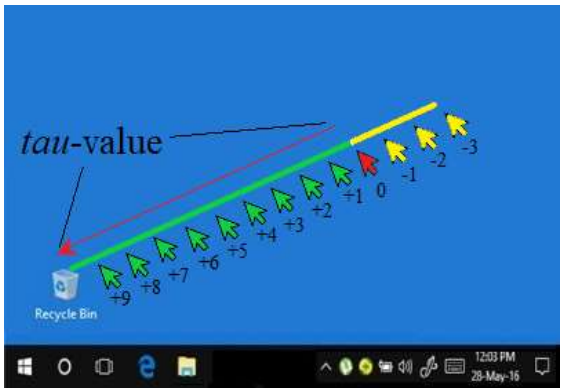
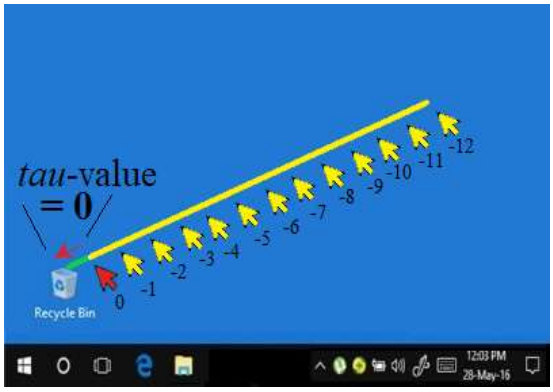
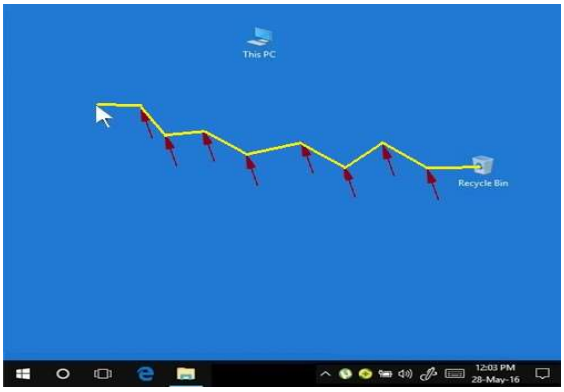
When clicking on an icon, the essence of the task is solely executed by the movements of the pointer within the primary focus; The pointer becomes constrained within an action trajectory shape which produces the *tau*-value







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

N.J. Mol

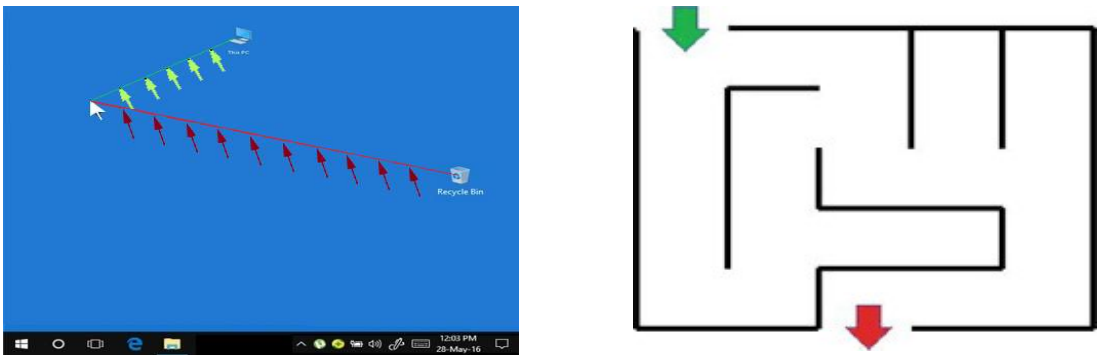
Introduction

Traditionally, science has assumed that one motor action corresponds to one focus. This assumption was likely so intuitive that it was never challenged. However, this has led to the situation where, even after more than 100 years of movement sciences, a plausible explanation for the underlying functional perception processes guiding the execution of all motor actions had never been found.
In contrast, in 2016, an explanatory model emerged that has the capability to identify all functional perception processes within any imaginable motor action. It demonstrates, beyond any reasonable doubt, that each motor action can only be executed through a mandatory coupling of two foci: an internal (secondary) focus that must always be directed towards an external (primary) focus. In which it should be explicitly noted that these two foci represent entities that fundamentally differ from current scientific terminology.
Regarding the external (primary) focus, it can be noted that the scientific community has thus far missed the mark entirely. This is precisely why this publication comprehensively addresses this aspect.

