The Reason Why Do Athletes Run Around the Track Counter-Clockwise?

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Abstract

In 1896, the First Modern Olympic Games was held in Athens, Greece. During this event the athletes were required to run clockwise during the track events. This was met with much complaint from the athletes. It was because of these complaints that the IOC then gathered in 1913 and set the current anti-clockwise rule. We run counter-clockwise because everything in nature tends towards counter-clockwise motion. That spectator will perceive the runners as moving left to right - the same direction our eyes move when we read. The human body is slightly heavier than the right because of the heart and when running anticlockwise, the body would tend to very slightly incline towards the left, which could be an advantage while running anticlockwise most people are right hand/leg dominant. Moving counterclockwise we have a better control and move faster. Position of the center of foot pressure during balance tests was correlated with the turning score.

KEYWORDS: Athlete, Clockwise, Counter clockwise, Track & Field

The Riddle

Whenever we watch any track & field events, specifically a race like 200 m, 400 m, 800 m, or 1500 m we just watch the speed in which the athletes run, but never focus or attention on a crucial fact that runners run in counter-clockwise direction only. Generally people brush aside it as something trivial because they are least bothered whether the athlete runs clockwise or counter-clockwise. However, for a curious mind this proposition stands as a million dollar question to which answer must be sought.

We are aware that no event in this universe occurs without a cause whether or not we are aware of it or not. It is true and perhaps well-known to us that all runners on the athletic track run only in counter-clockwise direction and noticeably there are only left turns on their path usually when it is 400m, 800m or more (Syah, 2010). Observably, runners have to cover more laps and on their way they have only left turns. For a moment, let us not confuse which is clockwise and which counter-clockwise but just imagine the situation as such we are watching the runners, sitting in the stadium. Then we can clearly understand that the runners run in counter-clockwise direction all time (i.e. for example… opposite to the direction, in wish we brush your teeth, if we are a right handed).

Now we can have a clear idea about the direction in which the athletes run on the track. Interestingly, it is not that only the track athletes run counter-clockwise but also circular sport athletes (discus and hammer throwers and shot putters) make the rotational movement in counter-clockwise direction. Even motorcycle and formula 1 racing are run counter-clockwise (Simone, 2009).

Physical educators, biologists, biomechanics experts, physiologists, and historians have tried to explain this phenomenon using facts casually gathered but no empirical evidence. Many theories are thrown around to define the reason

why athletes always run around the track counter-clockwise. The whole issue it seems is wrapped in fact and fiction, and to find a convincing reason is a Herculean task from out of several interesting explanations offered by many individuals (Anthony, 2012).

The Roman Tradition

Who actually knows why athletes are made to run on the track counter-clockwise but from a historical viewpoint, the legend has it that the chariot races at Rome`s Circus Maximus stadium in the sixth century BC were traditionally run clockwise until an unlucky chariot racer accidentally hit emperor Nero in the check near the whip. The charioteer was immediately executed by Nero and the subsequent day all races were run on the earth the opposite track, i.e. counter-clockwise, it might have been an arbitrary decision but became a tradition over time. What supports this tradition is the fact that the Circus was overlooked by the emperors on the Palatine hill, so the finishing line was on the eastern side of the north, where the spina ended (Eber, 2010).

The Greek Connection

Some people trace the tradition of running counter-clockwise to the Greek beliefs and mythology (Bredesen, 2005). The ancient creeks had big concepts about philosophy, art, democracy, sculpture, dramatics, and also athletics. They also were pretty high in the order of their athletic skills. They started having Olympiads[1]. One of the true test of a man`s worth is how fast can he run at the rival if needed, and is he faster than say, Apocraphe over at hand? The ancient Greeks were an optical people, and knew a good attitude when they saw it; hence the Acropolis. They also like write to their views. For most people natural way to see things is from left to right, and that landscape, when travelling, was easier to digest when it travelled from left to right. So the spectators at the ancient Olympic contests would want to see the runners run past from their left to right. To do this the runners would need to run counter-clockwise (word press, 2007). Interestingly, the Greeks didn`t have clocks; for them it was no clockwise or counter-clockwise, at hand it was singular right or left. The tradition goes back to the Olympic Games, 700BC (the booklet Olympia, Altis and Museum). The ancient Hippodrome (a course for chariot or horse races) appears to be based on an anti-clockwise race with competitors coming up to the finishing line at the end of the straight . How far the Greeks were accurate in their visual sense and applying it to their advantage in laying down running tracks and making athletes run from left to right, can be put to a simple test by yourself, with a FIFA activity on your Xbox or ps 123, and you will find you play far better when your team is going from left to right, and that if you play right to left you lose fluidity (soldjablue, 2007).

