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Psychology of athletic performance

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Many years ago, when I aspired to compete in the Scottish and UK championships, I spent a holiday with an elderly aunt in the Mull of Kintyre. In order not to interrupt my training altogether, I went for long cross country runs. My aunt, who was full of family pride about some small achievements on my part, asked her neighbour, a farmer, if he had seen me practising. He replied: 'Aye, I seen a body running o'er the hill. I thocht he was no wise'.

My talk today concerns the form of mental aberration which leads people to 'scorn delights and live laborious days', and specifically to subject themselves to increasingly strenuous and painful exertions, in the pursuit of triumphs on the track. There are, of course, different degrees of severity of this peculiar behaviour, but references in this article to 'athletics' means the performance of first-rank athletes, in international competition. These athletes live in a world of their own, a very different world from that of the casual club athlete who competes for the fun of it, follows a much less vigorous training programme. Men like Sir Adolphe Abrahams, who found time during his medical studies to turn out for the St. Bartholomew's Hospital sports, where he won the 100 yards every year, from 1907 to 1912, and the 440 yards from 1908 to 1912. He was a good student, and became a respected consultant, but he remained a man of many interests – among other things he was a pioneer in the photography of moving objects. I don't suppose his times for the 100 yards were of record breaking quality (he left that to his younger brother Harold) but his continuing interest in athletics for the next half century showed that for him running was, above all, fun.

Before the second World War, there would have been no need to draw this distinction between the totally dedicated top-class athlete and the amateur clubman. In those days Olympic champions and world record holders seemed to crop up arbitrarily, like genetic 'sports', among the ranks of their fellows. They were distinguished more by native talent than

by conspicuous dedication to training: even Joe Binks, who held the world mile record for many years, used to train only once a week and Eric Liddell prepared for his 1924 Olympics in Paris but still achieved a World Record of 47.6 s for the 440 yards.

Already in 1924 a new athlete had appeared on the scene who can be regarded as the harbinger of a new, sterner approach to training. Paavo Nurmi used to train every day, stop-watch in hand, and also carried a stopwatch when he raced. His preparation was simple, if rigorous: it consisted in preparing himself to run a few seconds faster than his rivals' best performance. At his first Olympics, in 1920, this still was not enough. The French cross-country runner Georges Guillemot tucked in behind him in the 5000 m and refused to be shaken off, and in the last lap Guillemot pulled out a sprint finish which Nurmi could not match. After this race, Nurmi revised his plan for the 10 000 m by the simple device of taking one second off each lap time: and as a result, neither Guillemot nor any other challenger could stay with him. Years later, in 1938, I had the pleasure of meeting Guillemot in his bistro, the *Bar Olympique* in the Place de l'Odeon in Paris, and heard him describe that great day in his life – the day when he beat Paavo Nurmi.

Nurmi's remorseless daily training schedule undoubtedly achieved the results he was aiming for, and under his inspiration Finnish athletes took their training equally seriously, so that for a whole generation they dominated the 5000 and 10 000 m races. In spite of this, between the wars there were several outstanding middle-distance runners who produced world-beating performances in spite of a much less strenuous approach to training – these included Douglas Lowe and Jack Lovelock. Even Sidney Wooderson, who took his training very seriously, only practised for about an hour, four times a week; but elsewhere, things were different. The German coach Woldemar Gerschler imposed on his protegee Rudolf Harbig a training schedule modelled on that of Nurmi, but with more emphasis on speed, and Harbig ran a superb 1 min 46.6 s 800 m in 1939. To combat the danger of monotonous staleness, Mackie used to interpolate past laps into the 5000 m, a technique later exploited by Kuts.

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In the late 1930s, Gosta Holmer, the Swedish national coach, devised a system of training called *Fartlek*, whose essence was variety. His athletes ran in the woods and open country, varying their exercise with a mixture of fast and slow, with periods of fast walking or jogging. They included such outstanding runners as Gunder Hagg and Arne Anderson. The former beat Lobelock's world record for the 1500 m, and Wooderson's for the mile, bringing this down to 4 min 6.2 s. Anderson brought the world mile record down to 4 min 2.6 s in 1942, and to 4 min 1.6 s in 1944, and in 1945 Hagg brought it down a fraction more to 4 min 1.6 s. Thus these two Swedes were on the threshold of the 4-min mile; but another 9 years were to elapse before that psychological barrier was swept aside.

In the early post-war years, there were still some splendid amateurs, like Roger Bannister and Christopher Chataway. When these two began their International athletic careers, in 1949 and 1951 respectively, they used to train on only 3 or 4 days a week, and they made it their aim to work up to a peak of fitness for one or two major races in the course of a season. By 1954, when they were at the height of their running careers, they were going out five times a week for an hour and a half. It cannot be denied that their system worked, at that time. Chataway helped Bannister to become the first 4-min miler, beat Vladimir Kuts in a memorable 5000 m race, and in 1955 himself ran a mile in under 4 min, and set a new world record for the 3 miles.

