INTUITION:
A MEANING MAKING PROCESS BASED ON FEELINGS

- Maybe cultivated through sports?

A theoretical analysis of the process of intuition and a perspectival discussion of how to cultivate intuition – maybe through sports?

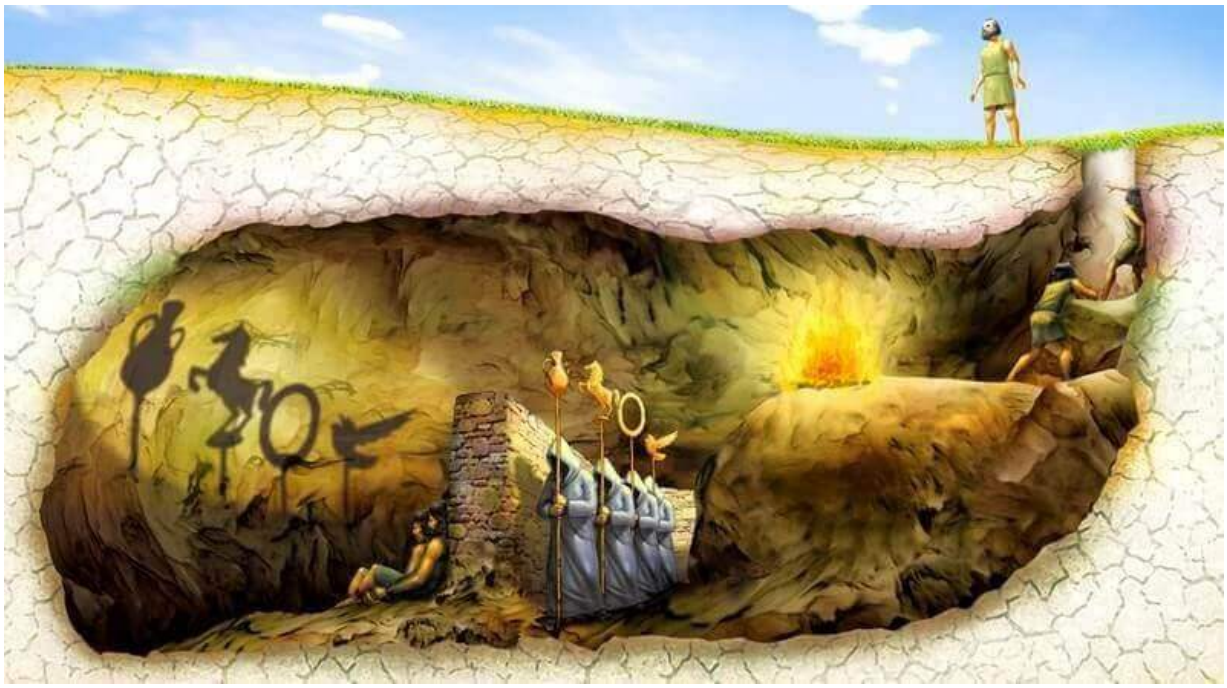

Figure 1 Plato's Allegory The Cave The Eye Opening Ancient Version - Platos Cave Painting (Painting Valley, n.d.)

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"My education at Fort Hare was as much outside as inside the classroom*. I was a more active sportsman than I had been at Healdtown. This was due to two factors: I had grown taller and stronger but, more important, Fort Hare was so much smaller than Healdtown that I had less competition. I was able to compete in both soccer and cross-country running.* ***Running taught me valuable lessons.*** *In cross-country competition, training counted more than intrinsic ability, and I could compensate for a lack of natural aptitude with diligence and discipline.* ***I applied this in everything I did. Even as a student, I saw many young men who had great natural ability but who did not have the self-discipline and patience to build on their endowment."*** (Mandela, 1995, p. 55).

Abstract

The aim of this theoretical thesis is to investigate what constitutes intuition and further discuss if intuition could be cultivated and if so, how. In order to do this, I have conducted a theoretical review and analysis of the development of the notion of intuition in the literature and what the prevalent underlying understandings of intuition are. Throughout this analysis, I have found that the prevailing understandings of intuition is largely influenced by prominent cognitivists investigating intuitive decision making under uncertainty. Thus, the heritage from the cognitive revolution is seen as governing modern day understandings of what constitutes intuition. Especially, the notions of bounded rationality and satisficing are seen as core elements of understanding intuition. However, these has hitherto prominently been approach cognitively. Following my discussion of the insufficiencies of conceptualizing intuition merely as a cognitive ability to be evaluated following the outcome of an action according to a predefined norm, I try to go beyond a cognitive understanding of intuition by implementing the notion of semiotic mediation. Through a semiotic mediational approach, I propose that in order to capture intuition as an inevitable process inherent in human meaning making, we need to see intuition as a feeling based process guiding our meaning making – both under pressure and in everyday life. For this reason, intuition is understood as being constituted by a pleromatic perceived feeling into the encountered situation guided by our hypergeneralized sign fields being made available in the current situation. Yet, these hypergeneralized sign fields are seen as being in a constant and reciprocal dynamic interaction with our schematic and pleromatic perception of the situations encountered and new hypergeneralized sign fields emerge through abductive leaps. From this analysis and discussion of a semiotic mediational approach to intuition I conclude that intuition is necessarily a dynamic and inevitable idiographic process true to *your reality*. Lastly, I perspectivally discuss my experiences from being a badminton coach both in Denmark and in townships in South Africa and from a pilot study preceding this thesis and from this discussion I conclude that if we move beyond merely relying upon abductive generalization in the semiotic mediational approach we might understand the opportunities of cultivating our, clients' or players' intuition intentionally and inductively. This suggestion of an inductive generalization pathway is largely founded upon the Acceptance and Commitment Therapy-inspired RICA-model (Register, Identify, Control/Accept, ACT) emerging through my pilot study at a Danish boarding school. Thus, following my theoretical discussion upon what constitutes intuition and if it could be cultivated, this thesis suggests that intuition is an inevitable idiographic process based on pleromatic feeling in to the situation and might be cultivated inductively and intentionally – maybe through sports.

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Introduction

It is the start of June. I have now been in South Africa for two weeks. The Danish sport federation, DGI, had asked me to go on a cultural exchange trip to South Africa with the primary aim of aiding the development of the sport of badminton in South Africa. I am at the moment on my way to my first practice in a township just outside South Africa in the city I here call RS. I have never coached players from such underprivileged backgrounds. And more stunningly – the players of RS were among the best in South Africa with several selections to the national youth and senior teams[1]. This is despite the rareness of a child growing up in the township ever to go beyond the fence of the township – even though Apartheid was abandoned several years ago. Now, 45 minutes into the practice loud noises outside the hall are making the players freeze on courts. What are they stopping for? Something heavy might just have been dropped or unloaded very close to the hall. So, I keep encouraging the players to go on even though they keep showing anxiety. But why did we react differently?

Only minutes later, the gate to the hall is locked and the local coach comes running. A gunfight had just taken place outside the hall. Now, I understand the shock in the eyes of the young players. I have been told that not all players find their way into the hall. Many get involved with gangs and drugs and maybe the victim outside was a sibling to one of the players in the hall. You could feel that tension among the players. On my way home, I wondered: *"What causes this big difference in our immediate experience and reaction in that particular situation? Is that intuition and why is it different among us?"*

Sadly, this is not a once in a lifetime experience for these players. This was just one example of the many horrors and meaningless situations encountered in my township visits. Later that summer, I had to pick up kids up to go to a training camp where they just jumped into the car due to a recent and maybe still ongoing gang fight with gun shootings around their flats. Five players jumped into the car even though I was only supposed to pick up three. Yet, despite these conditions a tendency of these young players, unlike their peers, was to end up with a degree from school, a job, and thus breaking the social inheritance of poverty promoting optimism and opportunities to others in the township both by being coaches, role models and mentors themselves and through creative artwork as music about the non-welcomeness of gangs in the community (Chad-Lee R Corker, 2020, March

[1] An example was from the year I attended South Africa. At the national championships for u19's. Of 5 finals, 2 included players from RS.

28). Since the return from South Africa, I have through my Master's studies continuously sought to investigate the above question – why are our immediate perceptions of and reactions in the same situation different? And why do our taken-for-grantedness and automatic approach to life differ, and what role does intuition play here? These questions lead me to the following quote of Plato:

> *"But our argument indicates that the power of learning inheres in everyone's soul. It's as if we couldn't turn our eye from the dark to the bright without turning our whole body around; so here we must turn the whole soul and its organ[2] of learning away from becoming until it faces being and can endure contemplating the brightest of what is … education would be the art of turning this organ around in the easiest most effective way … to look at where it should" (Plato, 1979, p. 178f.)*

In this little phrase, we can see the essentials of how Plato laid out both the grounds for understanding human meaning making – it is our eye of the mind. And if we follow the allegory of Plato's Cave in his dialogue with Glaucon (Plato, 1979, pp. 174-181), we can see how our eye of the mind is shaped by how we have experienced the world and the objects in the world hitherto.

In the allegory (see figure 1 on front page), prisoners have been chained facing the back wall of a cave without the ability of ever turning their heads and see what is behind the little wall behind them. Behind this little wall is a fire half way up the cave which projects light into the entire cave. Between this fire and the little wall people are walking with different objects balancing on top of their heads casting shadows towards the back wall which can now be seen by the prisoners. The prisoners here start to construct meaning of the objects seen in front of them socially by discussing what they see and how to understand the objects in front of them[3]. Further, all the noises and speech heard are by the prisoners thought to be originating from the apparent objects in front of them (the shadows on the wall). Yet, the shadows are not understood as shadows. The prisoners have never seen anything other than these shadows and therefore these shadows constitutes the reality for the prisoners – they are real objects for the prisoners. One day a prisoner is released and he starts forming new experiences while exiting the cave. And upon the hypothesized return of this released prisoner, Plato and Glaucon agrees that he has now formed new experiences with the world and thus his eye of the mind has taken

[2] = the eye of the soul, i.e. mind or intelligence (Plato, 1979, p. 179).
[3] This process of collaborative meaning making is today understood as social constructivism (Collin, 2012, pp. 371-374).

on a new perspective from where he can construct meaning opposed to the other prisoners still in the cave (See figure 1 on front page). However, as seen in the quote above, our meaning making processes are based in our experiences but it requires aid of the educator to turn our eye of the mind in the "right" direction. (Plato, 1979, pp. 174-181).

This opens for the possibility of affecting the way in which we make sense of the situations encountered in this world. But what if we do not have time to consciously and deliberately make sense of the situation? What about the immediate and non-conscious meaning making as seen above with the shooting accident? What about the taken-for-granted-approach to life as seen with the players showing initiative and seeing it as a natural thing to put in effort in their practice? What about the naturalness of jumping five people into a car to escape from gun shootings and being away from family for several days without your family's knowledge of it? I will term this automatic and non-conscious meaning-making process as intuition. However, this is a controversial term to apply since it leads to over 1 million hits and no clear definition (Hoffrage & Marewski, 2015, p. 156). Therefore, I want to look into what constitutes intuition and next will perspectivally discuss if we can cultivate and take control over our intuition and if so how. This lead me to the following research question that I decided to investigate in this thesis:

> *"What constitutes intuition? And is our intuition shaped by a coincidental accumulation of experienced situations and events, or could our intuition may be cultivated? And if so how?"*

Scope of thesis

In this thesis, I will not make a comprehensive systematic literature review of all research upon the notion of intuition since the literature dates back to Kant (2003, pp. 76-95) and maybe even before and has been largely theorized since. Instead, I will perform a theoretical analytic review of selected parts of the literature in order to understand how intuition is in mainstream literature understood to be constituted, and how we need to further elaborate these approaches in order to pave the way for understanding different immediate and intuitive perceptions of the same situation as we saw with the South Africa example. Further, I want to understand if and how our intuition and intuitive meaning making and approach to the world and life can be cultivated as with the South African players choosing different paths of life following their participation in sports and here badminton.

Throughout this reviewing process, a question kept ruminating in my mind, and this question could be understood from Plato's understanding of meaning making and the eye of the mind. Is intuition and thus the eye of the mind an inevitable meaning making process? And is there a "right" direction to look at *a reality* or is the intuition true to *your reality*? Going back to the township examples above was there then ***A*** right way of making sense of the situation? Certainly, there was a culturally proper way of making sense of the situation but was my automatic and non-conscious meaning and following action (intuition) wrong? Was it wrong of me to keep practicing despite of shootings? In almost every situation otherwise encountered by me this action would have been "the right one" because loud noises appear in badminton halls and should we stop every time? Was it wrong of them to jump five players into the car? The rules state that you are only allowed three in the backseat. And further, they had not told their parents. Yet, in this situation it could be argued to be a good solution to be five in the backseat without speaking to the parents. They were more safe with me driving away than at home still in the flats. And what about their initiative and apparent investment in their badminton and in school? Was that wrong? Their peers seemed not to invest as much in their school and future?

As you will see, as with the rest of psychological literature during the cognitive revolution (Friesen & Feenberg, 2007, p. 720; Moran & Toner, 2017, pp. 363-366) prevalent conceptualizations of intuition too turned towards a cognitivist approach to the ability (Gigerenzer & Gaissmaier, 2011; Kahneman, 2011; Klein, 1998) to modern day intuitionist theories acknowledges the role of education in turning the eye of the mind in the easiest way possible or to make it look at where it should look. But in which direction should we actually understand intuition – remember the examples above? As a relative process of perceiving *your reality* from the eye of your mind or as an ability to reach *a reality* following a realistic[4] approach or at least a socially constructed normative reality? To answer this question, we need to move through the methodology cycle (see figure 2) in order not just to reproduce already existing yet not fully sufficient conceptualizations of intuition but to move beyond already existing ideas of intuition and thus grasp the tension I have felt the underlying assumptions flavoring the modern understanding of intuition compared to my experiences both in South Africa and in my professional work as a badminton coach and mental coach.

[4] For further definition of realism see p. 13f.

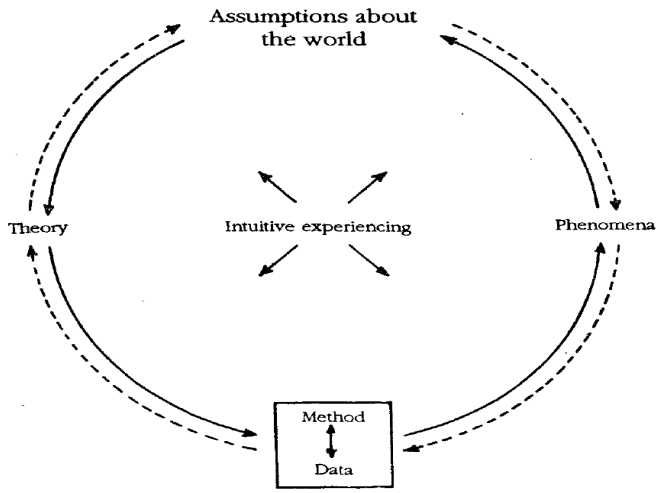

Figure 2 – The methodology cycle (Branco & Valsiner, 1997, p. 39)

We need to discuss the meta-theoretical more philosophically oriented question of reality in order to understand the basic epistemological assumptions behind prevalent cognitivist perspectives to intuition and how to move beyond to understand intuition as a relative and inevitable process. This will be pursued through implementing semiotic mediation by Valsiner and colleagues (Branco & Valsiner, 2010; Valsiner, 2021; Zittoun et al., 2013) which is a feeling based process-oriented approach to human meaning making bridging the gap between feelings and cognition inherent in the intuition literature as will apparent later in the theoretical analysis of the field. By applying semiotic mediation, we will further be enabled to understand the potentials of cultivating our intuition. This can only be achieved through not just replicating the methods and data already applied in the field and thus taking theoretical, ontological and epistemological questions for granted. In order to stay true to the phenomena experienced and capture the complexity of the phenomena – here intuitive meaning making processes – we need to question some of the underlying theoretical and meta-theoretical ideas identified as largely flavoring the already existing conceptualizations in the field.

To enhance the flow of reading and to be able to show my ideas in relation to already existing theorizations of intuition and meaning making, this thesis is not build ordinarily with a theoretical review, analysis, discussion resulting in a conclusion. This will be constraining my opportunities to show potentials for innovations of ideas following the identification of necessary moves beyond already existing and qualified understandings of intuition. I have instead chosen to build my thesis along chapters with incorporation of both theoretical explanations, analysis and discussion in order

to move flexibly in the methodology cycle leading to intermittent conclusions of the next steps to be taken in order to make a final generalizing conclusion in the end.

The content of the thesis is as follows. Chapter 1 is a meta-theoretical discussion of the philosophical and epistemological assumptions underlying the different theoretical perspectives in order to analyze distinctions in between and discuss suggestions for moves beyond the included theoretical accounts of intuition. Chapter 2 is an analysis and discussion of the cognitive turn in conceptualizations of intuition while chapter 3 is indications of moves beyond by incorporating feelings as inherent in the meaning making process and here intuitive meaning making. Chapter 4 will be an elaboration of a feeling based semiotic mediational move beyond cognitivist understandings of intuition and chapter 5 will be a theoretical conclusion of how intuition will necessarily be an idiographic feeling and not a cognitive ability. In chapter 6, I will present a perspectival discussion of if and how our intuitive meaning making process potentially be cultivated – maybe through sports. This chapter is inspired by my experiences from a recently performed pilot study. Lastly, chapter 7 will be a general conclusion of the whole thesis – both theoretical analysis and discussion of what constitutes intuition and the perspectival discussion of if and how it might be cultivated. Throughout this thesis, I will bring in my experiences from being a coach and from the. data from the pilot study as exemplifications of my theoretical proposals. Further, by bringing cultural psychology to the field of sports, I will show how this field can function as a strong catalyst[5] of development due to the great emotional engagement and goal-directed behavior present in this field which can thus function as a crucial magnifying loop of the inevitable goal-directedness of human beings in everyday life and a flourishing field for understanding human development (Henriksen, Diment, Hansen & Larsen, 2016, p. 72; Lykkeskov, Askildsen, Eckerdal, 2020, p. 83).

Chapter 1 – A meta-theoretical review and discussion of intuition being built upon philosophical assumptions as a normative cognitive ability.

Intuition has been largely investigated for decades both in basic psychological theorization as well as in management literature (Osbeck, 2001, p. 119f). As mentioned above, I will not perform a comprehensive literature review of the field of research in intuition. I have sought out every literature

[5] The catalyst idea highlights how we are not linear casual systems but open-ended systems affected by catalytic forces that are non-linear but present factors catalyzing certain developmental trajectories (Valsiner, 2014b, p. 31).

review with intuit* as the search word on PsycNet, and I got 394 articles reviewing this subject. However, I was interested in the reviews specifically reviewing theoretical contributions, and I narrowed my search to all contributions containing intuit* in title, and I got 36 hits going all the way back to 1984[6]. Since the scope of this thesis is to investigate the theoretical ideas and conceptualizations behind intuition, I read every literature review in order to find tendencies in theorizations upon intuition and I followed the traces in the reference lists in order to further investigate the field behind the reviews. Interestingly, the literature has not yet reached a common agreement upon how to understand this concept of intuition. Yet, a movement countering the rationality approach to human thinking and reasoning was slightly initiated from the times of the Würzburg school and Otto Selz (Wettersten, 2017, p. 442f) and his contemporary scholar in psychiatry Carl Gustav Jung (1910; 2017) around 1900-1920's to Herbert Simon (1955) here gaining prominence during the cognitive revolution up to the 1980's after Simon won a Nobel Prize in 1978. He was followed by three major conceptualizations that are repeatedly mirrored in this multitude of reviews and discussions on intuition. Here Tversky and Kahneman's (1974) Heuristics and Bias (HB) approach extended Simon's first endeavors by showing the biased human mind. Kahneman was too awarded a Nobel prize for his endeavors in 2002. In parallel Gary Klein (1998) situated in the Natural Decision Making (NDM) approach and Gerd Gigerenzer and colleagues' (Gigerenzer and Gaissmaier, 2011) fast and frugal heuristics (FFH) approach worked to show that Kahneman had not yet fully reached the goal.

