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| Title | School sport and academic achievement |
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| Publication date | 2013-01 |
| Original Citation | Bradley, J; Keane, F; Crawford, S. (2013) 'School Sport and Academic Achievement'. Journal of School Health, 83(1), pp. 8-13. doi: 10.1111/j.1746-1561.2012.00741.x |
| Type of publication | Article (peer-reviewed) |
| Link to publisher's version | http://www.blackwell-synergy.com - 10.1111/j.1746-1561.2012.00741.x |
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| Download date | 2024-09-03 09:55:17 |
| Item downloaded from | https://hdl.handle.net/10468/878 |

RESEARCH ARTICLE

School Sport and Academic Achievement

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ABSTRACT

BACKGROUND: Physical Education and School Sport (PESS) is an integral part of the school curriculum in Ireland. Historically the “Healthy Body, Healthy Mind” philosophy has promoted the inclusion of PESS with more cognitive school subjects; research suggests that PESS can promote cognitive function and provide educational benefits. However, there is little research on how the choice of school sport influences academic achievement. This study investigated how participation in school sport influences the Leaving Certificate points score in an Irish secondary school. In particular, the study will investigate how the particular sport chosen by students participating in school sport during their Leaving Certificate years influences their Leaving Certificate results.

METHODS: We recorded the Leaving Certificate scores and sports participation from 402 boys graduating from a secondary school in the Ireland during 2008-2011. Sports participation was assigned 1 of 4 categories: rugby, rowing, soccer, and no sport.

RESULTS: Participation in sports during the Leaving Certificate years conferred a 25.4-point benefit to the final Leaving Certificate score. However, participation in rowing, the only individual sport available in the study, resulted in significantly higher Leaving Certificate scores than rugby, soccer and no sport ($p < .05$), conferring an additional 73.4-point benefit over the next highest group, rugby.

CONCLUSION: Promoting participation in school sport and providing access to a range of team and individual sports throughout the secondary school years may be a beneficial way to improve students’ Leaving Certificate results.

Keywords: physical fitness and sport; PESS; academic achievement; team sports; individual sports.

Citation: Bradley J, Keane F, Crawford S. School sport and academic achievement. *J Sch Health*. 2013; 83: 8-13.

Received on October 07, 2011

Accepted on March 17, 2012

Physical Education and School Sport (PESS) has historically been considered an integral and essential part of childhood, promoting a range of benefits including childhood health, cognitive development, motor skills, and prosocial behavior.¹⁻³ The positive influence of sport and exercise on health is well recognized.⁴ In Ireland, the current generation of young adults played two thirds more sport when they were children than their parents did when they were children.⁵ Despite this only 12% of current post primary children meet the Department of Health and Children physical activity recommendations of at least 60 minutes/day of moderate to vigorous physical activity and the average time spent in school Physical Education is only 77 minutes/week.⁶ The number of individuals who are overweight or obese in Ireland is increasing⁷ and Ireland has one of the highest prevalence of overweight children in comparison to other European and developed countries⁸ with 1 in

4 Irish children either unfit, overweight, obese, or having high blood pressure.⁶

Physical Education and School Sport (PESS) is also viewed as beneficial to educational attainment.¹ Several studies have shown that increasing the time devoted to PESS did not harm academic achievement and may enhance achievement in some subjects despite the reduction in teaching time.^{9,10} However, results can be conflicting and further research seems to be necessary to define the precise relationship between PESS and cognitive outcomes.¹ However, there are many aspects of PE that can be included in PESS and many sports and activities can be used. Schools in Ireland offer a wide range of sports, but individual schools often limit focus to a few, prioritized sports aligned with dedicated coaches/PE staff. Weekly physical activity levels are greatest in primary school children (10-12 years). This then declines with age in both children and adults.^{6,11}

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Physical Education and School Sport in Ireland has been the subject of several recent studies and a new syllabus is currently being prepared for the Senior Cycle Curriculum.^{6,12,13} In Ireland, 76% of adult sport is individual sport, with the most popular sports being aerobics/keep fit, swimming, golf, jogging, and cycling.⁵ In contrast, team games occupy the most popular school sports with basketball being the most popular, followed by soccer, rounders, then badminton.⁶ However, there is little research quantifying how participating in a particular sport influences academic achievement. This study is a first investigation of the relationship between choice of school sports and educational achievement at 1 school in Ireland.

