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The motoric movement action *writing*

How the tip of the pen marks the exact division between the manifest and the latent part of the action trajectory shape



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

N.J. Mol
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The explanatory model of the motoric movement action hosts one universal clarification within all imaginable actions in which with the help of movements *from within the body* a movement of an (movement) action object within an action trajectory shape *on the outside of the body* must be executed. It shows an obvious tactical, perceptual cognitively driven, component prior to the actual execution and during the latter the explanatory model shows that out of the perspective of the factual position of the (movement) action object, within writing the tip of the pen, a manifest line segment shape fills a perceptual image of a latent action trajectory shape until the essence of the egocentric formulated will is completely executed.

Within almost all motoric actions the action trajectory shape will not become visible at any moment. Within the motoric movement action *pouring* the action trajectory shape between the bottle and the glass becomes temporarily visible but will not remain and within the game c.q. the motoric movement action *nerve spiral* the action trajectory shape is always compellingly present. Within the marble run and its extrapolations in the appearance of a bobsled track and the (lines of the) lanes of a highway it looks like the action trajectory shape becomes visible as well but that is not so. The marble run, the bobsleigh track and the lanes of a highway only indicate within which boundaries the future action trajectory shape of any action object will become manifest. So the motoric movement action *writing* belongs to just an unique set of motoric actions in which the action trajectory shape becomes and remains visible and that is the main reason why this action is appointed in here because it very plastically illustrates the universal principle of the explanatory model within all actions.

Just like within the motoric movement action *grasping/grabbing* we also have to (tactically) construct a perceptual image of a complete *precise global* latent action trajectory shape first within the motoric movement action *writing*. Without such a perceptual image of the shape of a letter, word or word part the explanatory model instructs that no actual execution of anything can start to happen. Although the explanatory model also shows that this perceptual image of a latent action trajectory shape is allowed to be very global as long as there is an image and furthermore the explanatory model shows that during the actual execution an optimization process occurs that within the motoric movement action *writing* is mainly occupied with guiding the tip of the pen *from the beginning* (!) to the end within a line segment shape of a letter, word or word part. The last position P within a letter, word or word part is very important but so are all other places P between the beginning and the end of the line segment shape of a letter, word or word part. Although you probably will admit this right away within writing the explanatory model wants to elucidate that this happens within all motoric movement actions. So within grasping/grabbing the exact same principle must be regarded as well and the clarification immediately reveals one of the big misconceptions in science. Also within grasping we beforehand need to tactically construct an action trajectory shape between the relevant fingertips and the handgrip of a coffee cup but during the actual grasping the action must be perceived out of (the perspective of) the relevant fingertips and not out of the position of the cup. Within that phase our perception processes are not occupied with the grasping of the coffee cup at all but they are only occupied with diminishing the latent places P between the relevant fingertips and the handgrip of the cup c.q. to fill the space/void/gap or to let the space/void/gap become zero. So the egocentric formulated will within grasping has always been approached faultily. We don't want to grab a coffee cup and we will never be able to do so. We are solely capable to move our fingers closer to a cup.

Conform this establishment the explanatory model elucidates within the motoric movement action *writing* that of course the egocentric formulated will at last intends to produce a readable text just like we want to hold the coffee cup in the end but that also within there during the actual execution our perception processes are solely occupied with the production of action trajectory shapes and only secondary or later that due to the actual production of collective cognitive recognizable shapes on a piece of paper communication can be initiated. So the essence of the egocentric formulated will within the motoric movement action *writing* exclusively aims at accompanying a tip of a pen on a piece of paper within a specific cognitively collective recognizable shape from a starting point A to an ending point B.

The motoric movement action *writing*

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Caught In A Line
The explanatory model of all motoric movement actions
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1. The explanatory model in relationship to the motoric movement action *writing*

At a microlevel the clarification within this epistle has the sole goal to reveal all functional perception and motoric processes within the motoric movement action *writing*. However at a macrolevel the main goal remains to communicate the complete explanatory model of all motoric movement actions. The explanatory model namely encompasses the complete and final description of all functional perception and motoric processes within all imaginable motoric actions. The problem however is situated in the fact that the final explanation of the explanatory model is situated at quite a remote distance from the current mindset within the movement sciences. Multiple significant mind steps are demanded which in a compelling way need to be regarded in their complex relations with each other before the final insight which the explanatory model provides us can be obtained. All readers at all levels will have to take this barrier and although the specialists within this field of science already possess much knowledge about certain single components it is expected that especially they will have great trouble to obtain the quintessence of the explanatory model because they persevere c.q. are taken hostage within some dogmas/premises which pertinent will appear to be false. This perseverance on the one hand and on the other hand the aforementioned demand for multiple mind steps within a complex dynamics system almost shapes an impossible barrier to overcome and needs to be bridged in a very structural and meticulous manner.

In this quest I implicitly tried to reveal major parts of the explanatory model by appointing very specific motoric movement actions. That is why I started to explain the motoric movement action *marble run* in addendum 2 of *Caught In A Line*. Although the trajectory of the marble not becomes visible at any moment one is able to perceive the whole latent action trajectory shape of the marble beforehand and within more modern flexible marble runs one is able to adjust that latent action trajectory in any preferred shape. Within this action it becomes perfectly clear that the (movement) action object (MA) i.c. the marble indeed reveals the actual position of the marble but much more than that it shows the exact border between the manifest and latent action trajectory shape which provides the opportunity to glue it to a revolutionary phenomenon which has never been acknowledged within science. This insight clearly reveals that a manifest action trajectory shape fills its latent part c.q. reveals that the vanishing of the latent action trajectory shape provides the *tau*-value, which will become zero, within the movement action (τ_{MA}^G). This implicitly provides us the insight of how we are capable of executing all interceptive c.q. catch actions because we are capable of determining the leading *tau*-value within an incoming *ball* trajectory shape to a previous cognitively determined (latent) catch point¹.

Besides the marble run the very specific motoric movement actions *pouring* and *writing* are explained as well. Conversely to most other motoric actions within the latter motoric movement action the action trajectory shape becomes completely visible. Or to phrase it in a different way, within writing the manifest part of the action trajectory shape remains visible while it disappears c.q. never becomes visible within most other actions. Of course the latter is the obvious main goal within writing and also in here the actual position of the tip of the pen marks the partition between the manifest and the latent part of the action trajectory shape. When the tip of the pen approaches the end of the (cognitively determined) perceptual image of (the line segment shape of) a letter, word or word part the writer will also perceive that the gap of the latent line segment shape will disappear c.q. will experience that the *tau*-value within the movement action (τ_{MA}^G) becomes zero and will align this with the following c.q. depending *tau*-value within the motoric movement (τ_{MM}^G) which will give the order from the *inside of the body* (!) just until the (*inside of the outside* (!) of the) tip of the pen to slow down till it finally has to come to a standstill at the end of the letter, word or word part.

The aforementioned motoric movement actions already present lots of novae and some complex mind steps. They for example clearly show that a perceptual image of a latent action trajectory needs to be

¹ Within catching a ball with the hand the catch point is the intersection point of two line segment shapes which definitely need to be constructed beforehand as latent perceptual images. Otherwise one wouldn't be able to catch anything. The line segment shapes involved are 1. the line segment shape in which your hand is thrown and 2. the line segment shape in which the ball approaches.

shaped before any actual action is able to occur and that the actual position of the (movement) action object (MA) during the action fills that perceptual image with a manifest action trajectory shape. Of course this immediately ends the perception-action dichotomy within science by showing that it was never the question which of the two was more important within an action but that they compellingly need to be linked within an overarching phenomenon which shows that the final explanation is much bigger and much more complex than was ever assumed within science.



Images: 1. Action trajectory shapes hardly ever become visible and although that of course is the underlying idea within writing it is factually wrong to suppose that it is the primary goal in relationship to the egocentric formulated will. That goal must be formulated much more basal by linking that will to the actual execution of a letter, word or word part. 2. Within your own empirical experiences you are able to identify that within writing with five ballpoints you probably are only capable of following just one of the writing line segment shapes and certainly not five.

