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Chips and Showmanship: Running and Technology

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Abstract: A brief review and classification of technology in general begins the paper, followed by an application of the classification to two specific marathon case studies: the 2018 Boston marathon and the 2017 Nike Breaking2 Project marathon. Then concepts from an array of sport philosophers are discussed to suggest an explanation for why each of the case studies strikes us as problematic. The conclusion provides a reasonable explanation for our misgivings, as well as an indication of how we might evaluate sporting endeavors in the face of increasing technological innovation.

Keywords: technology; running; fairness; competition

1. Introduction

This is a story of two marathons, one in objectively miserable conditions and the other in near-perfect ones. The influence of technology on the first was relatively light, while the other was engineered with cutting-edge technology. Yet, technology, in both cases, created controversy about the validity of the results. A brief review and classification of technology in general begins the paper, followed by an application of the classification to the two specific marathon case studies. Then I pull concepts from an array of sport philosophers to suggest an explanation for why each of the case studies strikes us as problematic. My hope is to provide a reasonable explanation for our misgivings, as well as an indication of how we might evaluate sporting endeavors in the face of increasing technological innovation.

2. Technology

Technology is vastly diverse, so adopting a classificatory scheme is helpful before making general claims. Butryn suggests five categories to distinguish sport technologies: self, landscape, implement, rehabilitative, and movement [1] (p. 112). Taking each in turn, self technologies make physical or psychological changes to athletes, so would include doping, genetic engineering, and sports psychological interventions. Landscape technologies involve the competitive area itself, e.g., innovative court and track surfaces. Implement technologies refer to sporting equipment, like bats and balls and shoes. Rehabilitative technologies are used to assist athletes in recovering from injury and strenuous training. And movement technologies are employed to evaluate and improve motions athletes undertake during their sports, like stride-length and cadence. To Butryn's list, Emily Ryall adds a sixth category, namely "*adjudication* technologies, e.g., Hawk-Eye, video replays" [2] (p. 56).

These categories are important because they open up distinctions between the types that allow us to avoid sweeping statements about the value of technology in general. For example, Butryn argues that self technologies are different from the other types because they change athletes internally, while the effects of the other technologies are external to athletes. For this reason, he suggests heightened caution is in order regarding the application of self technologies since they cyborgize sport, that is, decrease authentic human contribution to sport performance, while external technologies merely enhance human performance [1] (p. 113). To put it another way, self technologies may create "revenge

effects," wherein a technological innovation designed to improve performance results in the occurrence of some unexpected problem that didn't exist before the technology [3]. Of course, revenge effects are not limited to self technologies, as illustrated in the first case study below.

3. Case Studies

3.1. Boston 2018

The 2018 Boston marathon took place in unusually foul weather conditions—30 mph head and cross winds, steady driving rain, and temperatures in the 40s (5–7 C). As is standard practice at Boston and some of the other large marathons, the elite women began the race first. Twenty-eight minutes later, the elite men started, followed almost immediately by the faster non-elite runners in the main pack. The forty-six elite women started slowly because of the gusty winds and pouring rains, but the professionals started to break away shortly after the first mile. Long before the women reached the midpoint of the race, the runners had spread out and most were running alone. This is significant because it meant that none of these runners was able to tuck into a pack to avoid the full brunt of the wind and rain, resulting in a struggle that added an average of about fifteen minutes to the best times of the professional women. One of the non-professional elite runners who finished in the top ten estimated her finishing time would have been roughly five minutes faster if she had started in the first corral behind the elite men. Overall, the winning times were the slowest since the 1970s.

Most unusually, the women's top finishers list changed long after all the elites had crossed the line because three of the women who started the race in the first corral behind the elite men had cumulative times to fast enough to place them in the top fifteen. Exact calculation of each runner's finishing time was made possible by chip timing, an example of an overlap of implement and adjudication technology. Chip timing involves tiny transponders attached to runners' shoelaces or, more commonly now, embedded in the race numbers they pin to their shirts. The transponders contain coils that are triggered by electromagnetic waves emitted by mats at the starting line, key points along the course, and the finish line. When a coil is triggered, it generates an electrical signal, sending to a computer the exact time and identity of the runner crossing the mat. This innovation was introduced to solve the problem created in large races when runners back in the pack were unable even to cross the starting line until minutes (or, in very large races, even hours) after the race officially began. With chip timing, one's "gun time" is the official beginning of the race, while one's "chip/net time" is the time it takes that individual runner to travel from the starting line to the finish line. This is an example of a "regenerating effect," wherein an attempt to solve one problem multiplies the number of problems [4] (p. 211). Solving the problem of establishing an exact time for each runner created the problem of determining how to rank and reward the top finishers in the women's race. The official policy of the Boston Athletic Association (B.A.A.) is that only women in the Elite Women's Start (EWS) are eligible for prize money, but the organization, after public criticism, eventually awarded prize money to all the women whose net times placed them in money positions.[1]

