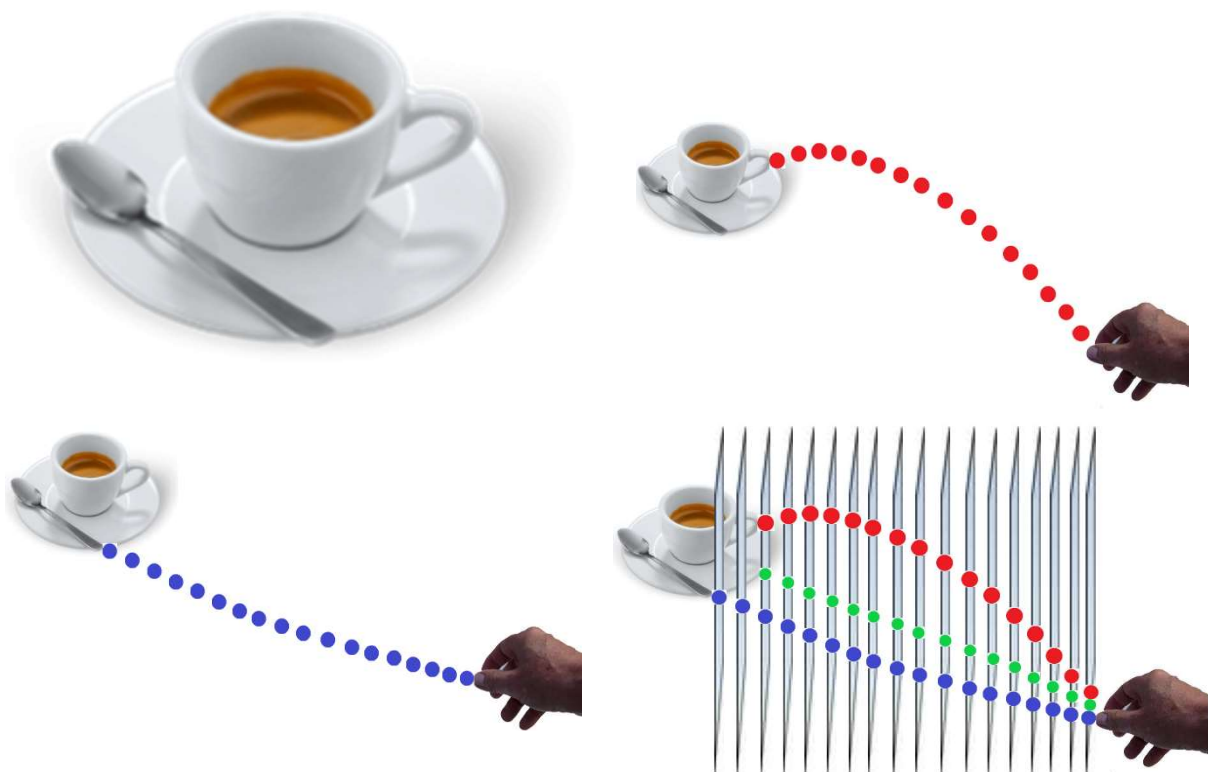


Grasping requires a compelling collaboration between an internal and an external focus – The external displacement of the fingertips along an action trajectory shape can only be accomplished through entirely different internal movements

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Caught In A Line

The explanatory model of all motoric motoric actions

N.J. Mol
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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, needle, key, tennis racket, bicycle, ball, spoon, 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 along a perceptual image of a latent action trajectory shape on the outside of our body. 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 motor 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 is entirely focused on the motoric movement action *grasping* c.q. reach-to-grasp actions. The article convincingly demonstrates that only the fingertips, or rather the movements of the fingertips, akin to a marble within a marble run, execute this trajectory of action and thereby accomplish the essence of the task. For this reason, primary attention must be directed towards the external movement of the fingertips. The fingertips can only be moved with completely different movements within the body which only reach the outer surface of the fingertips. The attention required for this should serve the main goal and is therefore referred to as the secondary (internal) focus.

Furthermore, the explanation shows that all conceivable motor actions are based on these same two foci. Due to this universal nature, the explanatory model creates the most ultimate conceivable ecological argument. The article does not delve deeply into the differences with the current state of science because there is still no clear consensus on this subject within the scientific community.

