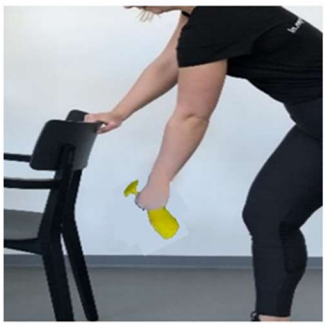
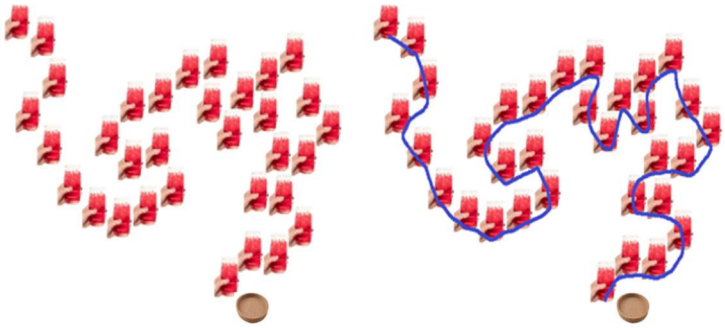
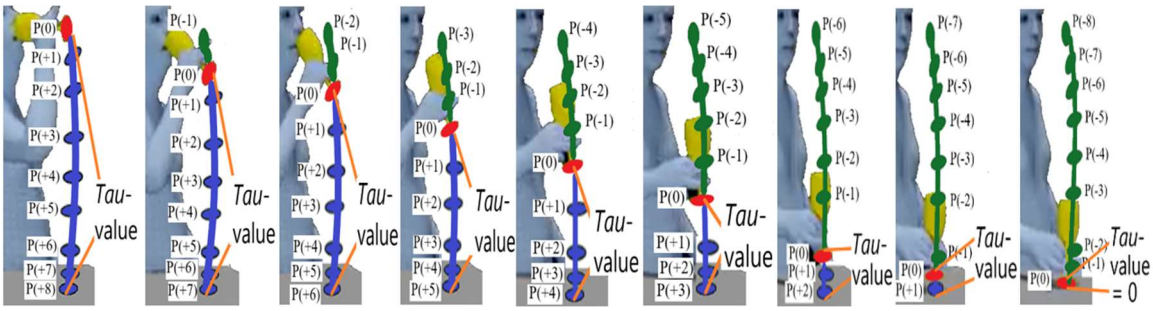
The bottom of the glass isn't capable to move by itself along an action trajectory shape; Scientific evidence of the implicit occurrence of an internal and external focus during random motor activity and how their roles evolutionary have reversed within placing a glass on a coaster







Caught In A Line

The explanatory model of all motoric movement actions

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https://www.explanatorymodel.nl/common-daily-actions/placing

Introduction

The explanatory model of the motoric movement action is capable of delineating all functional perception processes within any conceivable action. Nevertheless, challenges are encountered in its implementation within the scientific community due to the intrinsic nature of a new paradigm within a complex dynamic system. The explanatory model demands the simultaneous integration of multiple innovative mind steps.
In order to facilitate those necessary subsequent steps in science, a series of new articles is introduced, each time focusing on a different motoric action which will be assessed within the complete spectrum of (general) motor activity. The aim is to provide a broader perspective on specific motor activity required for goal-directed actions. Additionally, they universally demonstrate that motor activity always leads to the simultaneous autonomous perception of both internal and external movements, which can be appointed as primary or secondary, and finally, they elucidate all elements underlying the explanatory model of the motoric movement action.
This article centers around the common task of placing a glass on a coaster. The explanation consists of three parts. The first part exclusively focuses on general motor activity and not on specific actions. Here, an action is defined as deliberate motor activity aimed at performing a specific task as a result of an egocentrically formulated intention. At the end of this part, the glass placing task is fully explained in relation to general motor activity. In contrast to the first part, the second part addresses deliberate c.q. specific actions where an egocentrically intention is formulated to actually place a glass on a coaster. Two action strategies are highlighted in this part, logically stemming from the general motor activity mentioned in the first part. The concluding part emphasizes the relationship between the discussed motor activities and the explanatory model of the motoric movement action.

