are not entirely clear.

2. Exercise may be biochemical (endorphin production increased during exercise), but in reality few people do this exercise in their reaction.

We cannot measure endorphins in the brain, except in animals, and endorphin levels in human blood may not mirror those in the brain.

Physiological

Proposed physiological reasons for exercising mental health links include reductions in muscle tension following exercise. This is well supported and does help explain the relaxed 'feel good' effect — or 'afterglow' — that often follows exercise.

Psychological

Finally, there are several psychological reasons why people may feel good after exercise. These include increases in feelings of mastery and competence, time away from daily stresses and hastes, improved self-esteem, etc. All are possible, but not all have been convincingly demonstrated through good research.

Conclusion

We know that exercise has beneficial physical effects, such as control of body-fat and blood pressure, reduced risk of coronary heart disease, etc. However, despite the acceptance that exercise may make you 'feel better', health educators appear less aware of the evidence and possible reasons for a link between exercise and positive mental health. Such a link is more likely to be made if exercise is enjoyable, indulged in through choice rather than pressure, and where the activity suits the individual preferences of the child or adult, such as selecting non-competitive or competitive activities.

If I may be permitted to end on two controversial notes...

Do team sports build character?

First, there is certainly no evidence supporting the current government's view that compulsory participation in (team) sport will have the desired beneficial effects of reducing aggression and delinquency and enhancing character. That side of the mental health literature actually provides a less positive view. The limited evidence that does exist points to a tendency for competitive (particularly contact) activities to be associated with less moral behaviour.

Does physical activity promote brainpower?

Second, although exercise may help students in schools feel more relaxed (although this probably only occurs if the exercise is not too intense and is followed by sufficient time for the students to 'cool down', shower, etc.), the evidence that physical activity improves academic performance is controversial. Cognitive functioning can be enhanced through activity, but the evidence is clearest for very young children and old adults — those, one could argue, with most to gain.

But, despite this, exercise is certainly good for you — mentally and physically!

References


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**Table 1.** Percentage frequency of participation in three out-of-school active pursuits during the previous year. Provisional 1994 data; Year 10 pupils.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never or hardly ever</th>
<th>Once or twice monthly</th>
<th>Weekly</th>
<th>At least twice weekly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jogging</td>
<td>Boys: 60.4; Girls: 65.2</td>
<td>Boys: 19.7; Girls: 24.1</td>
<td>Boys: 12.5; Girls: 9.0</td>
<td>Boys: 7.4; Girls: 4.4</td>
</tr>
<tr>
<td>Exercise and sports</td>
<td>Boys: 51.2; Girls: 51.7</td>
<td>Boys: 22.8; Girls: 25.0</td>
<td>Boys: 12.5; Girls: 12.5</td>
<td>Boys: 11.3; Girls: 7.0</td>
</tr>
</tbody>
</table>

**Table 2.** Percentage values for VIGTOT — the number of out-of-school active pursuits engaged in at least twice a week.

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provisional 1994 data; Year 10 pupils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIGTOT = 0</td>
<td>28.8</td>
<td>28.8</td>
</tr>
<tr>
<td>VIGTOT = 1</td>
<td>21.5</td>
<td>21.5</td>
</tr>
<tr>
<td>VIGTOT = 2</td>
<td>11.2</td>
<td>11.2</td>
</tr>
<tr>
<td>VIGTOT = 3+</td>
<td>10.3</td>
<td>10.3</td>
</tr>
</tbody>
</table>

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Exercise and activity levels

We used question 16 in Version 16 of the Health Behaviour Questionnaire, which asks the young people how often during the previous twelve months they had taken part voluntarily in listed sports and activities. From the 19 checklist items we selected the following, because they were among the most popular non-seasonal active pursuits:

- *Jogging*
- *Exercise and sports (girls)*
- *Weight training (boys)*

There were four levels of involvement:

- Never or hardly ever
- Once or twice a month
- Weekly
- Twice a week or more

We also used the usual vigorous sporting activity index derived for each respondent, known as VIGTOT. This measures the number of vigorous sports participated in at least once a week (when in season, if appropriate). VIGTOT values of 0, 1, 2, and 3+ were used in the analysis.

Table 1 presents the percentage of the sample that had participated in the activities. Table 2 shows the percentage that come into the four different categories of VIGTOT.

