

Sports, exercise, and labor market outcomes

Increasing participation in sports and exercise can boost productivity and earnings

Keywords: human capital, earnings, public health

ELEVATOR PITCH

A productive workforce is a key objective of public economic policy. Recent empirical work suggests that increasing individual participation in sports and exercise can be a major force for achieving this goal. The productivity gains and related increase in earnings come on top of the already well-documented public health effects that have so far provided the rationale for the major national and international campaigns to increase individual physical activity. The deciding issue for government policy is whether there are externalities, information asymmetries, or other reasons that lead individuals to decide on activity levels that are too low from a broader social perspective.

KEY FINDINGS

Pros

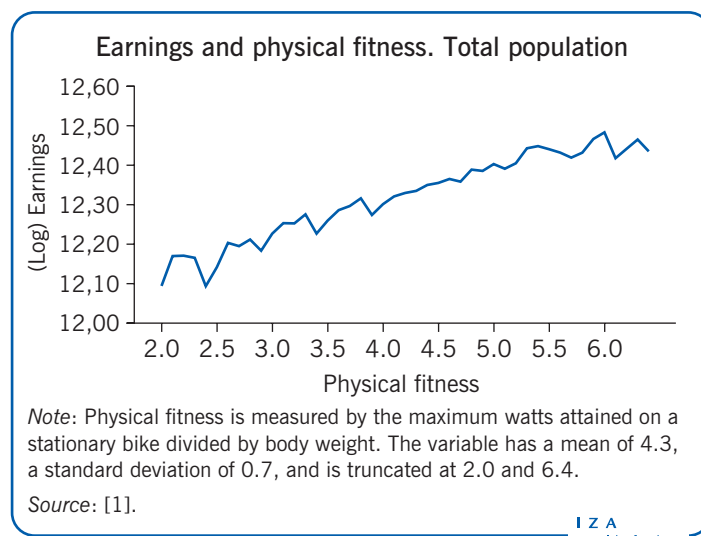
- + Sports and exercise improve physical and mental health.
- + Sports and exercise can substantially increase earnings.
- + As they are time consuming, sports and exercise may crowd out non-productive uses of time (such as watching non-educational TV).
- + Sports and exercise increase human capital in several dimensions, including soft skills (team work, self-discipline, endurance, stress relief, and self-confidence).
- + Sports and exercise increase individual well-being.

Cons

- Sports and exercise lead to injuries.
- The effects of increased sports and exercise on employment, unemployment, and working time are not clear.
- Sports and exercise are time consuming and may crowd out productive and utility-enhancing uses of time (such as education and work time).
- The relative importance of the different channels that are responsible for the positive effects of sports and exercise is not well understood.
- The credibility of empirical studies on the effects of sports and exercise is sometimes questionable.