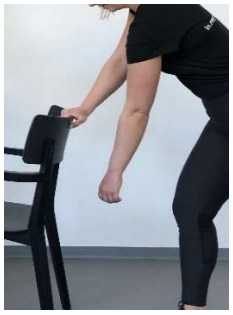
Part 1 - Internal motor (movement) activity when no deliberate goal-directed action is involved

The explanatory model of the motoric movement action identifies all functional perception processes within any conceivable action. In which the fundamental assumption encompasses that the action arises from explicitly formulating a particular egocentric will. However, in this paragraph, we do not assess a specific motor action with an egocentric intention yet. In here we solely focus on general motor activity. The distinction between mere motor activity and conscious actions provides valuable insight into the broad spectrum of motor (movement) activity.

a. Basic exercise (passive arm without a spoon)

The entire explanation is built upon a basic exercise, involving a forward-leaning posture with one arm hanging passively downward. This posture is often used in physiotherapy exercises to allow isolated

movement of the arm. That is strenuously not the intention of this exercise. It is essential to keep the arm entirely passive during the execution of the basic exercise.



Images: The basic exercise illustrates a forward-leaning position with a passive arm. Despite the apparent action in the images, the primary goal is to develop and observe other body actions and notice how they laterally influence the movement of the passive arm.

Although the hanging arm is prominently present, you are now asked not to focus on it specifically. Conversely, the emphasis must be put on developing other than arm activities (knee, torso, head, foot action, etc.) and observing whether the passive arm is going to move.

Conclusion of the basic exercise (passive arm without a spoon)

It can be conclusively observed that you are capable to (secondarily) perceive movement of all separate positions P of the outside of a passive arm by directing (primary) attention to an entirely different internal motor activity. This observation carries the following factual conclusions:

1) While there is nothing predictable about where the passive arm will move, as random internal motor activity will always result in random or chance movements of the passive arm, there is, on the other hand, a very essential fact to note. All individual points/positions P of the arm will always have to be connected c.q. will always have to emerge from each other. If we, for example, were to focus on three points of the arm, such as the fingertips, knuckles of the fist, and the elbow[1], you cannot escape the factual conclusion that all those points always move in a line segment shape and that it always involves only one (!) line segment shape[2]. So, this applies to all places on the arm, and within there it can also factually be established that each position P of the arm will move like a marble in a marble run[3]. The current position P(0) of each piece of the arm will always mark the separation between the manifest positions P(-x) and the future positions P(+x).
2) The second very essential conclusion encompasses the fact that the two movements have a causal connection, but the perception of the movement of internal motor activity (knee, torso, head, foot action, etc.) has absolutely nothing to do with the perception of the movement within the linear form where all separate parts of the arm become part of[4].

[1] Hence, you must also realize that when grasping a coffee cup, where we typically focus on the movement of the fingertips, all other mentioned body parts also move in linear forms. This demonstrates that the related perception processes are entirely subjective and depend on the chosen focus.

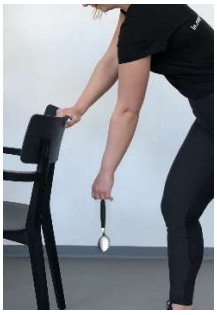
[2] Indeed, you can factually ascertain that your own body, from birth to the end of life, is also confined within one extensive line segment shape. Your body at every position P(0) is, in fact, bound to the penultimate position P(-1) and the subsequent position P(+1). There is simply no escaping it. You are factually "*Caught In A Line*".

[3] https://www.researchgate.net/publication/336880958_The_explanatory_model_of_all_motoric_movement_actions_-_The_Marble_Run

[4] The explanatory model of the motoric movement action demonstrates in numerous articles that the two perceptions of two types of movements are autonomous because they belong to the incompatible worlds of inside and outside the body. Therefore, there can never be a blending of the two.

b. Basic exercise (passive arm with a spoon)

A crucial aspect of the preceding conclusion involves the fact that internal sensorimotoric movements implicitly lead to a movement of, for example, the fingertips over an external line segment shape outside the body. There is, therefore, a direct causal relationship between these two movements, with the remarkable phenomenon that, without internal motor activity, an action trajectory shape of the fingertips is just not capable to occur. However, it is essential to establish that the perception of the movement of the fingertips over an action trajectory shape outside the body, in spite of this crucial causal relationship, has no connection with the perception of internal sensorimotoric movements. To further clarify this intriguing duality, the basic exercise is repeated, with the sole difference that the hand of the passive arm is holding a spoon. The entire exercise proceeds identically to the description above.



Images: In the repetition of the basic exercise, only a spoon is added, while the exercise remains unchanged. It is crucial, once again, not to develop conscious arm action but merely to observe how other bodily actions influence the entirely passive arm with the spoon. Now you can factually establish that all separate positions P of the arm but also all separate positions of the spoon will start to move in line segment shapes. Due to the fact that all those separate positions can only emerge from each other c.q. they will always be interconnected.