At the peak of his performance, Chataway declared: 'I am not prepared to train every day throughout the year, or to devote three hours to each training session'. And yet, less than 10 years later, he reluctantly had to admit that in present-day international competition only athletes who are prepared to work at their training for 3–4 h a day, throughout the year, are likely to reach the top.

Significantly, Christopher Brasher showed what can be accomplished by really dedicated training. Brasher was a fine, all-round athlete, but did not seem to be a world-beater; yet by a mixture of intelligent planning, learning from his mistakes and incessant practising, he steadily improved his performance in the 3000 m steeplechase and his efforts were rewarded with a gold medal in the 1956 Olympics.

Nearly all the giants of the last 15 years have devoted enormous amounts of time and effort to their training. Interestingly, though, there has been no uniformity in the actual training methods they adopted. Some, like Gordon Pirie, Vladimir Kuts and Emil Zatopek, believed in relentless, punishing work to build up their speed and stamina. In 1954, while Chataway and Bannister were still husbanding their strength for a few peak performances, Pirie would run up to 45 km a week on the track, much of this at racing speed. Zatopek was a believer in repeated moderately paced runs of one lap at a time, and would do as many as 60 such runs in a session, day after day. Kuts did the same, but threw in faster laps, aiming to build up a resistance to changes of pace during a long-distance race and did not confine himself to single laps, but included hard-paced runs

at distances of up to 2000 m in his daily training sessions.

Bannister, Chataway and Brasher were largely self-trained, preferring to think out their own programmes; but all three acknowledged their indebtedness to the great coach Franz Stampfl who seems to have had the knack of inspiring his athletes without ever dictating to them.

Since 1954, athletes have come to rely increasingly on the supervision of experienced coaches, in special training centres. Two of the greatest of these, Franz Stampfl and Percy Cerutti, both worked in Victoria, Australia, and for some years their contrasting systems of training were pitted against each other in the persons of their star athletes. Stampfl believed above all in interval training, that is measured runs on the track, carefully timed, interspersed with periods of relaxation; whereas Cerutti believed in hard training away from the track, including repeated runs up steep, high sand-dunes, weight-training and other forms of exercise. He made his athletes turn out for three hard sessions daily, involving about 4 h of strenuous effort, and recommended that they do another 4 h of light work, rather than relax in complete rest or idleness. Cerutti's pupils included such outstanding runners as John Landy, Peter Snell and Murray Halberg, while Stampfl had the great miler Mervyn Lincoln. In 1958, Lincoln and Elliott ran a memorable mile race in Dublin. Although Elliott won in 3 min 54.5 s, both men broke the world record, so honours were even.

If so many widely contrasting systems of training all seem to bring good results, one has to seek a common denominator; and this is surely the simple factor of *motivation*. Some men, such as Nurmi, Zatopek or Bannister, are driven by an inner urge to excel and need no prompting; but probably the great majority of athletes will find it easier to keep up the unrelenting effort to stretch themselves beyond their previous best if they have the stimulation, and the encouragement, of an inspiring coach.

In both eras of training, the predominantly 'amateurish' and the predominantly 'professional', one of the chief hazards to perfect fitness was recognized to be 'staleness'. Curiously, however, much more seemed to be made of this by writers of the old 3-days a week era than by modern coaches like Stampfl and Cerutti. Perhaps the difference is due to a better understanding of the importance of motivation, and of avoiding tedious repetition. Both of these factors were tackled, although in different ways, by the great Australian coaches. Stampfl recognized the importance of constant feed-back of knowledge about one's performance, so that his athletes were always aiming to beat their previous best, whereas Cerutti relied on hard training in a variety of terrains.

In an American textbook of the mid-1960s (*Track and Field Athletics* by Bresnahan, Tuttle and Cretz-meyer) staleness is defined as: loss of appetite, loss of sleep, worry, fatigue, loss of weight and loss of interest in the event. If these symptoms were presented to a psychiatrist, he would immediately diagnose *depression*, and would proceed to try to find out what events in the patient's emotional life may

have contributed to the onset of this depression of his spirits.

It is interesting to notice that a very similar affliction, 'loss of the sense of purpose' or 'accidie' has been reported by another, in some ways very different, but equally dedicated, group of men, namely the monkish communities of the middle ages.