[6] Checked 16/4/2021. I ended up with 28 reviews after discarding five reviews, one double, four dissertation abstract, one French, one German and one Polish: Akinci & Sadler-Smith (2012); Allaire-Duquette, Babai & Stavy (2019); Anderson, Slark & Gott, (2019); Baldacchino, Ucbasaran, Cabantous, & Lockett (2015); Bruce & Ricciardelli (2016); Claxton (1998); Dane & Pratt (2007); Des Jarlais (1999); Graham & Ickes (1997) ; Guzzetti (2000) ; Hall (2002) ; Hoffrage & Marewski (2015); Kardes, Muthukrishnan & Pashkevich (2005) ; Kubricht, Holyoak, & Lu (2017); Kuo (1998) ; McCrea (2010) ; Melin-Johansson, Palmqvist & Rönnberg (2017) ; Okoli & Watt (2018) ; Osman & Stavy (2006); Pétervári, Osman & Bhattacharya (2016) ; Pollard (1984); Reyna (2012) ; Saris & Gallhofer (2004); Shirley & Langan-Fox (1996) ; Torff & Sternberg (2001); Versloot, Grudniewicz, Chatterjee, Hayden, Kastner & Bhattacharyya (2015); Yu (2016); Zhang, Lei & Li (2016).

However, emerging during the cognitive and probabilistic revolution of psychology had its boundaries (Gigerenzer, 1991b, p. 84f). Neither the FFH or the NDM approach sufficed to move beyond a cognitive approach to intuition as well as the following approaches all more or less building upon the cognitive legacy (Okoli & Watt, 2018, p. 1124; Akinci & Sadler-Smith, 2012, pp. 115-117) – they are all left with Platonian dogma of orienting the eye of the mind in the right direction. In other words centering around the ability to intuitively make sense of the encountered reality in the proper

Figure 3 - Timeline from Akinci & Sadler-Smith's (2012, p. 105) review upon intuition and their selection of key ideas.

way. And thus as an ability to be evaluated. As apparent in figure 3, we see a massive increase of approaches to human intuition following the works of Simon (1955; 1979; 1981; 1982a; 1982b). Here, especially one question flavor the debate all the way from Kant's (2003, p. 70) statement that pure reason does not exist and intuition is flawful to Carl Jung's (2017, p. 6) and the intuitive irrational type and all to Tversky and Kahneman's (1974) biased mind; Is intuition to be trusted? Are you ought to understand human meaning making either realistically or more relativistically, and are people rational, irrational or non-rational?

As we see in The Republic (Plato, 1979, pp. 174-181) philosophers and educated people are ought to guide people to look in the right direction meaning that there is an underlying assumption of realism and a "right" and "wrong" way to grasp this world – if not a natural world then at least a normative world. If we follow Plato's lead, intuition or the eye of the mind might not be one to be trusted due to its dependence on our past experience, and the following inability to see and learn the truth – e.g. the ability to look in the right direction. However, if we do not completely follow Plato all the way but hang on only to the first part of the quote above, meaning and truth could be understood as relative to the perspective from where you look from your eye of the mind. To grasp intuition not as an ability to be evaluated but as a process to anticipate *your future* on behalf of *your* reality we need to see intuition as not being an unreliable cognitive ability to be evaluated but an inevitable perspective taking in our meaning making allowing us to make sense of the complexity of everyday life.

Following the cognitive inclination in theorizations upon intuition – all with traces to the above mentioned three approaches (Akinci & Sadler-Smith, 2012, pp. 115-117) I will in the remainder of this chapter discuss the dichotomy of realism vs. relativism underlying the intuition literature in order to understand how intuition is cognitively understood to be ***evaluated*** by the outcome of your action and comprehension of ***a reality***, while suggestions of a more relative approach to intuition understanding ***your reality*** and ***anticipating your future*** has been proposed but not yet fully embraced.

Realism vs relativism in the aim of understanding human reasoning

The discussion of whether to understand reality realistically or relatively goes back to Plato and maybe even before him. As we saw in the quote above the prisoners creates their own reality in the cave but Plato highlights the presence of *a reality* outside the cave which we need to educate people about. Thus, we see a relative understanding of meaning-making - constructed through social

interaction on behalf of your experiences with the world - but a realist understanding of truth. Realism is here understood as the ability to produce essential truths about the world and the reality in which we are living and further the ability to disregard false theories. In other words, through a realist approach you are able to find ultimate truth no matter the perspective, linguistic practices, meanings and conceptual frameworks. In opposition to this, relativism highlights that theories and truths about the reality we inhabit are largely dependent upon the cultural norms we adhere to and the perspective from where we are looking (Lippert-Rasmussen, 2012, pp. 504f; Lippert-Rasmussen, 2012, 528f).

Fast forwarding time around 2000 years, we saw revolutions all across Europe. The former days of being suppressed and ruled by secular and feudal powers were countered by a new era of enlightenment and a turn towards a liberation of the individual. Further, the revolutions led to a rebellion of the monopolization of knowledge. The contemporary previously suppressed individuals and intellectuals would no longer tolerate suppression and started investigating "the truth" independent of the feudal and secular suppressive ideas. A realistic pursuit of exploring "the truth" was initiated (Valsiner, 2012, p. 15f; Valsiner, 2012, p. 82f; Hoffrage & Marewski, 2015, pp. 147-151). The goal of the enlightenment era thinkers was to reach an actual understanding of the world they inhabit and they wanted to understand the individual apart from what has previously been prescribed by spiritual leaders in diverse religions (Hoffrage & Marewski, 2015, p. 147). They wanted to pursue the reality outside of the cave in which they had been forced into by the suppressing power holders.

One of the main thinkers in the Enlightenment era was René Descartes (Hoffrage & Marewski, 2015, p. 120). Merely by looking at his first rule in his Rules for the Direction of The Mind, (Joachim & Harris, 1997, p. 19), we see a realist approach to understanding truth and knowledge. The purpose of studying the mind is to enable the mind to make solid and true judgments on all that comes before it. Which is in line with Plato's prescription for Glaucon. To orient the eye of the mind to look in the right (here understood as the true) direction. Further, Descartes emphasize our natural abilities of discriminating true from false (Joachim & Harris, 1997, p. 19), and proposes in his third rule that we should not rely on what others believe but only what is clearly perceivable and inferred with certainty. This is the only way that you can obtain genuine knowledge (Joachim & Harris, 1997, p. 19). Thus, knowledge – Scientia – is infallible and reliable in contrast to opinions and conjunctions which are probabilistic thoughts that could be doubted and thus not with certainty entail *the reality* (Joachim & Harris, 1997, p. 19).

Immanuel Kant (2003) followed this pathway of investigating reality by highlighting the necessity of studying the order of knowledge and human reasoning and providing systematic results upon these orders and rules (Kant, 2003, p. 878f; Valsiner, 2012, p. 83). Yet, in Kant's pursuit of finding order in nature, he had difficulties of finding order in human thinking. Therefore he claimed that announcing psychology as a science would be an impossible construction (Kant, 2003, p.878f; Valsiner, 2012, p. 83). In his Critique of Pure Reason (Kant, 2003, p. 76-95), intuition is seen as an element of all our knowledge and thus pure reason is impossible. We are synthesizing our past experiences inductively in order to deductively form synthetic priori judgments from which we can infer about the situations encountered and further keep on inductively creating new synthetized priori judgments to guide us in future situations. These synthesized priori judgments is what Kant (2003, p. 97f) understand as intuition. Due to these intuitions our reasoning of the "real" world out there is flawed, and we cannot conceive anything purely (Kant, 2003., p. 70) – our conception of the world is dependent upon our experiences of the world (Kant, 2003., p. 122). We are in Kantian terms empirical intuitionists and thus flawful. Further, Kant prescribes the need of science to investigate these intuitions in order to understand if and how pure reason is created and further finding *rules* to understand how we can understand the synthetization of priori knowledge (Kant, 2003., pp. 95-100). If we do not apply science to understand reason everybody can claim "truths". Intuition is by Kant (2003, p. 95) seen as a relative synthetization of experience into priori judgments even though these might not mirror a more realistic and natural truth. Intuitions are subjectively and socially constructed and are phenomena that cannot exist by themselves and we know nothing more than our intuitions which is our mode of perceiving the objects encountered. We as human beings tend to forget our intuitions and thus forget that we are only claiming truths about representations of objects through our intuitions because we do not have pure reason but only empirical intuition which is synthesized judgment a priori on behalf of our previous experiences. Thus nothing can be known in itself. We are guided by our synthesized empirical intuitions and thus we may be *intuitus derivatus* (deducing) and not *intuitus originarius* (intuiting) (Kant, 2003, pp. 134-145). This underlying assumption of truth and thus the purpose of studying reason is realist in line with the ideas of Descartes and following Osbeck (2001, p. 120f) and Hoffrage & Marewski (2015, p. 147f) this realist approach of the enlightenment era was core assumptions underlying the rationality approach to human reasoning during the first half of the 20th century.

Oppositely, Hegel proposes a more relativist approach to understanding reality in the Romanticist Era (Valsiner, 2012, p. 83f). Around the 1790's the Tübingen School started to move away from the Kantian axioms of influencing on and being *influenced by* the environment to *living through* the environment. Hegel's dialectics was part of this move. And he built his ideas upon the ideas of Friedrich Schelling who did not see nature and reality as an entity out there to be known but instead being ever in the process of formation on behalf of interdependent relations (Valsiner, 2012, p. 90). Here, Hegel took one more step towards relativism with his notion of being (Sein) and being-out-there (Dasein). Hitherto, the nature of the reality out there was independent of man even though in relation and these relations and orders had to be measured and rules put forward. Yet, with Hegel's notion of Dasein he moved beyond this notion proposing that we should not investigate the illusion of *a reality* but instead accept our embeddedness in understanding this reality and thus investigate *our reality* - our Begriff – see figure 4 – (Valsiner, 2012, p. 95f).

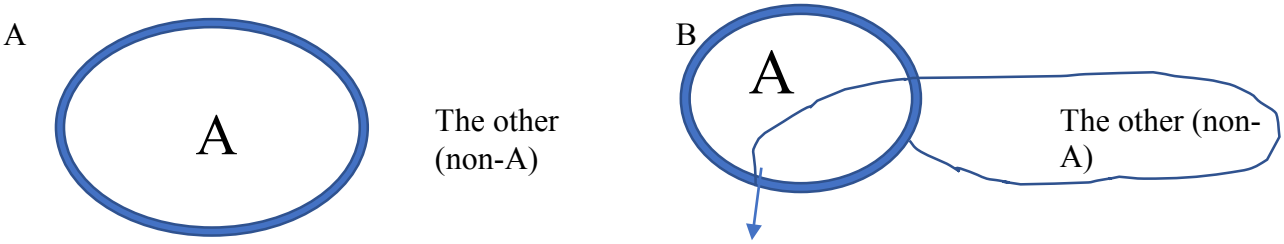

Figure 4 - Here we see the contrast between the Kantian notion of THE *other out there and the Hegelian other seen through A (after Valsiner, 2012, p. 96)*

Here, we see that we cannot understand The Other (the world encountered) independently but we will come to know The Other through ourselves. We are mediative generic beings who understand and construct a reality interdependently through our experiences with this world (Valsiner, 2012, p. 97). Thus, we see the roots of a phenomenological approach building upon Kant's ideas of empirical intuition which is our inability of knowing nothing more than what we have experienced. We are not able to investigate *a reality* out there. Instead, we are investigate *our reality* as it is mediated and stands out for us as a phenomenon to be grasped (Valsiner, 2012, p. 97). However, as you will see when we start discussing the different cognitivist approach to intuition, the Cartesian and Kantian ideas of *a reality* out there to be grasped are the prominent underlying assumptions; the evaluation of the amount of flaws in our ability to conceive of *the reality* and make *the right decision* or orient our eye of the mind in the *right direction* in the presently encountered situation.

In sum, following a realist approach stemming from the enlightenment era we are supposed to propose falsifiable theories in order to eliminate the false theories and uncover absolute truths (Lippert-Rasmussen, 2012, p. 504f). Yet, the relativist approach from the romanticist era takes on a kind of Hegelian perspective of looking at *your reality* on behalf of how it stands out for you and is understood by you on behalf of your cultural upheaval (Lippert-Rasmussen, 2012, p. 505; Lippert-Rasmussen, 2012, p. 528). In the following, I will investigate the move towards cognitivist theorizations of intuition, and how they are grounded philosophically and epistemologically in a realistic, rapid and non-conscious more or less truthful apprehension of *a reality*. This analysis is performed in order to discuss the need to move beyond a realist and cognitivist approach to intuition as an ability of more or less "value". As you will see below, I will instead propose a conceptualization of intuition allowing us to grasp the generic component of intuition and how we can influence, cultivate and maybe even control our intuition and thus our rapid, automatic and non-conscious meaning making of both everyday life and under pressure situations as in sports. How we can cultivate our eye of the mind.

The move from a phenomenological and relativist approach on reasoning to a realist and rational approach to human reasoning

In order to understand the move to a rational and realist approach to human reasoning, I will firstly show how the phenomenological school of Husserl could be seen as initiating a movement in the Würzburg school that set the stage for intuition being understood as an inevitable anticipating process of human reasoning on grounds of our past experiences, and how this was taken up by Jung but was abandoned and substituted by *the rational man*. Secondly, I will discuss how the questioning of the boundaries of this rationality started a movement in a contemporary time of a cognitive revolution towards an understanding of intuition as being irrational or at least non-rational partly flawing human reasoning evaluated by the ability to intuit rather than the enablement of anticipation due to a cognitivist inclination grounded on the Cartesian and Kantian axioms of realism.

Husserl's Phenomenological approach to intuition

Following the Hegelian imperative of a relativist approach to understanding reality through the eyes of the subject, the Würzburg School proposed the introspective approach in understanding the "Aha-

Erlebnis"[7] or insight (Bühler, 1951, p. 49) in a contemporary scientific community accepting these introspective endeavors.

Insight was in these years linked to intuition by Edmund Husserl in his phenomenological approach to knowing, when knowing is to realize that something is as it is thought to be, and this being is dependent on the perspective taken towards and intention acted upon the object (Willard, 1995, p. 138). Intuition, thoughts, and psychical experiences are not just symbolic representations of their content. Instead, intuition is the process producing the thought and intention on an object to be fulfilled, and the fulfilment of the representation confirms the intuition (Willard, 1995, p. 151). Thus, it is the *bewusst erkentniss* (conscious realization) of a fulfilment of the intention upon the object or content of thought leading to forming intuitions about what is known, guiding perception in future encountered situations (Willard, 1995, p. 145f). Thus, the object of investigation is for Husserl not an essential truth. Husserl argues that we are semiotically mediating the nature we encounter through the symbols and signs that stands out for us offering us meaning in that situation based on our past experiences with similar signs and symbols, and thus we can talk about idiographic authentic consciousness of nature which is to be investigated. Therefore, the aim of studying human thought is to study the knowledge of the truth within the individual (Willard, 1995, p. 141f). We see an apparent inspiration through the relations between the objects and signs as they stand out for us (Willard, 1995, p. 157) to the relational approach of Friedrich Schelling's *Naturphilosophie* of the end of 18th century. In sum, intuition and reality is to be investigated through the eye of the "knower", who is interacting with and mediating the situation encountered. Thus, there is an imperative to investigate intuition and knowledge as it is mediated by the individual paving the way for introspection of how the phenomena is perceived and stands out for the subject founded on his *bewusst erkentniss* of the objects and the situation – his insight. In other words, insights lead to intuitions to be formed – a shaping of our eye of the mind – and when these are fulfilled, we further create new intuitions (Willard, 1995, p. 145f). Note here the similarity to Kant's synthetization of experiences principle leading empirical intuition. Intuition is here seen as an anticipatory process on behalf of your past experiences. Thus, intuition is not flawing our opportunities to see *a reality*. In this phenomenological approach, intuition helps us comprehend *our reality* on behalf of our past experiences in a complex world and may thus be trustworthy for ourselves. Yet, this move towards a trustworthy intuition following insight in a contemporary environment encompassing introspection and thus a relative and phenomenological

[7] The original expression used by Bühler translated to "Aha-experience". The concept is further elaborated further in chapter 4.

approach to meaningful comprehension of *our reality* was soon substituted by a more rational approach gaining wind in an industrialized world (Hoffrage & Marewski, 2015, p. 147f; Osbeck, 2001, p. 120f).

The rational human being

The Hegelian inspired romanticist inspired approaches as the one presented above by Husserl with experience leading to intuitive anticipation of *your future* was largely affected by the massive industrialization during the beginning of the 20th century. In that context, Taylorism became the ideal of both science and work organization with analysis, objectivity, quantification and specialization being at the core of all prominent scholarly literature and organizational thinking (Hoffrage & Marewski, 2015, p. 150). This further enhanced the ideas of man being economically rationalist and this idea was largely present in the literature upon reasoning and decision making (Edwards, 1954, p. 381; Simon, 1955, p. 99f). The prevailing assumption in rationalism is utilitarian; we seek to maximize our outcome of a given situation (Edwards, 1954, p. 382). In our pursuit of utility human beings are calculating the decision from where they gain the most (Nedergaard, 2012, p. 472). To do this, the economic man will have to be able to calculate all courses of action and outcomes, have infinite sensitivity to all possible opportunities from which to choose, and man will be ordering and analyzing the situation in order to maximize the outcome of the situation (Edwards, 1954, p. 381). Discussions arose with game theory being proposed whether if the rational economic man was indeed trying to maximize outcome or if he was following a minimaxing principle. This entails that man being calculating from what applied strategy he is minimizing his maximum loss (Edwards, 1954, p. 407). Yet, with the rapidly evolving industrialized societies it was not only man who was economically rationalist – society was too (Nedergaard, 2012, p. 475). We see again the roots of enlightenment and the grudge of man being suppressed and now wanting to gain individual growth and capitalism was on a rise in these years during and post industrialization. Remembering the Cartesian and Kantian ideals of ordering the human psyche through realist inclinations we too see the ideas present here in the years of industrialization providing an understanding of man being rational – *the reality* is that man is rational, and there is ***A*** right way of maximizing your or the society's outcome. Accordingly, your actions can be evaluated against a reality and *your intuition* based on *your reality* will be flawing this calculation of optimization.

The rational approach to human reasoning was primarily founded by an economic game theoretical approach of individuals playing games with one or two other participants with no time

constraints on decision making. Here, Edwards (1954, p. 410f) started to question the underlying assumptions of mere rationality in more complex situations beyond the one-on-one games. And this call for beginning to question rationality was not completely absent in theories of human reasoning.

The (ir)rational human being?

