

Education and life long learning: summary

The material in this section explores the potential of sport (including sports event volunteering) to contribute, directly and indirectly, to improved cognitive and educational performance and provide developmental experiences. It also illustrates the need for innovative approaches to delivery to maximise these benefits and the need for more rigorous research.

Current research into the nature of the relationship between participation in physical activity/sport and educational performance has produced inconsistent and often non-comparable results (Etnier et al; Sallis et al; Shephard; Marsh and Kleitman). For example, some cross-sectional studies illustrate a positive correlation between participation in sport/physical activity and academic success (eg maths, reading, acuity, reaction times). However, critics point to a general failure to solve the issue of direction of cause – whether intelligence leads to success in sport, whether involvement in sport enhances academic performance, or whether a third factor (eg personality traits) explains both (Shephard; Etnier et al; Marsh and Kleitman). Longitudinal studies also generally support the suggestion that academic performance is enhanced, or at least maintained, by increased habitual physical activity. However, critics suggest that these studies are not definitive because some do not use randomised allocation of pupils to experimental and control groups (to control for pre-existing differences), others tend to use subjective teacher-assigned grades to assess academic achievement, rather than standardised and comparable tests and some programmes include parallel interventions, making it difficult to isolate specific effects (Sallis et al; Shephard).

More generically, Etnier et al illustrate that both acute exercise and chronic training programmes have small, but beneficial, positive impacts on cognitive performance. However, they conclude that as experimental rigour decreased, effect size increased. Further, generalisation is limited because effect size is influenced by the nature and type of exercise, the type of participants, the nature of the cognitive tests and the methodological quality of the study. Tomporowski provides a review of the limited number of studies of the role of acute physical activity on young people's behaviour and cognitive functioning and offers a tentative conclusion that physical activity exerts short-term positive changes. However, such effects are not global and appear to be related to aspects of information-selection and decision-making. In a randomised control experiment Winter et al compared the cognitive effects of three different conditions – 15 minutes being sedentary; 40 minute low impact running; intense three minute sprints. Those who took part in the intense activity performed better in the cognitive tests (reading and vocabulary) both immediately after the activity and eight months later (although the effects were small). Sibley and Etnier's review of 44 studies of the relationship between physical activity and cognition in children found a significant overall positive association (especially in elementary and middle school students), although

the type of activity was a non-significant moderator, indicating that psychological mechanisms may be the key to explaining the gains.

Sallis et al sought to address some of these perceived methodological deficiencies in a two-year longitudinal study of the effect of PE on academic achievement. They used random allocation to one control and two treatment groups, with pre-and post standardised tests. They conclude that increased time spent on a health-related PE programme did not lead to improved educational performance, although lower levels of decline among groups with classroom teachers trained to teach PE may indicate their improved ability to teach academic subjects. More generally, the physical and emotional benefits of participation in regular sports/physical education can be obtained *without* a negative impact on academic achievement. This conclusion is supported by Shepard's review, Lindner (using the methodologically less rigorous self-assessment of academic performance), Dollman et al (who controlled for a range of school and social characteristics) and Carlson et al who found only small effects for girls and one for boys between time spent in PE and maths and reading scores from kindergarten to fifth grade. The work by Coe et al found no relationship between PE and academic achievement. However, only 34% of PE class time was spent in moderate to vigorous activity and only self-reported out-of-school vigorous sports activity was correlated with higher educational achievement. Consequently, they raise the interesting issue of a necessary 'threshold of physical activity' to achieve the desired results.

Pfeifer and Cornelisen illustrate that participation of German adolescents in outside-school sporting activities has significant positive effects on educational attainment. However, the results also illustrate that taking part in more time-consuming sports competitions might offset, but not reverse, the beneficial effects of sports on the highest degrees. The data also indicate that the positive effects are generally larger for women than men. Fox et al illustrate that for high school girls higher academic grades were independently associated with sports team participation and moderate to vigorous physical activity. However, for high school boys only sports team participation was associated with higher grades and the authors conclude that the association between physical activity and academic performance may be related to the 'academic culture' of students in team sports. In this regard Marsh and Marsh and Kleitman claim that their longitudinal data confirm that sport contributes to increased identification/commitment to school values for both males and females. This in turn has a positive influence on academic performance. These findings are related to those of Lipscomb, who found a positive relationship between involvement in extracurricular clubs and sports and levels of achievement and self-reported academic expectations. Sports participation benefitted women more than men; participating in clubs with higher achieving members was associated with increased degree attainment expectations; clubs with lower scoring members did not appear to help student learning

The study by Sharp et al illustrates that the salience of sport for young people can be used to over-come stigma and attract young people to out-of-school compensatory educational programmes, which achieve substantial

improvements in literacy, numeracy and ICT – that sport, in partnership with specialist development programmes, can make a contribution to improved educational performance. This emphasis on partnership is also central to many of the contributions in the Crime Reduction and Community Safety section.