Conclusion of the basic exercise (passive arm with a spoon)

Like in the first version of the basic exercise it can be factually established that you are capable to (secondarily) perceive movement of all separate positions P of the outside of a passive arm, now holding a spoon, by directing (primary) attention to an entirely different internal motor activity. This observation carries the following factual conclusions:

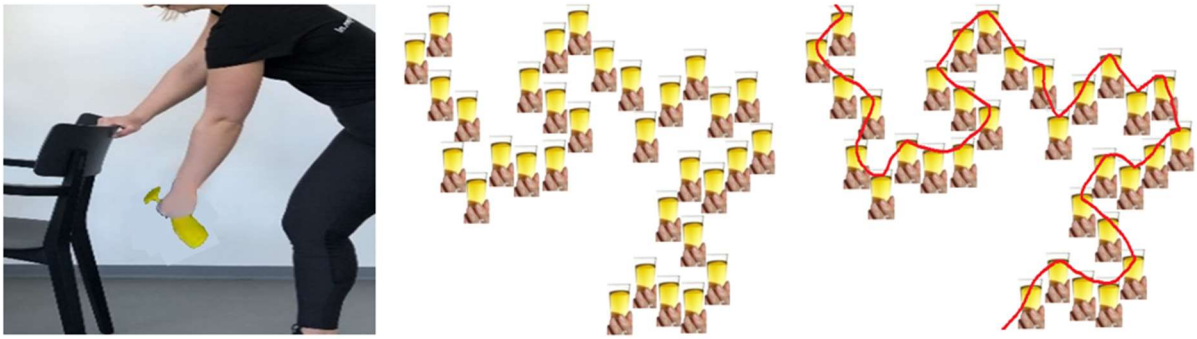
1) While there is nothing predictable about where the passive arm with the spoon will move, as random internal motor activity will always result in random or chance movements of the passive arm with the spoon, there is, on the other hand, a very essential fact to note. All separate points/positions P of the arm and all separate points/positions P of the spoon will always have to be connected c.q. will always have to emerge from each other. Once again, the three previously mentioned arm positions (the fingertips, the knuckles of the fist, and the elbow) will create a line segment shape, but also all the separate positions of the spoon also form separate lines. If you focus, for example, on the handle or the bowl of the spoon, you cannot escape the factual conclusion that all those points always move in a linear form, and that, too, always involves exact one (!) entire line segment shape[5]. So, all separate positions of the arm and of the spoon are going to traverse a linear form and within there it can also factually be established that each position P of the arm and of the spoon will move like a marble in a marble run. The current position P (0) of each piece of the arm and spoon will always mark the separation between the manifest positions P (-x) and the future positions P (+x).

[5] Hence, you must also realize that when eating soup, where we typically focus on the movement of the spoon-bowl, all other mentioned body and spoon parts also move in line segment shapes. This demonstrates that the related perception processes are entirely subjective and depend on the chosen focus.

2) The second highly essential conclusion, as mentioned in the first version of the basic exercise, remains fully intact here as well. The perception of the movement of internal motor activity (knee, torso, head, foot action, etc.) has absolutely nothing to do with the observation of the line segment shape that all parts of the arm and now the spoon become a part of. However, the new aspect introduced by the spoon concerns the fact that a spoon is an inanimate object. What leads to the astonishing factual conclusion that, for instance, we can observe the movement of the spoon's bowl over a line, but we can only generate motor activity up to the outer surface of the handle of the spoon. The perplexing aspect of this realization may be the fact that the movement of the spoon's bowl over a line segment shape is entirely dependent on a completely different internal motoric movement. Without this source of action, the spoon's bowl will never move. Additionally, the confirming aspect of this realization may concern the conviction that the perception of the movement of the spoon's bowl over a line has absolutely no connection with the perception of internal motor movement activity.

c. <u>The basic exercise in relation to motoric arm activity moving a glass</u>

If we define an action as a conscious motor activity in which a specific goal is pursued from an egocentrically formulated will, then the explanation in the entire first part of this article falls outside the framework of actions. In this paragraph, we still do not assume a conscious goal-directed action, but rather build upon what the basic exercise regarding the movement of a spoon demonstrates.



