)	1.172
No 2nd level	-0.295 (0.346)	0.745	-0.318 (0.339)	0.727
Leaving Certificate	-0.291 (0.253)	0.747	-0.350 (0.258)	0.705
Degree/diploma	-0.372 (0.262)	0.689	-0.197 (0.265)	0.821
Postgraduate	-1.351** (0.547)	0.259	-1.082** (0.550)	0.339
Mother played	-1.253*** (0.351)	0.286	-1.174*** (0.352)	0.309
Father played	0.238 (0.196)	1.269	0.297 (0.196)	1.346
Only ever team			1.475*** (0.226)	4.370
Team dropped individual			1.940*** (0.457)	6.959
Individual dropped team			-0.215 (0.254)	0.806
Plays both			-0.801* (0.473)	0.449
N	358		358	

(*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$).

Table A4 presents the equivalent analysis for females. In this case, because fewer women were playing sport at age 20 years, the sample is just 358, and the results should, therefore, be treated with some caution. While many of the variables (e.g. cohort and income) have coefficients of the

same sign as in the model for males, where the sample is 601, few reach statistical significance. Nevertheless, two variables stand out as having had an impact on females dropping out: educational attainment (to postgraduate level) and whether the individual had a sporting mother. This latter finding is particularly interesting, since the model is dealing with behaviour from age 20 years throughout adulthood, and yet those women who, while at school, had mothers who played sport, dropped out three times more slowly than those whose mothers did not play. The impact of coming from a family where women play sport is enduring.

Despite the small sample size, the effect of introducing the sporting history variables is even stronger for women than for men. Women who were playing only team sport at age 20 years dropped out very much faster; seven times faster if they had previously dropped an individual sport. However, those who were playing both types of sport were particularly likely to keep playing. The impact of postgraduate education and sporting mothers is unaffected by the introduction of the history variables, suggesting that both influence adult behaviour rather than the individual's situation at age 20 years.

Looking across the male and female models for dropping out, there are broad conclusions to be drawn. Those who had particularly high educational attainment were considerably less likely to drop out. But the single largest factor that influenced whether people continued to play sport well into adulthood is whether they played an individual sport rather than (or as well as) a team sport at age 20 years.

Table A5: Cox Regressions for the Determinants of Taking up a New Sport After Age 20 years

	ß (s.e.)	Exp (ß)	ß (s.e.)	Exp (ß)
Male	0.184** (0.088)	1.201	0.563 (0.093)	1.055
Decade	0.261*** (0.039)	1.299	0.257*** (0.040)	1.293
Income	0.351*** (0.067)	1.420	0.351*** (0.068)	1.421
No 2nd level	-0.103 (0.157)	0.902	-0.105 (0.157)	0.901
Leaving Certificate	0.112 (0.134)	1.118	0.059 (0.135)	1.061
Degree/diploma	0.469*** (0.142)	1.598	0.376*** (0.143)	1.456
Postgraduate	0.313*** (0.192)	1.671	0.388** (0.194)	1.475
No car	-0.514*** (0.152)	0.598	-0.473*** (0.180)	0.623
Professional	0.248** (0.107)	1.282	0.247** (0.106)	1.280
Dropped out			-0.252 (0.155)	0.778
Already plays			0.348*** (0.118)	1.416
N	2,049		2,049	

(*** p < 0.01, ** p < 0.05, * p < 0.10).

The last model to be considered is that for taking up a new sport from age 20 years, which is presented in Table A5. From the left-hand column, men, people in more recent cohorts, those of high income, people of higher educational attainment, those who own a car and people in professional occupations took up a new regular sport at a faster rate during adulthood. The relationships here are bigger than the equivalent relationships for dropping out. The influences of educational attainment and income are particularly strong for taking up sport, increasing the rate of take-up by somewhere close to 50 per cent. Because educational attainment and income are strongly correlated, this means that higher income people educated to third level took up sport at roughly twice the rate of those who are lower income and did not go on to third-level education. The cohort effect is also more notable. Being born one decade later is associated with an almost 30 per cent higher rate of take-up. The gender effect is small but significant, with men taking up sport at a 20 per cent higher rate.

However, gender is the one variable that ceases to be significant when sporting experience prior to age 20 years is included in the model (right-hand column). Three possible histories are included: already playing at age 20 years, having dropped out, and never having played. Those who already played a sport at age 20 years were significantly more likely to take up a new sport than those who had never played (the reference case). The negative impact of having previously dropped out is not statistically significant for this sample, although it is approaching significance and so a larger sample would be needed to be more definite. The disappearance of the gender effect when the history variables are included is an interesting finding. Further tests show that there is also no significant interaction between gender and the sporting history variables. This suggests that in the left-hand model gender was merely acting as a proxy for whether an individual already played a sport at age 20 years. Thus, whether people took up new sports as an adult was not associated with adult behaviour, as such, but was due to the fact that males were more likely to have been playing another regular sport already. Comparing like with like, women who had never played sport at age 20 years with men who had never played, and women who already played at age 20 years with men who already did, there is no gender difference in the rate at which they take up new sports.

Looking across the drop-out and take-up models, therefore, there is no evidence that adult women are any more likely to drop out from sport or take up sports, given their previous sporting history. Or, equivalently, the impact of gender on the likelihood of playing sport all stems from the gender gap during childhood. As discussed in the main text, that means that there may be a common misunderstanding about the relationship between gender and sport.