However how a (movement) action object (MA) fills a chosen action trajectory shape as part of an optimization process and that within there a crucial system, like the ventral and dorsal stream present us, needs to be located is still not becoming clear within the aforementioned motoric movement actions. So in the previous descriptions it doesn't become clear how for example the tip of the pen precisely reaches the end of the letter, word or word part during the actual writing. Maybe it occurred to you, at least if you still use pen and paper, that never one letter, word or word part was ever an exact copy of the other. First of all this has never been an issue as long as the letter, word or word part shows an *equal* shape within certain fluctuation boundaries and second it is just not possible to ever create the exact same shape because an optimization process is involved in which every time anew an action trajectory shape can only be adjusted indirectly with the *direct* (!) help of the other autonomous complex subsystem of the motoric movement (MM) because the explanatory model also provides the final insight that one motoric movement action can only succeed with the help of two foci. Maybe it sounds very awkward to you, although it reveals one of the very difficult needed mind steps, we aren't able to directly control the outside of the tip of the pen *as part of* (!) the action trajectory shape motorically. The movement on the outside of the tip of the pen within a letter, word or word part encompasses a completely autonomous complex subsystem within the successful execution of one motoric movement action. We are only capable of directly moving *the inside of* (!) the tip of the pen² from within the body with in fact very awkward and very weird body movements. It must be emphasized in here that those movements have nothing at all in common with the movements of the outside of the tip of the pen. This reveals the novum that we are only capable to visually perceive how the outside of the tip of the pen on the outside of the body moves within an action trajectory shape within the primary focus and that *simultaneously* (!) the secondary focus must be pointed at the

² This is possible because a pen encompasses a flexible (motoric) movement object (MM). Just like a tennis racket or a spoon/fork/knife.

proprioceptive perception³ towards the required motoric movements within the body. In which accordingly the novum is revealed that aforementioned visual and proprioceptive perception processes encompass completely different phenomena within one action and that the assumption/premise was wrong/false that they were part of one undivided motoric action.

Due to the fact that the movement action (MA) in which the actual production of the letter, word or word part in essence completes the task within an egocentric formulated will but can actually only indirectly be executed with the help of another autonomous complex subsystem i.c. the motoric movement (MM) the body of ecologically parsimonious developed organisms will need to host an important system that will take care that actions can be executed in an efficient and effective way. Because the (movement) action object (MA) can and will deviate from the perceptual image of the latent action trajectory shape it is preferable that the body hosts a double c.q. mutual system in which those deviations will be corrected.

“Although we have emphasized the separation of the dorsal and ventral streams, there are of course multiple connections between them, and indeed adaptive goal-directed behavior in humans and other primates must depend on a successful integration of their complementary contributions. Thus, the execution of a goal-directed action might depend on dedicated control systems in the dorsal stream, but the selection of appropriate goal objects and the action to be performed depends on the perceptual machinery of the ventral stream. One of the important questions that remains to be answered is how the two streams interact both with each other and with other brain regions in the production of purposive behavior⁴.”

“Much of our work to date has focused on the differences between the two visual streams – establishing where they go, why they are there, and how they work. This side of the story has depended crucially on evidence from patients who have suffered damage to one or the other stream. But even though studying the visual deficits and spared visual abilities in these patients has told us a great deal about the systems working in isolation, it has told us nothing about how the two systems interact. The big unanswered question for the future is how the two streams work together in all aspects of our visual life.⁵”

The explanatory model links this double c.q. mutual system to the scientific observations within research concerning the processing processes of the perception. The latter mainly encompasses revolutionary/ground breaking physiological scientific research in which again and again at the end the question rises how on earth it all works together at the functional level. Finally the explanatory model which introduces the existence of (perceptual images of latent and manifest) action trajectory shapes now provides the possibility to link the (movement) action object (MA) to a phenomenon which directly is capable of relating it what all physiological findings already suggest towards the function of it all. The explanatory model is even able to universally situate all those findings in a set and final way. So within the motoric movement action *writing* one is now able to mainly connect the ventral stream to (the processing of all perceptions concerning) the perceptual image of the whole (latent) action trajectory shape of a letter, word or word part and to connect the dorsal stream to (the processing of all perceptions concerning) the actual position of the tip of the pen within a letter, word or word part. However the explanatory model ranks the function of these cortical streams at such an important level because they only will have and are able to take care of the successful execution of the

³ The explanatory model also reveals the novum that we are capable of creating an action trajectory shape within the movement action (MA) and experience a *tau*-value just on basis of sole proprioceptive perception processes. We are for example capable of successfully executing many motoric movement actions in pitch black darkness. We are able to detect a keylock with the help of our two hands and to experience the closing of *the gap* between the tip of a key and the lock just on basis of those proprioceptive perception processes. So besides the already discovered phenomena of *limb position* and *movement* in regard to the proprioceptive perception processes the explanatory model adds a third important discovery.

⁴ A. David Milner, Melvyn A. Goodale; School of Psychology University of St Andrews Fife, KY16 9JU Scotland, U.K; <http://www.theassc.org/files/assc/2367.pdf>

⁵ Goodale & Milner - The British Psychological Society - <https://thepsychologist.bps.org.uk/volume-19/edition-11/one-brain-two-visual-systems>.

essence of the egocentric formulated will that the explanatory model hypothesizes that the two streams function within a double c.q. mutual system which over the years is more and more underpinned c.q. is in definite coherence with aforementioned physiological scientific research. So the explanatory model links the ventral stream mainly to the perceptual image of an action trajectory shape but in a definite relationship to the perception or the processing of the perceptions concerning the actual position of the (movement) action object (MA) and vice versa the dorsal stream will mainly perceive the actual position of the (movement) action object (MA) but in a definite relationship to the perception or the processing of the perceptions concerning the action trajectory shape.

The understanding of this mutual process can only lead to the conclusion that the filling of a latent action trajectory shape with a manifest action trajectory must be regarded as an optimization process. So within the motoric movement action *writing* of a letter, word or word part first a perceptual image of a latent action trajectory is cognitively shaped which the perceptions towards the dorsal stream than just will have to follow⁶. Deviations caused by the manifest action trajectory shape within the perceptual image of the latent action trajectory which will always occur will immediately have to be corrected within the ventral stream providing a new perceptual image of the shape of the remaining latent action trajectory and this will instantly have to be the next compelling guide for the dorsal stream until the next deviation occurs. This mutual process will only end when the (movement) action object (MA) reaches the very last part of the action trajectory shape when the *tau*-value approaches zero c.q. when it actually will fulfil the egocentric formulated will and within there reveals the universal optimization process within all imaginable motoric movement actions.

*“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)”*⁷.

So within writing the tip of the pen “*jerkingly*” arrives at the end of a letter, word or word part. Again 1. because the letter, word or word part is indirectly created within the autonomous complex subsystem of the movement action (MA) that solely can (directly) be executed within the autonomous complex subsystem of the motoric movement (MM) which both only in a compelling relationship can lead to a successful execution of the whole motoric movement action and 2. because the dorsal and ventral stream have to cope with the *processing* (!) of the perceptions concerning the (movement) action object (MA) in relationship to the (movement) action trajectory shape (MA). The processing of those perceptions take some time and so before they can and will be corrected the chance is considerable that a deviation will occur within the action trajectory shape because at any point P (0) the (movement) action object (MA) will be able to vary from the planned (latent) perceptual image P(+1) in numerous ways. In which again is stressed that this is not a problem at all as long as strict fluctuation boundaries of those deviations are involved. Which for example within the motoric movement action *writing* will have to take care of the *equal* (!) shaping of symbols which will need to host the opportunity that cognitively the same value will be attached to those equal shaped symbols which than only will make it possible that a written text can be understood. So within for example writing the execution of the exact same symbols has never been a goal at all. Within most *normal* motoric movement actions the main goal within ecological successfully evolved organisms indeed is that they are enabled to act quickly yet parsimoniously and so within for example the motoric

⁶ If one for example wants to grasp a coffee cup than at the start of the actual movement action (MA) one will have to throw the relevant fingertips in the beginning of the perceptual image of the latent action trajectory shape without any tactical considerations thrusting that the tactical movement action (MA) beforehand assessed that the end of that shape will reach the handle of the cup.

⁷ 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.

movement action *grasping/grabbing* it is not important at all that the fingertips reach the handle of a coffee cup in an exact precise way but that the essence clearly beholds that our perception processes are only occupied with the goal to diminish c.q. reduce the number of places P between the fingertips and the handle as parsimonious as possible. In which process only at the end of the action trajectory shape the possibility needs to arise that the manifest action trajectory shape will hardly deviate from the perceptual image of the still latent part of that shape and this process from *precise global* to more and more *precise* is afforded because the chance to deviations will exponentially diminish with every advancing place P within the action trajectory shape. Or with other words during the actual c.q. factual execution of a motoric movement action we are *Caught In A Line*⁸ which we are capable of crossing with the *sole* (!) help of the processing processes of the perception. So within your own empirical findings you are now able to verify why you never were able to construct an exact equal copy of one letter, word or word part and are now also able to examine that we walk or bring our fingertips to a light switch or a coffee cup in a “*jerking*” way. However in spite of the fact that we are able to verify this *shocking* execution within the affiliated action trajectory shapes within our own empirical experiences it subconsciously feels that we create straight line segment shapes and that is probably the cause that even scientific research pays attention to this subjective feeling. Conversely the explanatory model shows us that this can never be the case and therefor diligently looked for such a specific motoric movement action which implicitly would clarify the aforementioned jerking optimization process. Till now the best answer to this assignment was presented within the motoric movement action *nerve spiral*. This action shows an overlap with writing due to an obvious clear visible action trajectory shape. At first you think it is a very rare kind of action but when you observe it closer it just encompasses the motoric movement action *touching/taking/grabbing/grasping etc.* which without any doubt we execute most in our lives. For example the motoric movement action *eating* comprises such an action and will convince you right away that we often execute it and besides that it shows the immediate overlap with the motoric movement action *nerve spiral* because within eating we also use a flexible (motoric) movement object (MM). Just like the ring within the motoric movement action *nerve spiral* the bowl of the spoon, the prongs of the fork and/or the cutting face of the knife can be manipulated freely (flexible) along an action trajectory shape at around the same distance from the fingertips. The pen within the motoric movement action *writing* is also such a kind of flexible (motoric) movement object (MM) and shows lots of commonalities with the motoric movement action *nerve spiral*.