In order to evaluate the rectitude of this decision, it's important to understand the rationale behind starting the elite women almost half an hour ahead of everyone else. According to T.K. Skenderian, one of the members of the B.A.A.: "As opposed to starting men and women at the same time, and ultimately having the female competitors lose each other among packs of men (and potentially receive pacing assistance), the EWS allows athletes to compete without obstruction." Instituted "to highlight head-to-head racing and competition," the EWS "gives the fastest women the chance to race each other openly" [5]. However, not just anyone can line up with the elite women; getting into the EWS requires

[1] The B.A.A. clarified its rules in 2019, emphasizing that only those starting in the EWS will be eligible for prize money going forward. As well, the organization changed its practice of allowing the first wave to start immediately following the elite men; now there is a two-minute hold between the elite men's start and the first wave. While this change was met with fierce criticism from sub-elite men, it did have the fortunate effect of treating men and women consistently and equitably.

having run a qualifying time at a previous marathon. None of the women who started in the first corral had run fast enough to qualify, so they cannot be accused of seeking an unfair advantage. Still, they certainly were advantaged by being surrounded by others who could help them through the adverse weather. As well, the women in the EWS were disadvantaged by not being aware of how well the women who started half an hour later were running. As one of the women who was in the EWS put it, "In Boston, the race was strategic to overcome the elements (as any race is regardless of the tough conditions). Why would you run harder if you think you are in first place? You can only race those that you are lined up with. The flow of a race goes up and down based on who wants to press/make a move. It's about strategy" [6]. So this case offers an example of a way in which the use of technology creates a problem, namely, identifying the winner(s) of a race. I will say more about this later, but it also raises the question of identifying the essential characteristics of competition more generally. What make a race a race? Were the women in the EWS in the same race as the women in the first corral? I'll return to these questions, but, first, I consider another marathon in which technology played a huge role, complicating the evaluation of the participants' running performance.

3.2. Monza 2017

The marathon world record hovered just over two hours for several years, dropping a few seconds here and a few more there, approaching but never dropping below the two hour mark. (At the time of this writing, the official record is 2:01:39.) The Nike Breaking2 Project aimed to change that and spent more than two years and an incalculable amount of money in the attempt, employing a team of experts to determine how best to apply technology to the quest. Three world-class athletes—Lelisa Desisa, Eliud Kipchoge, and Zersenay Tadese—were selected based on previous accomplishments to train for completing a marathon in less than two hours in an event technologically-engineered to be as close to perfect as possible. Each of the previously-discussed categories of technology were represented, thus the categories offer a useful structure for examining the event.

Self technologies were employed in workouts designed to make psychological changes to the athletes through brain endurance techniques, using positive self-talk and intentionally monotonous training. The idea here is that training the brain to continue to focus through monotony prevents the mental fatigue that leads to the false perception that one has reached one's physical limits. Landscape technologies were used in the decision to hold the event in Monza, an oxygen-dense location situated only 600 feet above sea level. Further the race was run on a near-flat one-and-a-half mile auto racing track, requiring the psychological training for monotony just noted. Weather stations sent continuous data regarding temperature, humidity, and wind. Instead of scheduling the event for a particular day, the Nike team determined a three-day window in which conditions were calculated to be most favorable. Adjudication technology was also a part of the attempt, as timing mats provided pace feedback to the athletes and scientific team every 200 m [7] (p. 202).