METHODS

Participants

The Leaving Certificate results (the Irish State School Examination) were analyzed from 402 students (age 17-18 years) graduating from an all-boys secondary school between 2008 and 2011.

Procedure

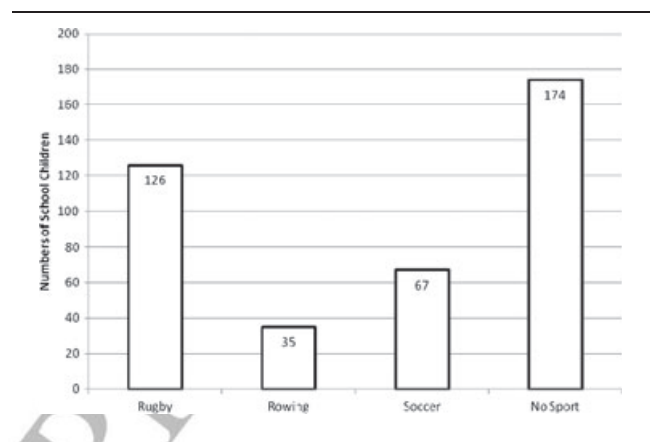
Most students completed 7 exam subjects with some doing an "extra" subject such as music. On completion of the Leaving Certificate examinations, the 6 best subjects are allocated points on a sliding scale as shown in Table 1. Students can achieve a maximum of 600 points and these points are used to apply for third level courses.

The student's Leaving Certificate scores were divided into 1 of 4 categories based on their sporting participation. The main sports at the school in the current study were rugby, soccer, and rowing. During the 2 years studying for the Leaving Certificate, these sports were available as extra-curricular activities only, that is, they were not timetabled in the normal curriculum and students participating in these sports would do so in addition to their normal timetabled classes. The sports participation of each school child

Table 1. Irish Leaving Certificate Examination Points

| Leaving Certificate Grade | Higher Paper | Lower Paper |
|---------------------------|--------------|-------------|
| A1 | 100 | 60 |
| A2 | 90 | 50 |
| B1 | 85 | 45 |
| B2 | 80 | 40 |
| B3 | 75 | 35 |
| C1 | 70 | 30 |
| C2 | 65 | 25 |
| C3 | 60 | 20 |
| D1 | 55 | 15 |
| D2 | 50 | 10 |
| D3 | 45 | 5 |

Figure 1. Overall Numbers of Schoolchildren and Sports Participation 2008-2011



was assessed according to 4 categories: rugby, rowing, soccer, and no sport.

Children were assigned to a category following discussion with teaching staff at the school, coaching staff of the particular sports, consultation of past school newsletters or other school publications, and verbal contact with the individual student or student peers. Involvement in a particular sport was based on a student being a member of the school squad at any level during the years studying for their Leaving Certificate (ie, in any of the school teams—first team, second team, etc.—if there was more than 1 team).

Data Analysis

The data from all 3 years were analyzed using a one-way ANOVA with 4 levels. Individual group differences were assessed using Bonferroni post hoc analysis. Statistical significance was set at $p < .05$.

RESULTS

The largest group over the 3 years of the study was the no sport group, followed by rugby, soccer, and rowing (Figure 1). Interestingly, over the 4 years of the study the numbers of students doing no sport averaged approximately 43% but the range was 27.5% (2010) to 55.9% (2008) as Table 2 shows.

The average Leaving Certificate score from the 4-year study was 420.5. When aligned with sports participation, however, rowing was significantly higher than rugby, soccer, and no sport (Figure 2, $p < .05$), giving a Leaving Certificate points advantage of 73.4 over the next highest category, rugby. The Leaving Certificate scores from rugby, soccer, and no sport were not significantly different to each other. The Leaving Certificate scores from rowing students each year were also consistently higher than from the other categories (Table 2).