Around the time of the Würzburg School of introspection (first decade of 20th century – Bühler, 1951), Carl Gustav Jung (1910; 2017) was conceptualizing a theory around human reasoning. For the scope of this thesis, we will not dwell upon a thorough discussion of Jung's (2017) typology of individuals according to their reasoning. Instead, we will look at how Jung (2017) started to question the rationality of human being and maybe even predicted the cognitivist move investigating the boundaries of rationality led by Simon (1955) and followed by Kahneman (2011) amongst others (Beebe, 2017, p. xviii). In order to investigate the non-conscious processes of human reasoning Jung (1910) conducted several word association tasks. The scope of these tasks was to investigate the first words coming to mind when presented with different carefully selected stimulus words. Further, the subjects' reaction times was measured to see which words created the longest reaction times. These were seen as the most emotionally significant and arousing stimulus words and Jung (1910, p. 223f) concluded that these word association tasks was a window to see, how the human mind was not rational but indeed guided by the non-conscious underlying feelings automatically emerging when faced with these stimuli. From these reaction times and associations provided, Jung (1910, pp. 226-230) could infer the meaning making tendencies of the subject in the experiment and thus try to understand these subjects' mediational tendencies similar to Husserl's and Hegel's relational concept of intuition – the study of the subject's reality. Further, Jung (1910, p. 238) actually reproduced his word association tasks with the same subjects in order to show the dynamics of human meaning making. They were not the same. Despite of Jung's endeavors of questioning rationality and investigating subjectively dynamic meaning making processes he still continued to pursue the realist ordering of personality types (Jung, 2017) and he was not able to abandon the rationality/irrationality dichotomy of evaluation of intuition fully and thus fully embrace the anticipatory aspects of intuition – even though the rationality was indeed questioned and subjective dynamics were highlighted.

Jung was not alone in questioning rationality. Starting out in the American Telegraph and Telephone Company as a statistician and ending in the management of the New Jersey Bell Telephone Company, Chester Barnard (1938, in Akinci & Sadler-Smith, 2012. P. 106) held on to the ideas of Jung (2017) with both a logical/rational mental process and a non-logical/irrational mental process.

In human reasoning, we are both applying logical processes of thinking being able to be expressed in words or symbols but simultaneously we apply non-logical processes being non-conscious processes apparent through judgments, decisions and actions (Akinci & Sadler-Smith, 2012, p. 106). By looking at executives opposed to scientists, Barnard (1938, in Akinci & Sadler-Smith, 2012. P. 106) proposed that executives did not have the luxury of time to perform thorough rational analysis. Instead, executives had to rely upon intuition in complex situations. Intuition was here complex, rapid and spontaneous judgments primarily based upon experience and knowledge. However, he did not perform a complete distinction between logical and non-logical mental processes (Akinci & Sadler-Smith, 2012, p. 106). This move (Akinci & Sadler-Smith, 2012. P. 106) started to make scholars interested in the operation of intuition in human reasoning when under pressure in complex situation as with the executives. Of course, some scholars have remained in the more rational and engineering approach to human reasoning and thus intuition. Here, models translatable to electronic devices in order to be replicated and ensure objectivity and transparency are proposed, and further neuro-imagination approaches are applied in order to capture the universal rules of intuition and predict outcomes according to these rules (Hoffrage & Marewski, 2015, p. 149; Anderson, 2007). However, the questioning of rationality initiated by amongst Jung and Barnard was key in the move towards the cognitivist approach to intuition that has been largely dominating the field since Simon's and Kahneman's two Nobel prizes in the era of the cognitive revolution.

As Edwards (1954, p. 410f) started to question the underlying assumptions of mere rationality in more complex situations beyond the one-on-one games, Simon (1955, p. 104; Simon, 1977, p. 310; Simon, 1982b, p. 383) followed this approach when proposing his behavioral model of rational choice later to be known as bounded rationality (Simon, 1979, p. 498). Following, Simon (1979, p. 502f) the omniscient rationality and the optimization paradigm introduced in management practices were not possible. For years, the theories of the optimizing and maximizing rational economic man had provided normative accounts of how we should behave. This was especially due to the underlying studies providing misleading results serving as grounds for conceptualizations of human thinking and decision making. Most studies had been investigating well-structured problems of puzzle-like experiments with numerical variables to be assessed for maximization of pay-offs in order to make the best decision. Thus, the subject could initiate computations of outcomes and consequences explicitly and quantitatively due to the structuration of the task at hand (Simon, 1977, p. 308f). However, Simon (1982b, p. 383f) sought to investigate how we actually do make decisions under uncertainty in ill-structured problems that do not have clear goals to be obtained and when the

problems are more symbolically or verbally presented across different units to be accounted for. Hitherto, optimization studies had been investigating production leaders and factory managers making decisions upon optimization. But what happens when you enter higher level executives ill-structured problems of drafting sick-leave policies and public relations policies (Simon, 1982b, p. 38f). Following the scope of this thesis of investigating intuition and cultivation of intuition through sports then ill-structured problems could be: Where to play the next stroke in a badminton match? When living in a township being selected to go to the nationals on the other side of the country and here being provided with money to food, how should I spend the money? Should I spend them all on food to be able to compete or should I save some for my family at home so my siblings could get food for some days when I get home?

The aim for Simon, was to investigate how humans made decisions under these diverse ill-structured situations and here he proposed that we are not approximating optimization and perfect rationality. Instead, we make decisions following completely different processes and these processes was of major concern to study for cognitive psychologists (Simon, 1979, p. 800f). Even though, Simon (1979, p. 494f) counters the perfect normative rationality he still stresses that the ideal is a realistic approach as in natural science – even though this might be unattainable. Thus, the approach as well as the decisions to be made by bounded rational individuals have to be realistic enough to the purpose at hand. This is one little step towards a Hegelian approach of relativism without leaving realism. But what is then this bounded rationality?

Simon (1955, p. 107f) studied amongst others chess players and from these studies he proposed that humans are rational within certain physical and psychical boundaries both internally and externally. Following introspective methods it was discovered that we do not complete fully rational computations of all outcomes before making a decision. Instead, we use simplifying methods of selective search based on some learned rules of thumb that allow us to make decisions rapidly (heuristics) (Gigerenzer & Gaissmaier, 2011, p. 454; Simon, 1979, p. 507) both stemming from our previous experiences (our ontogeny) and evolutionary development (phylogeny) (Gigerenzer & Gaissmaier, 2011, pp. 454-456). These selective searches then guide our attention in the problem space to a limited and meaningful area of the problem space from where we have to search for behavior alternatives to choose between (Simon, 1955, p. 102). We do not have processing capacities to process all the information given in a problem space when encountering a new situation (Simon, 1955, p. 101). Instead, we can only process a limited amount of information, and this limited amount is made available by the selective searches on behalf of heuristics. From these limited alternatives

considered we evaluate the possible outcomes of choosing these alternatives and what the pay-offs are for us. Here pay-off is the perceived value of an outcome in relation to the cost of reaching this outcome and how likely this outcome is to occur probabilistically (Simon, 1955, p. 102). From this a satisfactory level is set and when the information crosses this satisfactory level we make a decision. This is the satisficing principle (Simon, 1955, pp. 104-106; Simon, 1981, p. 36). An example of this in badminton could be seen with how much money spend on food at a badminton tournament when coming from a township:

> *When having to perform at the tournament, I might feel hungry and I know, I cannot perform optimally when feeling hungry. However, I too know that me and my family will not have money for food when I get home. At the tournament I eat small snacks just before matches so I have "enough" energy to play but I accept my hunger during the day, and I eat a big breakfast from the provided breakfast buffet*[8].

In this little example, the satisficing level is to not feel any hunger just before the match so that he/she feels he/she can concentrate at least a little during the match. Additionally, he/she eats plenty of food when meals are provided in the morning and when arriving late at night at the Bed & Breakfast. Here, the player uses simplifying methods in order to calculate simple pay-offs in a complex situation not being able to calculate all outcomes of every behavior alternative possible in that situation. Simon (1955, p. 107f) saw this satisficing principle with chess players looking for good enough moves and not the best moves. These simplifying methods based on heuristics leads to easier mappings of alternatives and thus decision making – not based on maximizing but on satisficing. These calculations in opposition to the optimization paradigms contain several diverse units in the calculations of pay-offs and satisficing. In the above example it is both energy level, hunger, food quality, badminton results, concentration capacities etc. But the question is: "What determines satisficing?"

Here, Simon through his notion of satisficing creates some sort of a black box[9] of intuition that has not yet been fully opened (Akinci & Sadler-Smith, 2012, p. 116). While optimization and

[8] This strategy was seen applied when attending the National Championships for U19's with the Western Province Badminton Association in South Africa in 2018.

[9] Black boxing is a concept especially used by Latour (1999, pp. 174-215) where theories, concepts and technologies can be black boxed and difficult to open up and fully comprehend because of the complex network of actors and artifacts reciprocally being constructed. Thus, theories and

maximization is not possible the satisficing principle entails that we are making situational assessments of what we want to attain in this situation on the basis of what we have previously learned is attainable and the limited amount of information available in the current situation. More specifically Simon (1955, p. 110f) relied on the notion of Level of Aspiration (LoA). LoA defines our satisfaction and as we learn that we can reach the satisfactory level our LoA will rise and if we fail in reaching satisfaction our LoA will decrease. Thus, our LoA is dependent on learning from past experiences in similar situation in order to allow us to set expectations for satisfactory levels (Simon, 1955, p. 113). But what is LoA then?

LoA is seen as a basic element of cognitive theory serving as the reference point for the feeling of success or failure (Starbuck, 1963, p. 51). The underlying assumption is that we are goal-oriented beings who perceive behavior alternatives to be satisfied and our learning from past experiences will determine what to expect and thus the level of aspiration in that particular situation (Starbuck, 1963, p. 52). LoA is seen as a realistic reference point guiding our expectations in a given situation and enables us to be adaptive (Starbuck, 1963, p. 53). The inherent realism stem from the situational closeness of the LoA and thus the consistency with the experienced reality of that person, his cultural background, achievement history (Starbuck, 1963, p. 56). Yet, this realism is not following the Kantian realism as presented above. It actually seems as a move to Hegelian Dasein notion of the reality of that person in that situation with that personal history situated in that cultural context. We see here inspirations from the Lewinian topological map of the field of forces where the individual is situated in a context between several social forces in the field around him affecting him to make expectations (here LoA) meanwhile the subject's actions are reciprocally affecting the forces in the field around him (Lewin , 1942, p. 215; Lewin, 1951, pp. 256-268). Throughout life individuals will then form a superstructure of vaguely defined, non-operational preferences guiding the goals of the individual in his encountered situations and this structure will be dynamic. And the goals guided by this superstructure is evoked by cues in the environment and the process of these cues (Starbuck, 1963, p. 58f).

From the above we can extract that humans are guided to make decisions by the satisficing principle that is based upon learning and adaptation following the ideas of LoA. In other words, the

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technologies will risk losing the transparency when being applied in several domains and thus folding the different meanings into one. I am in a research project studying this process with implementing technologies in monitoring work life motivation and engagement, and we propose the same is the case with theories. The black boxing is beyond the scope of this thesis to study. However, we will use the term as a substituent for: a complex concept/technology to be explored.

satisficing mechanism guiding decision making is a basic and simple mechanism operating in extremely complex boundary conditions – hence the bounded rationality. We see here how rationality is questioned by the notion of bounded rationality and that decisions depend largely on satisficing of levels of aspiration. And these LoA are largely based on the learnings from previous experiences forming goals and LoA in the encountered situation and thus guidance for behavior and meaning making in the current situation. But yet again we can ask the question: What determine the satisfactory level and how does that affect our meaning making process? And what happens when we are under time pressure and have to decide where to play the next stroke in a badminton match or how to react when shots are fired outside the hall?

Ultimately, Simon's endeavors lead to several approaches to decision making under uncertainty (Gigerenzer, 2008, p. 81). In the years after Simon's original questioning of rationality the cognitive revolution and probabilistic revolution rose and impacted the understanding of intuition (Gigerenzer, 1991b, p. 83f). Intuition was now investigated by large in the decision making and judgment literature – this turned intuition away from understood as a process of reasoning more to a skill of seeing and comprehending *a reality* based on the evaluation of the outcome of the reasoning process as you will see in the following chapter. As stated by Gigerenzer (2008, p. 90f) following his correspondences with Herbert Simon, bounded rationality was not a definitive and finite elaborated term. Instead, it came out not as a technical term but a vague term in opposition to the rational approach reigning the understanding of human reasoning – especially in the fields of economics and behavioral economics when having to make decisions in natural life settings such as in business settings in cooperation with large degrees of uncertainty. As seen above, Simon's vagueness of explaining the satisficing principle so crucial to the bounded rationality created a "black box" of satisficing and thus also intuition which several theorists have attempted to open (Gigerenzer, 2008, p. 80). Even the cognitive psychologist Hoffrage and Marewski (2015) previously working in close collaboration with Gigerenzer states how the notion of intuition has been turned towards a cognitive investigation of how to non-consciously yet still cognitively reach the satisfactory level and intuitively being able to make judgments and decisions when being under time pressure. However, they are still not satisfied with the explanation following these cognitive approaches to satisficing:

> *"Intuition, allow us to peak behind your veil! And please take it with a smile if we try to shed some light on you. We know your element is the night and you may not like our torches, beaming into the dark – your dark. We apologize. Bu we are cognitive scientists,*

we are curious, and we want to learn more about you." (Hoffrage & Marewski, 2015, p. 145f).

Here, intuition is by the authors seen as the lady in black operating in the darkness of the unconscious not yet understood (Hoffrage & Marewski, 2015, p. 145f). To understand what constitutes intuition and why the cognitive approach to intuition has not yet allowed an understanding of intuition, I will in the next chapter present and discuss the three most prominent approaches being in an intellectual battle of understanding intuition[10] – all with a cognitive psychological framework trying to unveil the simplifying heuristics put forward by Simon as seen above and one of them earning a Nobel Prize for his works[11]. I will especially discuss their inspiration by Simon's notion of bounded rationality and the satisficing principle and the inclinations towards a realist and evaluative understanding of intuition.

Chapter 2 – The cognitive turn in understanding intuition

In this chapter, I will analyze and discuss the cognitive turn in understanding intuition and satisficing. We start from the works of Kahneman & Tversky (Kahneman & Tversky, 1973; Tversky & Kahneman, 1974; 1983; Kahneman, 2003a; 2003b; 2011) and the dually processing both rational and irrational human mind and their questioning of human rationality as they experienced human beings as not being perfect statisticians in their Heuristics and Bias approach (HB). Next, I will investigate the parallel line of Natural Decision Making (NDM) (Klein, 1998; 2008; Klein, et al., 2003) and the role of experience in forming intuition, and I will discuss how these two approaches was attempted synthesized in 2009. Thirdly I will look upon Gigerenzer and colleagues' (Gigerenzer, 1984; 1991a; 1991b; 2008; Gigerenzer & Brighton, 2009; Gigerenzer & Gaissmaier, 2011) fast and frugal heuristics (FFH) and the notion of non-rationality opposed to irrationality as mentioned above. This will in sum lead to a discussion of the shortcomings of opening the black box of satisficing and thus intuition and what moves are needed to understand the process of intuition.

[10] This battle is especially apparent when Gigerenzer (1994, p. 141) challenges Tversky & Kahneman's illusionist paradigm for being inferred from insufficient and rigid understanding of human's ability to apply statistical knowledge.
[11] Daniel Kahneman in 2002 earned a Nobel Prize in Economics for his Heuristics and Bias approach to human intuition.

Heuristics and Biases - Human reasoning as biased due to cognitive illusions

Inspired by Simon's (1955) questioning of human rationality, Kahneman and Tversky (Kahneman & Tversky, 1973; Tversky & Kahneman, 1974; 1983; Kahneman, 2003a; 2003b; 2011) set out to investigate the boundaries of rationality in human reasoning, and they were at first surprised to see that human beings are not perfect statisticians which was otherwise assumed in a rational approach to human reasoning (Kahneman & Tversky, 1973, p. 237). What then proves to be satisficing when having to make decisions and form judgments?

By being guided by heuristics as seen with Simon above, we are forming satisfactory levels on the basis of these heuristics (Kahneman & Tversky, 1973, p. 249; Tversky & Kahneman, 1983, p. 1124). Consequently this leads to systematic flaws in our intuitive reasoning when faced with more complex statistical problems. When faced with statistical decision problems we rely largely upon heuristics in our intuitive reasoning. Tversky and Kahneman (1974, p. 1124) too relied upon heuristics as Simon above and saw how heuristics both can prove useful but can also lead to systematic errors according to rational statistical and probabilistic rules – called biases (Tversky & Kahneman, 1974, p. 1124). Thus, the early works of Kahneman and Tversky was a study of how human reasoning was systematically diverting from rationality and how judgment had to be erroneous, biased and not trustworthy in order to make a statistical and probabilistic true decision (Gigerenzer, 1991a, p. 260). Tversky and Kahneman (1974, pp. 1124-1128; Tversky & Kahneman, 1983, p. 294f) started to group and order the heuristics around three groups[12]. People were making intuitive judgments grounded in the representative heuristics, the availability heuristic and the anchoring/judgmental heuristic. The representative heuristic largely centers around judgment being biased through the neglect of base rate info, insensitivity of sample size, misconception of chance, insensitivity to predictability (Tversky & Kahneman, 1974, pp. 1124-1127), and conjunction fallacies (Tversky & Kahneman, 1983, p. 298). This means that people are biased in their judgments with limited amounts of information according to probabilistic rules due to a reliance upon what the limited amount of information represents thus making inconclusive fallacies and conjunctions. This is seen with the Bank Teller problem:

[12] Note here the resemblance to Kant's and Descartes' ordering of human thought realistically.

Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

Linda is a teacher in elementary school.
Linda works in a bookstore and takes Yoga classes.
Linda is active in the feminist movement. (F)
Linda is a psychiatric social worker.
Linda is a member of the League of Women Voters.
Linda is a bank teller. (T)
Linda is an insurance salesperson.
Linda is a bank teller and is active in the feminist movement. (T&F) (Tversky & Kahneman, 1983, p. 297)

Here several subjects made the conjunction of both being a bank teller and an active feminist (T&F) and they were confident about their choice. However, following probabilistic rules there is a bigger chance of her being a bank teller (T) in relation to both being a bank teller (T) and a feminist (F) no matter what the information about her states. Several of such experiments was pursued in order to find if people were following or violating the normative rules of probabilistic statistical reasoning as assumed by the theories prescribing the rational economic man (Gigerenzer, 2008, p. 85f). By availability heuristics people are biased by prior experienced information and thus the available retrievable information easily coming to mind. Thus, we are primed and biased by the information given based on what we have previously experienced being caused by this information and thus the associations created by the available retrievals (Tversky and Kahnmeman, 1974, p. 1127). Additionally, we are biased by the judgmental heuristic which entails that we are in the natural assessment of the situation or problem in which we have to make judgments neglecting full consideration of the information given thus only relying on relatively little information (Tversky & Kahneman, 1974, p. 1129; Tversky & Kahneman, 1983 p. 309f). This leads to the conclusion of man following the HB approach to be governed by cognitive illusions of truth and trustworthiness of intuitive judgments when relying on intuitive decision making based on heuristics (Gigerenzer, 2008, p. 85f; Tversky & Kahneman, 1983, p. 313). Throughout the years, the HB approach by Kahneman & Tversky has attempted through experimental designs as the Linda the Bank Teller problem to map

out even more heuristics being applied by humans thus distorting our ability to follow the normative reality of following probabilistic rules. However, we will not dwell with all these presented heuristics. What we can hitherto draw from the HB approach is that the heuristics serve largely as the determination rules for satisficing causing cognitive illusions in relation to rationality when having to make judgments and make sense of the encountered situation. But what does that mean to our intuition?