Solely the movements of the pointer encompass the essence of the task c.q. the external (primary) focus

The category of motor actions discussed by the explanatory model pertains the conscious actions where it is assumed that there is always an initial formulation of an egocentric intent (an egocentric formulated will). Before picking up a coffee cup, for instance, there is always the desire to do so. The explanatory model of all motoric movement actions recognizes this as an undisputed factual aspect but adds a caveat. The egocentrically formulated intent does not, for example, concern picking up the coffee cup itself. The explanatory model reveals that this is factually incorrect and that we can only move our fingertips toward the coffee cup. Therefore, the movement of the fingertips toward the coffee cup constitutes the essence of that action. In the context of the discussed action, we might indeed want to click on an icon, but the egocentrically formulated goal solely revolves around moving the pointer towards the icon. Only this aspect determines the essence of the task, and therefore, only this aspect should be considered as the external (primary) focus.

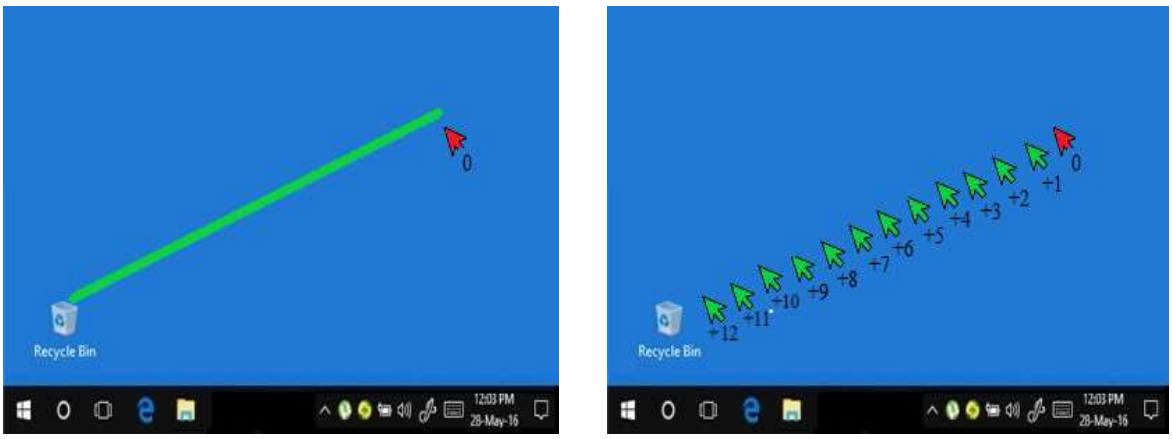
The tactical movement action (TMA) in relationship to moving a pointer towards an icon



Images: Firstly, an egocentric intention must be formulated that we want to move a pointer to a specific icon. On a desktop (left image), starting from the current position of the pointer (white), we then construct a perceptual image of a latent action trajectory that guides us to reach the icon of choice.

This process is part of a tactical action involving two crucial goals. Firstly, it should lead to a successful action, and secondly, ecologically evolved organisms seek to carry out actions as parsimonious as possible. The small maze (right image) further clarifies this tactical consideration. Although it might seem that we wouldn't do this on the desktop due to the absence of any visible edges, this is decidedly inaccurate. The tactical consideration doesn't focus on the edges at all; it solely focuses on the "*empty*" positions (P) where the pointer can move unhindered. In this regard, our visual perception always concentrates on the positions P where there is nothing to see, as all these positions ensure an unobstructed movement of the pointer.

The explanatory model of the motoric movement action demonstrates that after formulating an egocentric goal, we always engage in a tactical consideration[1], prior to any execution, to determine how we can bring the action object to the goal location within successive positions P. In the context of the discussed action, we always create a perceptual image of a latent action trajectory shape, allowing the pointer to be moved successfully toward the icon[2].



Images: It is not straightforward to present an animation that accurately represents the latent action trajectory shape being constructed. The image on the left very clearly displays the shape of the trajectory, in which all contiguous points P are distinctly weighed. However, it does not illustrate that within the construction of the trajectory shape, all dimensions of the pointer are also precisely incorporated, as shown in the image on the right. The perceptual image we pre-construct of the trajectory might possibly contain a hybrid blend of these two animations.

