

Sports and embodiment

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Abstract

The theory of embodied cognition implies that cognitive processes depend fundamentally on the physical characteristics of the subject's body. If this is true, physical aspects of an individual play a significant role in its cognitive process, and because of that, the theory rivals with all perspectives that defend any kind of duality, separating body from mind, such as the Cartesian thesis. This article presents the embodiment thesis, its main ideas, and provides examples within sports that support its validity. To do so, ideas from contemporary authors of various fields are presented and used to understand certain realities and situations that have gained importance in today's world, one in which sports has become one of the most significant manifestations of human culture. Concepts like "cognitive delegates", "a-rational" performances and the two-system cognitive hypothesis will be introduced to illustrate the relevance of the embodiment thesis in relation to all human activity.

Key words: Embodiment; Sports; Cognitive process.

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Esporte e “embodiment”

Resumo

A teoria do “embodiment” afirma que os processos cognitivos dependem fundamentalmente das características físicas do sujeito em questão. Se assim for, a realidade fisiológica de um indivíduo desempenharia um papel significativo em seus processos cognitivos, desta forma essa teoria se opõe a qualquer perspectiva que defenda qualquer tipo de dualidade que separe o corpo da mente, assim como a dualidade Cartesiana. Este artigo apresenta a teoria do “embodiment”, suas idéias principais e fornece exemplos do ambiente esportivo que suporta sua validade. Para isso, são apresentadas teorias de diferentes autores contemporâneos de variados campos para entender certas situações e realidades que ganharam importância no contexto atual, que fez do esporte uma das manifestações culturais humanas mais significativas. Conceitos como “delegados cognitivos”, ações “não racionais” e a hipótese do duplo sistema cognitivo serão introduzidas para indicar a relevância da teoria do “embodiment” em relação a toda a atividade humana.

Palavras chaves: Embodiment; Esporte; Processo cognitivo.

Deportes y “embodiment”

Resumen

La teoría del “embodiment” señala que los procesos cognitivos dependen fundamentalmente de las características físicas del sujeto en cuestión. De ser esto así, la realidad fisiológica de un individuo jugaría un papel significativo en sus procesos cognitivos, y debido a ello esta teoría se contrapone a toda perspectiva que defiende cualquier tipo de dualidad que separe al cuerpo de la mente, como lo hace la dualidad cartesiana. El presente artículo introduce la teoría del embodiment, sus ideas principales, y provee ejemplos del ambiente deportivo que respaldan su validez. Para ello, teorías de diferentes autores contemporáneos de campos variados se presentan y usan para entender ciertas situaciones y realidades que han ganado importancia en el contexto actual, uno que ha convertido al deporte en una de las manifestaciones culturales humanas más significativas. Conceptos como “delegados cognitivos”, actuaciones “no-racionales”, y la hipótesis del doble sistema cognitivo serán introducidos para señalar la relevancia de la teoría del embodiment con relación a toda actividad humana.

Palabras clave: Embodiment; Deporte; Proceso cognitivo.

Introduction

In the last few decades, and as a result of significant advances in the field of cognitive sciences and other related disciplines, a theory has been developed in philosophy that has challenged some of the traditional conceptions of western philosophy. This theory is known as embodiment, or embodied cognition, and it may have a revolutionary effect in the way we perceive ourselves and the world we live in.

In the context of the research project “Biology and Body: The curriculum of an embodied philosophy” from the Universidad del Salvador, this work aims to present the main ideas surrounding this theory and show how pertinent it can be from the perspective of sports. Needless to say, this argument will not be sufficient to prove its relevance beyond all contestation but being sports an important manifestation of human culture and related in so many ways to our everyday life, it might serve as a significant example of the magnitude of its worth.

Embodiment

The embodied cognition thesis advocates the idea that the mind is fundamentally dependent on the physical characteristics of the agent, and therefore, his corporeal aspects will play a significant role in its cognitive process (WILSON, 2015). This perspective goes against all other theories that have posed some kind of duality, setting apart the body from what they would usually refer to as mind, thought, spirit or soul.

Two of the main lines of thought that present this distinctive dualism would be the ancient separation between body and soul, upheld by Plato, and Rene Descartes’ thesis, which separated the body from the mind, and claimed that the latter was a non-extended thing. These and other similar viewpoints usually imply that there is a dependence of the body in relation to the mind or soul, and that the body has a secondary role when it comes to cognitive processes in general. It is precisely in regard of this idea where the significant change in perspective will take place with the appearance of the embodied cognition.