The Natural Reason

We run counter-clockwise because everything in nature tends towards counter-clockwise motion. The list of natural phenomena that run counter-clockwise is quite impressive. It includes: the molecule structure of amino acids, the shape of seashells, the rotational direction of all the planets (except Venus), and the orbital direction of the earth around the sun. On this point, Peter Brown from

[1] An **Olympiad** is a period of four years associated with the Olympic Games of the Ancient Greeks.

Sheffield argues: "Because of the effect of the Earth`s rotation, an athlete running anti-clockwise will have a slight advantage, resulting in a faster time. In the Southern Hemisphere, this effect is reversed but, as the sport grew up in the Northern Hemisphere, anti-clockwise races have remained, despite the international status of athletics. Evidence of this phenomenon is that none of the current world track records have been set south of the equator. The question is, if the World Championships are ever held in the Southern Hemisphere, would the IAAF decide that track events should be run in the opposite direction?" (Brown, 2011). Perhaps, no, for it would upset the entire athletic competition ethos.

The physical phenomenon of Coriolis effect when viewed from above the north pole of the earth, the earth rotates counter-clockwise, it orbits the sun counter-clockwise, and the moon orbits the earth counter-clockwise (Sprott, 2000). In fact, every planet orbits the sun counter-clockwise. All but Venus and Uranus rotate counter-clockwise, and all major moons except Triton orbit their planet counter-clockwise. To complete the picture, the sun rotates counter-clockwise too. In sum, counter-clockwise track racing follows the Law of Nature in human wisdom. However, many believe that Coriolis Effect[2] has very little to do with anything but bowel movements.

Biomechanical Concept

When an object (body) is in flight, every rotation is matched by an equal and opposite rotation. In other words, if the body is rotating about an axis (vertical or horizontal), any rotation added by the legs, body or arms in one direction will be matched by a rotation of the arms, legs or body in the opposite direction. If the long jumper sweeps the arms forward (clockwise) in flight, the effect will be to rotate the body backward (counter clockwise). Since there is a net forward rotation resulting from the takeoff, the effect of sweeping the arms will cause the body to remain in a vertical position.

The jumper wants to get his feet out in front of him so he can keep from doing a "face plant" when he lands. Bringing his feet forward would involve a certain quantity of counterclockwise rotation, but he didn't start out with any rotation when he left the ground. Suppose we consider counterclockwise as positive and clockwise as negative. The only way his legs can acquire some positive rotation is if some other part of his body picks up an equal amount of negative rotation. This is why he swings his arms up behind him (Crowell, 2011).

The Sentimental Reason

Though probably the tradition of running on the track counter-clockwise has not been questioned since the Roman Era, the most plausible answer might be that it symbolizes man`s run "against the clock", so the races are run counter-clockwise… By running satisfactory counter-clockwise, the athlete travel back within time, is also quoted to be a scientific fact in support of the sentimental reason , so to say. By this way, the figure-skaters are always trying to get the lowest time possible.

This is a simple variation where, as the Vertical Loop is being pulled from the right side to the left, the roper turns counter-clockwise from front to back. Now the

[2] **Coriolis** effect is an inertial force described by the 19th-century French engineer-mathematician Gustave-Gaspard Coriolis in 1835.

Vertical Loop is on what was the left side of the roper but because of the counter-clockwise turn is now the right side (Bunks, 1996).

Physiological Reason

As we know that if we breathe from left nose hole, cool air will go inside and if we breathe from right nose hole, warm air will go inside. When we run on a circular track anticlockwise, we will breathe from right nose hole .Which will warm up our body and we can run more fast as when we start race, we first warm up our body and then start running.