Even though the activities in Table 1 are among the most popular pursuits, note the comparatively small percentages of young people that are involved in any of them even at a 'weekly' level — well below a widely-recommended regime of three 20-minute exercise sessions per week.
### Table 3. A measure of the average amount of worrying done about each problem, on a scale from 0 (never) to 5 (a lot). Provisional 1994 data; Year 10 pupils.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Worry index'</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td>School</td>
<td>1.46</td>
<td>1.83</td>
</tr>
<tr>
<td>Money</td>
<td>1.45</td>
<td>1.64</td>
</tr>
<tr>
<td>Health</td>
<td>1.32</td>
<td>1.81</td>
</tr>
<tr>
<td>Career</td>
<td>1.48</td>
<td>1.72</td>
</tr>
<tr>
<td>Unemployment</td>
<td>1.31</td>
<td>1.48</td>
</tr>
<tr>
<td>Friends</td>
<td>1.26</td>
<td>2.02</td>
</tr>
<tr>
<td>Family</td>
<td>1.30</td>
<td>2.02</td>
</tr>
<tr>
<td>How you look</td>
<td>1.76</td>
<td>2.70</td>
</tr>
<tr>
<td>Drugs</td>
<td>0.84</td>
<td>1.17</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>1.25</td>
<td>1.71</td>
</tr>
<tr>
<td>Mean</td>
<td>1.34</td>
<td>1.81</td>
</tr>
</tbody>
</table>

### Measuring the mind

Several questions in the Health Related Behaviour Questionnaire examine the young people's attitude to commonplace problems and their confidence in themselves. We selected three of these:

- Question 50 asks how much they worry about the following problems: School, money, health, career, unemployment, friends, family, how they look, drugs, and HIV/AIDS.

- Question 51 derives a value of self-esteem from a checklist of questions dealing mainly with social confidence.

- Question 52 derives a 'health locus of control' value, on a scale from powerlessness to complete control over their health. We shall refer to this as 'health autonomy'.

The large bank of information derived from Question 50 was particularly useful. First of all, it allows us to derive a 'worry index' by calculating the mean values for each problem, based on the following scale:

0 = Never worry
1 = Hardly ever
2 = A little
3 = Quite a lot
4 = A lot

Therefore the higher the value, the more of them worry. The summary worry table (Table 3) presents the results. While recognising that this is statistically 'naughty', it does give an extra feel for the comparative degree of worry associated with each problem. It is clear that more girls than boys report higher worry levels about everything!

### Exercise and worry

We were now in a position to assemble and explore a hypothesis. The hypothesis was: if exercise is good for the mind, then people who exercise a lot should tend to worry less than those who do not. The absence of a common measure of exercise, and the problem of assigning values from a range of activities to a "worry index", made this approach impractical.

Tables 4 and 5 present the worry factors against the frequency of jogging, fitness-exercising, and weight-training by the young people in the sample. Only the extreme frequencies (never or hardly ever and at least twice weekly) are presented. Table 7 presents VIKTÖT (the number of vigorous sports participated in at least twice weekly) with values from 0 to 3+. The highest values of 'worry index', as calculated above, are in bold type, the lowest values are underlined.
Cause or effect?

Some years ago, when we published data relating to young people's smoking levels, a reporter wanted to use the results to show that smoking education in schools wasn't working. Our answer had to be that the smoking levels might have been even higher if schools did not address the problem. 'Scientific' research into the effectiveness of smoking education would have required a control group that was (in theory at least) unafflicted by the experiment.

Similarly here. Would the 'worriers', who tend to show a higher level of physical activity, worry still more if they did not have the opportunity to participate in active pursuits? We have no control group to enlighten us.

There is, however, a more fundamental question to ask. Regardless of the effect of jogging and fitness exercises, why do some young people pursue them and others not? Isn't it basically about fitness, or forgetting about the worries we have been considering, or even just because friends do them too?

"There are limits to the questions we can address using our data, but Table 10 displays the link between assessment of personal fitness and level of physical activity. It shows perhaps an obvious and expected link between the more physically active boys' and girls' perception of themselves as fitter people."

Table 10. Percentage of young people, by personal fitness assessment, involved in physical activities. Each of these activities is pursued at least twice a week.

<table>
<thead>
<tr>
<th>No. of activities</th>
<th>Girls</th>
<th>Boys</th>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfit or very unfit</td>
<td>43.8</td>
<td>71.1</td>
<td>30.5</td>
<td>56.0</td>
</tr>
<tr>
<td>Moderately fit</td>
<td>32.0</td>
<td>20.2</td>
<td>33.2</td>
<td>27.8</td>
</tr>
<tr>
<td>Fit or very fit</td>
<td>13.6</td>
<td>6.8</td>
<td>20.9</td>
<td>9.7</td>
</tr>
</tbody>
</table>

Even this is not a complete answer. This athletic group may feel fit because they are active, but they may also be active because they are worried about losing their fitness if they are not. The activity itself could be positive or protective, or a mixture of both; the 'worry' could be about lack of fitness or losing a present high level of fitness.