As neuroscientist Antonio Damasio voices, the idea that the mind comes from the whole organism might seem counterintuitive. Not long ago, the concept of the mind moved from the ethereal “nowhere” that it occupied in the XVII century to its current residence in or about the brain; this implies a certain loss of rank, but it is still a decent position (DAMASIO, 2016, pág. 260). However, in light of the evidence that the fields of cognitive science has presented, accepting the involvement of the body in what we usually recognize as mental or cognitive processes seems inevitable. That the mind is actually dependent on both the body and the brain might seem too far a stretch, but that is the predominant theory in the field today: it would be the body as a whole the ultimate responsible for our cognition.

So, the main thesis of the embodiment theory claims that creatures with conscious, intentional minds are necessarily and completely neurobiologically embodied (HANNA & MAIESE, 2009, pág. 15). If we accept this idea, the structure of our reasoning is a direct consequence of the composition of our brain, our body and our bodily experiences. Damasio asserts that the representation that we construct as a tridimensional space would be conceived in our brain, based on our body’s anatomy and the patterns of movement of the environment (DAMASIO, 2016, pág. 270). Following this idea, the representations that our brain constructs in order to describe a situation, and the movements formulated as a response to a situation, depend on mutual brain-body interactions (DAMASIO, 2016, pág. 263). What it is implied here is not that we need our body in order to be able to reason, but that the way in which we reason is actually shaped by our physiology.

Another crucial point that the theory points out is that our ability to reason is a consequence of evolution. Some time before the dawn of humanity, beings were beings. At some point during the process, an elemental conscience appeared. With this elemental conscience came a simple mind; with a major complexity of the mind, the possibility of thought appeared, and later on, the possibility of using language to communicate and organizing thought more efficiently. So for us, at the beginning

there was only being, and later came thinking (DAMASIO, 2016, pág. 284).

But the idea that our reason is a result of evolution lets us arrive to some other important conclusions:

- (i) If the first reason why the brain was evolutionarily developed was to ensure the survival of the body itself, then, when brains capable of thinking appeared, they began thinking about and from the body. “So, to ensure the survival of the body in the most effective way possible, nature opted to represent the external world in terms of the modifications it causes to the body itself” (DAMASIO, 2016, pág. 265).
- (ii) It “changes our relation to other animals, and changes our conception of human beings as uniquely rational. Reason is thus not an essence that separates us from other animals; rather, it places us on a continuum with them” (LAKOFF & JOHNSON, 1999, pág. 3). Our nervous system, including our complex brain, would have been developed from the same structures that our predecessors once had.
- (iii) Reasoning is universal in the sense that “it is a capacity shared universally by all human beings. What allows it to be shared are the commonalities that exist in the way our minds are embodied” (LAKOFF & JOHNSON, 1999, pág. 3). Cognitive processes among humans are similar between them because of the physiological similarities they share, and our reality shares the same luck.

Although an external reality exists, what we know about it would come to us through the body in action itself, through the representations of what affects it. We would never know how accurate our knowledge is in relation to the “absolute” reality. What we try to have, and in most cases with success, is a remarkable consistency in the constructions of reality that our brain creates and shares (DAMASIO, 2016, pág. 270).

Apart from these conclusions, the embodiment thesis is in line with many other significant ideas presented by

the cognitive sciences, but the one that stands out and that is crucial for this investigation is the idea that reason is mainly unconscious. Cognitive scientists believe that unconscious thought is at least ninety-five percent of all thought, so most of the comprehension of the world around us would actually occur below the surface of our conscious awareness, and our conscious mind would necessarily use the tools provided by this unconscious realm (LAKOFF & JOHNSON, 1999, pág. 12).

Damasio adds to this point when he refers to what we usually call intuitions. He states that the quality of the intuition of each one of us depends on how well we have reasoned in the past, how well we have classified the events of our past experience in relation to the emotions that preceded and took place, as well as how successfully we have reflected upon the success and failure of previous intuitions. Intuition is simply quick cognition with the required knowledge partially hidden under the rug, as a courtesy of the emotions and a lot of prior practice (DAMASIO, 2016, pág. 5). We will talk about a similar subject further ahead.

Embodied cognition presents several issues that must be addressed and answered. Since that is not the objective of this investigation, we will only present, as an example of these significant topics, the problem of categorization: how embodiment says we actually deal with this everyday cognitive action may turn out to be quite a surprise.

