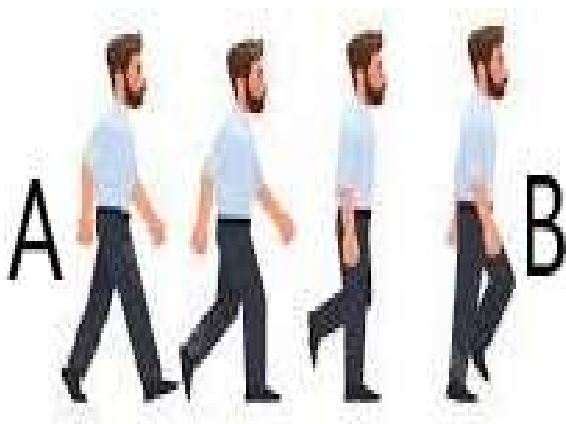


Walking versus a stepper – Walking demands a coupling of a secondary (internal) focus to a primary (external) focus;
The step machine solely requires a secondary (internal) focus

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Caught In A Line
The explanatory model of all motoric movement actions

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Introduction

Traditionally, science has assumed that one motor action encompasses one focus. This assumption has seemingly been so logical that it has never been questioned. However, this has led to the absence of a plausible explanation for the functional perception processes underlying the execution of all motor actions, even after 150 years of movement sciences. In 2016, an explanatory model was found that is capable of identifying all functional perception processes within any imaginable motor action. Beyond any reasonable doubt it conversely demonstrates that every motor action can only be executed through a compulsory coupling of two foci: an internal (secondary) focus must always be directed at an external (primary) focus. In which it should be explicitly noted that these two foci represent entities that fundamentally differ from current scientific terminology.

The explanatory model emphasizes that the essence of a motor task always involves the movement of an action object outside our body along an action trajectory shape, but that the action object will never be capable to move on its own along that line. The action object is often an inanimate object (pen, spoon, needle, key, bicycle, boat, tennis racket, ball, letter, pointer (pc) etc.) that we hold during an action, and even though the fingertips, during a grasp action with the hand on the outside, consist of living cells, we absolutely aren't capable of moving them there. The explanatory model unequivocally shows that initiating the movement of an action object outside our body is only possible by using secondary perception of autonomous movements within our body.

Compared to the current state of science, the explanatory model represents a revolutionary breakthrough, revealing that two foci must enter into an obligatory connection simultaneously, and this universal stacking of two perceptions of two autonomous movements occurs in every motoric movement action. They are clearly autonomous because they belong to two incompatible worlds. Observations of movement inside and outside the body are actually never able to overlap.

This article focuses entirely on the motoric movement action *walking*. It presents compelling evidence that only the body (as a whole), or the movements of the body (as a whole), akin to a marble within a marble run, executes the action trajectory shape and thus accomplishes the essence of the task¹. For this reason, primary attention must be directed towards the external movement of the body itself. The body can only be moved by entirely different movements within the body that only reach the outer part of the feet. The attention required for this must serve the main goal and is therefore termed as a secondary (internal) focus.

What makes this publication particularly remarkable is that it compares regular walking to walking on a step machine. This demonstrates that the secondary (internal) focus in both actions is exactly the

¹ Within this motor movement action, it is crucial to apply a shift in perspective. In many motor actions, we perceive the object of action from the outside. We see the ball, the pen, the letter, the computer pointer, etc., as a whole (in motion) outside our body. In motor movement actions involving A-B displacement, such as cycling, rowing, driving a car, etc., we do not observe the action from the outside but from within. Our body as a whole becomes part of the motor action, and we perceive the action from the perspective of that object of action. Just as we can observe the movement of a tennis ball outside our body, we now become the ball itself, thus traversing the line of action from that specific perspective.

same, but the primary focus is completely absent in the case of the step machine. Unlike regular walking, no visual perception is necessary when using a step machine. There is no coupling of two attentional foci, and therefore, no fixation (gaze) occurs. This finding should render further scientific discussion unnecessary, as the insight provides immediate clarity. Additionally, the explanation shows that all conceivable motor actions are based on these same two foci. Due to this universal character, the explanatory model creates the most ultimate ecological argument imaginable. The article does not delve deeply into the differences with the current state of science, as there is no clear consensus within the scientific community on this subject.