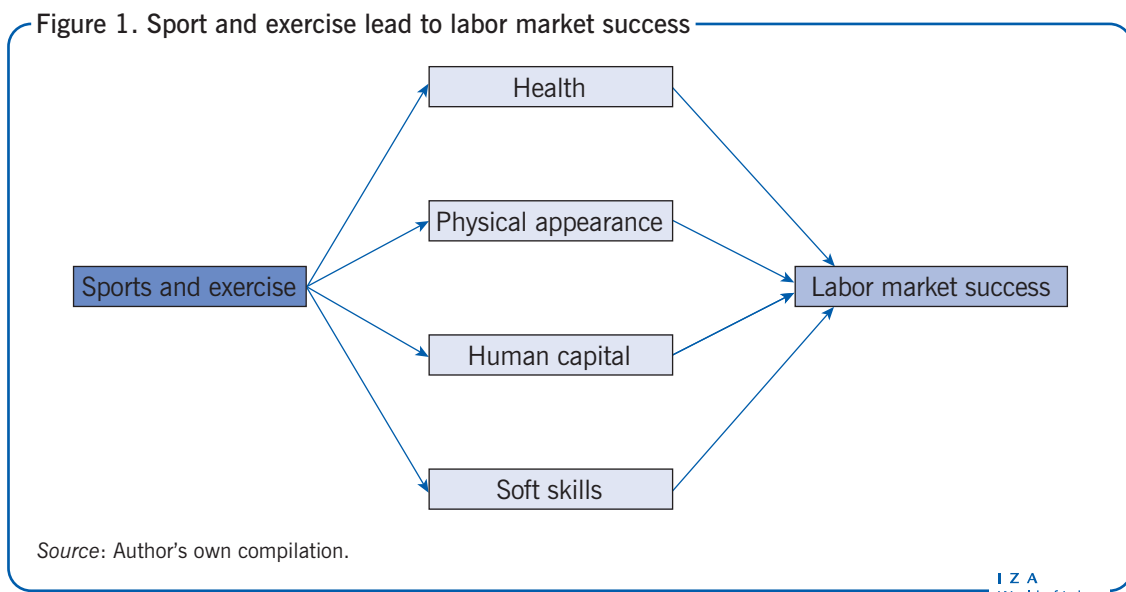
AUTHOR'S MAIN MESSAGE

Raising labor productivity is an important policy goal since higher productivity strengthens the international competitiveness of the economy and increases welfare. Engaging in sports and exercise can boost an individual's productivity by improving health and fostering cognitive and non-cognitive skills, including self-discipline, stress management, and team work. Since these factors not only increase productivity but also influence individual success in the labor market, it is not surprising that increased participation in sports and exercise can result in substantial earnings gains and may thus constitute an important policy objective.



MOTIVATION

Many of the measures thought to improve worker productivity, such as schooling and vocational training for youth and public employment services for unemployed workers, have been thoroughly investigated. In contrast, far fewer studies have examined the possible contribution of sports and exercise to individuals' labor market success, despite overwhelming evidence from epidemiology and other fields that increasing physical activity positively influences important determinants of labor market success. Sports and exercise are found to enhance such soft skills as self-discipline, endurance, stress management, and team work, as well as physical and mental health.



Many public policy campaigns by national and international health organizations, including the World Health Organization (WHO), have promoted sports and exercise as forms of physical activity for children, adults, and senior citizens. Their motivation, though, comes almost entirely from public health considerations. For example, involvement of employment offices in campaigns to increase physical activity seems to be almost unheard of (a recent newspaper announcement by the Flemish regional government being an exception).

This paper takes stock of recent studies on the effects of sports and exercise on individual labor market outcomes, beginning with an overview of which individual characteristics are associated with higher or lower participation in such activities. Because of space limitations, the focus is on the effects of sports and exercise on the prime-age labor force (after education and before retirement). More detailed results are available in [2] and [3].

DISCUSSION OF PROS AND CONS

To understand what constitutes “reasonable” levels of sports and exercise, it helps to turn to current official recommendations for activity levels. Since physical activity is considered a key determinant of individual health, various public health institutions, including the WHO, have issued such recommendations. For the most part, they recommend that all adults aged 18–65 engage in moderate-intensity aerobic physical activity for a minimum of 30 minutes a day, five days a week to stay healthy [4]. There is also consensus that, from a health perspective, more

WHO recommendations on physical activity, ages 18–64

In adults aged 18–64, physical activity includes recreational or leisure-time physical activity, transportation (e.g. walking or cycling), occupational (i.e. work), household chores, play, games, sports or planned exercise, in the context of daily, family, and community activities.

In order to improve cardiorespiratory and muscular fitness, bone health and reduce the risk of [non-communicable diseases] and depression the following are recommended:

1. Adults aged 18–64 years should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week, or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week, or an equivalent combination of moderate- and vigorous-intensity activity.
2. Aerobic activity should be performed in bouts of at least 10 minutes duration.
3. For additional health benefits, adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity.
4. Muscle-strengthening activities should be done involving major muscle groups on two or more days a week.

Source: WHO. *Global Recommendations on Physical Activity for Health*. Geneva, Switzerland: WHO Press, 2010; p. 8.

physical activity is better—within limits, of course (obviously, were it even possible, running 24 hours a day would worsen rather than improve health).

The recommended minimum level of physical activity corresponds to a daily energy expenditure of at least 1.5 kilocalories per kilogram of body weight. Individuals may meet this goal with various types and duration of sports and exercises. Examples are walking for 30 minutes a day at a speed of 2.5 miles an hour or running three times a week for 25 minutes or longer each time at a speed of five miles an hour. Though modest, these goals are not widely achieved. In Switzerland, for example, which has a high average activity level, more than one-third of the adult population does not achieve this level of activity. Thus, there is considerable room to increase the activity levels of the population without even getting close to the level of activity that might lead to negative health effects.

