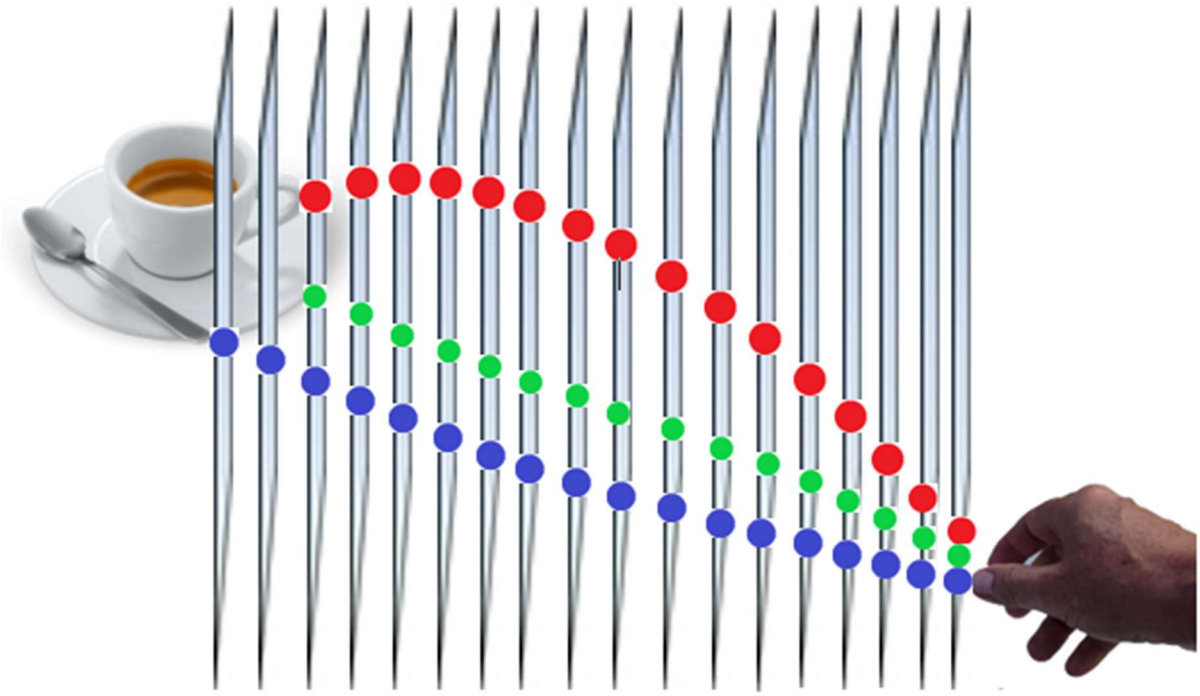
GRASPING

Within the grasping of a coffee cup we always first construct a perceptual image of a latent action trajectory shape out of the perspective of the fingertips – The scientific evidence



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

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Introduction

The explanatory model of the motoric movement action provides a universal explanation of all functional perception processes within all goal-directed actions. It demonstrates that performing any conceivable action always requires the simultaneous perception of three autonomous foci[1], in accordance with J.J. Gibson's theory, which includes both the movement of the animal/organism and the movement of the environment. When grasping a coffee cup, one autonomous focus remains engaged with (the movement of) the cup as the environmental object, universally representing a catching action. The other two autonomous foci are concerned with the perception of movement within the egocentrically executed action, i.e., the movement of the fingertips along an action trajectory shape (toward the coffee cup), which universally represents a throwing action.
This article specifically focuses on the two foci belonging to the egocentric throwing action of the fingertips in relation to grasping of, for example, a coffee cup. The explanatory model shows that every conceivable throwing action requires a compelling cooperation between an autonomous internal focus and an autonomous external focus. This insight, that two autonomous foci are present instead of a single undivided motor action, not only allows a final and ending specification of all perception processes individually but also reveals as a novelty that a coupling within the egocentric throwing action itself is capable to occur[2].
The explanatory model of the motoric movement action thus provides a complete description of the *tau*-coupling process, wherein the essence of the task, the primary focus, is executed through (the perception of) the movement of the fingertips over a pre-planned action trajectory shape between the current position of the fingertips and the coffee cup[3]. This perceptual image is therefore determined in advance within a tactical consideration and involves identifying the future sequential positions the fingertips must occupy to achieve a successful action. Sequential positions of any object effectively always create line segment shapes, and when the action is actually executed, the current position of the fingertips is going to fill in that perceptual image step by step. Thus, it can be observed within a line segment shape that the gap of the latent positions P gradually disappears and, in full accordance with the findings of D.N. Lee, produces the *tau*-value, which plays a crucial role in the completion of the motor action in cooperation with the secondary focus[4].
The explanatory model of the motoric movement action partly relies on logical reasoning but also presents scientific evidence. This chapter provides scientific proof that in grasping, we always first create a perceptual image of a latent successful action trajectory shape before we actually perform any action.