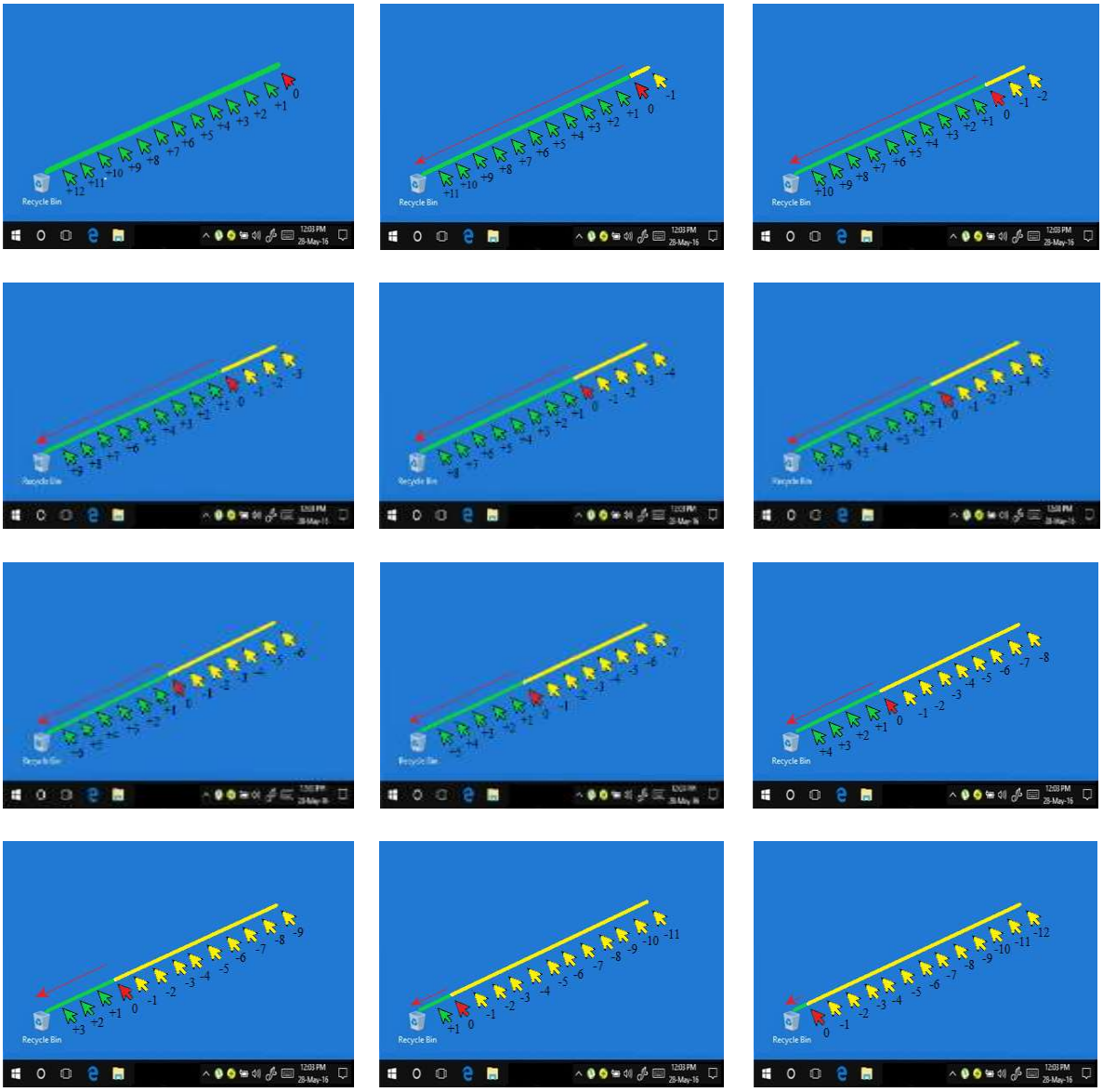
<u>The factual movement action (FMA) in relationship to moving a pointer towards an icon</u>