APPENDIX B – THE HEALTH PRODUCTION FUNCTION AND MULTIVARIATE ANALYSIS OF HEALTH MEASURES

B.1 The Health Production Function

Each individual begins life with a genetic health endowment and choices made over the lifetime such as taking exercise or smoking can increase or decrease the health capital stock. A person's stock of health capital can also be affected by a range of other factors including personal characteristics such as age, sex, education and environmental factors such as pollution. Random effects that the person cannot control, such as accidents, are also important, but may well interact with their other characteristics (young men for instance are far more likely to have accidents than young women or older men). All these different factors are combined in Grossman's model into the 'health production function' where health at any one particular point in time is a function of a large range of other factors including previous investments in health such as exercise. At its simplest, a person's health in any time period is the result of the stock of health in the previous time period (known as t-1), depreciation in health since t-1 (say through lack of exercise) and investments to improve health since t-1 (e.g. eating a balanced diet).

There are an impossibly large number of possible 'inputs' that are transformed, via the health production function into health 'outputs' and clearly the impact of these inputs is governed by biological processes and considerations, but the economic theory only aims to provide an overall framework within which predictions can be derived and models created, not to express the true complexity of the process. It is important to remember also that an individual's 'stock' of health itself may enter into the health production function since individuals in better health may be more able to translate other inputs into productive health investments. A good example of this is exercise. If a person is sick today they will be less able to participate in exercise and this means that tomorrow they will be a fraction less fit and their risk of other illnesses will rise. Simply put, today's

investments are influenced by today's health status and produce tomorrow's health status. We need to be of this type of 'reverse-causation' when analysing data on the relationship between health and sports participation.

Just as there are a very large number of possible inputs into the health production function including exercise and sport, other factors such as education and income may enter into the equation as well. Education is important because it may affect the way individuals can transform inputs into good health. For example, more educated individuals may be more aware of long-term health risks associated with smoking or drinking alcohol and thus be less likely to smoke or drink excessively. Similarly, they may be better at accessing the best doctors and medical services and when they find those services, of getting what they require from them. Income, like education may play a facilitative role in providing health. Those with higher levels of income will be more able to provide more and better quality inputs to the health production function in the form of food/nutrition, housing and health care, although the latter will depend heavily on the provision of services by the state and other organisations. In the Irish context, research shows that those with higher income are more likely to be able to purchase health insurance and that this gives quicker access to consultant led care services (Nolan, 2007).

B.2 Multivariate Analyses of Health Measures

Table B1: OLS Regression of Standardised PCS12

	β	Sig.	CI Low	CI High
Female	0.01	0.835	-0.08	0.10
Age in Decades	-0.16	0	-0.21	-0.11
Intermediate Certificate	0.27	0	0.12	0.41
Leaving Certificate	0.26	0	0.12	0.40
Degree	0.19	0.015	0.04	0.34
Postgraduate	0.03	0.749	-0.17	0.24
Log of Equiv. Income	0.13	0	0.07	0.19
Regular Sports Participant	-0.08	0.531	-0.32	0.17
Low Intensity Sport Played	0.18	0.032	0.02	0.34
Moderate Intensity Sport Played	-0.08	0.461	-0.29	0.13
High Intensity Sport Played	-0.11	0.18	-0.28	0.05
Days Per Week Played	-0.02	0.176	-0.04	0.01
Standardised Years Playing Low Intensity Sport	-0.02	0.309	-0.05	0.02
Standardised Years Playing Mod Intensity Sport	-0.01	0.729	-0.05	0.03
Standardised Years Playing High Intensity Sport	0.04	0.046	0.00	0.07
Years Since Played Sport at Low Intensity	-0.01	0.003	-0.02	0.00
Years Since Played Sport at Moderate Intensity	0.00	0.739	0.00	0.00
Years Since Played Sport at High Intensity	0.00	0.929	-0.01	0.01
Interaction of Years Playing Sport & Years Since Playing	0.00	0.951	0.00	0.00
Constant	-0.01	0.977	-0.42	0.41
N Cases		2,245		
R^2		0.2283		

Table B2: OLS Regression of Standardised MCS12

	β	Sig.	CI Low	CI High
Female	-0.13	0.011	-0.22	-0.03
Age in Decades	-0.01	0.814	-0.06	0.04
Intermediate Certificate	0.33	0	0.17	0.49
Leaving Certificate	0.31	0	0.14	0.47
Degree	0.34	0	0.16	0.51
Postgraduate	0.16	0.198	-0.08	0.40
Log of Equiv. Income	0.11	0.001	0.05	0.17
Regular Sports Participant	0.18	0.193	-0.09	0.46
Low Intensity Sport Played	0.00	0.974	-0.21	0.20
Moderate Intensity Sport Played	0.03	0.757	-0.18	0.25
High Intensity Sport Played	0.01	0.915	-0.14	0.16
Days Per Week Played	0.00	0.934	-0.03	0.03
Standardised Years Playing Low Intensity Sport	-0.02	0.488	-0.08	0.04
Standardised Years Playing Mod Intensity Sport	-0.01	0.539	-0.06	0.03
Standardised Years Playing High Intensity Sport	-0.02	0.445	-0.07	0.03
Years Since Played Sport at Low Intensity	0.00	0.337	0.00	0.01
Years Since Played Sport at Moderate Intensity	0.00	0.502	0.00	0.00
Years Since Played Sport at High Intensity	0.00	0.267	-0.01	0.00
Interaction of Yrs Playing Sport & Yrs Since Playing	0.00	0.175	0.00	0.00
Constant	-1.01	0	-1.49	-0.52
N Cases		2,245		
R^2		0.0449		

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