Rehabilitative technologies were employed throughout the training, perhaps most notably in physiologists using a device to measure muscle oxygenation during the hardest efforts. A portable ultrasound machine took readings both prior to and following training runs to determine how the athletes were storing, using, and replenishing carbohydrate in their leg muscles. And the team ensured that each athlete's carbohydrate levels remained sufficient by bicycling beside them as they ran to hand them drinks more often than they would have been available in standard marathon races [7] (p. 78). Movement technologies were present before and during the run. In training, the athletes practiced running directly behind pacers—other runners who took turns leading the way, protecting Desisa, Kipchoge, and Tadese from the elements and, most importantly, eliminating air resistance. "A 2014 analysis argued that the cost of overcoming air resistance, even on a perfectly still day, might amount to 100 s over the course of a two-hour marathon. Studies dating back to the 1970s have suggested that running directly behind another runner can eliminate a tremendous amount of extra effort, but in practice it's difficult to draft that closely behind someone else" [7] (p. 75). The rules for an official world record do not allow pacers to swap in and out, but it would be impossible to find a group of

pacers who could run at the prescribed pace the whole way, so Nike abandoned the quest for the world record so that the pacers could take turns and there would always be a group of them leading in a wedge formation. The teams of pacers, dropping in and out every 1.5 miles, followed a Tesla that had lasers projecting green lines of the wedge onto the track for the pacers to follow, taking the most efficient line possible.

Finally, it was an implement technology that many believe had the greatest impact on the event. For this attempt, Nike created a new shoe with a carbon-fiber plate in an extra-cushioned sole. The cushioning both weighs less and is more durable than anything previously tested, but doesn't result in energy loss because that loss is offset by a stiff carbon-fiber plate also in the sole. "External tests conducted at the University of Colorado show that the shoe improves efficiency by about 4 percent on average—a stunning figure that has sparked fierce controversy" [7] (p. 74). The controversy is on account of the perception that the shoe is more responsible for the result than the athletes who wear them. "Technology evolves, but when it evolves so quickly that it effectively picks winners, that's a problem. The top three finishers in the men's Olympic marathon in 2016, it turns out, were wearing disguised prototypes of the new shoe, which Nike has dubbed the Vaporfly. So was the women's winner; so were the men's winners of the 2016 London, Chicago, Berlin, and New York marathons. If we're interested in human limits, what does a sub-two-hour marathon truly tell us if all it takes is a 2:03 runner wearing supershoes?" [7] (pp. 204–205).

Although a version of the shoe is now on the commercial market, its price is roughly double that of other running shoes, effectively limiting it to economically advantaged runners. This adds to the controversy, since the perception is not only that the shoe confers an unfair advantage, but also that it is an advantage not equally available to all.

In the end, even with all of the technological innovation employed in Nike's Breaking2 Project, only one of the three runners came close to the two-hour goal. Eliud Kipchoge covered the marathon distance in 2:00:25. Perhaps if he had accomplished the goal, the reaction would have been kinder, but instead, most viewed the event as mere showmanship on a grand scale, a marketing stunt by Nike.

4. Conceptual Discussion

I want to suggest that the two cases—Boston and Monza—are similar because technology shifted the emphasis in both from sporting competition to quantifiable outcomes. In both, all that seemed to matter in the end was elapsed time. I argue that both races were deeply unsatisfactory for many because of what that focus left out—robust human competition. Looking to the sport philosophy literature, one can find several different ways to characterize this dichotomy. Kretchmar, for example, argues that competition is an essential characteristic of sport; there must be a winner. This requires that a comparison be made between at least two athletes. "Victory is always victory over someone; defeat is forever suffered 'at the hands of,' minimally, a second individual" [8] (p. 27). Certainly, the three runners at Monza were not competing against each other in any reasonable sense. Instead, they were engaged in what Kretchmar calls 'testing.' They were discovering their own limits, 'testing' their skill. But the test of any one is intelligible without reference to either of the other two. We can say the athletes were unsuccessful, but we cannot sensibly say they were defeated [8].

The addition of competition changes a test into a contest; beyond getting from point A to point B in any particular time, the concern changes to getting there *before* one's competitor(s). This is why it seems peculiar to award fifth place to someone simply for crossing the finish line in the fifth fastest net time, even though the athlete had not even visual contact with the athletes who had the fourth or sixth fastest times. We need there to be a race, i.e., at least two athletes engaged in competition against each other (rather than simply against the clock). " . . . if two [testing] family members are truly contesting, they are interested in each other's progress in taking the test. Their own strategies, rhythms, their very relationship to the test is, in part, dictated by the other's performance. Contestants watch one another. The contestants cannot be concerned merely with passing the test, for an opponent may pass it in a

superior fashion" [8] (p. 29).[2] Recall the competitor cited earlier who claimed it's all about strategy: "You can only race those that you are lined up with. The flow of a race goes up and down based on who wants to press/make a move." The women in the EWS were not truly contesting with the women who started the marathon half an hour later; thus, it is incorrect to assert that any of the women in the first open wave completed the marathon in a superior fashion to the women in the EWS.