Grasping requires a compelling collaboration between an internal and an external focus – The external displacement of the fingertips along an action trajectory shape can only be accomplished through entirely different internal movements

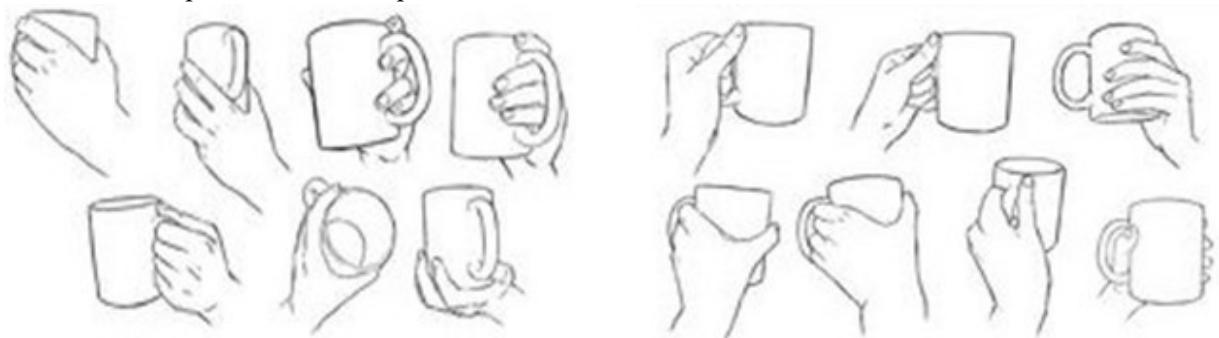
The primary focus within grasping encompasses the perception of movement outside the body

The explanatory model of all motoric movement actions, as demonstrated within grasping, shows that only the fingertips, c.q. the movements of the fingertips, will execute the essence of the task and therefore represents the primary focus within this action. The explanatory model provides scientific evidence¹ that a motoric movement action always involves two successive autonomous phases. The tactical consideration first aims to create a perceptual image of a latent action trajectory shape over which, in this case, the fingertips, c.q. the movements of the fingertips promise to become successful, and only then proceeds to actual action.



Images: Grasping solely encompasses moving the fingertips toward an intended target (handle, spoon, saucer of the coffee cup). The essence of this task is thus carried out exclusively by the autonomous movements of the (outer part of the) fingertips, and that is why it is the main process that we need to observe. In doing so, the fingertips follow an action trajectory shape just like a marble follows a track in a marble run. Within any conceivable motor action, the actual position of the marble, or the action object being manipulated, will precisely mark the separation between the manifest and latent parts of the action's trajectory.

When we factually start the action, we are going to fill in the perceptual image of the action trajectory with the fingertips. So within the primary focus, this is the essential process that our perception processes must guide, and surprisingly, science has overlooked this part entirely until now. In subsequent articles, it will become evident that filling in the action trajectory by the fingertips yields the crucial *tau*-value to which the secondary focus is compellingly linked, and the mediating role of the cortical streams in this process will be explained.



¹https://www.researchgate.net/publication/372290282_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? sg%5B0%5D=S6QcfWOrAN5tp5uWEHPpcYnJvsQycEUJ47I6kjDG6kVrJbH6HD9gGuL_CSPeFonRFI0-Wt7Cv2WKkT3LrUuwJtzKZJM35_I2Z6npSHp.I-Tz-28OcL3jw-TqQRNUI_uaYsU5d9J3GyeeqFBMc_eOPkcYAWZ5cTtCnF-H51TCD7eKrzi0sfp79PF-gwynzg](https://www.researchgate.net/publication/372290282_Grasping_encompasses_two_consecutive_autonomous_phases_-)

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Images: The explanatory model demonstrates that within every imaginable motor action, an autonomous internal focus must be directed towards an autonomous external focus. This insight reveals the scientific evidence that we can never execute any action trajectory shape identically, as it involves the stacking of observations from autonomous movements that belong to two incompatible worlds. For example, you have never executed a free throw in basketball in an identical manner. Similarly, you will never be able to produce an identical action trajectory when grasping a coffee cup. Within which the explanatory model hastily emphasizes that it has never been the objective to achieve such perfect uniformity. Creating a similar form is far more efficient and effective, to the extent that a resource-conscious (parsimonious) organism would have never evolved otherwise.