A dual process approach of human reasoning

The outcome of studying human decision making and reasoning throughout the last half of the 20th century and in the beginning of the 21st century lead to a proposal of a dually processing human mind (Evans, 2008, p. 256f). This entails human thinking and reasoning being governed by two simultaneously operating systems; system 1 and system 2 (Kahneman, 2003a, p. 698f). System 1 is an ever present process of perceiving and immediately and spontaneously reasoning about the encountered situation – the intuitive system. This effortless, immediate, associative, and automatic system of reasoning generates impressions of the encountered situation allowing us to form a sort of comprehension of the situation. Further, we are by system 1 enabled to make decisions, judgments and thus act in the situation - intuitively. System 1 is largely determined by the heuristic models or rules as presented above that is flawing our ability of seeing the true world and making the right decision according to probabilistic, statistical, and logical thought inherently thought to govern the rational and economic man as seen above (Kahneman, 2003a, p. 698f). In his later elaborations upon intuition, Kahneman (2011, p. 410) moves in a direction of seeing intuition as not being fully irrational. Instead, intuition and system 1 reasoning is an innate capability of human beings reducing the complexities of the world we encounter in order to allow us to make fast decisions and find causes through little information founded in the heuristical principles above in an attempt to open up Simon's black box of the satisficing principle. System 1 thus proves to be a system allowing us to make sense of and decisions in an uncertain world - rapidly. However, these intuitive judgments might not always prove to be "true" and this is due to the biasing aspects of heuristics (Kahneman, 2011, pp. 71-77). For this reason system 2 was introduced – the more rational, conscious and deliberate computation of the situation encountered monitoring the intuitive judgments initiated ensuring a more rational judgment in the situation, when activated. System 2 functions here as a regulation system of system 1 and helps us in making more precise and rational judgments in complex uncertain situations (Kahneman, 2011, p. 417f). Here, failures to make the right decisions is a failure of not just system 1

but both systems because system 2 was not able to correct the flaws of system 1 (Kahneman, 2011, p. 99). Intuitive judgments allow us to make decisions largely dependent on a context-dependent jumping to conclusions automatically and rapidly guided by what information comes easily to mind in that situation (Kahneman, 2011, p. 85f). If we encounter situations with higher stakes, and we are not under pressure, system 2 is more likely to be activated to monitor the decision making process. But usually system 2 is lazy, and if an easy solution or answer to a question comes easily to mind, we are likely to rely upon this intuitive and rapid solution e.g. the heuristics satisfies yet with an inherent bias (Kahneman, 2011, pp. 85-99).

Following the HB approach intuition becomes equal to system 1 reasoning based on heuristical laws flawing our ability to capture the "truth" of *a reality* out there provided by normative statistical rules of probability. Thus, intuition becomes evaluated upon the outcome of the reasoning process and thus the evaluation of the ability to make the right decisions. We see here largely inclinations towards a Kantian realist approach of finding the rules of human reasoning to which the individual adhere flawing the ability of capturing ***a reality*** provided by probability statistics. The outset of Tversky and Kahneman was the study of problem solving in laboratory settings as the Linda problem above to test the rationality of the rational man and thus the option of and often absence of activating system 2 when necessary. Thus, intuition became the ability to reason rapidly and truthfully and cognitively activate system 2 when necessary in order to adhere to statistical rules. However, this flawing and biasing aspects of intuition was countered by the social cognitive movement of Natural Decision Making (NDM) lead by Klein and colleagues (1998; 2008; Klein et al., 2003). Here, we are moving closer to Hegel's Dasein principle by conceptualizing of intuition as a more relative concept – however still normative and evaluative. In the following, we will investigate the works of Klein countering the works of Kahneman & Tversky creating a discussion of whether intuition is to be seen as rational and trustworthy or not.

Natural Decision Making – The ability to recognize patterns

Following the simultaneously emerging NDM approach the aim of studying intuition was not to study the flaws following heuristics. Instead, the aim was to study how people make decisions in real life situations based on their experience (Klein, 2008, p. 457). This approach was termed macro-cognition (Klein et al., 2003, p. 81f) while micro-cognition was the experimental tasks performed by Kahneman and the HB approach trying to find the building blocks of cognition, while macro-cognition is an approach to understand cognition at work in real life settings. Intuition is in this approach seen as

dependent upon the experience to recognize key patterns in the situation encountered and accordingly make a successful decision (Klein, 1998, p. 31). Yet, this approach of pattern recognition is not an overt and articulate process of explaining and consciously navigating and seeing clues and patterns. Instead, it is a recognition of patterns without knowing how we recognize these patterns. However, the outcome of the non-conscious recognitions of patterns allows us to make quick decisions in complex situations by attuning to the first workable option in the situation by a quick and conscious mental simulation of that workable option (Klein, 2008, p. 458). Here, you can again see the inspirations from Simon's abovementioned bounded rationality and the attempt of opening the black box of satisficing following expertise in recognizing patterns and cues. According to the NDM approach, we should not be looking for flaws or systematic errors or biases in non-conscious and intuitive decision making. We should rather come to understand how we through the accumulation of experience in similar situations become capable of recognizing complex patterns and making quick and workable decisions in the situation encountered (Klein, 1998 p. 33; Klein, 1998, p. 287). Here, we too see some similarity of a quick and non-conscious process (system 1 e.g. dual processing) recognizing patterns guiding our decision making, and further, we see a more conscious simulation of the possible outcome of the firstly identified workable options in order to see if we are to follow this option e.g. system 2 in the dual process approach (Klein, 2008, p. 458). Here, the main aim is to follow Simon's principle of quickly and intuitively finding satisficing solutions by pattern recognition and identifying the first workable option (Klein, 2008, p. 458).

Through the NDM approach the process of studying intuition diverted from the HB approach by studying people under pressure in naturalistic settings; fire commanders, military personnel, managers, nurses or master chess players (Kahneman & Klein, 2009, p. 515; Klein, 1998, pp. 4-6; Klein, 1998, p. 15). The NDM approach focused upon studying the ways of thinking and strategies of decision making applied by experts through introspective methods such as interviews, thinking aloud procedures of solving problems and participative observation (Klein, 1998, pp. 170-174). The main assumption was that to enable good and successful decisions in diverse and difficult situations in natural settings – making good intuitive decisions – people were prescribed to gain experience in handling situations similar to the one at hand in order to recognize the relevant cues and patterns available to form a good decision or solution (Klein, 1998, p. 152). But what is a good solution following this approach?

By investigating experts in the respected fields of study, the NDM scholars had to identify their experts to study. Experts were in the NDM approach seen as the skilled problem solvers whose

expertise were respected in the field being studied (Klein, 1998, p. 170). The experts' decisions were either studied, or the experts were used as judges to evaluate other novelists' decisions (Klein, 1998, p. 168; Klein, 1998, p. 171). Thus, as with the HB approach mentioned above, intuition is here an evaluative concept on the basis of the outcome of the reasoning process. Yet, this evaluation is differing from the HB approach. Here, the evaluation is not against the rational man and probabilistic rules. Instead, the evaluation is against a socially constructed norm in that context by that context's experts being socially constituted by the rest of the operators in that field. We are moving towards the other end of the initial presented paradoxes between rationality/non-rationality and realism/relativism. Instead of proposing an irrational decision maker being biased according to the realism-oriented truth of probabilistic theory, we are seeing a more rational or at least not irrational but maybe non-rational man making decisions that are beneficial according to the socially constructed rules and norms in that context. And this ability of making quick and non-rational decisions that are optimal or at least suboptimal in that situation accumulates with experience and the ability to recognize the socially normative relevant cues in the encountered situation (Klein, 1998, pp. 286-293). The ability to make successful intuitive judgments is the ability to recognize patterns, seeing the bigger picture and creating a situational awareness through a non-rational process of perceiving the situation and forming quick and workable decisions based on the available cues. The more experience you get, the more relevant cues you identify according to the socially constructed norm in similar situations, and this perceptual ability further enable skilled experts to adjust throughout the encountered event according to the interaction with the situation and the infinite number of outcomes from that encountered event according to the interactive dynamics unfolding (Klein, 1998, p. 287). Ultimately, the outcome of the skilled experts' perception of the relevant cues in the encountered situations is that the experts are able to form workable decisions but also expectancies of the outcome of the encountered situation – also by taking their own actions' impact on the outcome of the situation into account (Klein, 1998, p. 150f). Accordingly, intuition is not just making decisions but more a perceptual process of forming expectancies and a perceptual process of detecting anomalies that can affect the outcome of the situation and thus the workable option/decision (Klein, 1998, p. 151).

By stressing the importance of accumulation of experiences, we see here a move towards the introspective ideas of the Wurzburg School and Husserl's notion of insights leading to the formation of intuition. And this intuition is not a realist's grasp of the ultimate truth but the relative grasping of the socially constructed truth governing this field of expertise. Thus, intuition is here a more relative concept according to the insights gained leading to the formation of intuition and thus your

identification of relevant cues leading to satisficing. However, the intuitive reasoning is still evaluated upon the outcome of the reasoning process and the following action in relation to the relative truthfulness or at least usefulness when compared to the norm formed by socially constituted experts' actions and evaluations. Intuition is here not a cognitive ability more or less true to the probabilistic rules being flawed by heuristics. Instead, it is an ability to perceive the proper satisficing cues and form the proper decisions intuitively in relation to the socially constructed norm. As seen, Klein countered the main idea of a not trustworthy but flawing intuition presented by the HB approach by indicating how experience and expertise led to fruitful intuitive reasoning – especially when being under pressure. In 2009, Kahneman and Klein synthesized their ideas upon intuition. In the following, I will present these endeavors leading to intuition as a cognitive intuitive ability properly make sense and act according to ***a reality*** or at least ***a socially constructed and normative reality*** and not ***your reality***.

The synthesis of HB and NDM

Kahneman and Klein (2009, p. 515) made a collaborative attempt to align both the HB approach and the NDM approach in order understand intuitive skill and further to investigate the boundaries to overconfident biased impressions. Yet, their interpretation of successful intuition was different. Following NDM it was the historical and socially negotiated ability to make successful judgments according to social norms explicated by experts' strategies and opinions while in heuristics and biases it was the ability to judge accuracy rapidly without flawing probabilistic rules and rational reasoning (Kahneman & Klein, 2009, p. 519). In the NDM tradition of Klein, system 1 brings solutions quickly to mind that are simulated in system 2 for the first workable solution, while the heuristics and bias approach implies that system 2 is evoked when high stakes are perceived or there are cues present that intuitive judgment could go wrong (Kahneman & Klein, 2009, p. 519). In essence, both approaches thus form a dually processing approach to intuition. Yet, their aim is different. If intuition is to be trusted or not? And as seen above they are situated in different directions according to their reliance upon realist or relativist upheavals of truth.

Despite their differences, they agree that to develop intuitive skill you must have an adequate opportunity of learning the cues of the context and it often requires lots of training and accumulated experience. Secondly, they agree that most intuitive judgment of system 1 is skilled and successful but they have different approaches to how the flaws of intuition arises. Thirdly, they agree that intuition just comes to mind but we cannot know whether it is to be trusted or not – they are always

present with or without skills. This is why we need to bear in mind the heuristics and biases so that we do not become overly confident in our intuition when making decisions because this confidence is relying on consistency in experiences and not probability and can therefore be flawful (Kahneman & Klein, 2009, p. 521f).

Continuing Simon's bounded rationality Klein and Kahneman (2009, p. 523f) highlight that the more uncertainty we face in complex situations encountered, the harder it gets to account for all possible outcomes and thus perform complete probabilistic and rational calculations and analysis. Instead, we need to rely partly on our intuition. Occasionally, even experts face novel problems and situations in which their accumulated experience of pattern recognition are not of much help. Here, we will need to rely upon our professional intuition entailing an attitude towards the problem and not an intuitive solution. This entails the recognition of not having expertise in the encountered situation but relying upon a certain attitude towards problem solving in that situation. For example the activation of conscious and deliberate reasoning in system 2.

Following the collaborative works with Klein (Kahmenan & Klein, 2009), Kahneman (2011, p. 230) proposed intuition as the ability of knowing without knowing how and he further proposed that it takes time to build expertise but through emotional investment and strong experiences we might learn the ques and patterns of the given context quicker. Further, being in an environment entailing immediate and unambiguous feedback facilitate this learning process (Kahneman, 2011, p. 234f). Thus, we can conclude that Kahneman (2011) in his later years took one step towards relativism without leaving realism as initially proposed. Our intuition is to be evaluated by our ability to adhere to the satisfactory level set by statistical probabilistic rules *or* the socially constructed norm of "the right way to make a decisions" following the expertise constructed in the field by constituted experts. Thus, we are still left with a conceptualization mainly relying upon Kantian ordering and evaluation of intuition following rules yet not only probabilistic and universal rules but also normative social rules provided by experts. However, the inherent rationality debate has shifted slightly. Even though, we cannot resist framing and priming from heuristics and our reasoning cannot be fully rational, intuition will not either be completely irrationally understood as impulsive, emotional and stubbornly resisting reasonable arguments. It is instead what Gigerenzer (2008, p. 86) terms non-rational but still fruitful. This is apparent in the move towards relativism when Kahneman (2003b, p. 1469) states that the evaluation of intuitive judgments needs to be culturally dependent on what is natural and intuitive in that situation and in that context. Thus, we still have an evaluative concept – yet culturally situated. However, a new question arises: What happens with our intuition when we are not experts? The FFH

approach set out to investigate this matter of fruitful intuition without previous expertise. In the following we will see how the FFH approach saw heuristics as not biasing but a necessary mean to make meaningful fast intuitive meaning and decisions.

The fast and frugal simple heuristics

By the move towards non-rationality, Kahneman (2011, p. 234f) approaches some of the ideas proposed by Gerd Gigerenzer and colleagues (1984; 1991a; 1991b; 2002; 2008; Gigerenzer & Brighton, 2009; Gigerenzer & Gaissmaier, 2011). While, Kahneman and colleagues was invested in studying the flawfulness of our heuristics and thus our biases, and Klein proposed the NDM approach stressing intuitive expertise following experience, Gigerenzer proposed the fruitfulness of fast and frugal heuristics (FFH). Here, the purpose was to study and show the not irrational and flawful but effective and beneficial heuristics applied by individuals in complex situations (Gigerenzer, 2002, p. 174f; Gigerenzer, 2008, p. 87) We should counter the probabilistic revolution lead by Tversky & Kahneman among others in social psychology in order not to blindly accept the cognitive illusionist approach. Thus, we should free intuition from probabilistic rules and normativity in order to see the fruitfulness of fast and frugal heuristics in everyday life and here the HB approach was just a transitional stage (Gigerenzer, 1991b, p. 85f). As he states in the title of a chapter borrowed from Simon (Gigerenzer, 2008, p. 80): "*Striking a Blow for Sanity in Theories of Rationality*", Gigerenzer (2008, p. 82f) wants to counter the rational and optimization idea being prominent in contemporary understandings of reasoning – especially in the HB approach. Gigerenzer (2008, p. 85) opposes the HB approach by questioning this probabilistic normativity created. It was seen as insane to propose cognitive illusions causing irrationality. Originally, the heuristical notion stems from Descartes' 21 abovementioned (heuristical) rules for the direction of the mind (Gigerenzer, 1991b, p. 100f) and Simon brought this notion to psychology by bounded rationality and the satisficing principle. Here, heuristics were satisficing shortcuts to efficient and adaptive strategies to making decisions when facing complex environments as in the cooperation world of economics (Gigerenzer, 1991b, p. 101). Yet, Gigerenzer was not satisfied with the development of the HB program developing heuristics to being tools to reduce complex probability assessments to simple tasks that could be useful but was largely systematically flawing our reasoning. Thus, the golden standard in the HB approach of probabilistic rules tested in experimental settings were questioned. Instead, approaches as the NDM

approach to study the fruitfulness of applying heuristics or and guessing upon the process of intuition[13] but not *evaluate* according to *probability rules* or *normative expertise* was called for by Gigerenzer (1991b, p. 101). Thus, heuristics are proposed as efficient cognitive processes that either operate consciously or non-consciously but no matter the operation they serve to aid our rapid decision making and actions in complex situations with little effort. The application of fast and frugal heuristics and intuition is not due to cognitive limitations of the human species – instead it is an evolutionary developed non-rational efficient process allowing for effective decision making with limited knowledge – rapidly (Gigerenzer & Gaissmaier, 2011, p. 456). Opposite to evaluating these efficient processes upon the outcome of the situation we should study the environments in which the heuristics are applied and infer possible explanations of the process underlying these heuristics – especially when people face problems where they have no certain knowledge (Gigerenzer, 1991b, p. 104f).

As with the HB approach we do not use heuristics to make the best decision possible – we use heuristics to make the first good and workable decision in order to solve the situation encountered fast and frugally. These fast and frugal heuristics are based upon our past experiences and the ways in which we have learned to build heuristics and search for cues of validity based on our experiences and reference information in order to find the first good and workable solution and thus to handle the uncertainties of the future (Gigerenzer & Brighton, 2009, p. 107; Gigerenzer & Brighton, 2009, p. 135). We see here strong similarities to Simon's satisficing principle from above and the attempt to open this black box. The heuristics do not serve as biases. Instead, they serve as fast and frugal non-rational satisficing processes that can prove beneficial if they are ecologically rational meaning if they allow us to make fruitful and quick decisions in the situation encountered.

The evaluation in the FFH approach is measured by the accuracy of probability predictions of future events and thus the ability to make workable decisions in an ambiguous situations – not the optimal following probabilistic rules (Gigerenzer & Gaissmaier, 2011, p. 454). In an uncertain world, the quick and non-rational decisions based upon heuristics and limited knowledge actually proved more accurate and precise in predicting future events and in computing complex tasks with limited knowledge (Gigerenzer & Gaissmaier, 2011, p. 454). This entails that the classical idea originating in the heuristics and bias program of an accuracy-effort trade-off was countered. Less effort and quick

[13] Through looking at subject's outcomes and strategies during experimental tasks the FFH approach guesses the processes leading to the outcome by proposing ecologically rational and frugal heuristics applied and saw if these predicted future outcomes (Gigerenzer & Gaissmaier, 2011, pp. 458-466)

decisions did not result in a trade-off of in accuracy. In many aspects accuracy of judgments was improved (Gigerenzer & Gassmaier, 2011, p. 456f) and the less-is-more principle was born. We do not need complete insight to all information – limited knowledge will in many situations suffice if the proper experientially created heuristics are selected and thus proves to be ecologically rational (Gigerenzer & Gaissmaier, 2011, p. 473). This is exemplified by the baseball example of Gigerenzer (2008, p. 87f). Here several groups are proposed to be trying to account for where a batted baseball will land in the field when there is no wind affecting the trajectory of the ball. Following probabilistic rules we should compute several trajectories, account for spin of the ball, air resistance and etc. and first after that we can start running for the ball trying to be able to catch it. But the initial calculation only allow for a judgment of the landing of the ball and not the intuitive act of catching in. And when having done the computations, Gigerenzer (2008, p. 87f) imply that the ball will have hit the ground getting to run to the ball. Instead, we should look at what strategies and heuristics are actually in use – because baseball players will in many situations catch the ball within a matter of seconds. We as human beings are evolutionary designed to exploit the adaptive bias of the heuristics (Gigerenzer & Brighton, 2009, p. 135). Therefore, we should study what information we actually use. The heuristic applied in this context is the gaze heuristic:

> *Fixate your gaze on the ball, start running, and adjust your running speed so that the image of the ball rises at a constant rate and to catch the ball adjust your running so the angle of gaze remains constant*. (Gigerenzer, 2008, p. 88).