Papacharisis et al illustrate that, compared to control groups, experimental sports groups who took part in a sports-related educational programme had greater knowledge of life-skills and higher self-belief about their abilities to goal-set, problem solve and think positively. They also assert that the improvement in life skills can lead to an improvement in sports performance. Lakes and Hoyt report that children participating in martial arts training made greater gains in cognitive and affective self-regulation and pro-social behaviour than participants in a traditional PE class. Although sample sizes were small, the authors suggest that the measured differences are to be explained by the strong mastery orientation and emphasis on self-regulation and self-analysis in martial arts.

In a small scale qualitative study Holt et al conclude that measures of initiative among participants in a high school soccer team probably predated their involvement in soccer, with the coach creating an environment for its expression; with regard to respect for social norms they found no evidence that this was taught or reinforced; teamwork was not taught by the coach but generated by the participants. They conclude that adolescent experience and life-skill learning depends on how sports programmes are structured and delivered. The work of Danish and Allen illustrates that if sport is to achieve some of the desired life-skills, a more focussed and analytical approach is required. They suggest that specially designed sports-based programmes can be delivered to develop a range of transferable skills (eg goal-setting; communication; handling success and failure) and enhance self-perception and social competence. However, in order to achieve these outcomes, there is a need for specially trained sports psychologists who concentrate on process and task, rather than the more traditional approach of performance and outcome behaviours.

The article by Petitpas et al illustrates some of these general issues via an analysis of the Play it Smart programme in the USA. This broad based community programme uses specially trained academic-coaches to establish academic, counselling and coaching relationships with football players in inner city areas. The evaluation of the pilot indicates a degree of academic success.

More generally, Hansen et al's research explores issues relating to the nature of the learning and developmental experiences associated with sport, compared to other organised youth activities. The learning experiences are related mostly to personal development (self-knowledge, emotional regulation/control and physical skills), although sport also recorded the highest rates of negative peer interaction and inappropriate adult behaviour. As with other authors in this section, they emphasise the need for research into process - how specific, controllable experiences of youth activity are

related to positive developmental change. The emphasis on process is confirmed in Bailey's overview of research evidence about the contributions of PE and school sport to five developmental domains – physical, lifestyle, affective, social and cognitive. He concludes that their potential to contribute to the development of social skills, self-esteem and pro-school attitudes and academic and cognitive development is mediated by the nature of interactions and social process and that it is essential to understand such issues in the design and delivery of programmes. These themes are also explored by Sandford et al who argue that in order to achieve the potential of sport and physical activity to re-engage those disaffected from education greater attention needs to be given to context and process, with a more explicit emphasis on desired social skills and greater emphasis placed on personalised programmes and learning.

Most research in this area relates to the effects of participation in sport. However, Kemp, in a study of 200 volunteers at the Lillehammer Winter Olympics and the Sydney Olympics, illustrates that the majority of volunteers had positive learning and work-relevant experiences. She suggests that there is a need a greater understanding of the human resource management issues relating to sports events.

The researchers included in this section outline a number of studies that need to be undertaken to clarify the nature of the relationship between sport, physical activity and educational performance.

- Longitudinal studies using randomised control groups with before-and-after standardised testing, undertaken with a range of socio-economic and ethnic groups.
- Studies to examine potential underlying mechanisms (eg changes in cognitive or psychomotor functions; increased self-esteem/cerebral blood-flow; nutrient intake).
- Studies to examine the effects of different types and amounts of activity on brain structure and function.
- Examination of whether the improvement of the ability of primary classroom teachers to teach PE might lead to better student academic performance.
- Studies to understand how to design PE/sport programmes to maximise any beneficial effects on learning and cognitive performance and development.
- Overall, there is an increasing emphasis on researching and understanding the processes, mechanisms and cultures of programmes and their relationship to positive and negative outcomes. Is the activity or the social environment most important?

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Added to the Value of Sport Monitor in September 2011:

Fox, C.K., Barr-Anderson, D., Neumark-Sztainer, D. and Wall, M. (2010) Physical activity and sports team participation: Associations with academic outcomes in middle school and high school students, *Journal of School Health*, 80(1), 31-37

Lakes, K.D. and Hoyt, W.T. (2004) Promoting self-regulation through school-based martial arts training, *Applied Developmental Psychology*, 25, 283-302.

Lipscomb, S. (2007) Secondary school extracurricular involvement and academic achievement: a fixed effects approach, *Economics of Education Review*, 26(4) 463–472

Pfeifer, C. and Cornelisen, T. (2009) The impact of participation in sports on educational attainment - new evidence from Germany, *Economics of Education Review*, 29, 94-103