Images: The basic exercise can be translated into moving a glass. You should primarily focus on manipulating the sides of the glass c.q. you should mainly direct your attention to proprioceptive perception towards the exterior of the glass that you are touching with your fingers. Only incidentally (secondarily), should you notice if and how the bottom of the glass moves through the air. Even if you engage only in upper arm, forearm, hand, or even just finger action, the consequences remain the same[6].

As the previous paragraph illustrates, the basic exercise can easily be translated into an action involving an external (lifeless) object, such as a glass. To maximize the distinction between the (perception of) the movement of the spoon bowl/glass and the (perception of) the movement of internal motor activity, and thus make the principles easily accessible, you were specifically asked not to perform any arm activity. However, the distance between the spoon bowl/glass and internal motor activity doesn't matter at all. Even if you focus primarily on (internal) motor arm activity, you can secondarily observe that the spoon bowl or the bottom of the glass moves randomly through the air. You can develop only upper or lower arm activity, but even if you develop only hand or even solely finger action, the same

[6] Two essential omissions should be noted in the animations: 1. Only a limited number of glass positions are represented. If you engage in a few minutes of random motor activity, the entire environment should be filled with glass positions. 2. The connection of successive positions P of the glass cannot be captured in an animation. The perception of the glass movement involves a continuous (smooth) line of glasses. The red line represents this continuous connection but does not actually show glasses. Therefore, you need to create a hybrid perceptual representation, which you can only really perceive by actually moving a glass in the air.

principles will still apply. It should be reiterated that you can only empirically determine that the position P(0) of the glass, in the present action, must always result from the preceding positions, and that all positions P of the glass are always confined to one line segment shape.

Conclusion basic exercise in relation to motoric arm activity moving a glass

In actions involving lifeless objects, such as a glass, it becomes immediately clear that you (secondarily) can make the glass move by focusing entirely on a different (primary) motor activity, which can only reach up to the outer sides of the glass. This is the only thing necessary to draw the following factual conclusions:

1) Although there is nothing predictable about where the glass will move, as random internal motor activity will always result in random or chance movements of the glass, there is, on the other hand, a very essential fact to note. All separate points/positions P of the glass will always have to be connected c.q. will always have to emerge from each other. Due to which one can conclude that all those points always construct a linear form, and that, too, always involves exact one (!) entire line segment shape. The glass will move in that linear form in the same universal manner as a marble moves within a marble run. In which the current position P(0) of the glass will always serve as the precise separation between all manifest positions P(-x) and all future positions P(+x).
2) Once again, the second highly essential conclusion follows the explanation as in the case of the other basic exercises. The perception of the movement of internal motor activity has absolutely nothing to do with the perception of the movement of the glass within the line segment shape that all positions of the glass become a part of.
   The perplexing aspect of this realization may be the fact that the movement of the glass over a line segment shape is entirely dependent on a completely different internal motoric movement solely reaching the sides of the glass. Without this source of action, the glass will never move. Additionally, the confirming aspect of this realization may concern the conviction that the perception of the movement of the glass over a linear form has absolutely no connection with the perception of internal motor movement activity.

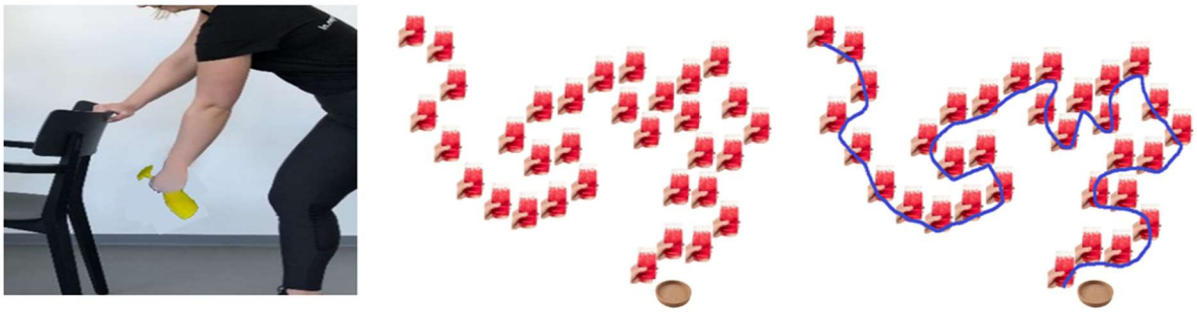
Part 2 - Internal motor (movement) activity when a deliberate goal-directed action is involved