A rather common popular delusion consists in a belief that athletes are superlatively healthy. It is true, of course, that they are trained to a high peak of fitness – but of fitness for one particular type of performance. With the obvious exception of pentathlon and decathlon men, and perhaps also (when one thinks of Chris Brasher's mountaineering feats) of steeplechasers, most athletes are as delicately tuned as racehorses: they seem even more vulnerable than ordinary mortals to pulled muscles and twisted ankles, and are far from immune to travellers' diarrhoea. Highly trained athletes can easily become hypochondriacs, excessively concerned about minor physical discomforts or trivial ailments. It seems that the very act of training makes one abnormally aware of one's physical functioning, and when this happens, athletes paradoxically find themselves in danger of joining the ranks of the psychoneurotics.

A colleague, Dr Crawford Little, has studied the 'self-image' of a series of neurotic patients and compared them with matched normal controls, in respect of whether they laid extreme stress on their physical health and fitness, showed a moderate interest in fitness, or appeared never to have taken any active interest in sports, games or other physical activities. Seventy-two per cent of normal subjects displayed a moderate interest in fitness; 9% were extremely athletic and 18% were completely non-athletic. In contrast, 39% of the series of male neurotics showed extreme concern about their physical fitness, 42% were completely non-athletic while only 18% showed the normal mild interest in exercise and fitness. The neurotics, in other words, tended to overvalue or to undervalue their physical well-being; and in the former group it seemed that an important contributory factor to the onset of their neurosis had been an illness or injury which threatened their cherished self-image of superior physical fitness.

What we expect of an athlete, and what he demands of himself, is not after all to be normal, but to do something peculiarly abnormal, namely, to push himself to the extreme limit of his capability in his particular event. This can never be done by physical training alone: an athlete's mental set is of vital importance when it comes to really superlative performance. I do not mean by this that an athlete is superlatively mentally healthy. That Argyllshire farmer was surely right; sensible, well-adjusted people would never punish themselves in the way that athletes do. We expect our athletes to suffer from a touch of monomania – dedicated single-mindedness, as sports writers prefer to call it – and a modicum of neurosis. They must not be too anxious, because that would interrupt their sleep, and spoil their coordination, but they must be capable of working up a good deal of anxiety shortly before their event. It was extraordinarily encouraging to me, as a

newcomer to international athletics, to see how nervous our British team captain, Don Finley, became while waiting for his event in the 1938 European Championships, in Paris. He had already created five records for the high hurdles, and was the favourite among a very strong field, and yet he paced up and down in the changing room, tried to relax and couldn't – and then went out and beat his own European record, in winning the event.

This anticipatory anxiety, which athletes share with actors, orators (and even occasional lecturers) serves an essential role in helping them to produce exceptional performances. There are two kinds of secretion from the adrenal glands. During periods of anticipatory anxiety the secretion from the inner cells predominates. This is adrenaline, which makes the skin pale, the palms moist, the mouth dry, and which may cause diuresis. When the waiting period gives place to the need for violent action, the secretion of the outermost cells of the medulla of the suprarenal gland, noradrenaline, predominates, and this is associated with vigorous muscular effort and with a fierce concentration of attention on the task in hand, accompanied by a capacity to ignore distracting stimuli, even quite painful ones.

Some years ago a Harvard psychiatrist, Dr Hudson Hoagland, investigated these phenomena in athletes engaged in highly competitive, indeed combative, sports. He began with university boxers, studying their blood adrenaline and noradrenaline levels before and after bouts, showing the changeover from a relative preponderance of adrenaline to an excess of noradrenaline. He then went on to two other sports where it is notoriously easy to move from competitive rivalry to open warfare – water-polo and ice hockey. Not surprisingly, the highest noradrenaline levels he found were in players who had just been ordered off for coming to blows; in contrast, team members who were waiting on the side-lines, in case they would be called on as replacements, showed high adrenaline levels, but the highest adrenaline level of all was recorded from the coach, who followed the game intently, but without the release of being able to get into the action.

Anxiety, anticipation and imagination thus play a part in winning championships; and so does intelligence, both in training and in the actual race. There have been some athletes who seem to be willing to let their coach do all the thinking for them; but he couldn't be there, once they were out on the track, and such men could be at the mercy of a rival who knew how to upset their expectations with surprise tactics. Using one's head can sometimes take quite simple forms, for example, in keeping count of the number of laps that have expired. Even in the Olympic Games, judges have been known to lose count; in Los Angeles, in 1932, the 3000 m steeplechase time was slower than might have been expected, because they ran an extra lap. I blush to admit that the only time I came in first when running for Britain was under similar circumstances, at the White City in 1938, during a match against Norway. Peter Ward, our record-holder at that time, was letting me lead the field in the 5000 m. As we came up for the bell, the judge called out 'Two laps to go', but I

was sure that he'd said the same the last time I had passed him, so I didn't wait. As we entered the back straight, there was a belated clamour from the bell, but by this time I had stolen a comfortable lead. Another example of low cunning was in a race here in Edinburgh, at about the same date. I had beaten my predecessor, Jackie Laidlaw, in a 3-mile, but his time for the mile was considerably better than mine when we turned out on the University grass track for a mile race, on a sunny summer evening, with a strong wind blowing down our distinctly down-hill back straight. He knew that in order to win he must dictate the pace and run the race from in front, and I knew that I mustn't let him do this. Each time we turned into that back straight I could see our long shadows on the grass, and each time his shadow moved out, I knew he was going to try to pass and increased my stride till his shadow merged with mine again. As a result, I was able to control the pace, and to beat him in the finishing sprint.