Here, the person uses the meaningful informational cues available and exploits these in the environmental structure at hand thus making this ecologically rational (Gigerenzer, 2008, p. 88f). From the example above, we see a move towards the non-rational and fast and frugal perspective of efficient cognition exploiting the relevant information in the encountered situation by ecological rationality and thus quickly creating workable judgments and solutions[14]. In other words, we are experientially constructing an adaptive toolbox entailing heuristics that can be beneficial in aiding rapid decisions in uncertain situations and thus prove ecologically rational to that situation if we have

[14] The notion of ecological rationality was exemplified in a critique of the HB approach by the example of the man continuously taken the shilling when proposed with the opportunity of choosing a shilling and a pound. Many guests came and made the same proposal and Gigerenzer (1991b, p. 108) proposed that this was an ecologically rational decision even though not adhering to probability theory.

learned to properly select between heuristics (Gigerenzer & Gaissmaier, 2011, pp. 452-458). It is the toolbox that should be studied and evaluated according to the effectivity of the heuristics applied the degree of successfully handling that situation (Gigerenzer & Gaissmaier, 2011, p. 473). Thus, the black box of intuition and satisficing has now been turned into an adaptive toolbox containing the building blocks of 1) search rules in order to search through cues in order of validity in that context, 2) search rules in order to search through cues in order of their environmental accessibility, 3) stopping rules when two cues point to the same object or decision, 4) decision rules where you decide that this object or choice has the higher criterion value and is the first good workable solution (Gigerenzer & Brighton, p. 2009, p. 128f). Further the toolbox is entailing this search and decision process being probed by recognition and aspirational levels. This entails the recognition of the better decision for me based on my assessment of the relevant information given in the encountered situation on behalf of my past experiences (Gigerenzer, 2008, p. 90).

Again, we see the move towards understanding the intuitive decision making as both adaptive and necessary in dealing with the inevitable uncertainties of human life. Rapid and intuitive decisions might not be irrational but more in line with Simon's bounded rationality outlined above. Thus, intuition is an evolutionary necessary developed non-rational, efficient, fast and frugal way of reasoning, acting and making decisions in an uncertain world based upon our experience of applying different heuristics in different situations. And it is evaluated as an ability to choose the right heuristic in the right situation e.g. ecological rationality. But what determines the satisfactory level of choosing the right heuristic? What cues do we have to search for? And what determines the satisfaction of the cues of validity? What determines the satisficing leading to stopping rules and thus decision rules?

The black-boxing of satisficing not fully opened by cognitive approaches

Hitherto, even though studying real life settings, we still end up with "normative" heuristic and "guessing" based on reverse inference both when studying experts as Klein, experimental probabilistic problems as Kahneman & Tversky, and the study of people solving problems where they have no prior knowledge as Gigerenzer. It is still cognitive strategies being inferred by verbalizations, and we see the clear inheritance from the cognitive revolution. And this was too acknowledged by Herbert Simon in a letter to Gerd Gigerenzer in 2008 (Gigerenzer, 2008, p. 90) when stating that bounded rationality was not a technical term and the heuristics had settled as satisficing and fast and frugal cognitive processes and yet we had not solved the problem of bounded rationality that was of vague terms.

The vagueness of both satisficing and bounded rationality and the absence of a technical idea but the initiation of an idea of bounded rationality created what I believe to be a black box of satisficing being relied upon but not yet fully opened. I believe the absence of integration of feelings in the conceptualizations of intuition and intuitive judgment in these approaches is the blockade for not being able to open the black box of satisficing and intuition any further. It still needs to be developed. However, we see how the understanding of intuition is moving away from a classical approach of rationality to a more non-rational and frugal way of reasoning – especially when being under pressure in an uncertain world. But we have not yet moved beyond the stagnation of understanding intuition following Kantian realism. Following the later works of Kahneman (2011) and following the NDM model of Klein we can learn through experience to intuitively understand the situation and make the right decisions - according to socially constructed norms and socially constituted experts. Thus, the evaluation of the intuitive meaning making is moving towards cultural relativism through the move from classical rationalism and realism to culturally bounded rationality and a culturally bounded realism. However, we have not yet taken the step to *Dasein* presented by Hegel above even though Gigerenzer (1991b, p. 105) state that individuals learn cue validity through frequencies of co-occurrences in past experiences and the individual's ability to exploit the environmental structures and thus make ecologically rational decisions. Yet, we are left with a cultural *Dasein* and the study of not *a reality* or *your reality* but intuitive meaning making evaluated upon contingency to *a socially constructed and normative reality* to which you can adhere or differ. Even though Gigerenzer (1991b, p. 105) highlights the individual learning of validity cues the aim is to create a periodic system of heuristics and building blocks to describe actions and structures of real life problems. Further, he does not leave a normative or at least culturally normative evaluation of applying heuristics when he stresses that some heuristics are adaptive and frugal and thus ecologically rational and some are not (Gigerenzer & Brighton, 2009, p. 135).

In sum, we can conclude that we have now seen three approaches to intuition. First, the HB approach propose intuition as the ability to intuit evaluated by reasoning outcomes compared to probabilistic rules and the following bias when not adhering to probability rules due to heuristics. Secondly, the NDM approach provides an understanding of intuition as the ability to recognize patterns following expertise, and thirdly the FFH approach proposes intuition as the ability to adapt following the adaptive toolbox of applying the proper ecologically rational heuristical rules to adapt to the conditions of the encountered situation. All trying to explain satisficing through a cognitive meta-theoretical approach (Gergen & Gigerenzer, 1991, p. 403f). This is a paradox in itself; the

explanation of non-conscious process by verbalizable cognitive processes. Thus, the cognitive heritage in intuition is here clear. The formation of rules and divided mental abilities to be measured and applied turns the concept of intuition to be a cognitive ability to rapidly, spontaneously, non-consciously and non-rationally and thus boundedly rational reach a satisficing outcome of the encountered situation, either following heuristics, the adaptive toolbox (more context dependent heuristics) or pattern recognition. However, all in all intuition is seen as an ability dependent on your accumulation of experiences of applying several heuristics or recognizing patterns in order to act normatively contingent according to the social culture to which you belong e.g. the evaluation and inference of your intuitive ability based on the outcome of your action. And we are still as with Plato's initial discussion with Glaucon left with the approach of *a "right"* direction to where you should orient your eye of the mind and your intuition is evaluated according to your direction of looking in relation to the cultural norm. It is thus the ability to see the *culturally contingent reality* and not *your reality* according to *your past experiences* thus making your intuition *meaningful to you*. I will not argue against the culturally situated human being, being guided by the social norms governing the cultural context wherein the subject is situated. Further, I will not neglect or deny the cognitive side of reasoning presented above. However, to fully grasp the richness and complexity of human intuition as an inevitable process in *your reality* we will need to return to Simon's (1981) notion of satisficing once again:

> *"… by showing real-world optimization to be impossible, demonstrates that economic man is in fact a satisficer, a person who accepts "good enough" alternatives, not because he prefers less to more but because he has no choice."(Simon, 1981, p. 36)*

What determines satisficing and what is a "good enough" alternative? When do we know what heuristic to apply and when it is not sufficient to apply heuristics? When do we know that our simple heuristic is sufficient and thus satisficing? How do we know what tool to use in the adaptive toolbox? When do we know when to stop searching for cues? When the satisfactory level is met. But how do we know when this is met? In the following chapter, I will turn to the implementation of feelings in opening the black box of satisficing and thus intuition and this will lead us to the necessity of moving beyond cognition to also implementing feelings as an inherent part of the *process* of intuition. This is performed to grasp intuition as an idiographic and relative process of our meaning making that is meaningful to our idiographic reality thus expanding the above conceptualizations prescribing that

we can put up rules for a "good intuition" and evaluating this as an ability. Because is the same option or alternative good enough for you and me at the same time or are these idiographically different? Or should we start conceptualizing intuition as an inevitable idiographic process based on feelings and not merely a cognitive ability? To answer these questions, I will in the next chapter investigate how feelings affect our intuitive meaning making beyond cognition before moving on to elaborating a semiotic mediational approach to intuition – an approach founded primarily on feelings and then secondly cognition – yet in an interaction (Valsiner, 2014a, p. 239; Bisgaard, 2020, p. 9f).

Chapter 3 - Feelings as an inherent part of intuition

It is not unknown to study feelings and affects as a part of intuition and intuitive judgment (Dane & Pratt, 2007). Yet, it has not been the most prevalent perspective and has been neglected as a biasing aspect of cognition (Akinci & Sadler-Smith, 2012, p. 113; Kahneman, 2011, p. 103f). The aim of this thesis is not to make an exhaustive review of all models of reasoning entailing feeling as an integral part of intuition. Instead, I will bring out key approaches highlighting the necessity of the presence of feelings and emotions in intuitive thinking which are all highlighted in the context of the above conceptualizations of the dual processing approaches and the FFH approach yet without gaining prominence in the field (Dane & Pratt, 2007, p. 38f). This incorporation of perspectives bringing in feelings without succeeding in going beyond cognition in intuitive meaning making will serve as the grounds for my move into semiotic mediation with *feelings being the originator of intuition and satisficing* and thus my move beyond cognition.

Intuition has been proposed as one of the most natural and universal abilities/modes of thinking that we possess and it provides us with hunches and gut feelings that guide our common actions (Shirley & Langan-Fox, 1996, p. 564). This is based on Bastick's (1982, in Shirley & Langan-Fox, 1996, pp. 573-575) conceptualization of intuition as emotionally encoded knowledge. Knowledge and information is remembered when we experience the emotions again. When living everyday life, we are drifting between different emotional sets inducing changes in our thoughts and our behaviors – and the next emotional set being inhabited will be the one overlapping the most with our current state of experiencing. The more our responses and thoughts are similar in the two emotional sets, the more these will be reinforced and the more likely it is that these emotional sets will be experienced in the future – especially successively. Thus, it is more likely that these emotional sets will direct and

guide our thoughts and behavior in the future. Yet, if there is a lot of conflict between the emotional sets being activated or present at the same time or directly after each other, we will feel a cognitive dissonance and we will feel an anxiety or tension with which we have to deal, and this is dealt with consciously through analytical thought. The emotional sets orient the individual in his path towards future goals – even if he does not know the goals. He feels if he is in the right or wrong direction, but when dissonance between sets are met he will have to analytically reason of whether direction of emotional set to follow. And if the anxiety and tension from the cognitive dissonance is releasing he intuitively once again knows that he is heading in the right direction. This response of feeling the rightness or wrongness or dissonance of direction on behalf of the emotional sets is thus termed as intuition (Bastick, 1982, in Shirley & Langan-Fox, 1996, p. 574f).

With Bastick (1982, in Shirley & Langan-Fox, 1996, pp. 573-575) we see that feelings are affecting our intuitive meaning making. And this origin of intuition in feelings is further highlighted by Bechara, Damasio and Damasio's (2000) somatic marker hypothesis. When living everyday life, we are not just experiencing life analytically. We are too invested emotionally in our experience of the world. This emotional experiencing of the world involve an integration of these feelings and bodily sensations experienced in that situation in our knowledge about the world and thus planning of future situations. This enable us to quickly make decisions and provide responses to new situations on behalf of the feelings experienced in this novel situation. The feelings evoke somatic markers that non-consciously guide our meaning making in that situation, and thus feelings become somatic markers of knowledge based on past experiences that guide our current meaning making and judgment in the present situation (Bechara, Damasio & Damasio, 2000, pp. 295-297)[15]. The somatic marker approach followed the cognitive experiential self-theory (CEST) proposed by Epstein and colleagues (Denes-Raj & Epstein, 1994). CEST is as HB by Kahneman (2011) a dual processing approach. Yet, system 1 was now not merely following heuristical laws as the ones Kahneman studied (See above). Neither or was it patterns to be recognized or a sophisticated adaptive toolbox leading to frugal search rules operating non-consciously. It was an experiential system with schemas of knowledge rapidly and spontaneously being applied. These schemas were thought to be inductively derived from emotionally significant past experiences (Denes-Raj & Epstein, 1994, p. 819) and these

[15] In line with the somatic marker hypothesis the line of embodiment has gradually emerged theorizing upon how our cognition and thus meaning making processes will necessarily be embodied through our physical experiences and embodied communication in this world and not only a mental representation operating independently of our bodily actions and experiences (Moran & Toner, 2017, pp. 362-368; Nedergaard, 2019, p. 293f)

are especially fruitful and adaptive in natural settings but maladaptive in experimental settings requiring logical analysis. This is partly due to the idiography inherent in this experiential system. When an individual experience subjectively highly emotionally significant experiences he or she creates a schema about *that* experiential knowledge *meaningful to him or her* that will then guide both his or her non-conscious behavior intuitively and conscious thought processes when similar experiences are encountered. This experiential system can override the rational system (system 2) – even when the necessity of applying rational analysis is apparent and verbalized in the task encountered (Denes-Raj & Epstein, 1994, p. 823). This too means that we here see a radical move in understanding the black box of satisficing and intuition, and what determines the satisficing through implementing feelings.

By integrating the emotionally significant experiences, we might have a clue that these significant experiences might generalize to in Denes-Raj & Epstein's terms schemas or in Bastick's terms emotional sets being activated in meaning making and judgment processes as shown with Bechara, Damasio and Damasio's somatic markers. Now, if these emotionally significant experiences are the guides of our intuitive meaning making, we need to take one more step in the direction towards Hegel's abovementioned Dasein and non-rational relativism in the fruitfulness and "truth" of intuition – according to *your reality*. Feelings will necessarily be personal and idiographic, and if intuitive meaning making is based upon significant emotional experiences we might be able to go beyond the normativity inherent in the cognitive approaches to the intuitive *ability* of seeing *a reality*. Instead, intuition will be a *process* in your meaning making based on *your reality* leading to individual heuristics and not heuristical laws or accumulation of patterns to be recognized. Even though Denes-Raj and Epstein (1994, pp, 826-828) highlights the interaction of the experiential system – and thus our emotional system – and the rational system, they do not fully open this black box of satisficing and intuition from a feeling-based direction. They just state the presence of individual differences in the degree of the intuitive-experiential system partly deriving from feelings and partly from the analytical-rational system when processing information according to the situation encountered. Yet, this understanding of significant emotional experiences guiding our intuition (system 1 in CEST) is our key to go beyond a somewhat realist, Kantian, and cognitive understanding of intuition to a more Hegelian understanding following semiotic mediation where significant emotional experiences are seen as the guide and core essence of human meaning making and thus the bridge between a cognitive and feeling based approach to understand what constitutes intuition (Salvatore & Valsiner, 2010, p. 826f; Zittoun et al., 2013, p. 90). In the following chapter, I will elaborate how a semiotic mediational

approach to intuition allow us to incorporate feelings preceding and interacting with cognition in the process of satisficing and finding a good enough alternative and thus in the process of intuitive meaning making.

Chapter 4 – Semiotic mediation – the move beyond cognition integrating feelings

Hitherto, we have seen attempts to open Simon's satisficing principle cognitively, inspired by Simon's (1982b, p. 382) outlining of the information processing human being on the basis of inductive generalization. However, as you saw in the preceding chapter we are still left with the question not yet answered – **when do we know what is a good enough alternative?** When do we know that we have searched through enough cues or when do we know that we have chosen the right heuristic? In other words, what constitutes the determination of good enough information when choosing or applying heuristics? This has not yet been answered by the inductive inferential approaches seen above reversely guessing the non-conscious process of thought on the basis of the evaluation of the outcome (e.g. FFH and NDM) – or evaluation of outcomes to be true or not true (e.g. HB) (Wettersten, 2017, p. 450). In order to open up the satisficing principle, I will highlight the inevitable process of feeling in immediate reactions and rapid meaning making as seen in chapter 3 which has otherwise been neglected by the cognitivist approaches (Dane & Pratt, 2007, p. 5-7; Kahneman, 2011, 103f).

How feelings enter into the process of rational decision making will be analyzed through implementing a semiotic mediational approach to meaning making and here intuition as it is presented by Valsiner and colleagues (Branco & Valsiner, 2010; Valsiner, 2012; 2014a; 2021; Zittoun et al., 2013). Seen from a socio-cultural perspective human beings are signifying creatures. This means that we are using and creating signs in order to make sense of the situation encountered and further in order to anticipate and pre-adapt to the inevitable uncertainties of the future in our constant pursuit of reaching a desired future based on our past experiences (Zittoun et al., 2013, p. 73). This whole meaning making process originates from feelings (Valsiner, 2021, p. 45) as was indicated to be necessary to implement in chapter 3. Further, we see inspirations from the Würzburg school of investigating thought processes in Simon's idea of bounded rationality and satisficing though being turned merely towards a cognitivist approach of applying heuristics (Wettersten, 2017, p. 440). In order to understand and elaborate upon Simon's satisficing principle I will too return to the ideas of

the Würzburg School investigating thought processes. But with a slightly different outset than the original Selzian ideas leading to the abovementioned evaluations of intuition (Wettersten, 2017, p. 440). In order to unveil the black box of intuition and satisficing, I will as the semiotic mediational approach take the inspiration from Karl Bühler's (1951, p. 41f) process orientation and AHA-erlebnis.

A key factor of the following semiotic mediational approach to satisficing and thus intuition is the aspect of anticipation of *your reality and your future* opposed to the evaluative aspect of adherence to *a normative reality* as presented by the HB, NDM and FFH approach above. Due to the dependency of our personal past experiences the process of intuition and thus our meaning making process initiated by feelings will be idiographic (Branco & Valsiner, 2010, p. 244). In other words, we make sense on *our reality* on the grounds of *our personal past experiences* and the signs we have created that are now available in the encountered situation offering meaning. To understand how we make sense of *our reality*, we will have to turn to three core ideas of semiotic mediation stemming from both Wundt, Bühler, and Vygotsky (Valsiner, 2015, pp. 94-96).

Meaning making – a dynamic process of "AHA" abductively leading to new connections of inter-experience knowledge

Around the turn of the century (1900), the Wurzburg school theorized on thought processes through introspective studies (Bühler, 1951), and these studies have served as a key inspiration for the emergence of the semiotically mediated approach. Bühler (1951, p. 41f) discovered and became especially interested in investigating the emergence of insight (AHA-erlebnis) and thus conscious thoughts and these studies further led to Bühler's emphasis that these conscious thoughts did not arrive gradually through a conscious process or independently but non-consciously; they were interconnected yet non-conscious (Bühler, 1951, p. 48f). This is apparent through his empirical study where insight was discovered (Bühler, 1951, p. 49). The subjects in his study was given a complex meaningful utterance, and they were to answer yes or no to the question of *"Do you understand (Stimulus)?* Following the answer the subject had to immediately report his thoughts during the search of an answer. Thus, the subject was presented with:

> *The most glowing colors in which the virtues shine are the inventions of those who lack them.*

Here the subject took 21 seconds before answering yes to the challenge of understanding the utterance and a description of the thoughts in between followed through an introspective effort:

> *First, again helplessness; I was unable to bring the possession and lack of virtues into the required contrast. There was a search connected with this [perceptually represented only by eye movements as though shifting back and forth on a surface], interrupted by occasional reverberations of the words, now of the first, now of the second part of the sentence. Then comprehension came suddenly with an affect like 'AHA! [not spoken]; the basis of comprehension was the far-fetched analogy, or as I would prefer to put it, a superordinate relationship: one that prizes highly what one lacks. Comprehension was tied in with this, and I said yes.* (Bühler, 1951, p. 49).