Of course the main difference is situated in the fact that the nerve spiral demands the execution of one precise set action trajectory shape which has the consequence that the tactical movement action (MA) can only come forward with almost the exact same perceptual image of the latent action trajectory shape which we always need beforehand before it will be executed during the actual movement action (MA). At the same time you are able to witness that within the game which goes along with the motoric movement action *nerve spiral* a challenging diameter ring-spiral ratio is used that allows players to successfully cope with the deviations within the actual manifest action trajectory shape in comparison to the actual spiral c.q. that those deviations will not lead to the ring touching the spiral. Therefor it is recommended that within scientific research a completely straight nerve spiral will be used but that the diameter ring-spiral ratio is minimized as much as possible. Than it will appear that no mere mortal will be able to move the ring from A to B without letting the bell ring. Even when one moves the ring as slow as one is able to do. With a *usual/normal* velocity (like within writing, taking, eating etc.) and a distance A-B present within a common nerve spiral one will touch the spiral even multiple times. It can't be otherwise because this is the *natural* way. We are only able to indirectly correct the movement of the ring within a line segment shape with the help of the processing processes of the perception.

⁸ Within the description of the ball trajectory shape within for example the book “Watch The Ball Trajectory!” the final conclusion is formulated that the tennis ball indeed creates the actual c.q. manifest ball trajectory shape but conversely also is bound to follow the perceptual image of the latent shape that stems from the manifest part. So like the tip of the pen also actually creates the letter they are both caught in that line.

2. Introduction to the motoric movement action *writing*

a. The motoric movement action *writing* is a (*hold on*) throwing action with a flexible (motoric) movement object (MM)

The explanatory model clarifies that all motoric movement actions find their origin in just a few basal forms. That creates a very solid ecological argument and also provides the possibility to appoint the whole spectrum of motoric actions including their relative complexity. All actions can be divided in two main groups. The explanatory model regards the actions which are initiated out of the environment towards us, the animal (Gibson), as catch actions and are exhaustively assessed within the motoric movement action *catching*. So logically all actions in which we conversely take the initiative towards the environment are considered to be throwing actions and are exhaustively appointed within the motoric movement action *throwing*. With both the clarifications the explanatory model shows crystal clear that our perception processes are, always and everywhere, constantly occupied with (not-)catching and throwing of all objects/subjects moving or not-moving (zero-movement) within every environment/vista.

There are three kinds of throwing actions: 1. (*hold on*) throwing actions with the whole body (e.g. walking, biking etc.), 2. (*hold on*) throwing actions with a part of the body (e.g. the hand) or with a flexible (motoric) movement object (cutlery, pen, tennis racket etc.) and 3. (*let go*) throwing actions.

The explanatory model considers every motoric action in which the egocentric will formulates the goal to move the whole body from A to B as a motoric movement action *moving A-B* and those actions can also be considered as throwing actions with the whole body. Among those kind of actions a large number of specific actions like walking, rowing, biking, sailing, riding horseback etc. etc. can be ranked. They encompass a great part of the spectrum of all our daily motoric movement actions and the prominent characteristic within those actions constitutes of the fact that the visual organ and so all the visual perception processes become a part of the transfer A-B and so become an actual part of the movement action (MA) itself. Ergo within the motoric movement action *moving A-B* we don't perceive the movement of a tennis ball *from the outside* (!) in a ball trajectory shape but we perceive the movement like a tennis ball *from the inside* (!) of the action trajectory shape itself. So if we traverse a crossing in daily road traffic we ourselves are the tennis ball within a ball trajectory shape. Due to cognitive knowledge that our eyes are situated at a set place in our body c.q. that we know that if our eyes are there our body must be there too we are also able to construct a *tau*-value within our action trajectory shape because also in those kind of actions it is possible to construct a perceptual image of a whole latent action trajectory shape and to fill that with the perceptual image of the actual manifest action trajectory shape. When you walk into a blind alley you will *automatically* create a perceptual image of the whole (ending⁹) latent action trajectory shape and you will *automatically* construct a perceptual image of how your manifest action trajectory shape is actually filling this latent image. But in fact at a functional level you only will have to perceive how *the gap* between 1. the actual place of the (movement) action object (MA) i.c. your body and 2. the last place P of the whole latent action trajectory shape is approaching zero¹⁰. So the moment you actually perceive that the *tau*-value becomes zero the motoric movement (MM) will have to reduce the speed of your body in such a way that the last part towards the wall of the blind alley can be bridged gradually and safely c.q. will have to take care that the *tau*-value not becomes completely zero in a blind alley.

⁹ In an upcoming addendum in which the motoric movement action *walking* will be fully appointed particularly the long jump will be appointed and will D.N. Lee's research be completed within this sport. This addendum will show that we bridge the gap within a blind alley, a far jump or for example to the beginning of a stairways if we want to descend or ascend it in a similar way.

¹⁰ So in principle we are not occupied with our speed in there. In either case of crawling or dashing/sprinting it is only essential with which value the manifest part is filling the latent part of the action trajectory shape. With this value we control the dependent yet autonomous complex subsystem of the motoric movement (MM).

The motoric movement action *moving A-B* is an example of a throwing action with the whole body. It completely follows the universal layout of the explanatory model. Within there we also construct a *precise global* latent action trajectory shape and actually fill that shape with the help of the processing processes, the dorsal and ventral stream, of mainly the visual perception¹¹. The (*hold on*) throwing action must be typified as opposed to (*let go*) throwing actions which within vernacular speech is only considered as throwing. Of course the obvious difference is that we hold on to the (movement) action object (MA) within (*hold on*) throwing actions and this provides the novum that we are allowed but also are obligatory c.q. compelled to *continuously throw* (!) in (*hold on*) throwing actions. In comparison with (*let go*) throwing actions that allows continuous guidance c.q. adjustments from within the motoric movement (MM) but also makes that imperative. Conversely to the motoric movement action *moving A-B* the visual organ will not become an actual moving factor within the movement action (MA) of the motoric movement action *grabbing/taking/touching*. So when we bring our hand towards a coffee cup we are able to observe this like we experience the tennis ball from the outside within a ball trajectory shape and conform how the tennis ball will fill a latent tennis ball trajectory shape we are also able to perceive from the outside (!) how our fingertips bridge the gap within an action trajectory shape. In which the fingertips will also be slowed down motorically within the motoric movement (MM) when the end of the action trajectory shape is perceived in the exact same way like we execute within the aforementioned example of walking into a blind alley. Or to phrase it more theoretically the (relative) till zero approaching *tau*-value within the movement action (τ^G_{MA}) will *automatically* take care that the complex subsystem of the motoric movement (MM) will be aligned in such a way that the corresponding *tau*-value (τ^G_{MM}) also approaches zero. Just like the motoric movement action *moving A-B* the motoric movement action *grabbing/taking/touching* is an example of a (*hold on*) throwing action in which the (movement) action object (MA) can and must be adjusted continuously because it will never be released. Hence the processing processes of the visual perception are allowed to but also need to be active all the time and have to correct deviations within the action trajectory shape till the action is fully completed. Just like within (*hold on*) throwing actions with the whole body. The motoric movement action *grabbing/taking/touching* is just one example of a motoric action which we execute with a part of the body and in which the visual organ doesn't become a part of the movement. We are for example able to close an open refrigerator door with the help of many body parts (left foot, right elbow, bum etc.)¹². If we now finally arrive at the (*let go*) throwing actions which form the subject within most scientific *throwing* (!) research then the explanatory model shows that we exactly have to execute all functional processes like within all throwing actions but with the clear distinction that within (*let go*) throwing actions we are only not capable of continuously holding on to the (movement) action object (MA) during the creation of an action trajectory shape. As aforementioned that exactly is the crucial difference as compared to (*hold on*) throwing actions but indeed we will also have to construct a perceptual image of the whole action trajectory shape first between the action object and the final goal which we formulated within the egocentric will like within all other throwing actions. But this whole action trajectory shape must be reduced to an initial phase in which we are still capable of actually influencing the (movement) action object (MA) and this initial phase c.q. starting/first/initial shape will have to host such a shape which automatically will provide a successful end of that action trajectory shape. The explanatory model clarifies within the motoric movement action *letter posting*¹³ that a strict *tau*-coupling will have to take care that the (movement) action object (MA) i.c. the letter will have to be released by all relevant fingertips at

¹¹ It is crucial to understand that we never will be able to produce exact straight lines with our body although it appears that way. If you would magnify the movements you would be able to experience a zigzag pattern within f.e. walking just like you will experience within the motoric movement action *nerve spiral*. It is crucial to understand that the egocentric formulated task within these actions is to *tactically* (!) arrive in B but that the *actual* (!) functional task during this action is *only* (!) to get in a position closer to B and nothing else.

