

ORIGINAL ARTICLE

Defining advantage and athletic performance: The case of Oscar Pistorius

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Abstract

Olympic style games were first held for athletes with disabilities in Rome in 1960. Today the Paralympic Games (parallel Olympics) feature competition for athletes from six disability groups, including amputee, visually impaired, and spinal cord injury. Olympic hosts, both summer and winter, are now contractually obliged to organize the Paralympics in the same venue. The size and popularity of the games have grown exponentially since their inception, but they remain largely separate from the Olympics themselves. Recently, a very successful Paralympic athlete from South Africa, Oscar Pistorius, made it clear that despite his double below-the-knee amputation he wanted to compete in his event (400 m) at the Olympics. Initially, however, Oscar Pistorius was prohibited from competing at *any* International Amateur Athletics Federation (IAAF) competition on grounds of fairness. On the basis of biomechanical and physiological evidence, the IAAF argued that his highly specialized prosthetic limbs gave him an advantage and were therefore in contravention of Rule 144.2. This rule forbids the use of any technical device (such as prosthetic limbs) that provides the user with an advantage over another athlete not using such a device. This decision was subsequently overturned by the Court of Arbitration for Sport following an appeal by Pistorius. Using this case as an example, the aim of this paper is to highlight the empirical and ethical difficulties associated with the application of the principle of fairness in sport. In particular, we discuss both the complexity of identifying the nature and size of athletic advantage and the basis for determining its validity. Moreover, we explore how similar difficulties arise when attempting to establish criteria for “relevant athletic performance”. We argue that reasonable rules and norms for competition are not simply inferred from the principle of fairness. Such rules and norms should result from careful judgements informed by scientific, conceptual, and ethical evidence, and be guided by the standards of excellence that best characterize the sport in question.

Keywords: *Fairness, athletic performance, equality, advantage*

Introduction

Oscar Pistorius’s case should by now be familiar. The young, talented South African Paralympian dominates the sprint events in his category (T44 – for track athletes with amputations below the knee), winning gold at 100 m, 200 m, and 400 m at the 2008 Paralympics.¹ He is particularly dominant in the 400 m, and although he did not achieve the qualifying time for the 2008 Olympics, he is aiming to make the grade for London 2012. In seeking to race against able-bodied athletes, Pistorius and his prosthetic limbs have caused controversy. Suspicions that the prosthetics give him an unfair advantage

over non-users gained legitimacy when the International Amateur Athletics Federation (IAAF) argued that their use by Pistorius contravenes the eligibility rules of able-bodied athletics. The IAAF forbid “the use of any technical device incorporating springs, wheels or any other element that provides the user with an advantage over another athlete not using such a device” (Rule 144.2). To determine whether such an advantage did accrue for Pistorius, the IAAF commissioned the renowned Professor Peter Bruggemann, Director of the Institute of Biomechanics and Orthopaedics at the German Sport University in Cologne, to conduct research. The results of the

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¹ For more information about the Paralympics in general and the classification process in particular see the official International Paralympic Committee’s website: <http://www.paralympic.org>

biomechanical and physiological testing carried out by Bruggemann suggest that the j-shaped blades, known as cheetahs, manifest certain important performance advantages in that they: (i) increase energy efficiency by up to 25%; (ii) provide up to three times greater energy return than the human ankle joint; and (iii) provide a mechanical advantage in relation to a healthy ankle joint of a two-legged athlete of more than 30%. Given the margins by which athletic sprint events are won, these purported performance advantages wrought by his blades are at first blush completely beyond the pale. As a result of the findings described above, the IAAF ruled that that the blades constituted a technical aid that produced an advantage, therefore contravening Rule 144.2. Initially, the IAAF excluded Pistorius from competing at the Olympics, a decision that was subsequently overturned by the Court of Arbitration for Sport following an appeal by Pistorius. Notwithstanding the particular impact this public dispute has had on Pistorius himself, the case raises some important and difficult questions for sporting institutions, rule makers, and governing bodies alike. In this paper, we examine the ideas that feature centrally in the debate, in particular the complex issues of fairness and athletic performance.