When considering the effect of sports and exercise on labor market outcomes, an additional factor needs to be taken into account: Because physical activity is time consuming, increasing an individual's participation in sports and exercise means that some other work or leisure activity (including sleep), which may also have a positive effect on labor market performance, has to be forgone to make room for sports and exercise.

Participation in sports and exercise: Theoretical considerations

Before discussing the labor market and other effects of sports and exercise, it is informative to consider why people participate in these activities and who is more, or less, likely to participate [3]. From an economic point of view, there are several potential motives for increased physical activity.

- There is the consumption motive. Sports and exercise are enjoyable and thus yield an immediate reward, similar to many other leisure activities that directly increase utility.
- There is the investment motive. Individuals believe that being physically active increases their general fitness, which is good for their health and their physical appearance, as they are reminded by many public-information campaigns and “get-active” campaigns in developed countries (and in some less developed countries too).
- Some people are aware that today’s investment in health is likely to lead to additional labor market returns in the future through the potential positive effects on various hard and soft skills. It is probably fair to assume, however, that knowledge of these positive labor market outcomes is not as widespread as knowledge of the positive health effects.

(There may also be future returns from improved fitness in other realms, such as an improved position in the marriage market.)

Rational individuals will spend some time participating in sports and exercise when the expected and discounted returns from the investment plus the consumption value of spending time in sports and exercise (net of direct costs, such as expenditures for gear, the expected costs of possible injuries, and any disutility such activities may have for some individuals) exceed the net gains from other activities (remembering that all activities, including sleep, compete for the scarce resource time, whose supply cannot be increased). Such calculations are, of course, approximate and may include some irrational elements. Furthermore, the calculations are not based on the true future effects, as they are unknown to the individual at the time of the decision, but on their subjectively expected values. Individuals may also be affected differently by the related uncertainty—both the general uncertainty about the type and magnitude of possible rewards, some of them occurring in the distant future, and the additional knowledge necessary to reasonably predict the likelihood that such returns will actually be realized. Naturally, this uncertainty will have a greater impact on the investment motive than on the (short-term) consumption value.

These simple ideas can be formalized in various types of mathematical models.

- The consumption motive is most commonly analyzed using Cawley’s Sleep-Leisure-Occupation-Transport-Home-production (SLOTH) model [5] (for examples, see [3]). This static model explicitly considers the trade-offs involved in allocating time to different activities, one of them being sports and exercise.
- The investment motive is captured by models built along the lines of Grossman’s investment-in-health-capital model [6] (for examples, see [3]).

Individual levels of participation are expected to vary because people differ in many ways that affect the decision to engage in sports and exercise, including their opportunity costs for different types of leisure and work, their taste for sports and exercise, their valuation of its side effects (such as physical appearance or injuries, for example) compared to work and other leisure activities, the potential gains they expect from sports and exercise, and their valuation of future consumption compared to current consumption.

Factors related to participation in sports and exercise

The variables associated with participation in sports and exercise have been investigated empirically by epidemiologists, sports scientists, and economists, among others (see, for example, [7]). The factors influencing participation can be classified into five general groups:

- individual socio-demographic characteristics;
- environmental characteristics;
- peer influences;
- costs;
- direct financial and non-financial incentives.

In addition, many studies emphasize the importance of habit formation as a key determinant—simply becoming accustomed to engaging regularly in sports and exercise and integrating these activities into one’s weekly routine [3].

Among the socio-demographic characteristics, studies emphasize age (younger people participate more than older ones, although the shape of this age-activity relationship remains somewhat unclear) and sex (men are more likely to be active in sports and exercise than are women, especially in a household with young children). Other socio-demographic characteristics found to be influential include religion, ethnicity, and immigration status. Being healthy and of normal weight are also associated with higher activity levels. Finally, higher education and better labor market positions go hand in hand with higher observed activity levels as well.