The annals of international athletics contain some stirring accounts of how intelligence can decide the issue in a close contest.

Turning to more substantial examples of the use of brains in international races, I would remind you of three particularly memorable duels. First, the great mile race in the Empire Games in Vancouver, in 1954, between Roger Bannister and John Landy. Earlier that year, both had aspired to be the first 4-min miler. Landy got down to 4 min 1.6 s before Bannister, paced by Chataway and Brasher, set his world record of 3 min 59.4 s. Less than 2 months later, Chataway made Landy run faster than ever before, to bring the world record down to 3 min 58 s. That year's Empire Games provided a confrontation between these two world record-holders.

Bannister knew that he must make Landy set the pace of a 4-min mile, believing that in an all-out race like that, he would be able to produce the stronger finish. At the A.A.A. Championships that summer, he demonstrated for all the world (and especially John Landy) to see, how fast he could sprint home over the last 300 yards, if the pace was that of a mere 4 min 8 s mile. Before setting out for Vancouver, Bannister discussed this race with Franz Stampfl, who helped to convince him that he could win: 'Neither of us under-estimated John Landy. He was the greatest miler in the world, both in the consistency of his performances and in the times he had set. If my mental approach was correct I could beat him. Landy was tougher than I, but I felt I could prepare myself better for the great occasion'.

As Bannister hoped, Landy set a gruelling pace running the first lap in 58.2 s. Bannister allowed him to go ahead, judging his own pace so that he passed the half-mile in 1 min 59 s. At one stage in the second lap, Landy's lead was nearly 15 yards. In the third lap, Bannister slowly gained ground, until he was only 5 yards behind, then right on his shoulder. Landy refused to tire, but tried instead to draw away again, 300 yards from the finish. Bannister struck as they came off the last bend, gaining a sudden lead

which he held, somehow, for the last gruelling 70 yards. That race showed that even when two runners have forced themselves to the extreme limit of their capabilities, they can produce just a little more, in the heat of competition.

In that same year, 1954, the world 3 miles and 5000 m records kept being beaten, by Chataway and Kuts, two worthy successors to the great Emil Zatopek. In the European Championships, Kuts started off at a furious pace, Zatopek and Chataway couldn't believe that he could last, and allowed him to increase his lead to about 50 m after five laps; but he refused to crack, and went right on to set a new 5000 m record of 13 min 56.6 s. This was the man that Chataway had to contend with, 6 weeks later, in the London *versus* Moscow contest. By now, Chataway knew that he must not let Kuts break away. Once again, Kuts ran the first half lap very fast indeed, and did not let the pace flag throughout the first kilometre; but this time, Chataway was only a yard behind. In the fifth lap, Kuts accelerated, putting in a 62.4 quarter-mile; Chataway fell 15 yards behind, but pulled himself up again in the next three laps. After this, Kuts repeatedly tried to shake him off by putting in sudden bursts of faster pace; but Chataway was still there. Kuts knew that Chataway was much the better miler, and counted on making him run so hard that he could have no sprint left at the finish so at the end of this tremendous race, Kuts began *his* sprint at the bell; but somehow, Chataway stayed with him, and somehow, he still found enough of a sprint to beat Kuts in the last few yards, in a new world record time.

The British athlete whose training schedule came nearest to that of Kuts, in intensity, was Gordon Pirie. When these two met in the 10 000 m, in the 1956 Olympics in Melbourne, Pirie had beaten Kuts' 5000 m record. Once again, Kuts set out to pummel his rival with bewildering alterations of slow and very fast laps. He succeeded, and won easily, though in far from his best time, while Pirie finished eighth.

In summary, there are three ways in which psychological factors play a part in competitive athletics.

1. *Intelligence*: which has to be used in planning one's training, and in the tactics of the race – in the former case, a coach can do the thinking, but in the latter, the athlete is on his own.
2. *Motivation*: the athlete is driven by a very powerful inner urge to excel: if this flags, his performance falls off. On the day of the event, *anticipatory anxiety*, if not too severe, seems to mobilize extra physiological resources.
3. *Staleness* is the dreaded let down of an athlete who can no longer muster zest and enthusiasm for his event.

In conclusion, as world-beating becomes increasingly hard work – though no less admirable a spectacle for the onlookers – let us thank goodness for the existence of so many club athletes who run, like Sir Adolphe Abrahams, simply for the fun of it.