The Pistorius case has attracted plenty of media attention, but has also prompted debate within the academic fields (Edwards, 2008; Jones, *in press*; Van Hilvoorde & Landeweerd, 2008). Edwards (2008) examined the case from a moral philosophical perspective and identified a number of arguments that could be, and were used, as grounds for excluding Pistorius from the Olympics. These included the fact that he was disabled, that he had an impairment, that he gained an unfair advantage over his competitors, that he might cause harm to others, aesthetic considerations, coercion, and last, but by no means least, that he was doing something other than running. For the purpose of this paper, however, we focus initially on two closely related issues before returning briefly to the matter of institutional decision making in sport. First, we deal with the claim that Pistorius ought not to compete because he gains an unfair advantage. Secondly, we explore the claim that Pistorius ought not to compete because he is not running, he is doing something else.

Unfair advantage

The basis of the most common objection to his inclusion in any future Olympics is that Pistorius uses means to gain advantage over his competitors in a race that are illegitimate and therefore deemed unfair, or vice versa. Empirical evidence was used initially by the IAAF to substantiate this claim.

The alleged advantage gained by Pistorius can be described in two ways. The first relates to the comparative amount of energy expenditure and loss while running. The second relates to the advantages gained due to the inertial properties of the blades compared with his competitors' limbs.

One mechanism via which mechanical efficiency in running and sprinting is maintained is the storage and later return of elastic potential energy by the elastic structure (tendons and ligaments) of the lower extremities (Novacheck, 1998). The report commissioned by the IAAF stated that the energy loss (i.e. energy not returned) in the prosthetic blades was around 9% during the stance phase compared with 41% in the human ankle joint, demonstrating that the blades are considerably more efficient in this respect. In addition to this mechanical efficiency, the blades have a reduced metabolic cost due to their passive nature. Structures, such as the blades, are able to return energy passively (i.e. with no cost), whereas considerable muscular work and therefore energy is required by the human ankle during the necessary active contraction of the muscles (Sawicki & Ferris, 2008). In agreement with this difference, and potential advantage, Hansen and colleagues (Hansen, Childress, Miff, Gard, & Mesplay, 2004) support the notion that an active mechanical system (a system of elements that interact on mechanical principles with some metabolic cost) would be necessary to mimic the characteristics of the physiologic ankle joint.

Due to the ultra-light carbon fibre from which the blades are constructed, the mass that Pistorius has to accelerate is lower than that of an able-bodied athlete. In other words, his prosthetics have less mass than the equivalent limbs. Myers and Steudel (1985) found that increased mass increased the energetic cost of running, and this was further evident when the increased mass was in the limbs. It has also been suggested that the prosthetic blades may give an athlete longer legs than they would have had naturally, therefore potentially giving them a greater stride length. An increase in stride length will result in an increase in sprint velocity, providing there is no reduction in the stride frequency (Hunter, Marshall, & McNair, 2004).

Although the data are insightful as to certain performance parameters that characterize Pistorius and not his able-bodied competitors, it does not follow directly that these differences constitute an unfair advantage. Best (1978, p. 85) argued that "it is not so much the experimental conclusions which determine our theoretical picture of the world as that the theoretical picture determines the character of the experimental conclusions". In other words, the empirical evidence pertaining to Pistorius alone does

not produce an *unfair* advantage conclusion unless one already has a definition of unfairness that the particular data confirm.

Two important questions must be answered before the unfair conclusion can be examined. First, do the blades give Pistorius an advantage over able-bodied athletes? And, second, are there any disadvantages that negate the advantages? Evidence seems to point in both directions on this matter.

When presenting his case to the Court of Arbitration for Sport, Pistorius argued that some features of the limbs have negative performance effects that outweigh or simply compensate for the positive features identified. One factor that is undisputedly a disadvantage for Pistorius is the start and initial acceleration phase of a race. Able-bodied sprinters rise gradually from the blocks, remaining low and adopting a forward lean throughout the initial acceleration period (Hunter *et al.*, 2004) in order to produce the horizontal force necessary at this stage of the race. This is because the acceleration phase of a sprint requires a greater proportion of horizontal to vertical force production than the maximal velocity phase, because of the need to rapidly develop horizontal velocity (Hunter *et al.*, 2004). Therefore, during the acceleration phase, the upright position of an amputee athlete wearing blades (due to the inability to crouch fully in the blocks) will limit the production of the necessary horizontal force (and therefore velocity) in comparison with an able-bodied athlete. In addition, the calf muscles are major contributors during the start and acceleration phases (Harland & Steele, 1997) and therefore amputee athletes have a further disadvantage during these phases of the race. At maximum velocity, the emphasis switches from horizontal to vertical force production (Mann, 1981) and the upright position of the amputee athlete is no longer a disadvantage.