¹² So the (*hold on*) throwing action will become more complex if the head actually gets involved within an motoric action like a header in soccer.

¹³ For a complete functional explanation within letter posting read the motoric movement action *letter posting* or read the article "How does the patient DF post a letter?"

the exact end¹⁴ of the initial phase due to the alignment of the *tau*-value within the motoric movement (τ_{MM}^G) which inter alia clearly illustrates that within motoric actions only optimization processes are able to occur.

Also in here we are only capable of executing a (*let go*) throwing action if we fill the gap within a perceptual image of the whole *latent* shape of an initial phase (!) with a perceptual image of the manifest part of the initial phase because only during that period we are able to actually influence/guide the (movement) action object (MA). Within the free throw and even within most throws within basketball this initial phase can be observed quite well. Within most players this initial phase comprises at least half a meter. That forms a huge discrepancy with for example the golf put, the hitting of a ball in tennis or the initial phase of the letter within the motoric movement action *letter posting* but also in there very tiny initial phases are necessary and only then a successful autonomous object line segment shape can be achieved due to a strict *tau*-coupling.

So writing belongs to the second category and encompasses a (*hold on*) throwing action with a flexible motoric movement object in the shape of a pen. Although it needs to be remarked in here that whilst the tip of the pen will be thrown from the beginning to the end of a letter, word or word part c.q. that we are able to perceive movement within that action that conversely the tip of the pen within that movement process will continuously have to execute the *static* (!) motoric action *touching* (and not the motoric *movement* action *touching*) of the tip of the pen against the paper¹⁵. Within a previous motoric action of the writing script the *tau*-value between the tip of the pen and the paper became zero within the motoric *movement* action *touching* in which the egocentric goal was to get the tip of the pen to an exact beginning of a letter, word or word part and during the actual writing in the classical way that static touching needs to be confirmed continuously by haptic feedback in which the constant touching needs to be aligned to the motoric movement (MM) within a continuous *tau*-coupling process¹⁶. The upcoming clarification will mainly describe how the motoric movement (MM) is involved with the actual writing process c.q. with the movement process but the explanatory model shows with all those different perception processes that writing is extremely complex. In which one is able to determine that one is able to simply execute it all at a functional level but that writing encompass many complex perception processes.

b. The motoric movement action *writing* hosts numerous and very specific action trajectory shapes

Writing is a very remarkable motoric movement action because the action trajectory shape actually becomes visible. Due to that fact it very plastically illustrates how much knowledge our cognitive basis needs to possess about the shapes of action trajectories. If we only limit ourselves to the Dutch language then already twenty-six letters c.q. unique action trajectory shapes exist within the alphabet with each of them their own characteristics, inflection points etc.. Besides the letters there are numbers, letter connections, capital letters, block letters etc. which also need to possess and show their specific and subtle differences in relationship to all other line segment shapes because otherwise they can't be distinguished and they wouldn't have been invented in the first place.

¹⁴ The explanatory model inter alia shows that the removing of the relevant fingertips within the motoric movement (MM) comprises an optimization process. Nobody is capable of removing the fingertips at the exact same moment in the exact same figuration. We do our utmost to achieve this but all relevant fingertips will always show relative deviations within the removing but as long as we strive to and manage to keep these releasing times within certain borders the letter will experience no hindrance of this optimization process. This exact at the same time releasing of all relevant fingertips will for example also have to be executed when a pitcher in baseball wants to construct a straight ball trajectory shape of a *fast ball* and he will definitely not execute this when he wants to create any kind of rotation within that ball trajectory shape (*screw balls*). Within the latter the relevant fingertips must be released from the ball apart from each other due to exact differences within the relevant *tau*-couplings.

¹⁵ There is a huge difference between motoric movement actions and motoric (non-movement/static) actions. For an exhaustive explanation see *Caught In A Line* and/or the definitions within the explanatory model.

¹⁶ Within your own empirical findings you are able to experience this when you hold the writing paper in your not-writing hand and hold it up in free space while you try to produce a readable text with the writing hand.

When we take a closer look at the cognitive knowledge which needs to be available within the motoric movement action *writing* then the explanatory model also shows within writing that the term line segment shape encompass two separate autonomous components just like within all other imaginable motoric actions. The word *line* within the term line segment shape expresses the basal component and can be linked to the development of the earliest organisms and conversely the word *shape* within the term line segment shape exactly expresses the differences with higher/late developed organisms which again creates a very strong ecological argument in itself. Within your own empirical findings you can easily verify that within any language you are able to follow a writer. You can witness when the writer starts and you are able to observe how the tip of the pen constructs line segment shapes and surely when actions are repeated you know approximately when the writer will stop writing. You are even capable of constructing strange letters yourself. However within most languages you don't possess any cognitive knowledge of all specific inflection points in there. Within for example Japanese you have no clue which thickening within a line segment shape stands for what symbol. Ergo we always perceive lines but in most languages we don't know anything about the shapes.



Image: An experienced writer possesses a huge cognitive basis of many specific action trajectory shapes (left). Lots of abstract cognitive knowledge concerning inflection points within one action trajectory shape provides the possibility to connect letters in very miscellaneous ways (right).

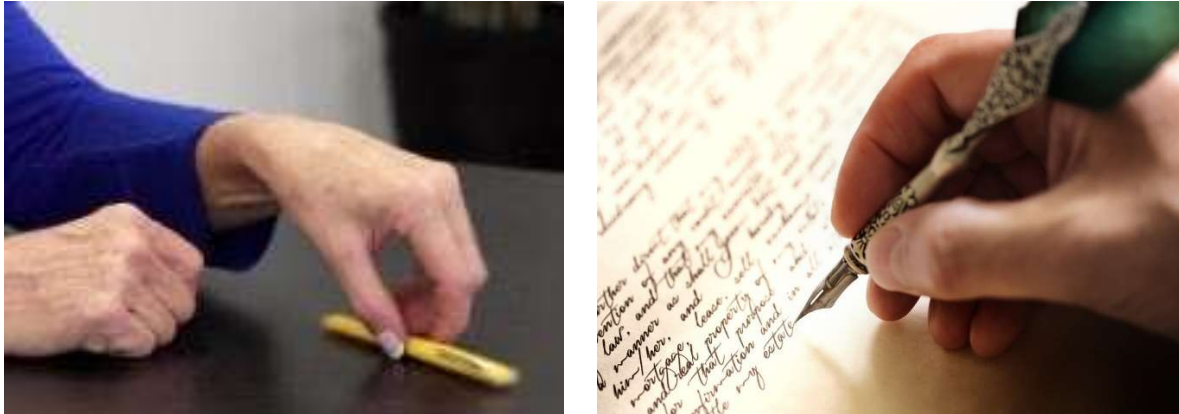
c. The writing script

Writing encompasses a script with three consecutive motoric movement actions. They are: 1. the motoric movement action *grasping* of the pen¹⁷ in which the action trajectory shape is constructed out of the perspective of the relevant fingertips to those parts of the pen that actually will be touched, 2. the motoric movement action *touching* in which the action trajectory shape is now constructed out of the perspective of the tip of the pen towards the specific place on the paper where the letter, word or word part needs to start and 3. the motoric movement action of the actual writing in which like aforementioned the tip of the pen will be thrown in a very specific line segment shape c.q. from a very specific starting point to a very specific end point.