There is also substantial evidence that environmental factors are associated with activity levels. Factors that have been identified include the availability of appropriate facilities (gyms, tennis courts, football fields, running tracks, and so on) and public spaces (such as public parks), crime levels (higher levels increase the expected costs of outdoor activities), and climate and weather. As expected, more facilities and public spaces, less crime, and moderate climate, with more hours of daylight, make it more convenient, safer, and cheaper to be active and are thus positively associated with activity levels. There are also strong indications that individuals are influenced by the activity level of their friends and associates; when peers are more active, individuals are likely to increase their own activity level (and vice versa).

Many of the factors just mentioned are positively associated with health and with labor market outcomes as well, such as earnings and job position. That means that any study attempting to establish causal links between sports and exercise activity levels and labor market outcomes has to deal with the non-randomness of the participation patterns, which overwhelmingly suggest positive selection (people who are likely to do better in the labor market, even without being more active, are more likely to choose higher activity levels). For this reason, some randomized controlled trials have been set up to deal with the selection issue when examining specific research questions. These experiments exploit the fact that it appears to be possible to bribe people to increase their activity levels, using relatively modest financial incentives. However, it is also a common finding of these studies that once the (rather short-term) financial incentives stop, activity levels return to their levels before the intervention started.

Effects of sports and exercise

As mentioned, participation in sports and exercise has many expected positive effects, including greater happiness, improved health, greater physical attractiveness, improved cognitive skills, and enhanced non-cognitive skills such as self-discipline, endurance, self-confidence, stress management, and team work. Research in these areas is vast and interdisciplinary (including epidemiology, psychology, sports sciences, biometrics, and economics). Generally, studies

find positive effects on all the factors mentioned, although not necessarily on other lifestyle indicators, such as weight and alcohol consumption.

Thus, almost by definition, it might seem that these positive effects would also be reflected in greater success in the labor market. This might not necessarily be so, however. For example, spending an additional hour in a gym in the morning before work might improve an individual's health, but it could conceivably lead to a decline in productivity if the training is too intense and requires a long recovery period (which could reduce concentration and effectiveness on the job).

Another key consideration for positive effects on labor market outcomes is which activities are crowded out in order to spend additional time on sports and exercise, whether sleep, other leisure activities, educational activities, or even work hours. Obviously, if additional participation in sports and exercise cuts into work hours, then reduced earnings might easily outweigh any positive productivity effects. Furthermore, if additional participation in sports and exercise crowds out other non-work activities that may increase labor market success as well, such as vocational training parallel to the regular job, reducing them in favor of sports and exercise might also have ambiguous effects.

Methodology issues

Before discussing the results of some studies of the effects of sports and exercise on labor market outcomes, it is important to consider some methodological issues that can affect the findings. One issue is that non-intrusive measurements of physical activity are difficult to obtain because of the need for some sort of monitoring devices. While this situation has been changing rapidly with the miniaturization of many activity monitors (like step counters) and the proliferation of smartphone-based applications for monitoring physical activity, most of the information used in empirical studies so far has been collected from questionnaires. However, it is well documented that people tend to overstate their activity levels in such self-reported accounts.

A second problem is also data related. Very few surveys collect adequately detailed information over a long enough period on both labor market indicators and participation in sports and exercise. However, a long observation period is needed because the impact of activity levels on labor market success is expected to be a long-term phenomenon. It takes time for a change in activity levels to be reflected in improved intermediate outcomes, such as better health and improved skills, that can be expected to influence labor market outcomes directly (the effect on happiness, which can be immediate, may be an exception). And even after increased activity levels have influenced these productivity-enhancing intermediate outcomes, it will take additional time for these improvements to be reflected in better labor market outcomes. Increasing individual earnings usually requires some wage bargaining or even changing jobs, both time-consuming activities.

Empirical findings

The problems of long-term impacts, positive selection, and measurement issues are circumvented in a well-designed randomized experimental study for Sweden [1]. In this experiment, more than 8,000 job applications were sent to employers in different economic sectors for different occupations with different skill requirements and degrees of customer contact. Information about activities in different types of sports and exercise were randomly added to the job applications. As expected, the study finds that employers take into account

such activities when deciding who to invite for a job interview since participation in sports and exercise conveys information about otherwise unobservable skills. The effects are not huge, however. Including a statement about being active in sports in job applications increases call-back rates by two percentage points.