Dolphins change overt behavior every 40 s, coincident with the respiration rate. The possibility is suggested that the salience of neural activity controlling respiration in the reticular system may effect/disrupt reticular attention mechanisms, thus leading to the changes in overt behavior. It is hypothesized that this 40-s period may represent the possible attention span of the sleeping bottlenose dolphin (Stafne & Manger, 2004).

Based on the known physiological facts, a lot of theories are thrown around to define the reason why athletes always run around the track counter-clockwise. Some say it is related to the heart`s position, others content that the direction has been determined to better facilitate a right handed runner. Equally strong arguments exist for and against the proposition. Experts in biomechanics, however, agree that running counter-clockwise may have some coincidental physiological benefits to the track athlete. The temporal sequence of LV twist. During isovolumic contraction[3], the LV apex shows brief clockwise rotation that reverses rapidly and becomes counterclockwise during LV ejection (Ingels, et al. 1989).

A Runner on a Curved Track

As the runner rounds the curve, she leans toward the center of rotation. The reason for this position can be understood from an analysis of the forces acting on the runner. Her foot, as it makes contact with the ground, is subject to the two forces, shown in: an upward force W, which supports her weight, and a centripetal reaction force F_{cp}, which counteracts the centrifugal force. The resultant force F_r acts on the runner at an angle θ with respect to the vertical axis. If the runner were to round the curve remaining perpendicular to the surface, this resultant force would not pass through her center of gravity and an unbalancing torque would be applied on the runner if the runner adjusts her position by leaning at an angle θ toward the center of rotation, the resultant force F_r passes through her center of gravity and the unbalancing torque is eliminated (Davidovits, 2008).

Evolutionary Facts

Before proceeding further, let us for a moment focus on man`s evolutionary history to gather support or the ongoing argument. According to biologists, in the course of development due to variety of correlative factors and conditions, the hominoid (the early ape-like man) left arboreal life and assumed upright posture (Coleman, 2013). This led to very significant structural and functional

[3] **isovolumic contraction:** the early phase of systole, in which the myocardial muscle fibers have begun to shorten but have not developed enough pressure in the ventricles to overcome the aortic and pulmonary end-diastolic pressures and open the aortic and pulmonary valves. During this period of muscle fiber contraction, the ventricular volumes do not change.

transformations in man as time passed. Charles Darwin pointed out: "Man`s ancestors lost certain characteristics either fully or in part; a keen sense of smell, the hairy covering on the body, the majority of the dermal muscles, the tail, the prehensile (fast moving) feet, pointed ear lobes, etc." Man also developed new parts of the brain (specially the cerebral cortex) and became homo sapiens or intelligent species, capable of thinking.

The adoption of upright posture (biped position) altogether changed man`s mode of walking, feeding, carrying objects rather hands), etc. In a danger situation, carrying baby with both arms impeded movement, so the intelligent man began to carry it on the left chest supported by left arm and used the right arm to propel the body and run for safety with all the speed at his command (Berk, 2006). With Use and Disuse principle in mind, we draw two conclusions of practical importance from this explanation: (a) since the human heart is situated in the left-chest, its rhythmic beat had a soothing effect on the baby during long and often rough carriage; and (b) at the same time, the disuse rendered the left side of the body weaker vis-à-vis the right side.

Besides, functional adaptations also took place in the human brain making several motor movements right-dominated (Krekelberg, et al. 2006). The heart is a vital organ on which the hinges the survival of the organism. Nature has devised instinctive mechanism to protect it. During evolutionary adaptations, there developed a tendency with the body to keep the left side drawn back in a fight reaction situation and offer resistance trough the dominant right side. Why most people are right-side dominant, and use the left arm and/ or left leg for support, could only be explained on the basis of these biological musings.

The Right-Limb Domination

Through various studies, physiologists have found that right-handed people tend to have more highly developed hand and leg muscles on their right hand side than the left. This gives them an advantage when running around a track counter-clockwise, because it allows for their more powerful leg to remain on the outside, facilitating the turns. When running counter-clockwise, you will filch longer strides with your right leg-which allows for more propulsion and speed on the turns. Scientists agree that most of us are not only right handed but also right legged. We kick the ball with the right leg, and if falling forward we catch ourselves more often with the right leg. The right leg is more muscular and makes longer steps in walking, according to Prof. Onur Güntürkün, biopsychologist at the Ruhr university at Bochum/Germany (Kosog, 1999). For the 90% of people who are right handed, a left turn is more natural and easier to negotiate.