There needs to be remarked in here that the first moment the relevant fingertips feel the pen or at the first moment that one feels the tip of the pen touching the paper due to haptic feedback that the corresponding motoric action immediately ends and one is able to completely switch to the next script-item. Nevertheless it is possible that the visual perception will be able to switch to the next script-item *during* (!) the execution of a current action like Hayhoe and Land observe within a tea making task. In

¹⁷ Although the word grasping is used in here it actually doesn't scientifically exist. Within the description of the motoric movement action *grabbing/grasping/touching etc.* the explanatory model reveals that within an obligatory linked script we are only capable of first execute the motoric movement action *touching* and subsequently the motoric movement action *pushing*.

which the explanatory model makes it crystal clear that the perception processes and within there for example the very complex functional *tau*-coupling within the current action needs to be perceived continuously until the aforementioned first moments of feeling the pen or the touching of the paper c.q. till the very last moment within one motoric movement action when the egocentric formulated will is fully completed and so the explanatory model makes it crystal clear that the switching of the visual perception doesn't mean at all that the current script-item is completed c.q. doesn't at all mean that the current process hardly needs anymore attention.



Images: Left – The explanatory model validates all scientific research that somehow concludes that one is able to switch the visual perception for example to a next script-item during the execution of the previous item. Although scientists within that research just guess why and when this can be done the explanatory model unequivocally shows that this phenomenon has a set relationship with the possibility of how the (movement) action object (MA) is capable of coping with the fluctuation borders within the possible deviations within the action trajectory shape. If we are about to grab a pen or to turn on a tiny light switch then the palm of the hand is relatively so big in regard to the size of the pen or the switch that possible deviations of the (movement) action object (MA) i.c. the fingertips within the action trajectory shape can be amply absorbed within those proportions. Then any part of the hand will always touch any part of the pen or switch and one is able to solely correct/adjust this with the help of proprioceptive perception processes. How and in what scale those deviations can be adjusted with the (movement) action object (MA) determine when one is capable of taking away direct vision during the present motoric action¹⁸ and that is also illustrated within the service and the tweener in tennis in which Federer and Nadal show that they don't need any direct vision on the ball in the very last phase *before* (!) they hit the ball¹⁹. Right – That is completely different within the next script-item in which the process of the touching of the tip of the pen towards the paper is the key issue. The tip of the pen is many times smaller than the palm of the hand and the touching towards one specific spot on the paper will much more demand an execution like within a task in which a needle must be threaded²⁰ or in which the tip of a key must be inserted into a lock²¹. Ergo the tip of the pen itself is hardly capable of coping with any deviations within the action trajectory shape and the explanatory model clarifies that one will need direct vision much longer within this touching process than within the grasping of the pen. Future scientific research will be able to easily prove this.

¹⁸ Those observations have a relationship with the initiation of movements during the beginning of a motoric movement action. Within for example the motoric movement action *traffic* or the motoric movement action *grabbing/taking etc.* the explanatory model clarifies that within *safe* (!) environments we actually initiate actions without any previous direct vision.

¹⁹ See “Watch The Ball Trajectory!”.

²⁰ See addendum 2 of *Caught In A Line* for a comprehensive description of those two tasks.

²¹ This phenomenon also explains the differences between the proprioceptive executable tasks of bringing your index finger to the point of your nose and the bringing of the palm of your hand towards your forehead although the tasks are of a different nature.

d. The task within the motoric movement action *writing* in relationship to the egocentric formulated will

Like it is extensively illustrated within the previous contents any writer will more than likely intend to initiate some kind of communication with the produced text and so this can also be appointed as a goal within the egocentric formulated will. However which line segment shape we finally will write has been considered completely *before* (!) the actual production of that shape and also within for example the grasping of a coffee cup a tactical consideration, in which a perceptual image of a latent action trajectory shape between the relevant fingertips and the handgrip is constructed, completely precedes the actual execution. Just like within the writing the grasp action is then actually executed by positioning the relevant fingertips in the beginning of the chosen action trajectory shape and by moving them along the *whole* (!) shape till the final end of a letter, word or word part. Ergo within grasping the egocentric formulated will has always been approached incorrectly and so we don't want to grasp a coffee cup but we conversely want to move the relevant fingertips towards the handgrip. That maybe looks like nit-picking but in that way the explanatory model shows crystal clear that during the actual writing it only matters that a line segment shape, from the beginning (!) to the end, is actually produced and in that way exactly provides the insight of when and how our functional motoric and perception processes exactly are involved within all components within the writing task. Ergo the task within the motoric movement action *writing* is to guide the tip of the pen within a specific line segment shape from A to B during the actual execution and in that way the explanatory model shows that the egocentric formulated will must primarily be attached to this essence.

e. Misconceptions within science in relationship to the egocentric formulated will within the motoric movement action *writing* and the consequences towards the explanatory model

To implement the explanatory model within the scientific community encompasses a huge laborious process. Also in regard to the egocentric formulated will science will argue c.q. will remain to believe that the construction of a line segment shape is a unique feature within writing and that it belongs to a very special motoric action within the whole spectrum of motoric movement actions. So even if the explanatory model will demonstrate that it all works like it states then science will refer to this unique exceptional position and will quickly return to their daily routine.

The opposite will appear to be true. With this description the explanatory model shows that it might be a (!) goal that a writer wants to communicate with a written text but that the primary task during the actual production of a letter, word or word part is solely to construct a specific line segment shape on paper and provides the crystal clear and universal explication how our motoric and perception processes are solely occupied with the guidance of a shape from a precisely chosen begin position A to a precisely chosen end position B. So the explanatory model unequivocally shows that the motoric movement action *writing* in essence doesn't differ from the motoric movement action *touching*, in which the fingertips are also guided from a begin point A to a precisely chosen end point B, which we by far execute most in our lives²². Hence this revelation the explanatory model shows that writing is not a unique motoric action at all but that it only encompasses a unique touching action i.c. an action in which the action trajectory shape becomes and stays visible.

f. The relationship between the egocentric formulated will and the primary focus within the motoric movement action *writing*

So the explanatory model reveals that every motoric action needs to be approached as a complex system and can only be executed successfully due to a compelling relationship between two autonomous complex subsystems. The movement action (MA) and the motoric movement (MM). Conversely to the current scientific mindset, science beholds a motoric action as one and undivided,

²² Already every grasp action is preceded by a touch action and the motoric movement action *walking* only encompasses touch actions.

the explanatory model shows that one is able to obtain final insights because one action allows a universal and stringent division in those two components in which in retrospective can be noted that science was never able to acknowledge that one action encompasses two perspectives. Causing that they were never able to discover that the execution of one action demands two separate forms of attention c.q. that two foci need to be present.

Accordingly the explanatory model shows that the essence within the motoric movement action *writing* beholds the task to transport the tip of the pen, and only the tip of the pen²³, over a trajectory from A to B. So even though this task is formulated out of an *egocentric* (!) will this task is only going to be executed by the tip of the pen²⁴. The tip of the pen alone will shape its action trajectory line segment shape with all its consecutive positions P. Just like a ball within every ball game, the ring within the motoric movement action *nerve spiral*, the food during the motoric movement action *eating*, the outside of a fingertip²⁵ within the motoric movement action *grasping/touching etc.* the tip of the pen is regarded as a fully autonomous entity within our perception processes. We don't share anything with the tip of the pen, we are not the tip of the pen and we don't have or will ever have anything in common with the tip of the pen. We are going to move the tip of the pen as a consequence of an egocentric formulated will but the movement action (MA) must be linked to the (movement) action object (MA) and not to any phenomenon belonging to the ego. Conform J.J. Gibson the action object expresses the relationship *between* (!) the animal and the environment²⁶ and nothing belonging to the animal or the environment itself.

However the tip of the pen as part of a line segment shape of a letter, word or word part doesn't do anything by itself. Without a pen you aren't able to write a text but if we don't pick up the pen nothing will be written either. Just like in all other motoric movement actions we will have to move the lifeless, dead, tip of the pen outside of our body with movement trajectory shapes from within the body which we conversely are able to control directly. We are only capable of creating and perceiving inner body movements *just until* (!) the outside of the tip of the pen and exactly from that (*transition* (!)) point we simultaneously will have to perceive the movement of the tip of the pen within a line segment shape of a letter, word or word part which in essence executes the egocentric formulated will. So the motoric movement action *writing* is only able to succeed if we point one focus (the primary focus) on the essence within the task, the line segment shape out of the perspective of the tip of the pen, and at the same time point a completely other focus (the secondary focus) on movement trajectory shapes within the body towards the execution of the movement action (MA) c.q. towards the primary focus.

²³ This requires a huge mind step. In the end a letter, word or word part needs to be executed by a writer but if you want to grasp the working of the two complex subsystems within the explanatory model you definitely need to start to understand that one part of our perception processes are solely occupied with the position of the tip of the pen out of the perspective of the tip within a specific line segment shape and another part of our perception processes is solely occupied with body movements towards the tip of the pen out of the perspective of the body. Due to the difference in perspective they belong to two irreconcilable worlds which can never be reduced to just one focus.