Table 2. Numbers of School children Participating in Sport and Leaving Certificate Score, 2008-2011 (Mean SD)

| Sport | 2008 | | 2009 | | 2010 | | 2011 | |
|----------|---------|---------------------------|---------|---------------------------|---------|---------------------------|---------|---------------------------|
| | Numbers | Leaving Certificate Score | Numbers | Leaving Certificate Score | Numbers | Leaving Certificate Score | Numbers | Leaving Certificate Score |
| Rugby | 31 | 432.1 (115.1) | 30 | 417.2 (85.4) | 37 | 431.6 (87.7) | 28 | 449.8 (76.0) |
| Rowing | 4 | 540.0 (43.8) | 5 | 547.0 (37.0) | 18 | 485.6 (85.8) | 8 | 508.1 (86.6) |
| Soccer | 14 | 372.9 (107.4) | 23 | 413.5 (123.0) | 19 | 395.8 (129.5) | 11 | 360.5 (134.6) |
| No Sport | 62 | 392.7 (126.0) | 41 | 417.0 (92.7) | 28 | 420.2 (115.1) | 43 | 405.8 (105.1) |
| Total | 111 | | 99 | | 102 | | 90 | |

Figure 2. Overall Mean (SD) Leaving Certificate Score From School Children and Sporting Participation: 2008-2011
*Significant difference, $p < .05$

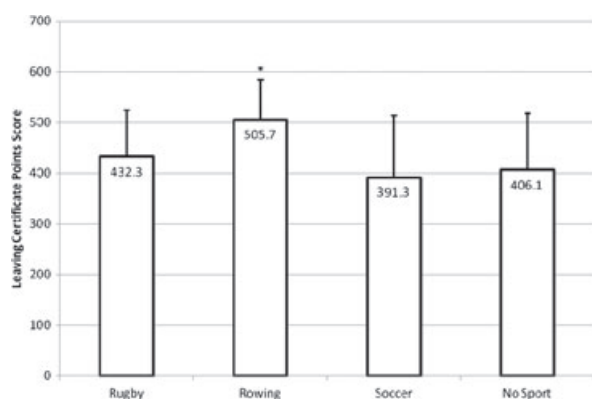


Table 3. Students Achieving Higher than the Average Leaving Certificate Score

| Category | Rugby | Rowing | Soccer | Sport | No Sport |
|--|-------|--------|--------|------------------|------------------|
| Percentage of students above school mean Leaving Certificate score (420.5) | 57.9% | 80.0% | 47.8% | 58.3% | 47.1% |
| Average Leaving Certificate scores (mean (SD)) | | | | 431.5 (106.2) | 406.1 (111.6) |

The numbers of students achieving higher than the school average Leaving Certificate score (420.5) over the study is shown in Table 3. For students participating in any sport, the average Leaving Certificate score was 431.5 points, compared to 406.1 points from students not participating in sport. From students participating in a sport, 58.3% of them exceeded the school average Leaving Certificate score compared to 47.1% of students not participating in any sport. Participating in a sport during the Leaving Certificate gave an average Leaving Certificate score benefit of 25.4 points.

Table 4. Sporting Success of the Sports in the Current Study

| Sport | Success |
|--------|--|
| Rugby | Won 27 Munster Senior Schools Cups and 27 Junior Schools Cups. Produced 23 Irish Senior Internationals. |
| Rowing | Four national titles and successful annually at regional and national regattas at all junior levels. Produced several Irish Junior Internationals. |
| Soccer | Recent Munster cup winners and semi-finalists. Runners-up in Munster Schools Cup (under 16 years) |

The school in this study has adopted a strong sports ethos and consistently has done well in local and national competitions. A summary of the sporting success of the 3 sports in this study is shown in Table 4.