Even though the comprehending thought occurs suddenly, it is not disconnected to previous thoughts of no comprehension and the feeling of helplessness. Instead, there is a thread of totality in the thought process ensuring a certain goal-directedness of the thought processes (Bühler, 1951, p. 43). This totality is ensured by non-conscious inter-thought or inter-experience knowledge. Further, Bühler (1951, p. 48f) implies that the basis for the emergence of new thoughts is the emergence of new relations non-consciously established between inter-experience knowledge which results in a conscious generalized thought in the form of insight or "AHA-erlebnis". Then, when encountering a more difficult or strange thought a subject halts and then suddenly comprehends the encountered meaningful stimuli like a revelation as presented above. Throughout his conceptualization of human thought, Bühler (1951, p. 48f) notes that human thought is mediated and guided by a more general thought which our insights are generalized into. When trying to solve difficult situations encountered, our investigative search for meaning as presented above is motivated by our dissatisfaction with the first attempt at comprehending. When a new insight is reached this will eventually lead to some kind of deeper meaning and thus impacting/altering our general thoughts governing our understanding (Bühler, 1951, pp. 51-54). Yet, new experiences might not lead to new insights. Direct comprehension (translated to intuition in my terms) is possible (Bühler, 1951, p. 54). Yet, he does not seemingly elaborate on how? We can only suggest that if investigative search is initiated by feelings of dissatisfaction with the first comprehension then direct comprehension could be linked to satisfaction

with the comprehension[16]. In the end, what we can extract from Bühler (1951, p. 48f) is that conscious thoughts have non-conscious origins in inter-experience knowledge which is by Bühler (1951, pp. 43-45) conceptualized to at least partly being feeling-based in order to ensure continuity and a thread of totality of our thoughts. And if this is lost or distracted, e.g. if the comprehension is disturbed or dissatisfying according to the more general thoughts underlying our thought process, we initiate a search for a new meaning that need not be conscious but is actually non-conscious leading to a new AHA-erlebnis.

Another crucial point we can extract from Bühler (1951, pp. 50-54) is the process-orientation. He is not interested in *the outcome*. Instead, he is interested in *how you arrive* at an outcome *meaningful to you* based on your experiences, inter-experience knowledge and general thoughts. And this arrival at a meaningful understanding of the situation encountered, as you saw, is not dependent on a deductive constraining of thoughts on behalf of already consisting meaningful general thoughts. Instead, we saw new connections appearing as an "AHA-erlebnis". However, it was not either an inductive generalization through accumulation of several incidents. It was instead through a process similar to abductive generalization of meaning arriving as an AHA-erlebnis initiated by the ambiguity and wonder created in the situation encountered – here a meaningful utterance to be comprehended. Following abduction, you start with facts (the utterance) and you need a theory to explain the fact. Abduction is a leap to explanations after being presented with the fact (here the utterance) that is usually surprising (Peirce, 1979, p. 137) or in Bühler's terms dissatisfactory and thus not directly comprehended but abductively comprehended through rearrangement of the non-conscious inter-experience knowledge leading to new conscious thoughts to be generalized and guiding in future comprehension.

Questions still left unanswered by Bühler in regards to understanding intuition and satisficing are what inter-experience knowledge consists of, and how this is linked with feelings? In order to answer these question we will turn to another seemingly key inspiration of the semiotic mediational approach – Wilhelm Wundt's feeling tone (Branco & Valsiner, 2010, p. 245).

Inter-experience knowledge – An affective field of feelings pleromatically perceived

Following Wundt's *Physiologische Psychologie* (Hollands, 1906), our perceptions of a situation encountered induces a feeling tone (Wundt, 1880, p. 465) that aids our conscious meaning making

[16] Note here the similarity to the satisficing principle of Simon above.

processes when encountering diverse and complex situations. Feelings are thus an underlying component of our consciousness and the meaning created in the encountered situation rests upon the feeling tone initiated by the sensations and experiences of that particular situation (Hollands, 1906, p. 207f; Wundt, 1880, p. 465). As we saw with Bühler's totality of thoughts grounded in inter-experience knowledge, feelings are inseparable from our sensation in and meaning making of the encountered situation and guide our conscious thoughts by a certain orientation or will (Hollands, 1906, p. 209). Thus, feeling tones are primitive facts of our consciousness not yet labelled and these feelings arising express our inward relation to the excitations externally in the encountered situation (Branco & Valsiner, 2010, p. 245). Hence, feeling tones are our inter-experience knowledge being interconnected in a manifold – and if this feeling is dissatisfactory direct comprehension (intuition) is disturbed.

A crucial inspiration for the semiotic mediational approach is here the guidance of the meaning making process through our feeling arising when encountering the present situation (Valsiner, 2021, p. 45). Following semiotic mediation, the function of our meaning making processes is to turn the settings and suggestions about the nature and situations encountered into personal acceptable ways of relating my past to my expected future. Thus, meaning making is Dasein-inspired in making sense of *my reality* and not *a reality* (Valsiner, 2021, p. 37). This process is largely based on the construction of signs initiated by feelings in that particular situation in our future orientation towards a desired or feared future (Valsiner, 2021, p. 40). Thus, cognition – and the cognitive processes as presented above are derived from feelings through signs emerging from a field of affective apprehension, and feelings feed forward to what is to be expected in the uncertainties of the future to be encountered (Branco & Valsiner, 2010, p. 244)[17]. Thus, inspired by Wundt's feeling tone, our meaning making process is affective and affect is here both containing emotions and feelings. Where emotions are categorical point-like signs feelings are instead better captured by sign fields of meaning containing the fullness and complexity of the feelings arising (Branco & Valsiner, 2010, p. 244). In real life settings when cognitively and consciously having to discuss our feelings, we are experiencing this disjunction between the categorical point-like signs available to be verbalized and the non-verbalizable fields of feelings and thus meaning. Thus, our meaning making process takes place through parallelly operating perceptive pathways feeding into each other allowing us to make sense of the situation and the feelings arising in that situation (Valsiner, 2021, p. 52f). One of these pathways, schematization,

[17] Here signs should be understood in Peircean terms as what stands out in the situation for that individual offering meaning (Peirce, 1993, p. 162f; Peirce, 2014, pp. 141-143).

is well-known and is present in the above cognitivist conceptualizations of heuristics and search through cues through perception of categories, similarity, representativeness, anchoring and formulation of heuristical rules and identification of rules. In other words reduction of the whole field of meaning into point-like categories of relevant information (Valsiner, 2021, p. 52f). The other is of pleromatization. Here, the richness and fullness of complexity of feelings are perceived holistically and generalized in to a non-verbalizable affective field of signs aiding our understanding and feeling of understanding of the situation (e.g. Wundt's feeling tone). And this allow for us to feel in to the situation[18]. Thus, the pleromatic affective field of signs is what Bühler called inter-experience knowledge and from this we can categorize and schematize point-like conscious thoughts.

Both of these perceptive pathways are present in most situations – for example when moving from one place to another place. Standing in your empty apartment ready to go to the moving truck and drive to the new place you are asked what you think and how you feel. This is a difficult question to sufficiently capture by the categorical signs you have available for verbalization through schematizing your affective field of feelings into words and categories. You might be happy, excited, curious, tense, nostalgic, sad, confused – all at the same time. We have a lot of words for emotions but every category is a reductionist exclusion of the fullness of the feeling in the body on that exact point of time (Branco & Valsiner, 2010, p. 244). Thus, the inspirations from Wundt and Bühler to semiotic mediation which serves the grounds for the understanding of intuition in this thesis is that we feel in to the situation and these feelings are both schematically and cognitively made sense of and they are simultaneously pleromatically perceived. This pleromatic feeling in to the situation serves as the guide for the meaning making process in the encountered situation when facing the uncertainties of the future. Thus, it is as with music; when you listen to a play you can schematically perceive or read every note but simultaneously the harmony and fullness of the whole play is perceived inducing a certain affective field of feeling in to the play and this make you anticipate which tones to follow the just played tone. However, the next tone to be played is not determined there is a lot of opportunities. Maybe a solo or other improvisations are starting? Yet, they are all guided but not constrained by the feeling tone just arising pleromatically in the situation (Branco & Valsiner, 2010, p. 244).

[18] Feeling in to the situation is an elaboration of Theodore Lipps' notion of Einfühlung commonly referred to as empathy and the ability to feel in to and create an inner imitation of the object or person in front of you (Montag, Gallinat & Heinz, 2008, p. 1261). Here, I extend the object to the situation pre-anticipated and now encountered.

In sum, what we need to extract, is that the semiotic mediational approach is a process oriented theorization upon meaning making processes within the human being – not disregarding the cognitive schematic meaning making process of conscious and categorical conscious thoughts. But going beyond by stressing the importance of the feeling tone arising when encountering new situations in the constant flow of new experiences towards the uncertainties of irreversible time (Zittoun et al., 2013, p. 72) and how these feeling tones or inter-experience knowledge are guiding our pleromatic perception of the richness of the situation in its fullness and complexity – maybe to be made sense of consciously and cognitively if the direct comprehension is not feeling satisficing. In the following, I will draw out how the semiotic mediational approach is inspired by Vygotsky's affective synthesis (Valsiner, 2015, p. 94) which will lead to an exemplification of how this semiotic mediational approach in essence provides an understanding of how we are self-regulating through signs (Branco & Valsiner, 2010, p. 243) in order to understand what our general thoughts consist of and how these are guiding our feeling in to the situation? And how this relates to intuition?

Meaning making guided hypergeneralization and constant interaction between schematization and pleromatization.

As human beings we are creating fictions and images of the future as a guideline for our process of becoming (Valsiner, 2015, p. 94). In other words, we are goal-oriented beings forming future pre-adaptations on behalf of our synthesis of past experiences. This synthesis is not merely a reconstruction of what has already been done and made. Instead, we are creative in our synthesis creating novelties on behalf of new insights – e.g. "AHA-erlebnis" (Valsiner, 2015, p. 95). Here, there is a qualitative jump in our understanding from one synthesis to a new, and this have to be based in an affective generalization with a new feeling (e.g. Wundt's feeling tone) transcending the previous opposing feelings or contents thus leading to a new insight or meaning. Following Vygotsky, this is a process of affective abstraction of a new generalization allowing us to once again make sense of the situation encountered (Valsiner, 2015, p. 97). Through this generalization process, our flow of experiences are turned into abstract affective fields that are guiding our future meaning making processes through the appertaining induced feeling tones in the encountered situation (Valsiner, 2015, p. 98). In the semiotic mediational approach this is called hypergeneralization of sign fields that are overarching fields guiding our aboutness-about-being-in-the-world and our future feeling in to new situations (Branco & Valsiner, 2010, p. 245; Valsiner, 2021, p. 52).

In figure 5, you see the hypergeneralization of sign fields through the parallel operation and continuously interaction between pleromatization and schematization as mentioned above. In the bottom of the figure, the undifferentiated physiological reactions to the encountered situations lie as arising feelings and affective turmoil to be made sense of in the encountered situation. The immediate rise of a feeling tone is initiated by the pleromatic and holistic perception of the fullness of the situation either leading to a positive, negative, ambivalent or somewhat different directed feeling tone in that particular situation. These arising feelings are then made sense of consciously and cognitively through

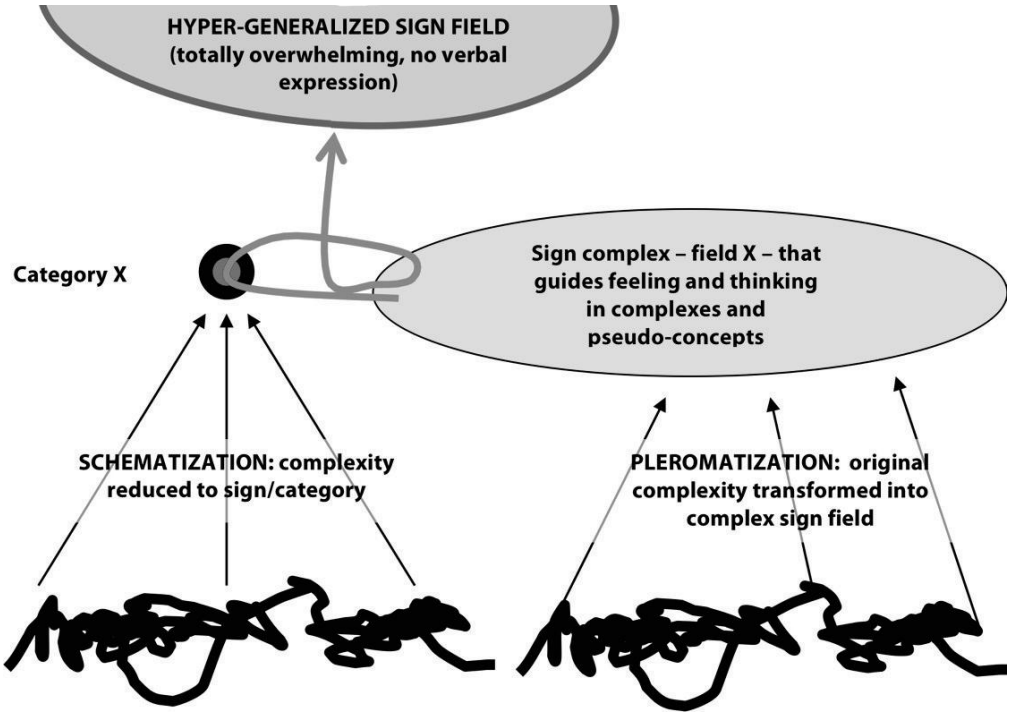

Figure 5 - The interaction of pleromatization and schematization leading to hypergeneralization (Valsiner, 2021, p. 53)

the schematization perceptive pathway (Branco & Valsiner, 2010, pp. 245-248). Let us take the moving example once more. The schematization is first a labeling process of the feeling arising by experiencing the situation of standing in the empty apartment. This ends in labels as sad, happy, nostalgic, excited, nervous. They are all categorized emotions arising in that ambivalent situation. These are then further generalized following an interaction with the simultaneous pleromatic perception of the complexity of the situation into an affective field of feelings guiding my meaning making and generalization of the situation. Thus, this feed-forward loop between the pleromatic

perception and the schematic perception ends in a reductionist, consciously available and verbalizable generalization of meaning into a point-like sign:

> *"I feel sad because I have so many good memories in this apartment and I am nervous for what the future will bring, and I have felt safe and happy here. However, I am too excited for the change and what the future will bring, and I am happy that change is happening. Thus, I feel excited for what is to come but I will miss this place and my life here."*

Conclusively, this meaning making process of the feelings arising by the encounter with the situation of standing in the empty apartment hypergeneralizes into a polysemic field of meaning that is complex and heterogenous and resist precise definition (Branco & Valsiner, 2010, p. 245) – even when centering around this particular person's experience of moving. Instead, it is a diffuse and fuzzy yet directed aboutness about change and consistency, security and uncertainty, and thus feeling of relation between dynamicity and stability (Branco & Valsiner, 2010, p. 245; Reyna, 2012, p. 333f). Following Vygotsky's abovementioned affective synthesis, we here see an affective synthesis of a new hypergeneralized sign field available to guide this person when he encounters new situations with perceived signs activating or making this hypergeneralized field of stability and change available in order for this person to make sense of his future encounters, how to perceive and how to act accordingly.

The process of guidance by hypergeneralized sign fields is inevitable due to the notion of irreversibility of time (Zittoun et al., 2013, p. 72). This guidance presents itself as fictions and imaginations of the uncertain future to come in order for us to pre-anticipate and pre-adapt to the uncertain future and act in novel situations. Thus, we are open and active systems, that are not predetermined by our past e.g. abductive leaps (see above p. 47). We are on behalf of our past experiences and the available hypergeneralized sign fields making sense of the encountered situation in a continued interchange between pleromatization and schematization in order to reach a desired future. Thus we are perceiving the world as it is AS-IS on behalf of our past experience in order to anticipate the future as it could be AS-IF – see figure 6 (Zittoun et al., 2013, pp. 73-76).

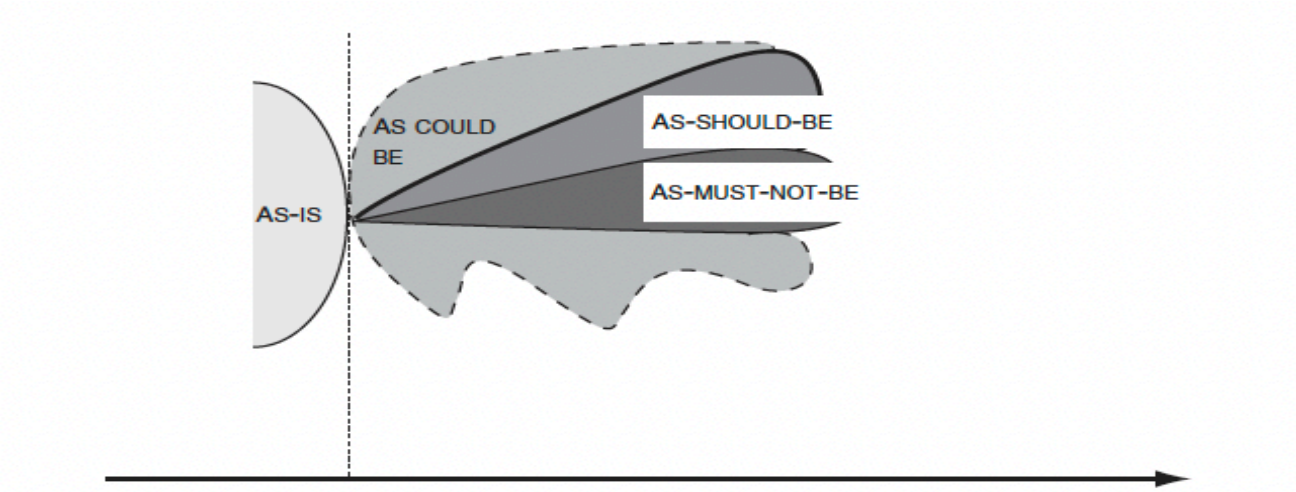

Figure 6 - The future AS-IF as presented by Zittoun and colleagues (2013, p. 76) where the vertical line represents the presence.

In figure 6, we see how we make sense of the present moment - AS-IS - in order to pre-anticipate the future – AS-IF – illustrated by AS-COULD-BE, AS-SHOULD-BE and AS-MUST-NOT-BE. Exactly here, we see a step beyond the realist, normative approaches presented in chapter 2. Following HB and NDM there is a normative future of AS-SHOULD-BE defined by either probabilistic rules or expert strategies and there is an AS-MUST-NOT-BE which is the rest. And the intuition is evaluated according to if the outcome of your actions live up to the requirements of landing in the AS-SHOULD-BE future. Further, the FFH approach too prescribed an AS-IF as fast and frugal heuristics AS-SHOULD-BE to be adhered to – the most simple ecologically rational heuristic allowing you to reach a satisficing outcome. Here, there is too a satisficing normative outcome – e.g. catching the baseball. And there is too a simple heuristic to be learned to catch this baseball. Yet, there was no direct prescription of a wrong heuristic – just an evaluation based on an outcome of more or less frugality and speed. So, we just see an AS-SHOULD-BE.