²⁴ It is like the flow of the water within a mountain stream. Only due to moving rocks we are able to manipulate the direction of the water. We just never will be able to manipulate *autonomous* matter in any other way. The very complex next mind step that stems from that idea is the fact that even the outsides of our body need to be considered as such. We for example are only able to manipulate the *outside* (!) of our fingertips within an action trajectory shape on the outside of our body with inner body movements just till a very close point of the outside of those fingertips. But they will always remain within our body/fingertips.

²⁵ See *Caught In A Line* – Addendum 2: The motoric movement action *grabbing/grasping/touching etc.*. The outside of our fingertips indeed belongs to our body. It is made from living tissue but we are not able to consciously direct it as a part within an action. We are only capable of manipulating the outside of a fingertip just from the inside of the body until close to the outside of that fingertip. Ergo the outside of a fingertip can only be manipulated within an action trajectory shape on the outside of the body with movement trajectories on the inside of our body.

²⁶ With this third entity the explanatory model finalizes Gibson's *The Affordances Theory*. It shows that not only the environment affords the action but that it depends as much on the available movement space between those two phenomena.

So in summary within any motoric movement action our perception processes within the movement action (MA) are solely engaged with the (movement) action object (MA) out of the perspective of that object and our perception processes within the motoric movement (MM) are solely engaged with the *execution* (!) of the movement action (MA) by and within (out of the perspective of) the body and not with the tip of the pen within an action trajectory shape at all. Ergo the movement action (MA) is solely occupied with the (visual) perception of the movement of the tip of the pen along a line segment shape of a letter, word or word part (outside of the body)²⁷ and the motoric movement (MM) is solely occupied with (proprioceptive) perception of movements (within the body). So within writing we are only capable to visually perceive the movement of the tip of the pen within an action trajectory shape and are only capable to manipulate that movement indirectly by producing rather awkward body movements which have no relationship whatsoever with the action trajectory of the tip of the pen. It is necessary that you start to see that the autonomous movement of the tip of the pen can only be influenced by a completely other autonomous moving process²⁸.

So in retrospect one is able to conclude that science was never capable to acknowledge that there is a set relationship between the tip of the pen and the line segment shape of a letter, word or word part within a crucial overarching phenomenon c.q. that science was never able to discover the primary focus. Current science even wasn't capable of appointing any part within the primary focus. They were just capable of addressing parts within the secondary focus.

3. The movement action (MA) within the motoric movement action *writing* – The primary focus

The explanatory model clearly reveals that in an universal way every motoric action can be divided in two autonomous complex subsystems. The movement action (MA) and the motoric movement (MM). Although the explanatory model must be regarded as a complex system it shows that the possibility to divide one motoric action into two completely separate pieces is giving way to much simpler explanations in regard to those pieces then science regards a motoric action as a whole right now. With which the explanatory model of course is indicating that only in this way one is able to finally clarify it all.

Within the movement action (MA) itself which is only occupied with the movement of the (movement) action object (MA) within the (movement) action trajectory out of the perspective of the action object the explanatory model appoints three components on basis of empirical experiences and logical reasoning. They are: 1. the cognitive basis, 2. the tactical movement action and 3. the actual movement action. The first two parts encompass the tactical department and mainly have the goal to come forward with a perceptual image of one latent action trajectory shape out of multiple options before any actual execution will occur. Every day we execute many motoric movement actions in which we move our body, a body part or a (movement) action object (MA) from A to B. So we possess a huge cognitive basis of knowledge how to get from A to B. Ergo this knowledge comprises a huge arsenal of *shapes* (!) of reference action trajectories in which also a lot of abstract knowledge of inflexion points, timing, length, duration etc. is stored.

Within writing we possess a huge base of general knowledge concerning all the action trajectory shapes (letters, numbers, capital letters, punctuation marks etc.) and then we don't even consider different languages. Within there we own a huge basis of general knowledge of all inflexion points of

²⁷ And that is exactly conform the way we observe other writers. Then our movement action (MA) is working in the same way like we are writing ourselves but our motoric movement (MM) doesn't have to execute anything. With this novum within the movement sciences the explanatory model also provides valuable openings within NMI research.

²⁸ It is like the flow of the water within a mountain stream. Only due to moving rocks we are able to manipulate the direction of the water. We just never will be able to manipulate *autonomous* matter in any other way. The very complex next mind step that stems from that idea is the fact that even the outsides of our body needs to be considered as such. We for example are only able to manipulate the *outside* (!) of our fingertips within an action trajectory shape on the outside of our body with inner body movements just till a very close point of the outside of those fingertips. But they will always remain within our body/fingertips.

the specific line segment shapes which also make it possible to connect them while writing in many various ways. Although due to the fact that we write in complete *flow* we don't realize that anymore but there was a time during our first years in school that we intensively had to incorporate this all. Within the tactical movement action (MA) this broad general knowledge will be translated to the actual writing situation. If we for example need to put an autograph in a very small rectangular cadre or if a paper is almost completely filled we adjust this general cognitive knowledge towards the specific situation at hand.

So the cognitive basis and the tactical movement action together form the tactical department and within the motoric movement action *writing* they have the main goal to come forward with just one action trajectory shape out of an abundant supply of action trajectory options. In which there needs to be remarked that always only one action trajectory shape can become manifest within the motoric movement action *writing* but even much more important that without a perceptual image of a latent *precise global* action trajectory shape we just will not be able to continue with any actual purposeful execution. In which within the latter there needs to be remarked that it doesn't matter at all how global the perceptual image is as long as it is there.

When the *tactical* (!) choice for one latent *precise global* action trajectory shape within the tactical department is fully completed the explanatory model shows that subsequently the tip of the pen will be thrown *into the beginning* (!) of the perceptual image of that latent *precise global* action trajectory shape during the actual movement action (MA) and within that throwing process the explanatory model shows that the voyage of the tip of the pen within the line segment shape of the letter, word or word part can solely be perceived with the help of the processing processes of the perception and only directly can be adjusted with the help of the other autonomous complex subsystem of the motoric movement (MM). The explanatory model accordingly shows that that voyage of the tip of the pen within a line segment shape of a letter, word or word part can only be regarded as an optimization process which we are only capable of perceiving and so are only able to accomplish *indirectly* (!).

Within the motoric movement action *writing* the ventral stream will mainly have to process all perceptions towards a perceptual image of the whole line segment shape of a letter, word or word part but definitely will have to keep a relationship with the actual position of the (movement) action object (MA) i.c. the tip of the pen. The dorsal stream will mainly have to process all perceptions towards the actual position of the tip of the pen but definitely will have to keep a relationship with the perceptual image of the whole (movement) action trajectory shape. With this mutual c.q. double process the explanatory model shows that the ventral stream needs to come up with *new* perceptual images of *new* latent parts of the action trajectory every time the dorsal stream signals a deviation within the latent perceptual image due to the manifest action trajectory shape and the dorsal stream will just have to follow this new perceptual image unequivocally just until the next deviation occurs. The explanatory model concludes that if we didn't possess those processing processes of the perception we would never be able to execute actions successfully.

So within this optimization process in which in other words a manifest action trajectory shape fills a perceptual image of a latent action trajectory shape the only outcome can be that a letter, word or word part is constructed *jerkingly/shockingly* (!). Which justifies the conclusion that within all motoric movement actions perceptions of deviations within action trajectory shapes are indeed processed due to an ingenious system but which will never show one exact copy of an action trajectory shape due to the processing time involved and that is why nobody will ever be able to create exact copies of a letter, word or word part.

a. The τ -value within the movement action (τ_{MA}^G) of the motoric movement action *writing*

The actual spot of the (movement) action object (MA) like the tip of the pen within the motoric movement action *writing* shows the exact partition of the manifest and latent part of the action trajectory shape i.c. a line segment shape of a letter, word or word part. The same strict boarder which the marble shows within a marble run. If only you will start to realize that the manifest part is filling a latent part of an action trajectory shape until the latent part has completely disappeared and that our perception processes are mainly occupied with this phenomenon only then you will be able to gain insight in how the τ -value of the movement action (τ_{MA}^G) is perceived c.q. must be observed. The τ -value of the action trajectory within the movement action (τ_{MA}^G) can only be determined by

observing how the manifest line segment shape of the letter, word or word part closes the perceptual image of the still latent part of that action trajectory shape and in the end of the execution of a motoric action that *tau*-value will always become zero. The *tau*-value of the action trajectory shape within the movement action (τ_{MA}^G) can solely be determined by perceiving how the manifest writing line segment shape is closing its latent part and the perception of this leading *tau*-value within the movement action (τ_{MA}^G) in regard to the timing c.q. the *tau*-coupling only needs to be observed one-dimensionally in which it only matters how the (presumed) *lines* (!) within the two line segment shapes relate and that the shape doesn't have to be considered at all.