Embodiment and categorization

According to George Lakoff and Mark Johnson, every living being categorizes:

Even the amoeba categorizes the thing it encounters into food or nonfood, what it moves towards and what it moves away from. The amoeba cannot choose whether to categorize; it just does. The same is true at every level of the animal world. Animals categorize food, predators, possible mates, members of their own species, and so on. How animals categorize depends upon their sensing apparatus and their ability to move themselves and to manipulate objects (LAKOFF & JOHNSON, 1999, pág. 17).

For the simple reason of being neural living organisms, humans have to categorize too. It is not a conscious choice, but an inevitable corporal predisposition. It is a consequence of its embodied cognition, consequence of how our species has evolved. We categorize as we do as a response to the type of brains and bodies that we have, and the way in which we interact with the world around us. To explain this idea, we will now focus on the human brain, and how its composition determines the necessity of categorizing as we do:

Our brain each has 100 billion neurons and 100 trillion synaptic connections. It is common in the brain for information to be passed from one dense ensemble of neurons to another via a relatively sparse set of connections. Whenever this happens, the pattern of activation distributed over the first set of neurons is too great to be represented in a one-to-one manner in the sparse set of connections. Therefore, the sparse set of connections necessarily groups together certain input patterns in mapping them across to the output ensemble. Whenever a neural ensemble provides the same output with different inputs, there is a neural categorization (LAKOFF & JOHNSON, 1999, pág. 17).

The specific example presented by the authors in their work describes how images are received by the eye and transferred to the brain. The ratio between light-sensing cells and the fibers leading to the brain is around a hundred to one. Therefore, each image captured in the eye must be simplified in that ratio if it wants to reach the brain. So that detailed and complex piece of information must be categorized in order to be transferred. It is inevitable that the complexity of the data gathered, in this case by the eye, will be reduced to a simpler form, and this occurs all throughout our nervous system and on every level of categorization one could think of.

The result of this constant automatic categorization is that a very small percentage of our categories are actually consciously created. Most of the categories respond to this kind of process, an autonomous activity that is the result of our functioning in the world, and there is nothing we can do about it.

Though we learn new categories regularly, we cannot make massive changes in our category systems through conscious acts of recategorization (though, through experience in the world, our categories are subject to unconscious reshaping and partial change). We do not, and cannot, have full conscious control over how we categorize. Even when we think we are deliberately forming new categories, our unconscious categories enter into our choice of possible conscious categories" (LAKOFF & JOHNSON, 1999, pág. 18).

What Lakoff and Johnson are saying is that not only our bodies force us to categorize, but they also determine the types of categories that we use. Everything that constitutes our body will be responsible for these, and it will be so no matter what we expect or choose. Our physiology will be the one that shapes our capacity to conceptualize and categorize, and the control we have over these activities is clearly inferior to the one we thought it was.

If we take the embodiment thesis sternly, and scientific evidence encourages us to do so, it is necessary to rethink the relationship that the so called Cartesian dualism pretends to uphold. If what this theory implies is actually true, there is no way we can argue that the body depends on the mind. As a matter of fact, the roles are reversed: our mind or thought would not depend on the body, it would actually be determined by it.

Embodiment and Sports

Now that we have established and exemplified the ideas that the embodiment thesis sustains, we can explore its affinity with sport activity. This relationship is particularly relevant to a specific field in philosophy that has recently gained popularity, sports philosophy, that has emerged due to the unparalleled spotlight that sports have received in present days.

The importance that sports have in today's world is undeniable. This could be said whether we are referring to it from a cultural, an economical or even a political perspective. It seems only logical that the eye of the philoso-

pher would turn towards this activity, an object of study that, because of its nature, requires an interdisciplinary approach which includes very different fields: physiology, physics, psychology, ethics or technology, all are relevant in the process of understanding sports.

In the following pages we will do a brief recap of some of the most distinctive and relevant realities of sports that present evidence to support some of the ideas that the embodiment theory upholds.

a) Athletes and their bodies

The simplest argument that could probably be made in defense of the embodiment thesis from the perspective of sports would be the link that exists between athletes' bodies and their respective qualities or performances. Although most skills could be developed by most people through a meticulous training program, we cannot escape an obvious fact: some people enjoy a particular comfort or ease when they have to execute specific activities. And this is not casual. The reason why some will have specific strengths and weaknesses is, at least at the very beginning, the differences amongst their bodies.