In sum, this means that in the process of semiotic mediation we are not constructing meaning in a vacuum. We are all living in collective cultures providing signs that are being internalized through the above meaning making process and maybe even hypergeneralized into sign fields guiding our future meaning making processes – our AS-IFs and especially our AS-SHOULD-BE and AS-MUST-NOT-BE (Zittoun et al., 2013, p. 86). Thus, signs in the situation encountered is being internalized and intra-psychologically reconstructed into idiographic subjective meanings. This process is based on our past experiences with the world and thus the already existing hypergeneralized sign field guiding our meaning making process in the present moment. Therefore, we cannot internally mirror

a realistic picture of the external world (Zittoun et al., 2013, p. 80). We will in Daseinian ways create a meaningful internal generalization and hypergeneralization of the world that allow us subjectively to anticipate and preadapt to the uncertainties of the future encounters and changes in the external world in our pursuit of a desired future (Zittoun et al., 2013, p. 80). Hence, we are internalizing culturally situated idiographic generalizations of the collective culture into a personal culture which will guide our future meaning making processes. Our actions will here impact the collective culture reciprocally (Lewin, 1951, p. 256f; Rommetveit, 1992, p. 22f). In this way, we are not predetermined to follow the cultural AS-SHOULD-BE and AS-MUST-NOT-BE. Instead, the field of AS-IF is dynamic and your new idiographic AS-COULD-BE action might be generalized in your culture as the new normative collective AS-SHOULD-BE. This is again the process of abduction. We are not merely accumulating experiences subjectively or collectively and reproducing the field of AS-IF. This is constant in development due to the interaction of several idiographic externalizations of meaning in a collective culture with the potential of creating a wondering or surprising outcome leading to a new hypergeneralized field that are affecting the norms in the collective culture (Zittoun et al., p. 80). Here again, we can return to orchestra comparison. Our own feeling tones arising guiding our meaning making processes are not isolated in vacuum but part of a collective cultural orchestra playing a concert – however, during this concert we all have the possibility of playing a solo or improvise collaboratively if felt to fit in (Zittoun et al., p. 80). As illustrated by figure 7, we are members of an orchestra and cannot escape the cultural patterns prescribing an AS-SHOULD-BE. However, our creative actions being externalizations of our idiographic meaning making opens for the potential to novelty-construction (Branco & Valsiner, 2010, p. 250). If a surprising or at least non-expected action is played out we might reach an unexpected outcome in that situation. This could potentially lead to a new hypergeneralization and a new understanding of AS-IS. Further, our potential and imagined AS-COULD-BE is altered. Additionally this new AS-COULD-BE might alter the expression of the AS-SHOULD-BE and AS-MUST-BE in the future due to our potentially new idiographic hypergeneralized sign fields. Thus – to summarize – we are all sharing experiences between people, **but the subjective significant experiences being generalized will inevitably be idiographic –** and thus our pleromatic side of experiencing will for this reason be fully individual according to your personal past and being hypergeneralized within the present moment.

This leads to the conclusion that it is this pleromatic perceptive pathway—rather than schematizing – that makes intuition possible. It may even be termed the intuitive meaning making

process. Yet, this process is embedded in the general anticipation in the present of what the immediate future brings. But how?

An inspiration for this approach has been the introspective methods of the Würzburg school where time was recorded but not limited. And as you saw in the movement example – time was again not limited and schematization and pleromatization could interact. The same was apparent in the above cognitivist approaches to intuition. What if we take time to the maximum with the semiotic mediational account. How can we then explain intuition?

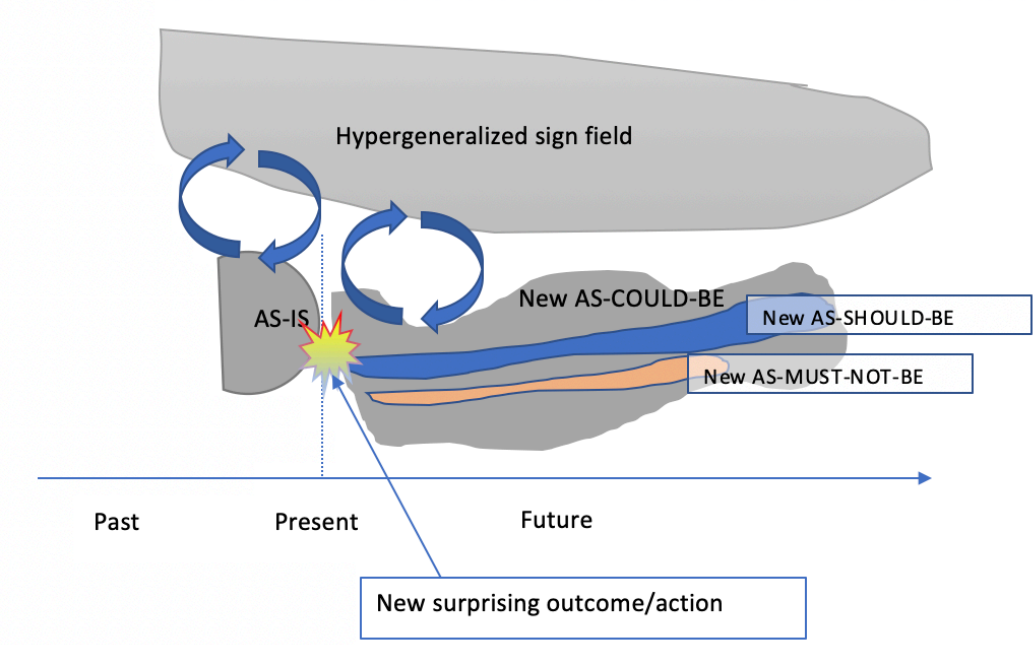

Figure 7 - A revision of the field of AS-IS and AS-IF following a surprising outcome or action in the presently encountered situation

Taking time to the maximum to understand intuition

It is the first big senior tournament for a young emerging talent still in his teen years (Adam) who has succeeded in reaching the playoffs where he is opposing one of the best badminton players in the world. Adam is feeling excited and a little worried: "How am I going to score points against this opponent? Usually, I can rely on my physical stamina and technical abilities and wait for them to make mistakes. However, a world class player doesn't just make mistakes and needs to be physically strong as well. How should I play? When should I play more offensively trying to score points and when should I play more

defensively and wait for him to make technical or tactical mistakes? How do I know when to do what? I feel that I cannot do as usual."

In the above situation, we see a pleromatic feeling into the situation creating a tension of his hitherto hypergeneralized sign field of playing on the right aggressiveness-passiveness balance. And he schematizes this tension into a generalization of *"I feel worried and nervous because I cannot rely on my usual game plan against this opponent. It will not suffice."* This is too illustrated in figure 8 where the feelings arising in the situation of preparing for the match is pleromatically perceived as a tensions and dissatisfaction with available hypergeneralized guiding aggressiveness-passiveness balance and appertaining habitual game plan.

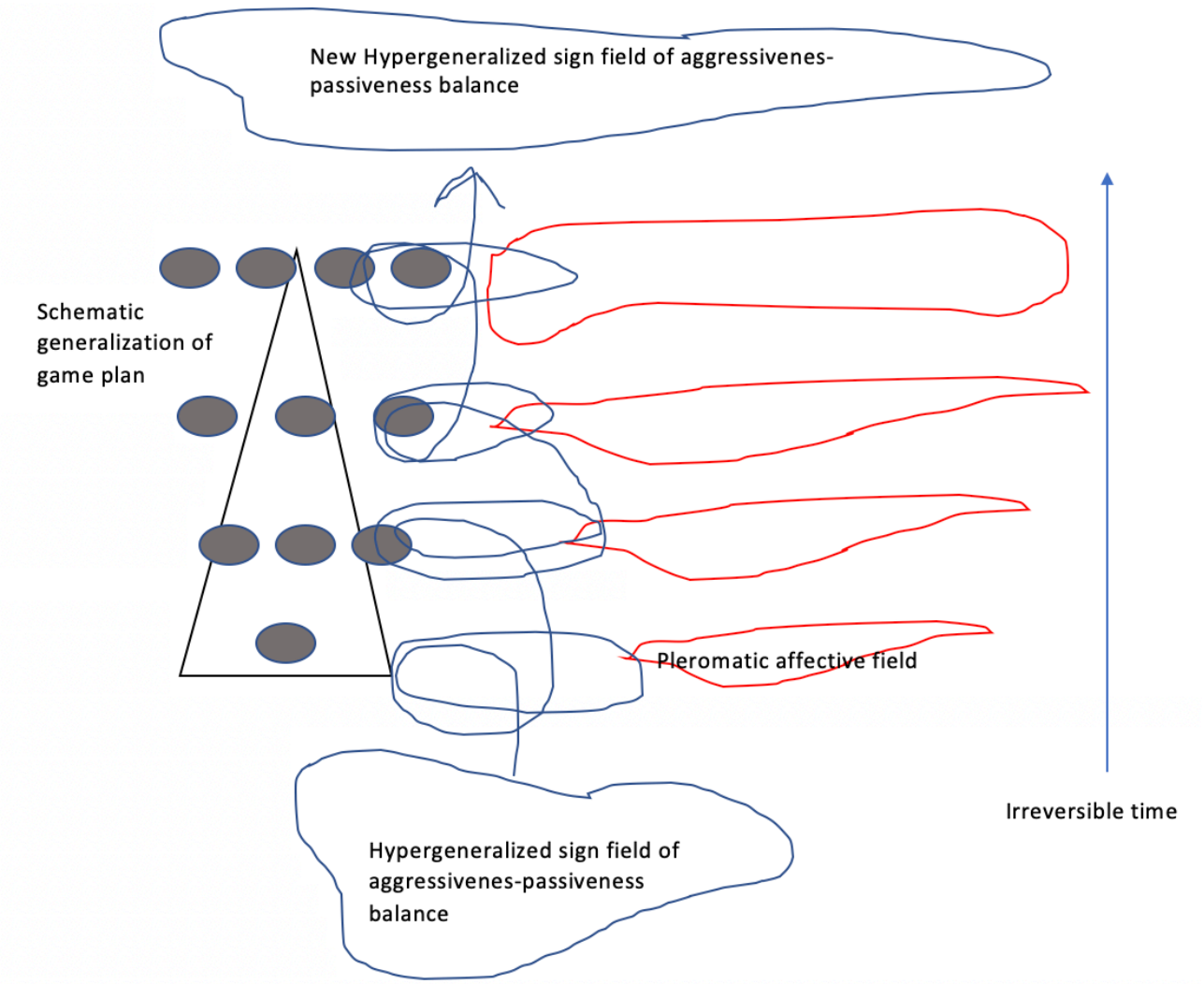

Figure 8 - the ever expanding and further categorization of a situation pleromatically and schematically through the loop of feedback between schematization and pleromatization leading to new hypergeneralization.

Following the feeling of dissatisfaction with the usual game plan guided by the available hypergeneralized sign field of aggressiveness-passiveness balance, we consciously created and formed simple mental models and categories schematically to a new game plan of rules of thumbs of when to be offensive and try to score points and when to rely upon defensive abilities but try to neutralize the opponent. See figure 8 in the upward move towards expansion categorization of the game plan and the feed-forward loop expanding the pleromatic affective sign field now entailing more richness and complexity then the original pleromatic field as guided only by the original hypergeneralized sign

field. We end up with a tactical plan for how and when to play neutral, aggressively and passively. However, we could not account for all factors involved in the upcoming match. We are not able to decide what strokes the opponent will play, we are not able to decide the rulings of the umpire, line judges and service judge. We are not able to control the wind in the hall etc. Numerous factors were at stake that could not be controlled. Thus, Adam did not have all information available and had to choose satisficing solutions on court when returning the shuttle. To make these decisions we had made a game plan of what could be satisficing solutions. One of them was to play a certain straight stroke from Adam's forehand side to the middle of the opponent's side because then the opponent habitually returned it cross-court and Adam could exploit this knowledge and score easy points. This experience expanded his pleromatic affective field of signs (See the upward helical move in figure 8) as Adam turned around and said to me behind the court:

> *"In order to score point, I feel that I have to do this move in both sides and not just in the forehand side!"*

Here, Adam schematically categorizes his expanded pleromatic affective field of signs now entailing to use the same strategy from both sides and he was able to score points from both sides. Thus, we can assume this was a subjectively significant psychological experience for Adam being hypergeneralized into a new aggressiveness-passiveness balance guiding his pleromatic feeling into the situation during the rest of the match.

When playing badminton, the shuttle is flying back and forth over the net so rapidly that your choice of where to play the shuttle is reduced into seconds and sometimes into milliseconds. Further, we cannot determine and control how the opponent will return the shuttle. We have limited information available and we have limited time for decision making. In between rallies Adam can schematically talk with the coach about potential generalizable strategies on behalf of Adam's feeling in to the situation expanding his pleromatic affective field. And this expansion may be a result of a new hypergeneralization of the balance between aggressiveness and passiveness. However, his actions will rely on his pleromatic holistic feeling in to the situation. In between each stroke, Adam does not have the chance to turn to the coach or reflect rationally upon the next move. He might setup rules of thumb (schematized plans – e.g. simple, fast and frugal heuristics) to be initiated at specific situations – as with the jump across court. However, he can never control his opponent fully and will have to

rely on the fullness and complexity of the sign field of the game guiding him in that situation – affectively and pleromatically. And this will be guided by our hypergeneralized sign field being inevitably dynamic due to new surprising outcomes of the situation encountered e.g. the cross-court stroke from the backhand as well as the forehand side and the following offensive strategy applied by Adam.

Above, we have seen how we gradually move from generalizations to new hypergeneralizations through the feed-forward loop between pleromatization and schematization. However, as we saw with Bühler's (1951) "AHA-erlebnis", the conscious and cognitive side might be absent and thus intuition might be creative leading to hypergeneralization and then afterwards schematization. Maybe the cognitive schematization process might be bypassed. This process was apparent in the quarterfinal played by Adam.

One of the schematized rules before the match was to play the shuttle away from the net. The opponent was known for having superior skills when the game was played close to the net. Therefore, Adam did not feel comfortable challenging the opponent at the net. However, in the second set, Adam played the shuttle close to the net and rushed to the net and played it there once more and then he killed the shuttle and won the point. He turned around and looked surprised and immediately in the next point he won another point by playing close to the net. Thus, his non-verbalized "AHA-erlebnis" here lead to an expansion of the pleromatic field and thus intuitive meaning making following the abductive generalization of a new hypergeneralized aggressiveness-passiveness balance now also entailing aggressiveness when playing close to the net. He just felt that he had to play it to the net, and he did so and continued to do so. In the end, he won the match.

From this example, I will propose that intuition is to be understood as a feeling coming from our pleromatic feeling in to the situation and guided by our subjective significant experiences in the past and hence intuition will be a process of pleromatic feeling into the situation allowing us to act. And exactly these intuitive and non-conscious actions will be revealings of our hypergeneralized sign fields guiding our immediate actions in the present situation when facing the uncertainties of the future. Therefore, satisficing will be a pleromatic feeling guided by our hypergeneralized sign fields stemming from our significant past experiences and your intuition will thus be meaningful to *your reality* hitherto established. From this we can also understand why my reaction in the township in the introduction to the loud noises was not a *bad* intuitive action but was *an intuitive process of meaning making leading to a meaningful action* ***to me*** in relation to my past experiences while it was simultaneously meaningful of the young township players to be scared and paralyzed due to their past experiences. This is depicted in figure 9 where the schematic meaning making process is bypassed and

externalization of meaning rests on the pleromatic feeling into the situation guided by our hyper-generalized sign field.

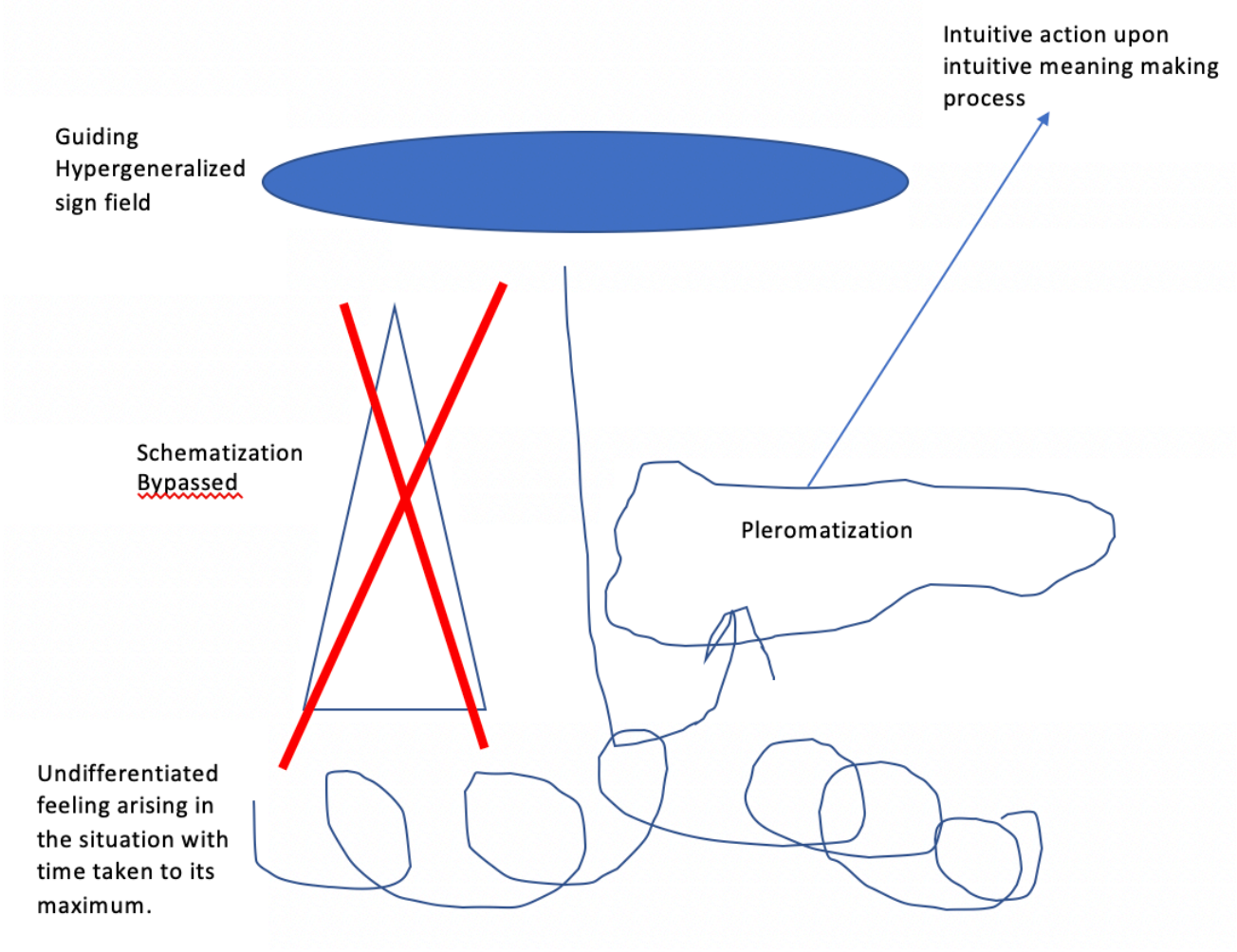

Figure 9 - Bypassing schematization by intuitive meaning making process when time is taken to maximum

We have now seen the rapid and automatic operation of intuition when time is taken to the maximum. But how can we account for intuition in everyday life following a semiotic mediational approach?

Intuition in everyday life

As mentioned above, we are feeling into and automatically perceiving and making sense of situations pleromatically – guided by our hypergeneralized sign fields. And this process is without mediation of words or through verbal categorization – but by intuition (Valsiner, 2014a, p. 244f). Yet, intuition

is not only operating when we take time to its maximum. We are too guided by intuition in everyday life when we do not feel tensions in the way we are guided by our pre-anticipations and pre-adaptations from our hypergeneralized sign fields, and what we actually experience in the encountered situation (Valsiner, 2014a, p. 244f).

As seen above, we form expectations of AS-COULD-BE on behalf of our hypergeneralizations of AS-IS automatically and intuitively by our pleromatic feeling in to the world. In this way, we pre-anticipate and pre-adapt to the uncertainties of the future. Taking time to its maximum, we then act intuitively on behalf of what is expected without deliberate reasoning upon what is to come as seen above. However, in everyday life time is not always taken to its maximum – yet we are still at times acting intuitively while we are at other times engaged in a conscious deliberate meaning making process making sense of the situation encountered schematically. It is exactly, when our expectations and thus our pre-adaptations are violated or at least ruptured that we are engaged in conscious deliberate meaning making in order to make sense of the situation once again (Valsiner, 2014a, p. 244f). Due to irreversibility of time, we are constantly engaged in new situations with the potential of creating tensions between our pre-anticipations and what is actually experienced. These initiates deliberate meaning making and schematization of the encountered situation in order to once again make sense of the situation by releasing these tensions – either by generalizing schematically our pleromatic feeling in a way adhering to available hypergeneralized sign fields. Or by altering/creating new hypergeneralized sign fields following this new rupturing experience (Campill & Valsiner, 2021, p. 12f). In other words, many situations are intuitively made sense of due to the absence of tensions in our meaning making process of what is expected and pre-anticipated guided by our hypergeneralized sign fields and what is experienced in the situation (Valsiner, 2014a, pp. 240-247).