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[1] The cortical streams mediate the grasping of a cup equal as they mediate within the nerve spiral (youtube.com) https://www.youtube.com/watch?v=QP4vPVAw-Yg
[2] D.N. Lee did indeed identify the *tau*-value associated with the primary focus, but he considered the egocentric action as one indivisible whole. His lifelong quest to find the phenomenon it should be connected to remained unsatisfied because he never realized that the coupling occurs within the egocentric action itself.
[3] https://www.researchgate.net/publication/379270667_Random_motor_arm_activity_implicitly_induces_an_internal_and_an_external_focus_-_The_scientific_evidence_how_two_autonomous_foci_arise_within_grasp_actions_and_how_their_roles_evolutionarily_have_reve
[4] https://www.researchgate.net/publication/375591596_The_tau-coupling_process_in_grasping_demonstrates_that_we_absolutely_do_not_need_a_motor_plan_The_sensorimotor_perception_processes_within_the_secondary_focus_must_obediently_follow_the_external_actio

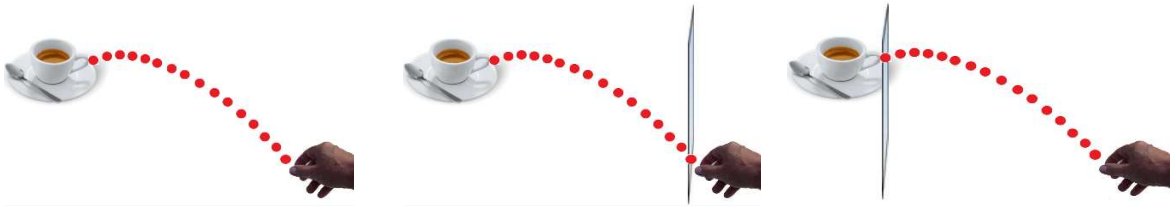
The scientific proof

The evidence is quite straightforward and can be easily verified through a simple empirical investigation. You can either conduct the experiment yourself or ask a test subject to repeatedly try to grasp a coffee cup. The only instruction given to the subject is to attempt to grasp the cup only if they genuinely believe they have a realistic chance of successfully holding it.

Images: The scientific proof is based upon the competence to visualize a giant huge glass shopping window. The left image shows a normal dimension of such a window. In relationship to the scientific proof you need to magnify that image 10 to 20 times. Like in the right image.

Pick a random table with a random placed coffee cup and create the following circumstances:

Situation 1:	Do not alter the environment (zero measurement). Let the test subject execute ordinary grasp actions.
Situation 2:	Place a giant huge glass shopping window (height 20 meter x width 30 meter) between the test subject and the coffee cup, close to the test subject.
Situation 3:	Place a giant huge glass shopping window (height 20 meter x width 30 meter) between the test subject and the coffee cup, close to the coffee cup.
Situation 4:	Place a giant huge glass shopping window (height 20 meter x width 30 meter) between the test subject and the coffee cup, at any random position P.