There is no doubt that some bodies are better prepared for specific sports, and no matter how much effort and training they put into it, certain structural realities of their bodies will not change, at least in a natural manner. Nicholas Nassim Taleb shares in his book "The Black Swan" how we often confuse the result with the selection criteria (TALEB, 2009, pág. 172), and the world of sports is not an exception to this misconception.

When we see the athletes in the swimming Olympic finals of the 200 meters freestyle relay, we notice how similar their physical qualities are, and we mistakenly conclude that if we want a body with similar characteristics, swimming would be a great option to achieve it. We assume that the practice of this discipline must generate a body with that aspect. But the actual truth is that those bodies are the best prepared to advance with speed through water within the rules of the competition. Taking that into account, if you want to compete at an Olympic level,

it is extremely helpful to have a body composition similar to that of Michael Phelps, Ian Thorpe or Jose Meolans (for example, their height is approximately 6'33", the size of their hands is larger than the average, and they have long aerodynamic muscles). It is from this perspective that their physical qualities turn out to be the selection criteria required to become an elite swimmer, and not the result of years of training.

Although the countless hours spent at the swimming pool and gym could change the shape of our body and improve our swimming skills significantly, no amount of swimming will provide the swimmer's body unless you were born with the genotypic possibility of it. To put it in simpler terms, our initial conditions will determine, at least up to a certain point, our possibilities of becoming successful at an elite level in many athletic disciplines, and even more so nowadays, where the search for the ideal body for each sport logically happens as a consequence of the popularity of sports. The democratization of the disciplines naturally transforms into specialization.

This idea might seem quite evident when it comes to the height of a person, the size of his hand, but what we must understand is that this is also true at a more complex and structural level. For example, nowadays it is accepted that there are two types of muscle fibers, the fast one and the slow one. As its name reveals, the fast fibers are the ones that specialize in rapid contractions, while the slow ones take care of actions that are not as quick, but which are lasting in time. The first kind of fibers uses ATP to obtain energy and work perfectly for sprinters for example, or any other athlete that require short potent movement. On the other hand, the second type of fibers use oxygen to generate energy and they are ideal for long distance runners or anyone who need resistance in their muscles.

The problem is that these fibers are not distributed in a proportionate way, neither along the body nor amongst individuals, and although some fibers could change their type with the right kind of stimulus, most scientists believe that genetic disposition will always have a significant influence in the type of fibers somebody has (Insua). People born with a greater number of quick fibers

will have a natural advantage in a 100 meters sprint. Of course, training will also help an athlete improve his time in a sprint, for example by neuro-motor grouping, or by improving the performance of the fibers he possesses, but a body with a larger proportion of quick fibers will always have an advantage when it comes to training for a sprint.

We could use these same statements in reference to many other aspects of the body, that may go from the size and rhythm of the heart pumping the blood that oxygenates the muscles, to the position of the eyes in the skull, enabling a broader peripheral vision, always useful in all multidirectional sports. And the same argument could be applied to all kinds of cognitive capacities, given the structure of the body (including the brain and nervous system) determines its abilities and possibilities. For example, a brain with a shorter response time to stimuli would have the natural qualities to play a defender position, quickly reacting to the actions of his opponent. An individual with a higher capacity for creative thinking would be appropriate for a position in charge of finding new dynamic solutions to what the opponents are doing.

It appears as though we had to accept that our capacities, though improvable, are in many ways determined by the composition of our bodies, and examples of this perspective are constantly present in the world of sports. There is no doubt that Usain Bolt, the current holder of the 100 meter dash world record has trained for decades, and that none of his achievements would have been possible without his untiring efforts. However, his performance would not be possible without his height of 6'43", with which he is able to finish the race in 41 strides while his competitors need 44 (GONZALEZ LEONI, 2016). Nature and nurture, both are required at the elite level of sports, and this could also be said about many other cultural activities.

b) The embodied mind

The second big idea that we have to analyze is the relationship between sports and what is usually known as

philosophy of the mind. This is a broad subject, so we will begin by pointing out some important concepts that Mark Rowlands presents in his book "The new science of the mind: from extended mind to embodied phenomenology".

In his work, the author presents a position that goes even further than what we have stated so far, with theories where the mind exceeds the boundaries of the body itself. Though what is known as embedded, enacted and extended mind exceeds the purpose of this work, a brief reference to their meaning seems pertinent for the possible relations that could be perceived in relation to sports:

The idea that mental processes are *embedded* is, roughly, the idea that mental processes have been designed to function only in tandem with a certain environment that lies outside the brain of the subject. (...) *enacted* is the idea that they are made up not just of neural processes but also of things that the organism *does* more generally (...). (...) *extended* is the idea that they are not located exclusively inside an organism's head but extend out, in various ways, into the organism's environment" (ROWLAND, 2010, pág. 3).