Similar to the test/contest distinction, Heather Reid distinguishes between what she calls the holistic Olympic Ethos and the analytic Efficiency Ethos, identifying the former with qualitative knowing and the latter with quantitative. "The Olympic Ethos," Reid says, "connects human beings with each other, as well as with the natural and spiritual worlds. The Efficiency Ethos reduces athletes to quantifiable parts—as analysis that risks leaving their humanity behind" [9] (p. 162). Here, the technological engineering of Nike's Breaking2 Project would obviously be an example of the Efficiency Ethos. On the one hand, it is easy to imagine the teams of pacers moving on and off the track as pistons in a machine, mindlessly pulling Desisa, Kipchoge, and Tadese along behind them, like interchangeable parts rather than unique humans. On the other hand, we see the elite women racing in Boston, connected in competition with each other and with the elements.

Another example of discussion around this sort of distinction is woven through the work of sport philosopher Loland, which refers to the dichotomy variously as the thin and thick theories of competition, the narrow and wide theories of sport, the physiologically inauthentic versus the natural performance, and the logic of quantifiable and qualitative progress [10–13]. In the last, the logic of quantification focuses on record-setting as a sign of progress in sport, while the logic of qualitative progress denies that athletic performances can be compared in such a way as to allow for quantification. "Performances are relative and depend upon interplay between competitors. Every game is different and cannot easily be compared in quantitative terms" [10] (p. 44). The logic of qualitative progress, then, would not characterize the women in the EWS and the women starting thirty minutes later as being in competition with each other since competitors must interact. And the differences in the conditions, both weather and surrounding runners, would make quantitative comparisons impossible. Neither would Loland agree that Monza was a competitive race: "Basic physical qualities, such as endurance, strength, speed and flexibility provide a means only. The primary challenge is on technical and tactical skills that have to be learned through practice and experience in social interaction with others" [10] (p. 45). Thus, we can extend the conclusion also to indicate that Monza was not a real challenge, given that Desisa, Kipchoge, and Taldese exhibited no tactical skill or social interaction.

One might note that I have presumed the superiority of one side of the dichotomy without offering support for that privilege. For that support, I point to Kretchmar and Elcombe's work on sport's potential to enhance human flourishing. As they point out, contesting skills involve more complexity, collaboration, and achievement than tests. It is not simply that more means better; contesting skills are qualitatively superior because they tap into more of what makes us human, rather than cyborg or machine. They "provide enhanced meanings that tell us more about who we are and what we have accomplished" [14] (p. 185). Contests are self-revelatory in a way that tests are not, in part because of their increased requirements. To wit: " Contests introduce a host of additional excellences related to the processes of winning, such as, leading, taking the lead, holding a lead, gambling for a lead, delaying strategically for a reversal late in the contest, intentionally forfeiting a lead, mustering resources that would not be needed just to do well on the test but are necessary to surpass an opponent, intentionally and skillfully deceiving an opponent into thinking that a lead has been lost when it has not, identifying the precise moment when a move will have its greatest impact, and sensing when an opponent is flagging and vulnerable. Clearly, these processes involve a second group of excellences, a group that has been missed or ignored by most commentators" [14] (p. 189). The "excellences" listed here were

[2] Sporting activities designed such that participants cannot watch one another, like cycling time trials or downhill skiing events, are most accurately characterized as tests, not contests, and require less complex skills than contests.

entirely absent from the run at Monza, while present but in duplicate (at least) in Boston where the women in the EWS exhibited them and the women in the later start did as well, but not in any relation to each other. We might say there was no contesting at Monza and too much at Boston.

5. Conclusions

The problem with the Boston race is the same as the problem in the Nike Breaking2 Project's Monza attempt—neither was a singular *race*. There was no racing at Monza and there were many races at Boston. One might object that the races were *against the clock*, but that ignores the importance of contesting skills. This accounts for the dissatisfaction many people felt with the outcome of both races. The timing chips at Boston and the scientifically engineered corporate showmanship at Monza shifted the events too far away from what is distinctly human, and for that reason valuable, about sport. Without the interplay of competitors, engaged in display of contesting skills aimed toward victory, human excellence is forfeited to technology.

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