The explanatory model of the motoric movement action encompasses the clarification of all functional perception processes within any conceivable action, assuming that these are conscious actions driven by an egocentrically formulated will, with a clearly defined specific goal. So, the motor movements in the first part specifically did not involve actions aimed at placing motor activity in a larger context. Conversely within the second part, general motor activity will now be translated towards specific motoric actions. Although the explanatory model of the motoric movement action is emphasized more in this part, the explanation within this section still aims to clarify the entire spectrum of motor (movement) activity.
So, within the second part we do assume deliberate goal-directed actions where an egocentric will is formulated to achieve a specific goal and in this chapter the placing of a glass on a coaster encompasses the main issue. The basic exercise clearly shows that two possible action strategies c.q. execution perspectives can be pursued in this regard.

a. Execution perspective 1 – Primary focus on the internal movements towards the outer sides of the glass and secondary focus on the external movement of the bottom of the glass

The basic exercise from the first part clearly demonstrates that with primary attention on internal motor activity, focused on the sides of the glass, we can randomly move a glass through the air. However, this random movement becomes problematic when formulating the egocentric intention to precisely place the glass on a coaster. Even with primary attention on internal motor activity, we can make the (bottom of the) glass cover a considerable amount of positions in the air in a few minutes, but it is far

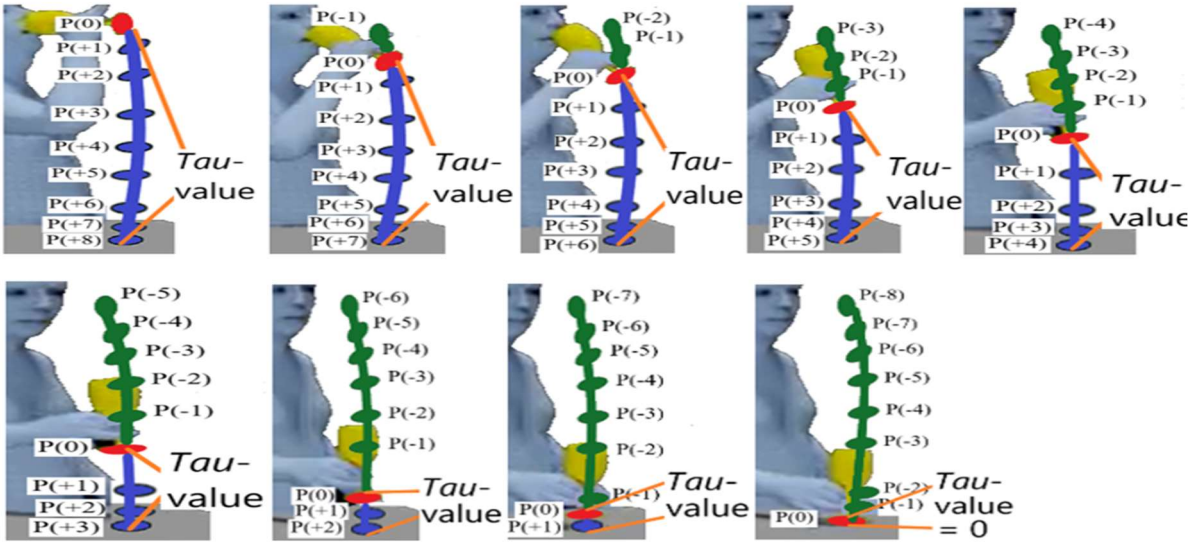
from economical (efficient and effective). And this is even aside from the question of whether you could precisely bring the (bottom of the) glass, which moves relatively quickly due to the numerous motor activities, to a stop exactly at the coaster.



Images: Even when consciously attempting to place a glass on a coaster, it remains a strategy at all times to, with primary attention on the outsides of the glass, secondarily observe whether the bottom of the glass ever reaches the coaster. While it may require a considerable amount of luck and/or patience, it is a possible action strategy. In any case, it is not an economical (efficient and effective) strategy for this task.

b. <u>Execution perspective 2 – Primary focus on the external movement of the bottom of the glass and secondary focus on the internal movements towards the sides of the glass</u>

Contrary to the description of random motor activity within the basic exercises within the first part of this article and also in contrast to the previous action strategy, when it comes to the emergence of a deliberate action, one can adopt a completely different execution perspective. It would indeed be by far the most parsimonious (ecological) solution to first conceptualize an action trajectory shape and then proceed to execute it.



Images: Within a glass placing task the most economical approach is to first create a perceptual image of an efficient and effective latent action trajectory shape over which the bottom of the glass will successfully reach a coaster and then proceed to fill it in factually.