DISCUSSION

Physical Education and School Sport (PESS) is thought to be beneficial to educational attainment.¹ The average benefit to the Leaving Certificate scores of 25.4 points from participation in sport supports the "Healthy Body, Healthy Mind" philosophy. The nearly 74-point average benefit that rowing confers to the Leaving Certificate score over the next highest category (rugby) is interesting. To our knowledge, there has been little research over choice of sport among children or the influence of choice of sport on educational attainment. The majority of research in this area relates to the continued participation in sport on leaving school. Research from England shows that adults with a degree-level qualification are 3 times more likely to participate in sports compared to those with no tertiary qualification,¹¹ whereas in Ireland, 43% of people who play sport have a third-level qualification compared to 28% of the wider population.¹⁴ The impact of educational attainment on playing sport in Irish adults is consistent across all age groups, so the positive benefit of education on sporting participation lasts a lifetime.¹⁴ The impact of adult education and low income may have some impact on childhood sporting participation, as there is

1 an indirect link between not playing sport as an adult
2 and having parents who also did not play sport.¹⁴
3 Socio-economic status (SES) has been shown to be
4 related to academic achievement,¹⁵ and is related to
5 sports participation in adults¹¹ but does not influence
6 the physical activity of school children⁶—presumably
7 as PESS is often a timetabled, compulsory class in
8 the pre-leaving certificate school years. PESS often
9 becomes an optional extra-curricular activity in the
10 Leaving Certificate school years in Ireland (age 17-18).
11 Creating an exercise habit in the earlier school years
12 may encourage school children to continue with PESS
13 in their Leaving Certificate school years and allow
14 them to realize the academic benefits shown in this
15 study.

16 Socio-economic status was not assessed in the
17 present case study. However, the school participating
18 in the study was 1 of the 56 fee-paying, post-primary
19 schools in Ireland. Fee-paying schools in Ireland are
20 classified as high SES with a high correlation to
21 parental occupation and parental education.¹⁶ This
22 may suggest that the range of sporting options avail-
23 able to students are greater and may influence the
24 results by making more sports accessible to students
25 in their Leaving Certificate years. However, this also
26 provides a greater opportunity to investigate the rela-
27 tionship between choice of school sport and academic
28 achievement. Further research is needed to see if a sim-
29 ilar relationship between choice of sport and academic
30 achievement exists in other schools in Ireland and
31 further afield. The range of school sports available is
32 usually determined by the particular school. As men-
33 tioned earlier the 3 most common sports in schools
34 in Ireland are team sports, with the most common
35 individual sport, badminton, the fourth most popu-
36 lar school sport. With sport being available mostly
37 as an extra-curricular option in the Leaving Certifi-
38 cate years (the situation in this study), participants
39 will have the option to choose to participate in a
40 particular sport or not, rather than participating in a
41 general PESS lesson, when the content is determined
42 by the PE teacher. Children continuing to participate
43 in PESS throughout their Leaving Certificate years
44 perhaps develop a particular personality that may con-
45 fer benefits in academic achievement. Several studies
46 have shown that there is a positive association between
47 sports, extraversion, and conscientiousness.^{17,18} Ath-
48 letes exhibit higher personality scores for extraversion
49 and conscientiousness than non-athletes¹⁹ and partic-
50 ipation in sport is associated with positive emotions
51 such as feeling energetic, extraverted, and being effi-
52 cient, organized and systematic.¹⁸ These characteris-
53 tics, while not a prerequisite for sporting participation,
54 will be reinforced and enhanced by continued partic-
55 ipation in sport. Encouraging PESS in early school
56 years may promote these characteristics and encourage
57 participation in sport throughout the school years and

beyond. This study neglected to include any involve- 1
ment in extra-school sport (sport separate from the 2
school environment). Whereas this has the potential 3
to introduce confounders such as students participating 4
in new sports, the aim of the study was to investigate 5
the role of school sport in academic achievement and 6
the influence of the range of sports offered at a typ- 7
ical fee-paying school in Ireland. Extending this to a 8
wider range of schools would widen the range of sports 9
encountered. Duplicating the school sport in an extra- 10
school context was thought not significantly to affect 11
the findings of this study as it would simply reinforce 12
the influence of participation in sport on academic 13
achievement. 14