But regarding the idea of embodied cognition, he also maintains that the composition of the body is fundamental to sustain all mental processes that men practice on a daily basis. Rowlands points out that traditional cognitive science (or as he calls it, *Cartesian cognitive science*) has a central assumption: "mental processes are identical with, or exclusively realized by, the brain" (ROWLAND, 2010, pág. 3). On the contrary, he starts from the idea that what a non-cartesian cognitive science is "actually concerned with its mental states and processes, and not whatever it is that has them" (ROWLAND, 2010, pág. 8).

It is quite interesting his conception of how the cognitive tasks of the mind, that will also take place in the brain, will be distributed by ourselves through different ambits, one of them being the rest of our body. The core of the non-cartesian cognitive science is precisely that the cognitive tasks do not need to be carried out necessarily by the brain (ROWLAND, 2010, pág. 16). In other words, we manage to have the body, and according to Rowland's

theory the external world too, perform some of the mental work for us. Rowlands quotes Whitehead as follows:

Civilization advances by extending the number of operations we can perform without thinking about them. Operations of thought are like cavalry charges in a battle- They are strictly limited in number, they require fresh horses, and they must only be made at decisive moments (ROWLAND, 2010, pág. 19).

The cognitive action is one that demands effort, so it is a good idea to “cognitively delegate” (ROWLAND, 2010, pág. 19). In the case of athletes, they do so through numerous delegates, being the body the primary one.

c) Consciousness in the expert athlete

After identifying the concept that the embodiment has of the mind, it is important to dedicate a part of the investigation to the consciousness of the expert athlete at the moment of his performance in his respective discipline. This is a topic that the philosopher Hubert Dreyfuss has analyzed deeply, and that can be applied in our daily life in a great number of situations.

An opinion that has been upheld for quite some time by the *classic cognitivism* claims that, basically, the mind processes information, like a computer would do (STEFFEN, 2015). Following this idea, the expert sportsman would excel at his discipline due to certain advantages he might have at the time of perceiving stimulus, because he can make good decisions when responding to those stimuli, and because he can execute the orders that generate movement in his body in a quicker way than others practicing the same sport, but who fail to do so at the same level of expertise. According to this theory, then, the main reason why they would have better results would be that they can process information in a more effective way, thus improving their performance.

Dreyfus disagrees with this theory. He argues that expert athletes are directly “a-rational” at the moment of executing their activity, that their actions are non-reflexive (DREYFUS & DREYFUS, 1986, pág. 36). He states that

the body of the experts “knows” what to do when they practice their respective sport because an “expert’s skill has become so much a part of him that he need be no more aware of it than he is of his own body” (DREYFUS & DREYFUS, 1986, pág. 30).

The author alleges that this way of analyzing the question at hand is a continuation of the position presented by Martin Heidegger. First of all, man exists in the world, he is thrown into a world he must cope with, and only afterwards comes the cognitive sophistication of being able to think about it in a more abstract way. Coping precedes reflective thinking. The expert athlete would be aware of the changing circumstances surrounding him during a competition, and would react to them in a non-reflective fashion. This would be consequential with the idea that during an athletic performance, thought is the enemy of the expert, a reality that repeatedly takes place in the highest levels of sports.

The reason why the expert would not need to think in order to execute his discipline would be directly related to the embodiment thesis. Starting off from the idea that mental processes are not limited solely to neuronal activity, the body would have the actions incorporated in such a way that it would perform them without being aware of it. Needless to say, in most cases this bodily knowledge is the result of a specific, directed and repetitive training, practiced to a point where the desired movement takes place in an instinctive, mechanized manner (BOMPA, 2000, pág. 85). However, this does not disrupt the argument that at a certain level, the body would know what to do in certain circumstances, reacting without the need of any deliberate reflection whatsoever.

Also relevant to these ideas is what Daniel Kahneman has explained in his book “Thinking, fast and slow”. He is a renowned psychologist and a Nobel Prize winner in Economics who considers that the embodiment thesis is an ineludible reality: “as cognitive scientist have emphasized in recent years, cognition is embodied: you think with your body, not only with your brain” (KAHNEMAN, 2011, pág. 51). Kahneman points this out when he is trying to explain how the body of a person reacts after read-

ing two words that are trying to generate disgust in the reader. The body has various unconscious reactions to what is read, even when there is no previous reflection.