In the second execution strategy, the roles of attention are reversed. The primary focus now has the goal to track the progress of the bottom of the glass within the action trajectory shape, and this must be followed secondarily by motor activity. In which you now have to observe, similar to the basic exercise in the first part, that motor activity passively follows the primary focus.

It would, of course, be by far the most parsimonious execution strategy, but the reversal of roles requires significantly more cognitive capacity. While the first execution perspective allows for a straightforward initiation of the action, the second one demands the following essential cognitive skills:

a. It demands that first a perceptual image of a latent action trajectory shape is constructed over which the bottom of the glass can be successfully moved towards a coaster.
b. There needs a significant complex system to be present which must be capable of mediating the (perception of) the movement of the bottom of the glass within the action trajectory shape. While the roles of attention can be reversed, will not change the fact that the bottom of the glass can only be moved by (the perception of) a completely different autonomous (internal) phenomenon. Even if we try to enforce that the bottom of the glass actually fills in the perceptual image of the latent action trajectory shape, the autonomy of the motor activity will cause the bottom of the glass to deviate from that perceptual image of the latent action trajectory shape at every position P.

Part 3 – General conclusion

The explanatory model of the motoric movement action is capable of appointing all functional perception processes within any conceivable action. However, its implementation in the scientific world encounters several challenges. It represents an entirely new paradigm and involves an explanation within a complex dynamic system where multiple new conceptual mind steps must be combined simultaneously. Therefor the goal is to try to enhance the insights around the explanatory model, and for that purpose, the preceding paragraphs zoomed in on the entire spectrum of motor activity. From a generally recognizable image, a translation was made to the core concepts and mental processes demanded by the explanatory model of the motoric movement action.
In the end, within this article, two possible action perspectives were identified based on general motor activity. Without any reasonable doubt it becomes clear that the second perspective, where the primary focus is pointed at the construction and execution of a perceptual image of a latent (external) action trajectory shape, will be far more superior to the first mentioned action strategy. However, this ultimate parsimonious solution also reveals which additional conditions the most superior action strategy should meet:

a. Firstly, an organism must have the cognitive ability to create a perceptual image of a latent action trajectory shape, over which, in the present action, the bottom of the glass will be successfully moved towards the coaster. Regarding this first condition, the explanatory model of the motoric movement action has provided universal scientific evidence that we create such a perceptual image within every conceivable action and also within this placing task[7].
b. Secondly, an organism must have the cognitive ability to mediate the movement of the bottom of the glass within that perceptual image of a latent action trajectory. The mere quintessence of this article encompasses namely that motor activity is a completely autonomous phenomenon and although it has a direct causal relationship with the movement of the bottom of the glass within an action trajectory shape, the bottom of the glass will never be able to move by itself. So, we might be intensely motivated to reverse the roles of the primary and secondary focus and envision very neat and straight (optimally economical) action trajectory shapes but due to the autonomy of the perception of both movements, we simply cannot execute them in that way. The autonomous (mainly visual) perception of the movement of the bottom of the glass will eagerly try to follow the perceptual image of the latent action trajectory shape, but the autonomous proprioceptive perception towards the sides of the glass will actually cause the bottom of the glass to deviate at every position P within the perceptual image of a latent action trajectory shape.
   The explanatory model of the motoric movement action thus concludes that there must be a very heavy significant system to mediate the ever-deviating movements of the bottom of the glass

[7] https://www.researchgate.net/publication/382877620_When_putting_a_glass_down_we_first_create_a_perceptual_image_of_a_latent_action_trajectory_shape_out_of_the_perspective_of_the_bottom_of_the_glass_-_The_scientific_evidence

within an ever-deviating action trajectory shape each consecutive time frame. Regarding this second condition the explanatory model finds that this very heavy system is present within the processing processes of the perception c.q. is present within the functioning of the cortical streams and, based upon current scientific literature, it asserts that there is a double and mutual relationship between the dorsal and ventral stream. In the present placing task, the dorsal stream is mainly related to the processing of perceptions concerning the specific position of the bottom of the glass, and the ventral stream is mainly related to the processing of perceptions concerning the perceptual image of the whole action trajectory shape. However, this must be seen as mutual. At any time frame *t* or at any point P(0) of the action, one perceives the bottom of the glass relative to the action trajectory shape and vice versa. So, the dorsal stream mainly processes the position of the bottom of the glass, but this is always related to the action trajectory shape, and conversely, the ventral stream mainly processes the progression of the action trajectory, but this is always related to the specific position of the bottom of the glass.