Maybe we do construct perfect straight action trajectory shapes when we create perceptual images of the future positions of the fingertips within grasping. However, due to the fact that you can only execute the movement of the fingertips along an action trajectory shape with the perception of an entirely different autonomous movement, the fingertips will inevitably deviate from that "perfect" original pre-perceptual image at every position P within the action trajectory. This process is, therefore, 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 efficient and effective way possible. The ventral and dorsal streams continuously interact with each other to correct the inevitable deviations, but this interaction does require a (very short) reaction time². As a result we can never perform one motor action identically (conform Bernstein) and the fingertips will always follow a different zigzag pattern while grasping a coffee cup.

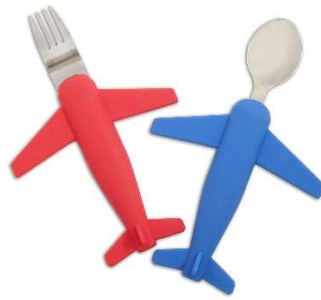
The secondary focus within grasping encompasses the perception of movement inside the body

When one starts to realize that the primary focus solely concerns the movements of the fingertips, it implicitly becomes evident that the fingertips themselves aren't capable to move at all. This analogy is strikingly similar to a ball during a free throw in basketball or various other inanimate objects like tennis rackets, cricket bats, spoons, knives, bottles, pointers (pc) and more, which clearly never move on their own. But even when we grasp a coffee cup with our hand, the explanatory model demonstrates that the hand, and consequently the relevant fingertips, must also be considered as lifeless action objects. The outer layer of the fingertips does comprise living cells, but it is absolutely incapable of moving the fingertips in an action trajectory shape outside the body with those living cells. We can only induce movement in the outer layer of the fingertips through internal body movements. While they may approach the outer surface of the fingertips, they will always remain within the confines of the body. So in the case of grasping a coffee cup, we can haptically perceive (the outer surface of) the cup solely with (the outer part of) our fingertips, and we can only proprioceptively³ perceive how movements within our body influence that haptic contact with the coffee cup.

² 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

³ Scientific research has demonstrated that proprioceptive perception encompasses two autonomous phenomena, namely: 1. Limb Position (perception of limb position) and 2. Movement (perception of motion), which the explanatory model within grasping clearly links to the overall grasping technique and the specific location where, in this case, that perception must specifically be directed towards the haptic contact between the hand and the coffee cup.

Grasping requires a compelling collaboration between an internal and an external focus – The external displacement of the fingertips along an action trajectory shape can only be accomplished through entirely different internal movements



Images: Grasping with the hand serves as the foundational form for numerous other actions. In activities like eating⁴, for example, one may extend the role of the fingertips with a tool for various reasons. But it compels only a dislocation of the fingertips and so it makes no difference in relationship to the functional perception processes. Regardless of the motoric movement action one assesses, the stacking of two autonomous foci will always reveal the same universal collaboration.

The purpose of the task within a motoric action is implicitly connected to the observation of the primary focus, leading us often to be unaware of the secondary focus during many motor actions, especially when they involve simple observations like within grasping. However, in highly complex motor actions, such as a tennis serve, attention is conversely only directed towards the secondary focus c.q. the serving technique. Completely ignoring the fact that the primary focus compels the realisation of an outgoing ball trajectory shape (OBT). Which is the sole essence of a tennis service. With some practice, you can consciously perceive the two foci simultaneously within many motor actions. Also within a grasping action, it is very well possible to perceive the movement of the fingertips within an action trajectory shape on the outside of your body while also focusing on movements on the inside of your body.

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https://www.researchgate.net/publication/372862585_Eating_requires_the_compelling_collaboration_between_an_internal_and_an_external_focus_-_Getting_the_bowl_of_the_spoon_to_the_foodmouth_along_an_action_trajectory_shape_is_the_sole_essence_with_in_eati?_sg%5B0%5D=5sYWF5EByxJR1rwugwmSiOCqtID3YM3N36UYXSaVWiLSuC98yPmOAyGvwo5XCiszgUjxPya25GRsF3sy_ygS_IojqoLvYc5IdqegyFXl.IdwhypTzBNNa6U-OQI-R8PqADqbqM29bqa_DfVY4a5dQXaXrpD6f7-RUGXwMfafJ0z4Ce5rlzbtwfkf0dB7o9A