The primary focus within walking encompasses the perception of movement outside the body

In abstract terms the egocentrically formulated will within walking encompasses the movement of *the whole body* (!) from A to B². The explanatory model of all motoric movement actions demonstrates that solely the body (as a whole) c.q. the movements of the body (as a whole) carry out the essence of the task and therefore represent the primary focus within this action. The explanatory model provides scientific evidence that a motoric movement action always consists of two successive autonomous phases. In the first phase, a tactical consideration aims to create a perceptual image of a latent action trajectory shape, over which, in this case, the body or the movements of the body will be successful, before transitioning to actual action. When we proceed to physically execute the action, we fill in the perceptual image of the (latent) action trajectory shape with the body. This is the essential process that our perception processes must guide within the primary focus, a process that science has completely overlooked until now.

Subsequent articles will reveal that the process of filling in the action trajectory shape by the body yields the essential *tau*-value to which the secondary focus is inherently linked, and an explanation will be provided on how the cortical streams must mediate this process.



Images: Walking is solely about moving oneself c.q. moving the entire body from A to B. The essence of this task is thus carried out exclusively through the autonomous displacement movement of the body as a whole, the object of action. Therefore, that is the primary process we must observe. It is abundantly clear that the step machine will never start moving, hence there will never arise a need to perceive an action trajectory shape within a primary focus.

The explanatory model demonstrates that within every conceivable motoric movement action, an autonomous internal focus must be pointed at an autonomous external focus. It thereby provides insight into the scientific evidence that we just aren't capable to produce an identical action trajectory shape, as it involves a stacking of two perceptual images of autonomous movements that belong to two in-

² The explanatory model defines all actions in which the primary egocentric objective involves a distinct movement from A to B as motoric movement action *moving A-B*. This encompasses activities such as walking, cycling, sailing, swimming, boating, skiing etc. etc..

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compatible worlds. For example, you have never taken hold of a coffee cup in an identical manner, or performed a free throw in basketball in an identical way. In the same vein, you will also never be able to produce identical forms of action while walking c.q. you will never be able to walk one meter in an identical manner.



Images: In any imaginable motoric movement action, the action object will traverse a action trajectory shape, like a marble does within a marble run. The action trajectory shapes usually remain invisible. However, in the case of walking, a marble run becomes visible at times. In which the current position of the body (as a whole), similar to the marble, precisely delineates the separation between the manifest and latent parts of the action trajectory shape.

It could be that we construct nearly perfect straight action trajectory shapes when we create perceptual images before we factually start walking. However, due to the fact that you can execute the body's movement only by perceiving an entirely different autonomous movement, the body will inevitably deviate from that "perfect" original perceptual image at every point P within the action trajectory shape. This process, therefore, needs to be guided by the double and mutual process of the cortical streams, representing the brilliant ecological response of the body to execute every motor action in the most effective and efficient manner. The ventral and dorsal streams remain in constant interaction to correct the inevitable deviations, but this interaction does require a (very short) reaction time³. As a result, we (conform Bernstein) can never perform any motor action in an identical manner, and therefore, the body's movement always follow a continuously different zigzag pattern within walking. Upon which the explanatory model hastily emphasizes that achieving an identical execution of motor actions has never been the objective of parsimonious organisms and therefor doesn't fit into an ecological evolution. Generating form similarity is far more efficient and effective.