Given that the evidence points in both directions, a further question that should be addressed is how is the importance and significance of the advantages/disadvantages quantified so that the appropriate conclusions are drawn? The difference in energy return, for example, was found to be greater than 30%, but the rules do not stipulate the size of the advantage that warrants censure. The letter of the rule requires that *any* advantage that accrues from technical aids, however small and insignificant, must count as a rule infringement. Even the slightest valid and reliable observable difference caused by the technological aid is an infringement. This is perhaps a weakness of the rule itself and a more appropriate

rule should consider only advantages that are significant. In sports science research, differences that are considered significant vary according to the research hypothesis and statistical methods used to analyse the data. Atkinson (2003) argues that a researcher's selection of the minimal worthwhile effect should be an informed decision based upon the practical significance of the findings. In sprint events, the slightest difference in time can have the greatest significance in terms of the result.

Even if we are confident that there is an advantage, a case must be made as to why this should be considered an unfair one. There is a significant body of literature in sports ethics that deals with the issue of unfair advantages, specifically in relation to performance-enhancing drugs.² Advantages may be considered unfair *inter alia* if they are not available to all competitors equally, if they are not the product of the athlete's own efforts, or if they are somehow unnatural or synthetic. Arguments based on these ideas (among others) have been presented by the anti-doping lobby and vary in merit and force. The problem, as Edwards (2008) rightly identifies, is that current sports rules seem to condone significant advantages that fall foul of one, two or all three of these principles, yet they are not outlawed in the same way as performance-enhancing drugs (nor draw the suspicion that Pistorius's prosthetics do). When these types of arguments are used in the Pistorius case, they are vulnerable to the same counter-arguments found in the doping literature and more recently in the medical enhancement literature.³

Let us consider the first principle that Pistorius's advantages are unfair on the grounds they are not available to all competitors; that is, he has a uniquely privileged access to the advantages. The advantage he has is unique and special. If this is true, the same would apply in his T44 category. He is similarly unique in those races and should not be allowed to use his prosthetics in those races either. More importantly, similar arguments can be made about a host of other advantages that are not equally distributed in sport. For example, significant benefits arising from geographical regions that provide high-altitude training conditions, and financial advantages that bring untold benefits, including access to technology, scientific support, medicine and all the other aspects that contribute to athletic success, are not distributed equally. In terms of equality of opportunity or access to decisive resources, certain sports are far from operating equally. Pistorius's advantage is not dissimilar to these other types of

² For a useful review of the arguments contained in the literature, see Schneider and Butcher (2000).

³ See the special edition of *Sport, Ethics and Philosophy* volume 2, number 2 (2008) for a range of essays on the legitimacy of various medical enhancement techniques in sport.

advantages and, as Edwards (2008, p. 117) argues, the advantage could be available to other athletes “were they to have their lower legs amputated”⁴.

The real objection might be that Pistorius is not fully responsible for his athletic ability, that the key causal contributory element lies outside of his control and this is where the unfairness lies. His prosthetics and their ingenious designers and manufacturers are primarily responsible for his athletic ability. Pistorius himself, it could be argued, is simply exploiting the technology to turn moderate ability into athletic excellence. In response to such claims, Edwards (2008) invokes what Loland (2002) called the “natural” lottery issue. Natural predispositions, including one’s genotype, may provide the most significant and systematic advantage for an athlete in any given competition. Usain Bolt’s incredible stature is not of his own making, yet he is allowed to take maximum advantage of its benefits in competition. Edwards’ objection mirrors Carr’s (1999) arguments about the merits of victory in sport. Carr (1999), in an article entitled “where’s the merit if the best man wins?”, argues that victory in sport is never deserved in a true moral sense, because it is primarily, if not exclusively, the result of natural endowment. Pistorius did not come up trumps in the natural lottery in relation to athletic hardware. He was born with a congenital absence of the fibula in both legs. Oscar Pistorius’s endeavours are testament to dedication, courage, hard work, and perseverance, initially to overcome his disability and then to pursue an athletic career. Such qualities according to Carr (1999) ought to be rewarded ahead of natural endowments.