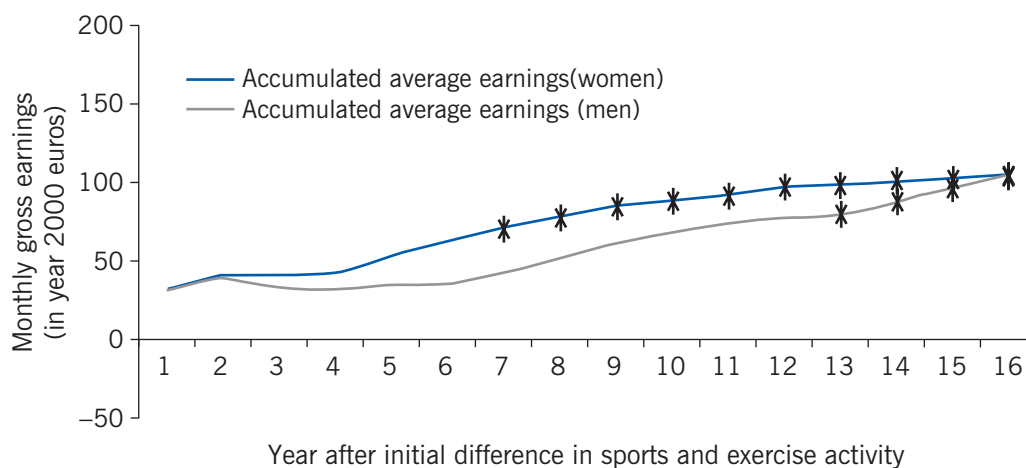
To investigate the impact of physical activity on unemployment duration, a non-experimental study used data from the German Socio-Economic Panel (GSOEP), a general purpose household panel survey (starting in 1984) that contains some information on sports and exercise, although not very detailed, along with detailed information on individual labor market performance [8]. The study finds a positive correlation between engaging in physical activity and moving from unemployment to employment for women who have at least three years of working experience. However, the study cautions that the findings might reflect lower psychological barriers to job search rather than an actual effect of being physically active.

Another non-experimental study analyzes the impact of sports participation on employment among different age groups, using a series of cross-section data from the Active People Survey (commissioned by Sports England) [9]. The sports information is extremely detailed, making it possible to investigate the effects of different types of sports. Drawbacks are the cross-sectional character of the data and the crude labor market information. This study also finds a negative correlation between physical activity and unemployment, in this case for men. Moreover, it also finds a positive relationship between physical activity and employment for individuals aged 26–45. The findings did not differ by types of sports and exercise performed. Although strict causal relationships cannot be established in this non-experimental study using cross-sectional data, the detailed information on individuals and the type, intensity, and duration of physical activity, along with the results of formal sensitivity analysis, suggests that any impact of endogeneity due to confounding factors would be limited.

Another strand of the literature on physical activity and earnings focuses on the short- and long-term effects of adults' participation in sports and exercise on their current earnings. Analyzing data from the GSOEP, one study finds that men who practice sports at least once a week earn 5% more than men who do not [10]. The study also looks at the impact of youth sports on current earnings and finds that women who were involved in sports at age 15 earn about 6% more than women who were not. Using the same database in a substantially different way with the goal of more reliably identifying causal effects (rather than simple correlations) of sports and exercise on earnings, another study obtains similar results (see Figure 2) [11]. It finds an average increase of €1,200 a year over a 16-year-period for adults who are more active. Another study that analyzes earnings effects estimates the effects of different sports on annual household income in England finds gains of £4,300–£6,500 a year for men aged 26–45 and £3,400–£5,300 a year for women of the same age, with the results varying with type of sports [9]. For men, outdoor sports and then fitness sports have the strongest correlation with earnings, while for women it is racquet sports for those aged 26–45 and outdoor sports for those aged 46–64.