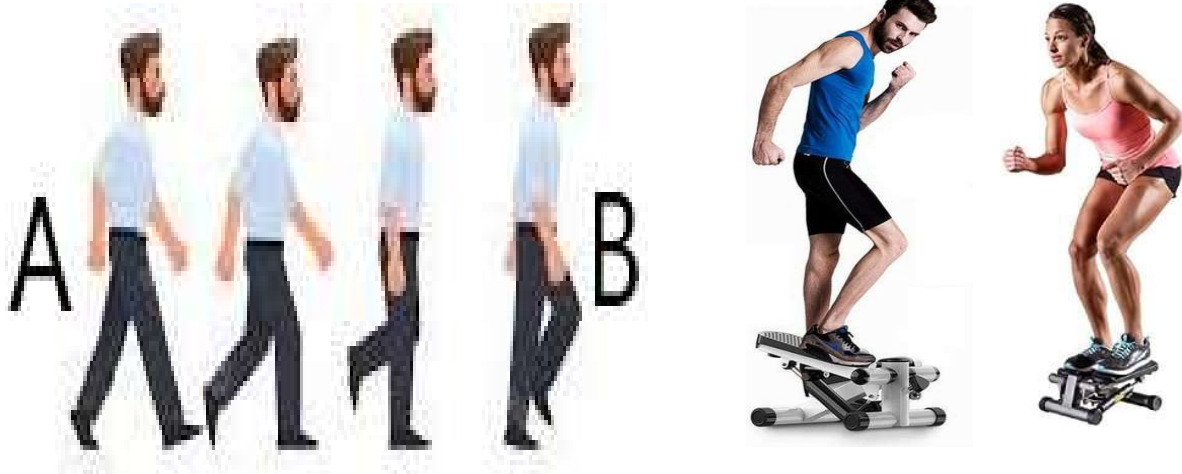
The secondary focus within walking encompasses the perception of movement inside the body

When one starts to realize that the primary focus within walking solely concerns the movements of the external surface of the body as the object of action, one will also simultaneously recognize that we cannot move our body within an action trajectory shape solely through this external surface. While the external surface of the body consists of living cells, we can only set the external surface of the body in

³ The specific reaction time concerning cortical streams in relation to the explanatory model has never been examined. General information and empirical experiences provide an indication that the reaction time is estimated to be around 0.1 seconds; "It takes about one-tenth of a second for information about the visual scene to reach the back of the brain or the occipital lobes. During the next tenth of a second, the visual information is analysed in two separate ways. Figure 2 shows the two pathways of the dorsal stream and the ventral stream. The dorsal stream runs from the occipital lobes to three locations, the back of the brain at the top (called the posterior parietal lobes), a vertical strip of brain in the centre (called the motor cortex) and the front of the brain (called the frontal cortex). The ventral stream runs from the occipital lobes to the back of the brain at the bottom (called the temporal lobes)": Cerebral Visual Impairment - Working Within and Around the Limitations of Vision; Gordon N Dutton; http://www.liv.ac.uk/~pcknox/Publications/trimble/CVI%20chapter%20for_hers-Dutton.pdf

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motion through movements within our body. These movements come close to the external surface but always remain within the confines of our body. In the context of walking, this concept is translated to the outer part of the foot, often covered by a shoe. So in the act of walking, we can haptically perceive the walking surface only through (the outer part of) the soles of our shoes, and proprioception⁴ allows us to perceive how movements within our body influence this haptic contact between the sole and the walking surface.



Images: Within this article, it must be made entirely clear that the secondary focus makes no distinction between regular walking and using a stepper. The transmission of the sole of the shoes to the surface of the ground or the surface of the pedals is completely identical.

Also within walking, the essence of the task is implicitly linked to the observation of the primary focus. This often results in us being unaware of the secondary focus during many motor actions, particularly because these are frequently simple observations. However, in highly complex motor actions such as a tennis serve, attention is exclusively directed towards the secondary focus (the serving technique), completely disregarding the fact that the primary focus involves creating an outgoing ball trajectory shape (OBT). With some practice, you can consciously perceive the two foci simultaneously within many motor actions. By alternating between regular walking and stationary walking, you can perfectly become aware of the two foci within the motoric movement action *walking* as well.

⁴ Scientific research has demonstrated that proprioceptive perception encompasses two autonomous phenomena, namely: 1. Limb Position (LP) and 2. Movement (M). The explanatory model clearly illustrates this within the context of rowing as well. LP is linked to the overall walking technique, while M pertains to the specific point where this overall perception needs to be transferred from the soles of our shoes to the ground.