The right side of the body, in general, being stronger makes it easier for people to turn left than to turn right. Biomechanically, pushing is easier than pulling; so when the right side pushes or propels, the left side being weaker automatically withdraws, but while turning right, the dominant right side makes a truly tiring effort, allowing the left side to simply follow. Same way, most people being right-leg dominant, use their left -leg for support when turning. Right dominate leg will push off stronger, carrying the body farther, which leaves a greater distance between strides of the non-dominant foot. Because of the slight difference in stride length, a right dominate person will circle, or veer, toward the right. Whereas a left dominant person will veer toward the left (Stockton, 2009).

A Matter of Heart

Physiologist have also cited structure of the human body especially location of our most precious heart on the left side as an important factor in explaining why counter-clockwise running or turning is most helpful to the athletes than clockwise movement.

According to them, as the heart is on the left side, for humans and animals, running counter-clockwise makes the centrifugal force in the body to act from left to right, and from right to left for clockwise running. When the body loses equilibrium, it has a strong tendency to fall toward the heart side. This also explains why most riders find it easier to corner to the left than to the right. And it's why track races go counterclockwise so that all turning is to the left (Borysewicz, 1985). Superior venecava, the principle vein, carries the degenerated blood from the upper half of the body to the heart`s right atrium assisted by heart suction. The centrifugal force, due to running in clockwise direction, will make the centrifugal force to impede suction and tire the athlete. Apart from this, it is also argued that when an athlete runs in counter-clockwise direction, he encounters only left turns and as a matter of fact left turns are easier than right turns, as explained above.

The physiological fact is also quoted as the major reason for the health officers in the olden days ensuring that all carnival merry-go-rounds were run only in the anti-clock-wise direction. It is a curious fact that all things which move over the surface of the earth tend to sidle from their appointed paths-to the right in the Northern Hemisphere to the left in the Southern Hemisphere. The magnitude of the effect also depends directly on the speed of the moving object. Every carnival worth the name has a Coriolian coordinate system: viz., the merry-go-round. When the merry-go-round starts up, you begin a game of catch. The earth is a spherical merry-go –round, and all of the carioles drifts we observe when we use terrestrial coordinate systems are due ultimately to the fact that the earth, like the merry-go-round, is always spinning out from under our dynamical systems. To an observer conscious of Newton`s second low of motion ,the apparent "acceleration" (deflection from a straight path) of an object moving over the earth suggest that some force is acting on it, and he is strongly tempted to speak of the carioles "force." He likes to regard these motions as according in obedient Newtonian fashion in what he calls "inertial space" (McDonald,1952). In pursuance of this principle, the racing tracks, animal shows in circuses, bullock-down pelt on wheels, all mostly have only left turns. Stairways in temple towers have only left turns for going up. It is so because moving counter-clockwise is probably parsimonious (economical) in terms of energy cost and biomechanics. Although we find it much easier to hoop in an anti-clockwise direction than a clockwise one (apparently this is normal for right-handed people). However, if we can learn to hoop in both directions we will get better-looking abs, because we will then be working the muscles on both sides of our body (Wood, 2013).

The Tail Piece

The direction we read also provides a fine answer to this question. Most languages are read from left to right. It is true that Chinese and Arabic are read from right to left and traditional Japanese is read downwards left to right, but these are the exceptions. Rugani (University of Trento, Italy) says animals and humans may instinctively count from the left because the right hemisphere of the brain – which processes the left field of vision – is dominant in visual tasks. This suggests counting from the left may be instinctive rather than culturally learned. Even

in languages such as Farsi that are written and read from right to left, numerals are organized from left to right (Coghlan,2010). It is no fun but a proven fact that if a person is blindfolded and told to walk forward, the right-handed person will begin to lean towards the left and the left-handed person towards the right.

The Rule Book

With regard to the track events (foot races), the rule book says that running will run with their disappeared hand to the inside. Somewhere, lost in the mists of time, officialdom fixed to standardize on certain things close to the distance of races, the point of hurdles, and the width of lane. Importantly, they also standardized the direction the race would go. Presently, the rules for track events (foot races), the track geometry, direction of travel, etc., have been set by international agreement to ensure comparability of times.

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