For the *tau*-value towards the timing within the movement action (MA) one only needs to observe one-dimensionally²⁹ how the (alleged) line segments relate to each other and so one doesn't have to exactly observe what the *shape* of that line exactly beholds. This basal functioning of our perception processes can ecologically be linked to the earliest organisms. Evolution of cognitive knowledge about *the shape of the line* (!) can be observed within higher and later ranked organisms which will provide them a more secure determination of the *tau*-value. So conform D.N. Lee you could suppose that for the construction of the *tau*-value within the motoric movement action *writing* one only needs to observe how the gap between the tip of the pen and the last position P within the perceptual image of the line segment shape of a letter, word or word part approaches zero. This simple linear gap becomes very transparent within for example the motoric movement action *pouring*. When you fill a glass with a liquid you only one-dimensionally observe how the actual surface is rising towards the rim of the glass³⁰.

4. The motoric movement (MM) within the motoric movement action *writing* - The secondary focus

The explanatory model clearly reveals that in an universal way every motoric action can be divided in two autonomous complex subsystems. The movement action (MA) and the motoric movement (MM). Although the explanatory model must be regarded as a complex system it shows that the possibility to divide one motoric action into two completely separate pieces is giving way to much simpler explanations in regard to those pieces then science regards a motoric action as a whole right now. With which the explanatory model of course is indicating that only in this way one is able to finally clarify it all.

So the description of the aforementioned movement action (MA) already shows that the final explanation of all motoric movement actions is far more complex than ever was assumed within science. Accordingly it shows many complex elements with many perception processes but conversely also shows that one is able to simply execute them at the functional level. Now the whole explanation becomes even more complex because the explanatory model indicates that the movement action (MA) can only be perceived (indirect) and solely can be executed directly/motorically with the other autonomous complex subsystem which provides the novum within the movements sciences that a secondary focus must be present within every motoric movement action. Of course it could never have

²⁹ The explanatory model shows within *Caught In A Line* and the eponymous addenda that the term line segment shape hosts two essential components. The basal word *line* can ecologically be linked to the development of the earliest organisms and shows that the *tau*-value within the movement action (τ_{MA}^G) can be perceived one-dimensionally by the blunt observation that a line is filled without ever having to know any detail of the shape of that line. With the word *shape* the explanatory model appoints the cognitive element that conversely separates higher from lower ranked organisms. Due to this revelation the explanatory model is able to explain why even toddlers are able to hit tennis balls because they are already capable to perceive the one-dimensional filling of a line and to perceive the corresponding basal *tau*-value becoming zero. However it will take more than a decade of hard practice before they will be able to distinguish most of the relevant ball trajectory shapes in tennis and to tactically approach them in the right way.

³⁰ Within the motoric movement action *pouring* this *tau*-value can clearly be observed twice. The first time this happens when the arch of the liquid reaches the glass but the second time provides an even better example. When the liquid is filling the glass we only one-dimensionally need to perceive the rising of the level of the liquid till the rim of the glass. When we observe that the gap between the actual level and the desired level disappears then the motoric movement (MM) will receive the signal to slow down the pouring.

been regarded in a different way and this encompasses one of the major misconceptions/omissions within science. Within the movement action (MA) one needs to perceive everything out of the perspective of the (movement) action object (MA) i.c. the tip of the pen within the motoric movement action *writing* and within the motoric movement (MM) one needs to perceive everything from *within the body* just until (!) the outside of the tip of the pen out of the perspective of the acting organism. The explanatory model shows³¹ that the motoric movement (MM) in principle hosts three complex subsystems. They are: 1. the body processes (BP), 2. the body movements (BM) and 3. the individual condition (IC). They are autonomous complex systems themselves and the product of the three needs to be optimized when you want to reach the highest outcome within the motoric movement (MM) towards the the movement action (MA) in for example sport performances. So they are also present within the motoric movement action *writing* but one can easily see that within there they do not become relevant at all. 1. You don't need any stamina/endurance (BP) to execute the motoric movement action *writing*, 2. you don't need or will have to consider a technique model (BM) within the motoric movement action *writing* and 3. the individual conditions (IC) don't need to be optimized as well within the motoric movement action *writing*.

So although the whole motoric movement action *writing* must be assessed as very complex at the functional level the motoric movement (MM) remains very simple. Just like the movement action (MA) and that is why we are able to execute this motoric movement action in complete flow³². The motoric movement (MM) within the motoric movement action *writing* even remains very simple when you consider that the action becomes more complex due to the use of a flexible (motoric) movement object (MM)³³. The tip of the pen situated at the other end where one holds the pen adds an extra movement trajectory to the motoric movement (MM). The tip of the pen can be manipulated freely/flexible and therefor the movement trajectories within the body will have to create a unity with it. But in spite of this remark the movement technique remains simple and besides a single arm action mainly encompasses hand and wrist movements.

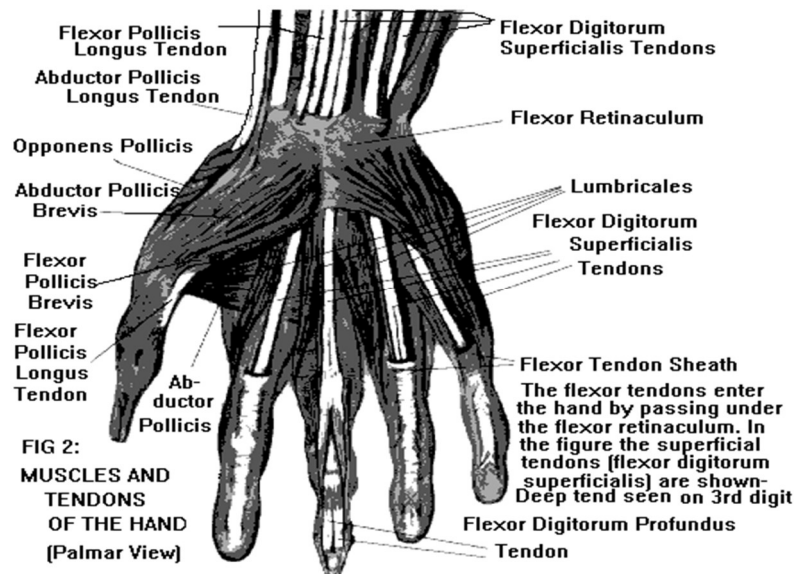


Image: Movement trajectories within writing are produced *within* (!) the body. Just like the movement action (MA) the body has chosen a second generic system with the motoric movement (MM) to execute all possible action trajectories with a universal system of movements. The movements within writing are mainly the effect of antagonistic cooperations of parts of the hand, wrist and lower arm which in a slightly altered way also serve the motoric movement action *pouring* and *nerve spiral*. So movement trajectories which can be observed on the outside of the body are a translation from the initial/original movements. Bodily movements origin from within the body!

³¹ Within *Caught In A Line* and Addendum 1 and 2 of *Caught In A Line*.

³² *Caught In A Line*

³³ See: *Caught In A Line*; p. 52.

Of course physiologically it is a little more complex than that but within this functional explication that is not relevant right now. The only thing important in here is that you start to understand that we are only able to manipulate the movement of the tip of the pen along an action trajectory shape with these, much different, motoric movements. The tip of the pen is a lifeless substance and is doing nothing and will never do anything. So the movement of the tip of the pen along an action trajectory shape will always have to be executed somewhere else c.q. somewhere from within the body. The movement trajectories are linked to the motoric movement (MM) within the actor. The action trajectory is linked to the (movement) action object (MA) within the movement action (MA). They are not able to show any overlaps because their perspectives belong to two irreconcilable worlds. So the technique isn't elaborated any further in here because it is all too simple within the motoric movement action *writing*. However two matters within the motoric movement (MM) need to be clarified because they will have to show how the secondary focus is present within the whole motoric movement action *writing* and which will have to show the link with the τ -value within the motoric movement (τ_{MM}^G) which is crucial within the functional τ -coupling of the whole action.

a. The secondary focus in relationship to the transition point

So with the novum of two simultaneous existing foci the explanatory model also reveals the novum that within every motoric movement action in general the secondary focus must be pointed at the biomechanical main action within the motoric movement (MM) towards the action trajectory shape c.q. the primary focus. This is formulated like this because in very complex movements, like a tennis service or a long distance golf swing, one is definitely not able to avoid paying a profound part of attention to aspects of the motoric movement (MM). In simple actions like within the motoric movement action *letter posting* or *writing* that is completely needless. We don't have to pay any conscious attention to a specific letter posting or pen moving technique.