The final principle and the one that Edwards (2008) notes might be the crux of unfairness arguments is that Pistorius’s advantage is an external or scientific one. Similar arguments have been proposed in favour of the ban on performance-enhancing drugs. The particular problem with the type of advantage drugs and other stimulants give, it is argued, is their unnaturalness. They are artificially manufactured and not part of the athlete. Pistorius’s advantage is similarly a product of science rather than nature’s gifts, however unequally they may be distributed. Such arguments also fail the consistency test. Edwards (2008) doubts whether the natural–synthetic (manufactured/external/unnatural/scientific) distinction is tenable for the purpose of demarcating legitimate and illegitimate means of enhancing performance. A string of analogies, counter-examples, and anomalies, both conceptual and empirical, are always ready to scupper the principle. Spikes, javelins, swim suits, bicycles, and Formula

One racing cars, to name but a few, are used to enhance performance to gain an advantage over the opposition. The mere fact that Pistorius’s legs are external manufactured implements does not in itself make them unfair. If one then invokes the caveat, “but he is the only one using them”, we are back to the first principle of equality of opportunity with its own problems identified above.

Edwards (2008) argues that none of the arguments above establish conclusively why the particular advantage Pistorius gains is significantly and morally different to the other advantages permissible in sport. Even if scientific research can provide a clear account of the size of the advantage being gained, it is not easy to say why this particular type of advantage is more unfair than other types. The problem is essentially with the indeterminacy of the principle of fairness. The principle does not contain within it precise information about its implication in all the different situations that may arise.

To better understand what we mean by advantages and whether they are unfair or not, it may help to look more closely at sporting contests. Edwards (2008, p. 115) rightly identifies that in the context of competition, “What is most relevant is his athletic ability, not his physical constitution”. The desire is to isolate the essence of the athlete’s endeavours – namely, athletic performance or ability. This ingredient has been variously described as skill, athletic ability, and athletic performance, but its role at the centre of sports contest is crucial. Loland (2002, p. 10) argues that “the goal of sport competitions is to measure, compare and rank two or more competitors according to athletic performance”. Comparing “athletic performance” is the central aim of sports contest, it is their *raison d’être*. In many ways, a contest is analogous with a scientific experiment:

In sports contests, what we are attempting to discover is the relationship between victories (potentially conceived as a dependent variable) howsoever measured, for example, time, distance, weight, goals scored and so forth, and athletic performance (potentially conceived as the independent variable). In an ideal sports contest the dependent variable, victory, ought to be wholly dependent upon athletic performance. To put it more simply, superior *athletic performances* should *ceteris paribus* be victorious ones. (Jones and Howe, 2005, p. 135)

The question about fairness or legitimate advantages is essentially a question about what specifically we are trying to measure or compare in a sporting

⁴ See McNamee (2007) for a discussion about legitimate medical enhancements in the name of sport, and Lenk (2007) for a broader discussion about sport enhancement and equal competition.

competition. Which of the ingredients do we want to identify, measure, and *reward* and which do we want to eliminate? These are questions about what athletic performance properly consists of. It is possible, although not easy to provide, a framework of athletic performance. Jones and Howe (2005, p. 139) argue that “athletic performance is a delicate mix of natural, moral, and technical, aesthetic, psychological and physical capacities... a collection of contextually grounded intentional and unintentional actions or excellences that we praise and celebrate”, but the specific nature and amount of each ingredient is not fixed by a general formula and varies from sport to sport. Tactical, open games like soccer require a different and broader range of ingredients than fairly closed contests such as power lifting. Identifying the necessary and sufficient conditions of athletic performance would seem easier in the latter because of the fairly closed nature of the skills involved. Debates about proper technique, preparation methods, and the use of stimulants abound in even the apparently simple sports. Sprinting is a sport that would seem to involve a fairly narrow range of abilities, at least anatomically, physiologically, and biomechanically, especially in relation to, say, rugby, yet it is in this fairly simple sport in which the current controversy arises. The reality is that each sport contains its own idea of the athletic performance it wishes to test, and its traditions, rules, and ethos loosely specify what that is. The specifications are mostly related to what constitute fair contests, but may also involve moral and aesthetic criteria too. In summary, each sporting practice community determines (although such ideas are not completely determinable) what kinds of skills and excellences it wants its competitors to test, but these expectations are not fixed.⁵ They change over time in light of media demands, safety concerns, and issues of fairness. This does not mean that no good reasons can be given for changes based on fairness principles, but such judgements are not simply inferred from the principle without debate and deliberation. An agreement at the level of principle does not guarantee agreement at the level of rules and conventions.