Using data from the Canadian National Population Health Survey, another study analyzed the impact of sports and exercise on the earnings of Canadian adults for different activity levels [12]. The survey has collected data from the same individuals biannually since 1994 and so provides panel data. Furthermore, as one of very few surveys, it collects extensive information on health and physical activity for a large and representative sample of adults. The study uses the same method as [11], but because the data are so much better, the strategy for identifying a causal effect is much more credible. This is also one of a very few studies that investigate different levels of sports and exercise. It finds that the change from inactivity to moderate

Figure 2. Effects of sports and exercise activity on earnings



Note: Effects of sport and exercise participation at least monthly (compared to less than monthly) for the population of individuals who are active in the decision period. A symbol on the line of the mean effect indicates statistical significance (5% level). Accumulated average earnings are computed as monthly earnings summed up year by year until the year in question divided by the number of valid interviews up to the respective year. For more information, see the original.

Source: Lechner, M. "Long-run labour market and health effects of individual sports activities." *The Journal of Health Economics* 28:4 (2009): 839–854 [11].

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levels of activity (corresponding roughly to the recommendation mentioned previously of 30 minutes a day, five days a week) does not substantially increase earnings over time but that the change from moderate levels to higher levels increases earnings 10–20% over 8–12 years.

Another piece of evidence on the positive effect of sports and exercise on earnings comes from a study using Finnish administrative earnings records to investigate earnings differences for twins who differ in their activity level [13]. The study finds substantial earnings gains from greater physical activity, gains that are even larger than the ones mentioned before.

Finally, a non-experimental study examines Swedish administrative data for more than 400,000 individuals [1]. The data include fitness information from army enlistment tests for men at age 18. Comparing siblings only, the study finds strong gains in current earnings from additional fitness at age 18.

From the findings presented above, the evidence for positive labor market effects of sports and exercise is very strong, especially for earnings. Earnings effects range from about 4% to 17%. There is also strong evidence that the positive effects of sports and exercise on human capital begin with children and adolescents, as measured by their cognitive and non-cognitive skills. These additional skills reap returns later in life.

LIMITATIONS AND GAPS

The results of several of the studies discussed above should be interpreted with some caution. Applied microeconometrics puts substantial emphasis on developing research designs that can credibly identify causal effects as opposed to simple correlations. Several of the studies discussed here do not conform to the highest analytical standards, for example like those used to evaluate active labor market programs. One reason is the scarcity of longitudinal data sets that jointly contain information on labor market outcomes and the level, type, and intensity

of sports and exercise. This makes controlling for self-selection into higher activity levels more difficult. In addition, the long-term nature of the effects of sport and exercise also makes conducting experiments in a reasonable time frame at reasonable cost very challenging, if not impossible. Despite these weaknesses, however, and despite wide differences in research designs used, it is nonetheless revealing that almost all studies find either positive or statistically insignificant effects, with insignificant effects usually being related to an insufficient sample size leading to a lack of statistical precision.

Another limitation is the lack of evidence on the individually optimal level of intensity of sports and exercise and on the importance of the different channels through which sports and exercise influence labor market outcomes. And although many countries spend a substantial amount of public funds on subsidies supporting sports and exercise, credible evaluation studies of the effects of those subsidies are rare. Thus, reliable cost–benefit analyses providing economic justification for those subsidies are missing as well.

SUMMARY AND POLICY ADVICE

The empirical studies of the labor market returns to sport and exercise activities suggest strong effects. These findings complement previously found positive effects of sport and exercise on cognitive and non-cognitive skills, physical appearance, and health. Since the labor market returns are appropriated first of all by the active individuals themselves, it is a matter of debate and judgment whether they provide justification for (further) state subsidies.

In such a debate, the deciding issue is whether there are external effects, information asymmetries, or other reasons that lead individuals to decide on activity levels that are too low from a broader social perspective. However, there may be cases where additional government intervention may be clearly warranted. For example, governments may want to include among their active labor market policies encouragement of sports and exercise for unemployed people whose productivity is below the going wage rate and whose participation in these activities is below optimum, in order to increase the re-employment chances for this group. While such policies do not appear to have been implemented anywhere yet, in the second half of 2014 the regional Belgian government of Flanders announced plans to do just that. For the future, it will be interesting to see the effects of those measures. But whatever the conclusion on promoting further expansion of physical activity using public funding, it is apparent that increasing the general level of physical activity is very likely to boost productivity among employees at all levels.

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Competing interests

The IZA World of Labor project is committed to the *IZA Guiding Principles of Research Integrity*. The author declares to have observed these principles.

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Further reading

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