Ergo within the motoric movement action *writing* we don't have to focus consciously at any motoric movement but at a subconscious level the secondary focus must be linked to the primary focus. The explanatory model shows that this linking always occurs in one specific point. This is defined as the transition point. The transition point is the point where the movement action (MA) and the motoric movement (MM) come together or in other words it is the point where they *transition* which the transition point literally indicates.

Within the motoric movement action *writing* the two complex subsystems transition within the point *between* (!) 1. *the ink on the outside of the tip of the pen* and 2. *the outside of the tip of the pen* (under the ink). So what we finally are able to actually manipulate within the motoric movement (MM) is positioned immensely close to the transition point but will never show an overlap with that transition point. The ink on the outside of the tip of the pen will become part of a line segment shape of a letter, word or word part outside of the body between a starting and ending point within the movement action (MA). This process can only directly be executed by the motoric movement (MM) which is only capable of producing movement trajectories within the body *just until or just before* (!) the transition point in order to manipulate that transition point within the movement action (MA). So even though a technique c.q. the motoric movement (MM) must be considered as very simple within a motoric action the secondary focus, conscious or not, must always have to be pointed at movements within the body towards the transition point while simultaneously the primary focus must be pointed at the action trajectory shape within the the movement action (MA) outside of the body.

b. The τ -value within the motoric movement (τ_{MM}^G) of the motoric movement action *writing*

So within *self-paced* motoric actions like the motoric movement action *writing* the next phenomenon occurs. The action trajectory shape and within there the τ -value concerning the timing of the movement action (τ_{MA}^G) is constructed by all consecutive places P of the ink coming out of the (outside of the) tip of the pen. The τ -value of the motoric movement (τ_{MM}^G) is constructed by all

consecutive places P' of the outside of the tip of the pen (under the ink) within the secondary focus³⁴ because that is the last point we are able to directly manipulate motorically and is situated closest to the attention point within the primary focus.

Because we will continuously hold the pen during the motoric movement action *writing* the places P and P', although they encompass essential different functions, will statically remain to be close to each other³⁵ during the complete action. They relate to different gaps but in relationship towards the timing c.q. the functional *tau*-coupling they can be observed as one because they fill an exact similar gap within a line segment shape in an exact similar way. Or within other words the observations in relationship to the gap of the movement action (MA) automatically provides information about the gap of the motoric movement (MM). So in these kinds of (*static*) motoric movement actions one is able to say that there is an equalization of gaps. This implies that you are able to pause the action trajectory at any moment when you for example need to sneeze. The pausing of the gap of the action trajectory will automatically pause the gap within the motoric movement (MM). If you resume the movement action (MA) then the perception of the gap within the motoric movement (MM) will be resumed simultaneously and will continue with the movement of the ring till the leading *tau*-value (τ^G_{MA}) will approach zero. Although in common language this isn't called timing you are now able to understand that self-paced actions are timed as well. This phenomenon can be regarded as *self-paced* timing. If the visual perception processes observe that the *tau*-value of the movement action (τ^G_{MA}) approaches zero then the *tau*-value within the motoric movement (τ^G_{MM}) is guided in such a way that it also approaches zero.

Within this kind of static (*hold on*) throwing actions just like within the motoric movement action *nerve spiral* or within the two first phases of the motoric movement action *letter posting* the determining of the *tau*-value of the motoric movement (τ^G_{MM}) is hard to grasp. However with the explanation of the *tau*-coupling within the (tiny) throw of the letter within the non-static last phase of the motoric movement action *letter posting* the *tau*-coupling within static actions becomes crystal clear as well. We need to close the relevant fingertips during the holding on to the letter (or to a pen) in the first two phases of this action *as active as* (!) we need to open them simultaneously³⁶ within the throwing phase. Within our subjective feelings we only regard the opening of the fingers as a genuine motoric movement (!) action but the static holding must be considered as active within a zero-movement (!)³⁷.

*“However as aforementioned the timing is not really relevant in the first two phases of the motoric movement action letter posting because within there we hold on to the letter constantly. In the final phase of the letter posting when the letter is actually inserted into the slit of the mailbox the tau-coupling becomes more significant c.q. transparent. Even this tiny throw needs a tau-coupling”*³⁸.

³⁴ So for all clarity our primary focus during writing is only observing the ink coming out of the tip of the pen and that produces the *tau*-value within a letter, word or word part. At the same moment our secondary focus is observing the transition point from the inside of the body. As aforementioned we do have to pay attention to a certain writing technique but that doesn't need conscious attention within this motoric action but it does need attention though. So during writing you visually observe all points P of the construction of a line segment shape of a letter, word or word part and at the same time you proprioceptively observe all points P' of the transition point out of the movements within your body.

³⁵ So for all clarity our primary focus during writing is only observing the ink coming out of the tip of the pen and that produces the *tau*-value within a letter, word or word part. At the same moment our secondary focus is observing the transition point from the inside of the body. As aforementioned we do have to pay attention to a certain writing technique but that doesn't need conscious attention within this motoric action but it does need attention though. So during writing you visually observe all points P of the construction of a line segment shape of a letter, word or word part and at the same time you proprioceptively observe all points P' of the transition point out of the movements within your body.

³⁶ Read: “simultaneously within certain fluctuation borders” because you can't, never will be able or ever released your fingertips from the letter in the exact same constellation.

³⁷ Within the motoric movement action *grasping/grabbing etc.* the whole spectrum of obligatory linked *touch* and *push* actions are revealed.

³⁸ The essence of a throwing task is that the (movement) action object (the letter) must pertinently be held over a certain (very tiny) line segment A-B in which the initial phase of the object trajectory will be shaped. That initial phase is essential for the upcoming or near future shape of the action trajectory and for the transfer of energy.

Although in here a very small distance A-B is involved a small energy transfer is needed and therefore a small initial phase needs to take place. The tau-value of the movement action (τ_{MA}^G) is now determined by how the letter fills the small line segment A-B of that initial phase. The tau-value of the transition point towards that action trajectory within the motoric movement (τ_{MM}^G) will have to follow this leading gap and will have to provide the message to the motoric movement (MM) to completely (!) release the letter from all the relevant fingertips once the letter reaches the end of the perceptual image of that latent letter action trajectory shape in B. So with other words if we perceive that the tau-value of the movement action ($\tau_{MA\ A-B}^G$) approaches zero then the tau-value of the motoric movement ($\tau_{MM\ A-B}^G$) also has to approach zero as well and will have to give the order to take all fingers of the letter at the exact same moment at all transition points.

In that way the tau-coupling can be brought back to the primary and secondary focus. The primary focus in a throwing task must be pointed at the initial phase of the action trajectory shape and especially at the previous determined end point of that initial phase. The secondary focus in a throwing task must be pointed at the transition point towards that action trajectory shape out of the perspective of the throwing technique belonging to the motoric movement (MM).³⁹

So we continuously perceive the *tau*-value of the motoric movement (τ_{MM}^G) within the motoric movement action *writing* within all time frames of the whole action during the pushing of all relevant fingertips around the pen. In the explanation of the motoric movement action *grasping/grabbing etc.* you are able to read the explanation that within holding with the hand the relevant fingertips need to create pushing-vectors in such a way that a zero resultant must be perceived within the flexible (motoric) movement object (MM). By the way every day you are able to witness this multiple times within your own empirical experiences during the motoric movement action *eating* within the use of a spoon, fork or knife.

5. The complete motoric movement action *writing*

Due to the comprehensive separate descriptions of the two only organs of the motoric movement action the suggestion could arise that they are linear or otherwise separated processes. That is a complete misconception. Both organs are part of one undivided complex system. The explanatory model explains the motoric movement action as a complex system and the description of the motoric movement (MM) and the movement action (MA) only concerns the explanation of the two complex subsystems. During the execution of a motoric movement action they need to be executed and they need to be perceived simultaneously. The explanatory model explains which perception processes in both parts are required and out of which perspective they need to be observed. The explanatory model is connecting the processing processes of the perception to the movement action (MA) and proprioceptive perception processes to the motoric movement (MM) but it doesn't exclude that some perception processes show overlaps. So within the motoric movement action *writing* the primary focus needs to be pointed at the movement of the tip of the pen within a kind of set marble run and at the same time the secondary focus must be pointed at the biomechanical main action towards the transition point within that action trajectory shape which will *execute* (!) the movement action (MA). Like aforementioned both foci produce a *tau*-value which is essential for the completion of the functional *tau*-coupling within the whole action.

When the action object approaches B the body parts which hold the object will have to receive the message to release from the object at the exact same time.

³⁹ Excerpt from the motoric movement action *letter posting*.