15 Studies investigating the personality characteristics 15
of high achievers in education suggest key indicators 16
are motivational strategies, self-regulation and self- 17
efficacy.^{20,21} These characteristics of high achievers are 18
consistent with the high levels of conscientiousness 19
and extraversion identified in athletes participating 20
in different sports. Learners who have high levels 21
of conscientiousness show greater motivation levels 22
and are more motivated to learn.²² These individuals 23
are more reliable, self-disciplined, and persevering, 24
leading to greater motivation and self-efficacy. Also, 25
conscientious individuals have a greater tendency for 26
self-deception,²³ all of which tends to lead to higher 27
achievement levels. Applying this rationale to the 28
current study can perhaps account for the average 29
benefit to the Leaving Certificate score of 25.4 points 30
from those participating in sport. 31

32 The most popular sports at school in Ireland are 32
team sports.⁶ However, rowing, the only individual 33
sport available to children in this study produced 34
significantly greater Leaving Certificate scores than 35
the team sports and not participating in any sport. 36
Comparison of personality traits in athletes of 37
individual and team sports showed that athletes 38
of individual sports scored significantly higher on 39
conscientiousness and autonomy and athletes of team 40
sports scored higher in agreeableness and sociotropy.¹⁹ 41
This perhaps suggests a reason why rowing seems to 42
confer a further advantage on the Leaving Certificate 43
scores compared to rugby and soccer. The higher level 44
of conscientiousness displayed by athletes of individual 45
sports suggests higher levels of motivation to learn and 46
a greater tendency to strive for achievement leading to 47
a greater benefit to academic achievement and Leaving 48
Certificate results. 49

50 The Leaving Certificate cycle is a busy time for Irish 50
children. Informal discussion with the children in this 51
study suggested that those who gave up sport in the 52
Leaving Certificate school years did so in order to 53
concentrate on their studies. Students who gave up 54
training for sport often spent less time subsequently 55
on their studies (unpublished observations). The 56
conscientious personality trait characteristic of sports 57

1 participants in general and displayed in greater levels
2 in participants of individual sports in particular may
3 partly account for this. This study suggests that those
4 students who can maintain involvement in a sport
5 benefit both their sport and their Leaving Certificate
6 scores. By having a strong sporting ethos, a school can
7 enhance its reputation in both the sporting field and
8 the educational field. The sporting achievements of
9 the school in this study (Table 4) suggest considerable
10 sporting success nationally in Ireland. Given the
11 significant improvement in the Leaving Certificate
12 scores from students who participated in rowing,
13 perhaps a greater emphasis on individual sports in
14 schools could create a beneficial environment for
15 higher academic achievement.

17 Limitations

18 This study was, to our knowledge, the first study
19 looking into the relationship between choice of school
20 sport and academic achievement. The results and
21 findings are based on sporting participation and
22 Leaving Certificate results from only 1 secondary
23 school in the Republic of Ireland. The findings are
24 consistent over the 4 years of the current study but
25 further research is needed to see if they are consistent
26 in other schools and other areas. The current study
27 is also limited to the sports available at this school.
28 The relatively small number of students involved
29 in rowing may limit the wider application of the
30 results. Further investigation is needed across a range
31 of schools incorporating a range of individual and
32 team sports to support the claims of the current study
33 that the personality characteristics of participants in
34 individual sports can positively influence academic
35 achievement.

38 Conclusion

39 Our study suggests that participating in extra-
40 curricular school sport whilst studying for Leaving
41 Certificate secondary school-leaver examinations can
42 benefit academic achievement. Furthermore, our
43 results suggest that participating in individual sports
44 confers a further benefit to academic results because
45 of the enhanced positive personality characteristics of
46 conscientiousness and autonomy associated with these
47 sports.

50 IMPLICATIONS FOR SCHOOL HEALTH

51 This study illustrates the impact that school sports
52 can have on academic achievement. The benefits of
53 sport and exercise to health are well recognized.
54 However more academic subjects can often take
55 precedent over PESS during the important final years
56 of secondary school. Encouraging participation in
57 school sport can help promote academic achievement

as well as providing an opportunity to achieve health-
promoting physical activity. School sport programmes
that offer a range of individual and team sports can
enhance the benefits that both bring to academic
achievement and personality development. This study
could have significant impact on the choice of sports
offered by schools and the emphasis schools place upon
PESS.

Human Subjects' Approval Statement

The study was approved by the Social Research
Ethics Committee of University College Cork.

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