After determining a perceptual image of a latent action trajectory shape, we proceed to actually carry out the action. This process effectively starts with bridging the gap from the current pointer position P(0) to the next position P(+1) within the action trajectory. Although our ultimate intention of course is to reach the icon, the explanatory model clearly demonstrates that our perception processes in this phase are solely focused on traversing the empty space between the pointer and the icon c.q. between

[1] The scientific evidence has been unequivocally provided for all grasping actions and all throwing actions, and can be easily universally extrapolated to any conceivable action. N.J. Mol; *Grasping encompasses two consecutive autonomous phases – The scientific proof that we tactically construct an action trajectory shape prior to the factual execution of that exact same action trajectory shape.*

[2] N.J. Mol; *When moving a pointer on a computer screen, you are mainly attentive to where 'nothing' is - The scientific evidence regarding visual perception within each motor action.*

the animal and the environment (Gibson)[3]. Which at a micro-level shows, that essentially only the positions P(-1), P(0), and P(1) matter to us during this bridging process.



Images: In an animation, the progression within an action trajectory shape can be depicted as follows. Within any conceivable action, the action object can successfully execute the action only by first occupying the next position P(+1) within the action trajectory. The current position P(0) then shifts one step forward, and a manifest position P(-1) is added. This process repeats with every new position P(0) until the end of the action trajectory is reached. To comprehend the perception processes at the most fundamental level it is of the utmost importance that you start to understand that the latent part of the action trajectory shape will factually need to sprout out of the already manifest positions P(-x).

<u>The perception-action coupling in relationship to moving a pointer towards an icon</u>

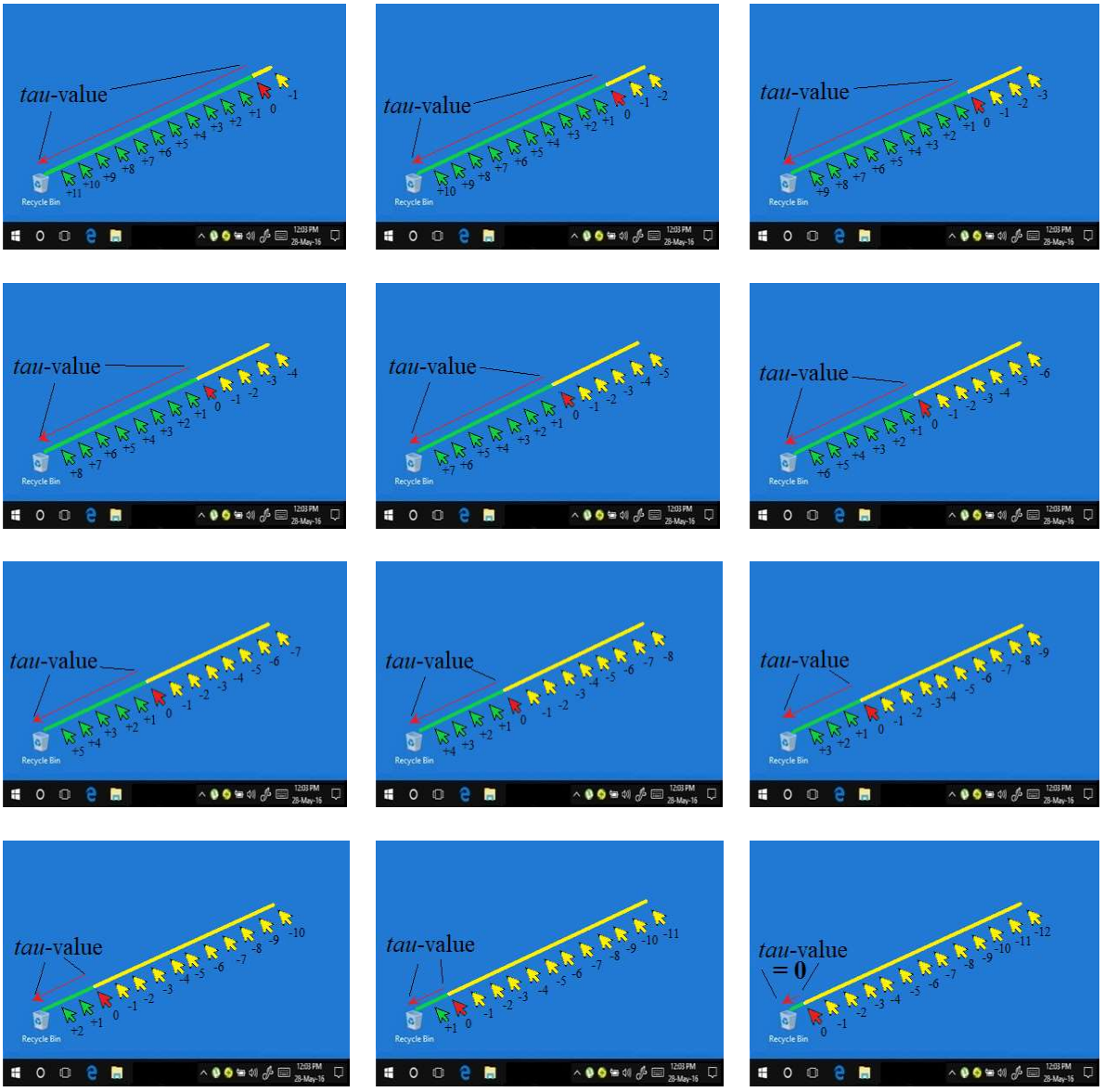
[3] The explanatory model completes The Affordances Theory by J.J. Gibson. Gibson introduced the crucial second element of the environment besides the animal, yet he was still missing the finalizing entity that connects the animal and the environment. The action space between the animal and the environment.