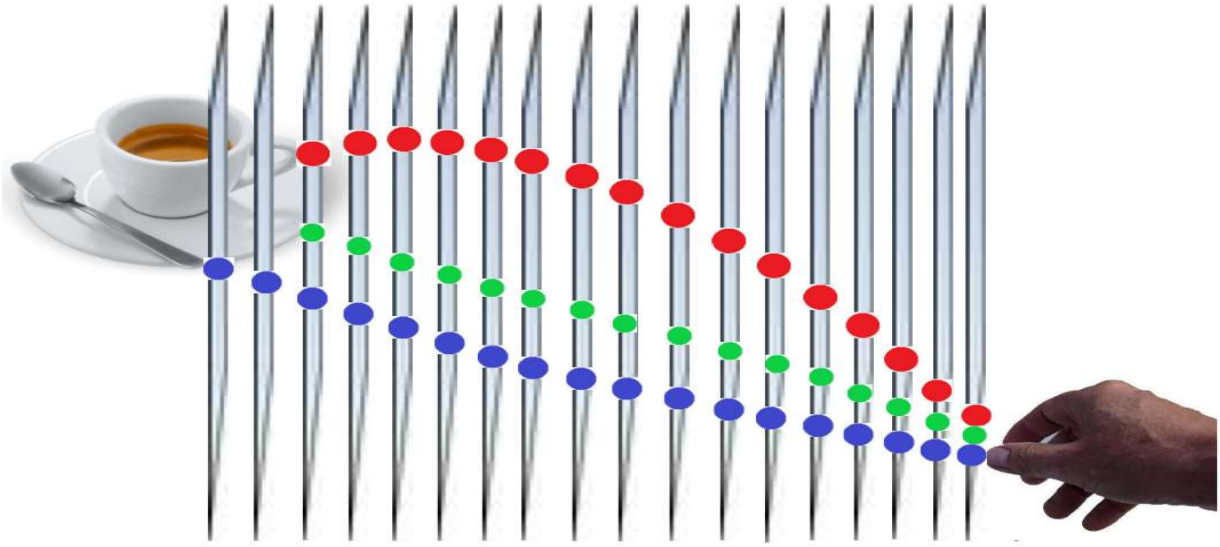
Situation 1 Situation 2 Situation 3

Images: In situation 1, a test subject will simply attempt to grasp the coffee cup. In situations 2 and 3, a giant glass shop window is placed between the hand and the cup, and the test subject will not initiate a grasping movement with the intention of actually getting hold of the coffee cup. Due to the fact that the perception processes solely notice *one* (!) position P that prevents a full undisrupted course of the fingertips (hand) to pass.

Conclusion:

In situation 1, you and/or the test subject will simply pick up a coffee cup. In situations 2, 3, and 4, you and/or the test subject do not initiate a grasping action with the intention of getting hold of the

coffee cup. Situations 2 and 3 do not provide significant insight on their own, but situation 4 clarifies everything. Whether the giant glass shop window is placed near the hand or near the coffee cup makes no difference to the test subject. If there is a large shop window anywhere clearly present, the test subject will not initiate a grasping action with the intention of getting hold of the coffee cup. This applies to every conceivable position P of the shop window, from the very first position P(0) near the test subject to a shop window occupying the last position P(n) just before the coffee cup.



Situation 4

Image: In situation 4, it becomes clear that prior to the actual execution, we consider all consecutive *future* (!) positions of the hand/fingertips. It doesn't matter where the shop window is positioned between the hand and the coffee cup; the grasping action is not performed. Mathematically, one can argue that an uninterrupted series of consecutive positions P creates a line segment or line segment shape (action trajectory shape). The image provides a perfect visual representation that within the grasping action, we first form a perceptual image of the entire latent action trajectory shape before we actually execute anything. In the animation, you can clearly observe the subtle differences in action trajectory shapes when we want to grasp the saucer instead of the coffee cup handle or when we first want to pick up the spoon to stir the coffee.

This means that we assess every position P(0-n) between the fingertips and the coffee cup beforehand, clearly determining whether each position P allows the hand to pass through so that it can ultimately reach the coffee cup. In relationship to which it can be observed that if one position P is not *empty* (!), the mission is aborted. Upon which you can draw the factual conclusion that we will have *to look at* (!) c.q. we will have to perceive every position P(x) between the hand and the coffee cup beforehand if that specific position P(x) is also allowing the physical dimensions of the hand to pass. Mathematically, an uninterrupted series of consecutive positions P can be designated as a line or line segment shape (action trajectory shape). This completes the scientific proof that within a grasping action, we first form a perceptual image of the entire latent action trajectory shape before we actually execute anything.