Comparing athletic ability: Playing the same game

A canonical text in the philosophy of sport, “The Grasshopper” by Bernard Suits (1978), is very informative as to the nature and purpose of sports

contests. In his analysis of games, of which all sports are examples,⁶ he identified four elements of game playing. The first was the pre-lusory goal – a particular state of affairs that has to be achieved, say putting the ball in the hole or crossing the finish line. The second element he calls the lusory, which means deciding on the way in which these goals are to be achieved – which kinds of actions, skills, and strategies will be employed? Are we to throw, roll or strike the ball, are we to run, ride a bicycle or use a motor car, are we to use prosthetics or other equipment? The lusory means to define the game as one that requires mental strategy like chess, power and speed like sprinting, balance and poise like gymnastics. The agreed-upon lusory means are then instantiated into a set of rules and regulations that specify which means are permissible and which are not. Yet these rules are open-ended enough (at least in some games) for creativity, invention, imagination, and ingenuity. Richard Douglas Fosbury’s success at the 1968 Olympics using a new high jump technique, although unconventional, was within the rules of the sport. The rules of high jump could have been rewritten to outlaw this technique if the practice community felt that the Fosbury Flop was not the means that should be used to clear the bar. It didn’t and it soon became the universal high jump technique at the elite level. The issue of legitimacy is centrally about deciding on the nature of the lusory means (the type of athletic performance we want to see) and writing rules that ensure that other means are ruled out. It is unquestionable that a 400-m race for amputees and a 400-m race for able-bodied athletes share the same aim. Whether the means employed are the same depends on the level and specificity of the analysis. *Prima facie*, in both cases the means appear to be the same – to run. The rules also specify that in both cases the race shall be conducted around a track divided into lanes with a staggered start, etc. One possible interpretation of Suits’s perspective is that if Pistorius is running (employing the lusory means), there should be no rule against his competing. If he is not “running” and the 400-m game is a running one, then a rule must be written that makes his means of travelling 400 m impermissible in *this* game. In another game called 400m-T44, the means he is using is perfectly acceptable. A more fruitful avenue for discussion, therefore, as Edwards (2008) advocated, might be to ask whether Pistorius is actually doing the same thing – can he, in Suits’s term, be considered to be playing the same game?

⁵ MacIntyre’s (1985) account of practice communities provides an important descriptive and normative account of the nature of sports and their sustaining institutions. We are using the notion of practice community in a way that is faithful to MacIntyre’s articulation.

⁶ One of Suits’s (1978) disputed claims is that all sports are games. We don’t want to re-visit the debate here, but take Suits’s position that the essence of all sports contest is that they have a game logic.

This change in focus from the moral issue of fairness to what seems like a less controversial and empirical phenomenological issue – “what is running?” – seems to have some benefits. To say that Pistorius is not doing the same thing rather than saying he is cheating when he competes against able-bodied athletes is perhaps more palatable. According to Van Hilvoorde & Landeweerd (2008, p. 106), such a judgement implies an account of running and a “norm” for running. The problem now becomes one of establishing a norm or standard for running with suitably operationalized empirical content rather than establishing a norm or standard for fairness with suitably operationalized empirical content. To what extent is this task possible and will it, if satisfactorily achieved, solve the problem?

If one attempts to provide an operational and measurable account or standard for running, then the task will involve both conceptual and empirical endeavour. McNamee (2005, p. 4) argues that “Every good scientist in their activities needs to address conceptual questions”. Similarly, ethicists must use the data provided by scientists that describe the running action in great detail to inform their deliberations on whether Pistorius and his able-bodied competitors can be said to be doing the same thing.