In his book Kahneman talks about two different types of cognitive systems, which he calls system 1 and 2. System 1 has the characteristic of being fast and intuitive; it operates automatically and with little or no effort at all. On the other hand, system 2 is slower, more reflexive, and demands effort from the person in order to be used. The author says that system 1, the quick one, is responsible for most of the actions people execute. System 1, that following the ideas of Rowlands, Lakoff and Johnson, would be formed by the totality of the body, is responsible for most of the actions at the moment of delivering expert athletic performances like the ones Dreyfus was pointing out.

Kahneman claims that the decision of who takes control in each situation between system 1 and system 2 has a lot to do with what he calls the *cognitive ease* in which the person finds himself in. The *cognitive ease* could go from Easy to Strained, and the assessment of the situation would be carried out by system 1: in case it is needed, system 2 will be called upon. So if things are going well, system 1 is in control managing almost instinctively, following his standard ways of acting, and only when tension or a problem or an unmet demand appears will the “lazy” system 2 take control. It will only do so when it is required, since its involvement demands a greater cognitive effort, as well as an increased amount of time in order to solve the situation in which he is immersed (KAHNEMAN, 2011, pág. 59).

The expert athlete appears to be the perfect example for this abstract conceptualization of the mind, and the theory manifests itself quite clearly in moments where the sportsman is under extreme pressure. In those circumstances, during a competition, the expert athlete, who has executed a similar action in countless prior occasions (where he has acted in a mechanized and non-rational manner through his body), finds himself in a problematic scenario: due to the extreme pressure the situation poses, he finds himself, no at ease, but under duress,

feeling uncomfortable. It is at this point when system 1, overwhelmed by the tension it is under, reaches out to system 2 so it can take over.

But now, what would normally be an intuitive and automatic response, the result of the mechanization imposed by repeated training and years of experience performing the same activity, is classified as a situation where thought and reflection are required. Under unusual pressure, the kind of pressure to which he is not used to, system 2 will come into play, thinking about every decision and movement he has to complete, and in some way, losing the thing that made him an expert at his discipline.

Many athletes have developed certain calming routines in order to stop this “unnecessary” thinking that takes place during stressful situations. They might carry out a certain automatic checklist in their mind, or execute a series of premeditated movements, or even carry out a meaningless ritual to shut down the relentless rational activity that is taking place in their minds. The idea is that if they get to quiet their mind, they might be able to act as they usually do in those scenarios.

This could easily explain why we see the best players of the world, in any sport, fail hopelessly in particularly stressful situations while performing actions they would normally do without any hesitation. It is not that Michael Jordan does not have the ability to make a three-point basket, or that Lionel Messi does not know how to shoot a penalty. But under a certain amount of tension their system 2 also takes control of the situation, and in those cases failure may actually occur because of over thinking the actions they normally perform intuitively.

It is precisely in those situations where we can clearly see what Dreyfus meant when he claimed that thought is the enemy of the expert. We could even argue that the great competitors of all time might not be the ones that perform the actions in the most perfect way, since many individuals could execute great athletic feats during training or in the backyard of their house with no one watching. The greatest athletes might actually be those who are able to perform in a sufficient way and

have the calm and poise to keep doing what they had always done at the most difficult moment. Maybe, greatness in sport, and in many other aspects of life, is not determined by ability, but by that threshold of pressure that everyone appears to have: those who are able to withstand the most stress and continue to deliver, even in the most difficult and adverse scenarios, will be the ones that end up being successful at their respective activity.

Conclusion

There is no doubt that many more questions will arise in relation to the embodiment thesis. It is not only that the rough answers this theory suggests are not proved beyond all argument, but also that many of the intellectual and theoretical consequences that those answers might arise are yet to be discovered and dealt with.

Still, it is interesting how different aspects of life tend to support this theory. In that regard, the evidence that sports add in favor of the embodied cognition theory is something to be acknowledged.

However, it is difficult not to think that this is just one of multiple spheres where embodiment thesis might provide some serious insight. The possibilities it might present are unimaginable yet, and if science keeps supporting it, all fields of knowledge should give this theory some serious consideration. As Descartes himself once said, tradition or authority cannot be the sole justification of an intended truth, so if evidence points elsewhere, that is where our attention should be directed to.

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