With the preceding argumentation, the explanatory model of the motoric movement action now provides a comprehensive and universal explanation of how perception is linked to action within any conceivable task. The animations in the previous section illustrate that the action object maintains a fixed relationship with the perceptual image of the action trajectory shape. This becomes easier to comprehend when envisioning a marble in a marble run. In this analogy, you will become much more aware that the perception-action coupling is a unified phenomenon where only a single change occurs every ongoing time span. Within the marble run it becomes quite visible that during the actual execution, each position P(0) serves as the precise separation between all already manifested positions P(-x) and the latent positions P(+x) yet to be traversed.
Through this explanation of the perception-action coupling, the explanatory model can precisely demonstrate how organisms must have evolved within an ecological framework. However, delving into this subject exceeds the scope of this publication. Instead, several crucial points will be highlighted concerning the functional perceptual processes within this motor action.
It's imperative to recognize that while the ultimate goal is reaching the icon, during the execution of the action, we are solely engaged in bridging empty space where seemingly nothing is happening. It can be observed within any conceivable action that we spend relatively more time bridging this nothingness than in actual observable activity. The explanatory model, however, unequivocally shows that not only the end goal matters, but all positions P between the pointer and the icon are equally significant.
Additionally, it must be remarked that the action of the pointer at P(0) can be perceived distinctly, yet no fixed unit of time can be attributed to it. Each unit of time can be divided into a thousand smaller units, and these units can be further subdivided, leading the explanatory model to argue that the action at P(0) fundamentally takes such a brief time span that it only gains significance in relationship to perceptions of the adjacent time frames. In other words, perceiving the current pointer position solely gains meaning through the adjacent future "*current*" positions P(+x) and the adjacent manifest "*current*" positions P(-x) of the pointer. Within which the overarching idea is to emphasize that perceptions within any conceivable action mainly pertain to one single phenomenon wherein the perception of the action also compels a perceptual image, but primarily that they are absolutely interdependent.

Images: Within many motoric actions the action trajectory shape will not become visible, making it challenging to depict with animations. Conversely, the marble within the marble run, is capable to vividly illustrate this concept. It clearly showcases one single phenomenon wherein the marble, at each position P, delineates the precise separation between all already manifested positions P(-x) and all latent positions P(+x). Additionally, it exemplifies one of the essences of the (perception-action) coupling. If we couldn't see the marble run, the movements of the marble would lack essential context, and conversely, without the marble, we would be completely unable to perceive any coupling as well.

The *tau*-value in relationship to moving a pointer towards an icon

The explanatory model of the motoric movement action demonstrates with the aforementioned perception-action coupling that the perception of each position of the pointer c.q. the action object within the action trajectory shape is equally important. However, as the pointer approaches the end of the action trajectory shape, the task c.q. the egocentrically formulated goal starts to become finalized. Within any imaginable motor action, the action object will universally traverse the action trajectory shape until there are no latent positions P left. Within his *tau*-coupling theory, D.N. Lee referred to this phenomenon as the closing of the gap c.q. as the *tau*-value approaching to zero.