Smoking and exercise

Neil Armstrong asked us to explore the links between physical activity and smoking (Table 11).

The results show statistically significant, in fact obvious, differences in smoking habits between high and low exercisers, high exercisers being less likely to smoke regularly. Other analyses show that higher exercisers are also more likely to have given up smoking. The difference is not surprising; perhaps we might have expected it to be greater.

Conclusion

If health educators are to encourage more voluntary physical activity, they need to adopt strategies that find an echo in the young people's attitudes and reflect facilities available in the community. Many of the inactive youngsters in Table 10 still regard themselves as fit, and Neil Armstrong's research has shown, in his own words, that 'children are fit but not active'. Therefore the pleasure of physical activity (including the relief when you stop, and the thirst it creates!), rather than the good it does you, may be the message to adopt.

Incidentally, more girls than boys need encouragement in this respect. Young People in 1994 will show that the percentage of inactive girls rose from 11.2% in Year 7 to 23.3% in Year 11; the boys' figure was stable at 14.7%.

Perhaps one last comment should be made. There is such a strong tendency to link fitness and activity together that many of the young people in our sample, who consider themselves anything from 'very unfit' to 'moderately fit', are probably basing their personal assessment on their low levels of physical activity. If they do not think they are fit, they may be less likely to want to attempt active pursuits which could cause them distress or show them up as failures. Perhaps health educators might consider impressing upon them that they are fitter than they really think, and are well equipped to adopt a more vigorous and beneficial lifestyle.

Babies can lift properly — but 7-year-olds have learned bad habits.

Table 11. Percentage of young people involved in physical activity that are regular smokers. Each of these activities is pursued at least twice a week.

<table>
<thead>
<tr>
<th>No. of activities</th>
<th>Unfit or very unfit</th>
<th>Moderately fit</th>
<th>Fit or very fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9.6</td>
<td>20.0</td>
<td>65.5</td>
</tr>
<tr>
<td>1</td>
<td>9.7</td>
<td>20.2</td>
<td>71.1</td>
</tr>
<tr>
<td>2</td>
<td>11.8</td>
<td>19.0</td>
<td>70.7</td>
</tr>
<tr>
<td>3+</td>
<td>10.6</td>
<td>14.2</td>
<td>74.3</td>
</tr>
</tbody>
</table>

Appraised as a 'brilliant concept', the pack has won awards and rave responses.

Backs into the Future

An 'uplifting' video for primary schools!

How many people do you know who have bad backs? The cause is usually poor lifting techniques and failure to look after one's back in early life.

Yet when children are very young, they naturally lift correctly. Why does it go wrong? One reason is that we do not teach children to take better care of their backs.

Now, for the first time, a complete project pack has been produced to encourage children to have good posture and to develop and maintain their inherently correct lifting technique in adulthood.

The pack is called Backs Into The Future, and it was produced by a team of teachers from all over the UK, as well as health educationists and health and safety professionals from industry.

The Backs Into The Future project was allied with the European Year of Health & Safety 1993, and was initiated by the company's chief health & safety adviser, Emile Jeffery.

"Our research has shown that poor lifting technique, which is usually acquired long before people start work, is the major cause of back injury," he says. "Therefore, if we can educate children to take proper care of their backs, many of the injuries that occur later on in life may be prevented."

Mr Jeffery contacted Jo Ablent, a teacher at North Bradley Primary School, Whitley, for her advice on how to get the message into the classroom effectively, taking into consideration the demands of the National Curriculum.

Months of work by the project team, including specialists from the Universities of Loughborough and Exeter, resulted in the Backs Into The Future pack, which consists of an amusing adventure video interspersed with cartoons to reinforce the 'lifting message', posters, and a teachers' manual. The manual is a complete resource which consists of a topic web with ideas to promote every primary-school subject, plus a full range of support material aimed at Key Stage 2.

'We wanted the pack to be flexible and user-friendly,' explains Jo Ablent. 'The teacher can use it as a major project, as an aid to Health Education, as part of the PE coverage, or simply show the video and choose an exciting follow-up session.'

The first wave of packs to be distributed produced rave responses. The resource has won two awards for its video and a special award for an Outstanding Contribution to the European Year of Safety, Hygiene, and Health Protection at Work.