The development of a set of parameters, with specified limits, could be used to define running. To achieve this, a description of running in terms of the actions of individual body segments or limbs would need to be established. This would primarily involve a description of the lower limbs with particular reference to the ankle, knee, and hip joints. If an athlete’s technique falls outside of the set of limits, then the movement should no longer be classified as running. This idea of classifying an action or movement as being legitimate has been adopted in other sports. One example is in cricket, whereby the rules stipulating the nature of the legal bowling action have been influenced by sport science technology. The rules specify clearly the difference between a legal delivery (bowling) and an illegal (“throwing”) action. Research by Portus and colleagues (Portus, Rosemond, & Rath, 2006) led to the current rule which states that if a bowler increases their elbow angle by more than 15°, the ball is defined as illegal. A second example where more straightforward criteria are used to determine whether an athlete is performing within the rules is race walking. A competitor is deemed to be walking only if there is some part of the body in contact with the ground at all times.

If scientists can provide a detailed description of running, rule makers can draw upon the data to make informed decisions about rules and regulations designed to promote good sports contests. This might mean that practice communities or governing bodies stipulate that, for the purpose of *this* game, running action will have to meet these parameters. To a certain extent, the classification and categorization of Paralympic athletes follows a similar principle. Athletes are assessed based on their functional ability and then assigned to a category or class of athletes who present similar characteristics. In so doing, competitions feature contestants who share similar performance and/or physical characteristics.⁷ One difficulty with the concept of classifying actions rather than individuals is the complexity of the movements involved. Numerous studies have been required to confirm the rule on cricket bowling action and this is simply the quantification of the action of one individual joint. Defining a sprinting action would necessitate multiple parameters to describe the whole body action and this may prove too complex to either define or quantify.

Making the decision: Practice community

We have argued that working with a principle or an abstract conception of athletic performance alone is not enough to resolve issues of fairness in sporting practices. Judgements must be made about which kinds of actions, norms, and practices instantiate fairness or athletic ability in any given contest. Even if valid and reliable data are produced which describe carefully Pistorius’s advantage or demonstrate that he is not actually running (defined narrowly), such data will only be one feature of a broader judgement. Who is entitled to be involved in making these judgements is an important question. In this particular case, both the IAAF and the Court of Arbitration for Sport had a say, but according to Morgan (1994) there are many more legitimate contributors to such discussions. In this case, there are a host of interested parties, not least Pistorius, the IAAF, the International Olympic Committee, and the International Paralympic Committee, but important contributions may come from beyond this narrow group and include athletes, coaches, spectators, officials, journalists, veteran athletes, sport scientists, and sport ethicists. These are members of the practice community conceived more broadly, and Morgan (1994, p. 237) argues that “all substantive policy matters regarding the conduct and reform of sport be turned over to its practice communities”. In other words, such decisions ought

⁷ See Jones and Howe (2005) and Howe and Jones (2006) for a critical analysis of classification system in Paralympic sport.

not to be the exclusive preserve of the politicians and the elite of members of governing bodies. Drawing on the evidence available, both empirical and ethical, the practice community should be empowered to make decisions, including the decision about Pistorius, based on what constitutes the good for athletics.⁸ The decision making in this case may, in reality, have little to do with the minutiae of sporting rules and regulations, but revolve around broader concerns about issues of equity, inclusion, justice, and the very essence of the Olympic Games and their relationship with the Paralympics.

Conclusion

In this paper we have explored two arguments that have been used in support of prohibiting Oscar Pistorius from competing in the Olympic Games. We have analysed the concept of unfairness and demonstrated that it is difficult to demarcate those advantages that commonly occur in sports into fair and unfair categories. We have also argued that the main ingredient in sport, namely athletic performance, is a complex and multifaceted one that is neither easily specifiable nor measurable. Each individual sport has its own conception of the range of skills and abilities to be tested when trying to secure victory. It is important, however, that a continuing debate about issues of eligibility in general and in Pistorius's case in particular draw both upon valid and reliable scientific and ethical evidence. Lastly, we tentatively suggested that the debate should extend beyond the hierarchy of practice communities and include those members with a vested interest in the good of the sport at all levels.

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⁸ See Howe and Jones (2006) for a discussion about how Morgan's (1994) critical theory of sport would effect the IPC's decision making with regards to the classification of disabled athletes in the Paralympic games.