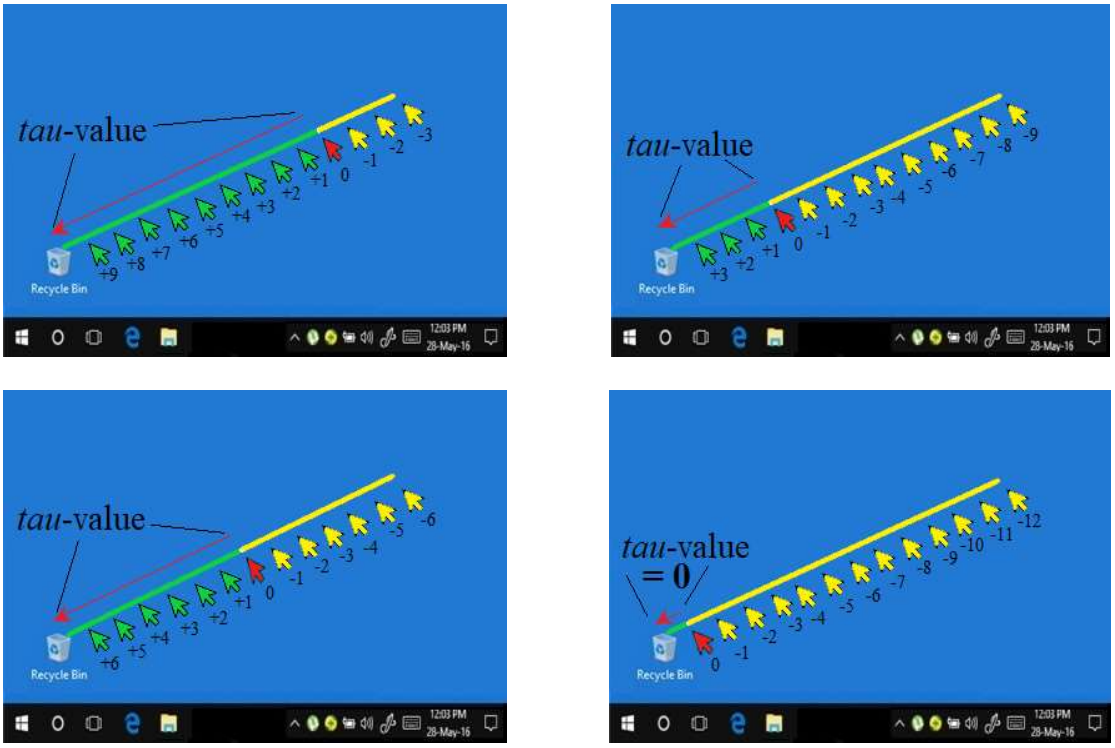


Images: Within the perception-action coupling, the pointer will traverse all latent positions P that are tactically predetermined within a perceptual image of an action trajectory shape. With each successive position P of the pointer, the *tau*-value will decrease, until it eventually approaches zero c.q. becomes zero.

The perception of the *tau*-value in relationship to moving a pointer towards an icon

The perception of the *tau*-value within the external (primary) focus is an essential process, as it must establish a compelling relationship with the internal (secondary) focus within a strict *tau*-coupling to ensure the successful execution of an action. When it is perceived that the pointer is approaching the

icon, the perception within the internal focus, or rather, the perception of the movements of the computer mouse, must take charge of slowing down and adjusting the pointer's movement in such a way that it precisely ends up on the icon.



Images: The *tau*-value can be perceived in two autonomous ways. You can either observe how the yellow manifest action trajectory shape takes over the green line or at the most basal level you could solely observe with what speed the green line, representing the still latent action trajectory shape, is disappearing. Within which you factually solely observe how the latent (green) gap is closed.

Perceiving the *tau*-value approaching to zero can be observed in two autonomous ways. The first way involves filling in the perceptual representation of the entire latent action line form with the manifest positions P of the pointer. In animations, this should be depicted as the yellow line taking over or filling in the green line. The other way involves a much more fundamental way of perceiving the *tau*-value. In contrast to the first way, this is solely based on the disappearance of the latent positions P from the perceptual representation of the entire latent action trajectory shape. Which means that you solely observe with what speed the green line disappears.