As an example, we can turn to a pilot study discussed in chapter 6 performed at a boarding school when investigating the cultivation of intuition and especially the hypergeneralization of a broad-ranged flexible LoC belief within the students. Here, an interesting dynamic was at stake with the students having to share dormitory rooms with other students. Small everyday life routines normally performed non-consciously and automatically at home was now questioned. Going to bed at night how much do you talk together before falling asleep and how do you say goodnight? Having a free period, how do you spend it? When your roommate is sleeping during the day do you then turn on the lights and leave the door open? These examples of situations can function as examples of how hypergeneralized sign fields of flexibility and tolerance was in tension with the experienced feelings in the situation of the other being interpreted as not showing consideration for the other (see excerpts

of this interview in appendix 1). Thus, schematization was initiated in order to understand the situation constantly being in a feedback loop with the pleromatic feeling into the situation and simultaneously being guided by and possibly altering the hypergeneralized sign fields. This tension was apparent up until and during the interview session after one and a half month at the boarding school where the student now schematically generalized the experience in order to expand his hypergeneralized sign field of what tolerance and flexibility could entail as well. Additionally, this lead to reflections of how the student could flexibly act in the situation following a flexible range of LoC and thus initiate a matching of expectations schematically between the roommates in order to collaboratively affect each other's hypergeneralizations of tolerance and flexibility (see examples in the excerpts in appendix 1).

In order to understand meaning making and here also intuitive meaning making, we will have to remodel the semiotic regulation of dynamic fields originally presented (see figure 10) by Branco and Valsiner (2010, p. 246) once more.

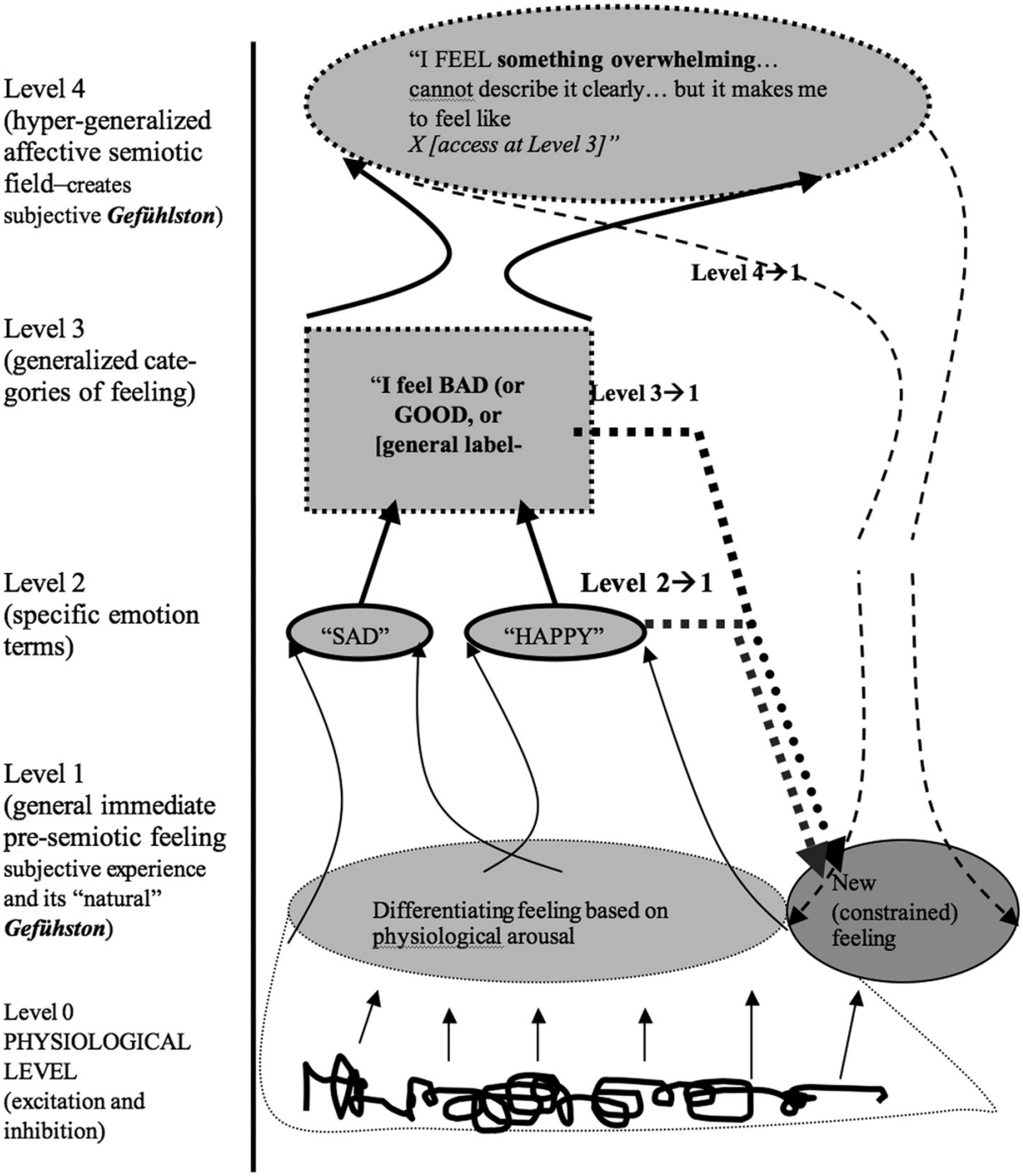

Figure 10 - Original process of semiotic regulation of signs (Branco & Valsiner, 2010, p. 246)

Here, we see how our feeling tone in level 1 becomes schematized and generalized working back into our new (constrained) pleromatic feeling in the situation guiding our new more conscious meaning making process of schematization and generalization until enough significance is reached and a new

hypergeneralized sign field emerges abductively either through revision of the existing hypergeneralization or creation of a fundamentally new hypergeneralized sign field (Branco & Valsiner, 2010, pp. 244-248). However, by having the hypergeneralized sign field as "the end product of meaning making" we are not fully grasping the constant dynamic flow of experiences following the constant loop between pleromatization and schematization seen above – both when time is taking to its maximum and when it is not.

Even though our meaning making processes are guided by our hypergeneralized sign fields, we are not constrained. Every new experience has the potential of being significant enough to create enough tension between the pre-anticipations of the uncertain future and the actual experience and thus feeling in the encountered situation. Conclusively this urges a revision of the model of semiotic regulation. Instead of a bottom up hypergeneralization process and top-down constraining of future experiences, I propose a non-linear feed-back looping model with the ability of bypassing levels and constant interaction between the loop of schematization and pleromatization and hypergeneralization. Further, this leads to expansion of the pleromatic affective field of experiencing the situation, expansion/abstraction of the hypergeneralized sign fields and further generalization and differentiation of the situation schematically thus increasing our grasping the encountered situation based on our dynamic feeling in to the situation. This continuous expansion of fields and further categorization and generalization is an interactive feedback loop with the hypergeneralized sign fields depicted in figure 11.

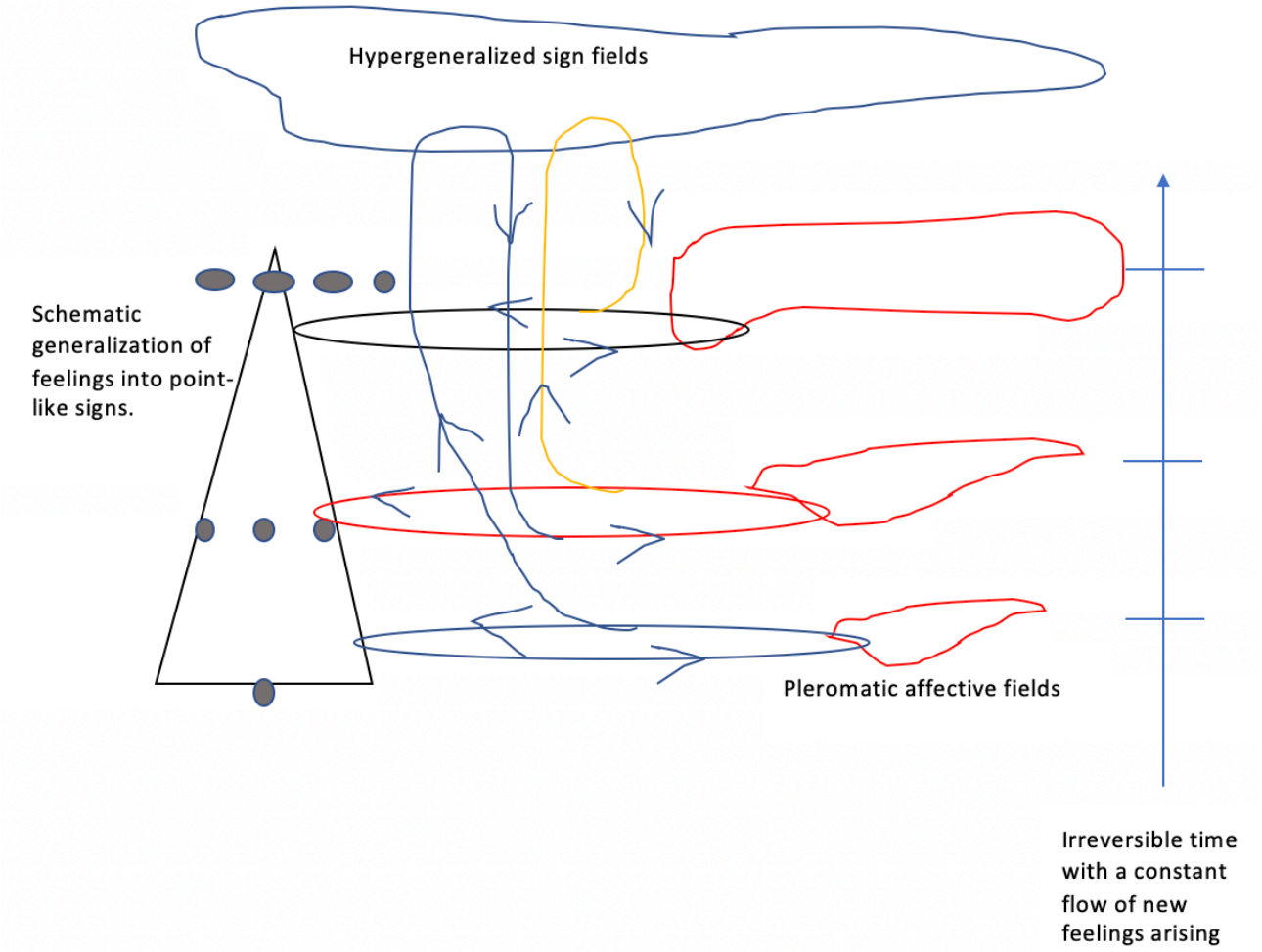

Figure 11 - Illustration of the constant feedback loop between schematization and pleromatization in the irreversible flow of experiences in a constant interacting loop with our hypergeneralized sign fields.

Additionally, as we have seen, we need not a conscious and verbal generalization of meaning before moving into hypergeneralization. Instead, it is proposed that a pleromatic feeling can be of such significance that we alter or revise our hypergeneralized sign fields as seen with Adam rushing to the net above without verbal conscious reasoning and schematization of a plan of what to do. He just did. This is depicted in a revision of figure 10 in figure 12 with bypassing loops from every level of abstraction to hypergeneralization.

Conclusively, to understand the operation of intuition, we see in figure 9 when time is taking to its maximum how the schematizing, conscious reasoning process is bypassed and we rely on our

pleromatic feeling into the situation while in everyday life our intuition is interacting with our more conscious and rational schematization of the process in a constant feedback loop.

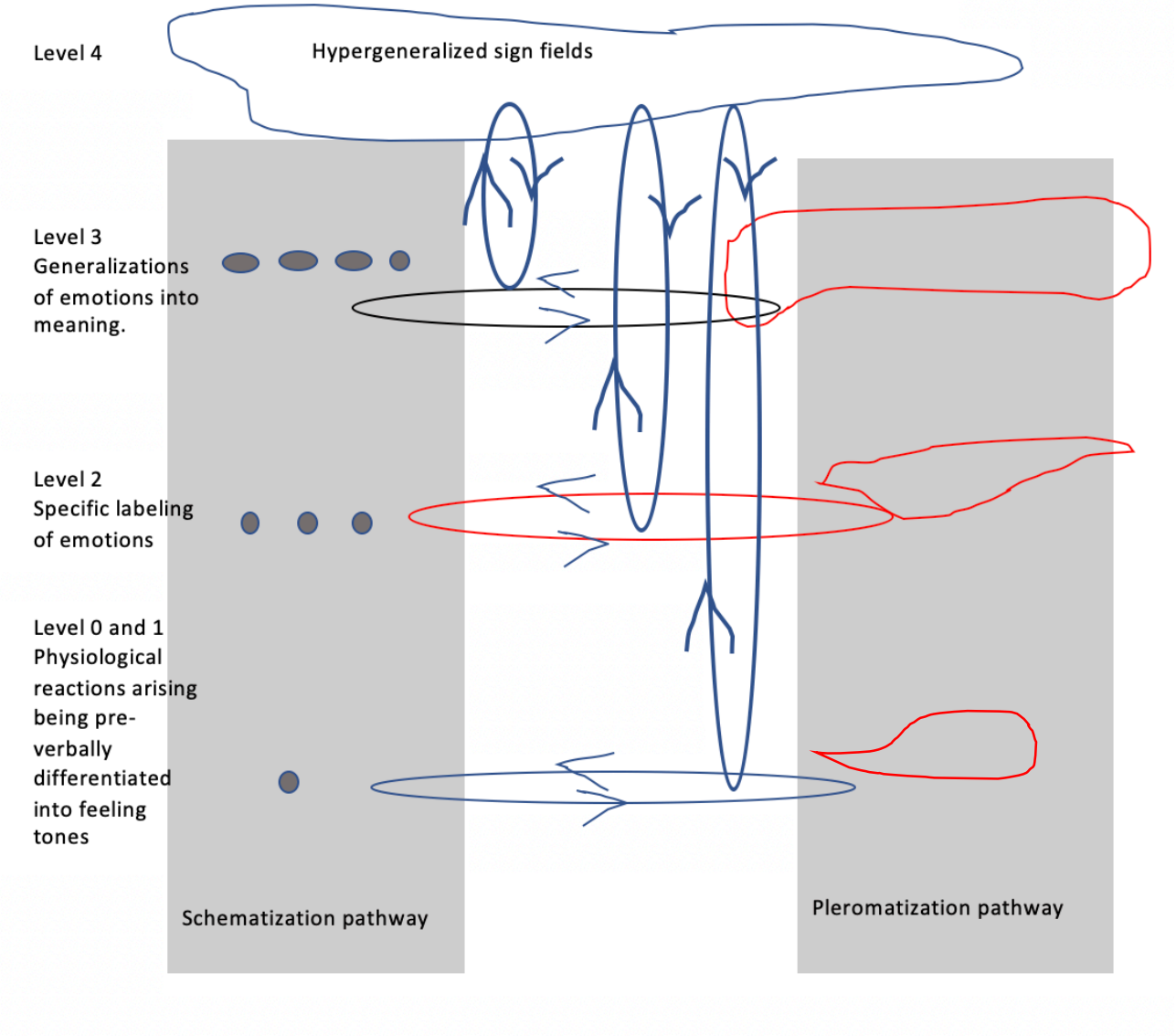

Figure 12 - Revision of the original model of semiotic regulation with bypassing possibilities of hypergeneralization instead of a rigid bottom-up approach.

Chapter 5 – Theoretical conclusion: Intuition as a pleromatic feeling.

To answer the initial discussion of what constitutes intuition, we can now conclude that we have to move beyond the cognitivist approaches being prominent in the literature upon intuition. Several experimental studies and field observations have been conducted in order to reversely infer factors, cues or heuristics causing satisficing. However, as seen, the cognitivist approaches could not account for

when and how we do know what is satisficing. Instead, they enabled us to evaluate intuition as an entity based on an outcome more or less adhering to norms – whether being statistical rules, the simplest heuristic or recognition of patterns[19]. In order to understand the constitution of intuition on the basis of satisficing we need to move beyond seeing intuition as an ability. We need to move to the process of feeling of satisficing allowing us to pre-anticipate the uncertainties of the future following our pleromatic feeling in to the situation. Meaning making and externalization of meaning is a constant process involving more or less cognition and schematization. As apparent in sports, taking time to its maximum the schematizing cognitive pathway remains inhibited and our meaning making and actions will be dependent on our pleromatic feeling in to the situation guided by our hypergeneralized sign fields. Thus, intuition rely on the satisficing of the "good enough" alternative which is non-consciously perceived and felt pleromatically – see figure 9.

Further, we live in irreversible time, and the present has just become the past. We gain ever new experiences and these experiences can potentially alter our intuitive meaning making and externalization of meaning through action in the future. This is due to abductive generalization. Thus, abductive leaps can lead to hypergeneralizations of new sign fields to guide us when made available by the encountered situations in the future. In sum, this leads to a mechanism of ever-expansion or at least alteration of the pleromatic affective field initiating a guiding feeling tone in the situation allowing us to pre-adapt and pre-anticipate to the uncertainties of the future. Both in everyday life where we do have the time to consciously wonder upon non-expected events and thus initiate in the feedback loop between schematization and pleromatization arriving at a new generalization potentially being hypergeneralized and when time is taken to its maximum.

In sum, to fully grasp the constitution of intuition, we need to move beyond the original conceptualization of the semiotic regulation hierarchy as presented above. When time is taken to the maximum, we bypass the schematization side and act intuitively upon our pleromatic feeling in to the situation. And in everyday life this feeling in to the situation is then in a feedback loop with schematization when we feel tension between what is actually experienced and felt in the situation and what is made available by our hypergeneralized sign fields guiding our pre-anticipation to the uncertainties of the future. Therefore, I suggest a revision of the model to a non-linear[20] reciprocally interacting

[19] This aspect of conceptualizing an outcome ability was also identified throughout the reviews upon intuition (Dane & Pratt, 2007, p. 34f; McCrea, 2010, p. 30; Shirley & Langan-Fox, 1996, p. 2).

[20] Psychological research has for years been preferring the axioms of linearity assumptions being imposed on dynamic processes. In order to innovate and grasp the complexity of the dynamic

model of pleromatization and schematization at level 2 and 3 together with a constant interaction with and potential affection of the hypergeneralized sign fields in an ever expansion of affective pleromatic fields and differentiation of experiences schematically – see figure 11. Further, it is here the significance of the experience – non-consciously or consciously perceived – that is determining whether an abductive hypergeneralization is initiated – no matter what level of abstraction this significant experience is occurring – see figure 12. Now, I have proposed what constitutes intuition and how satisficing is felt pleromatically leading to intuitive action. But could this intuition be cultivated? And if so, how could it be studied? In the following chapter, these two questions will be perspectivally discussed.

Chapter 6 – Perspectival discussion of cultivating intuition

Originally the cognitivist approach to intuition was a process of evaluating intuition according to the outcome of a rapid decision-making process all with the aim of determining the satisfactory level leading to decision and thus action. Yet, by turning to semiotic mediation we see how satisficing is felt pleromatically guided by the hypergeneralizations of sign fields of our past experiences. However, these hypergeneralizations has been proposed following the lines of abduction but has not yet been investigated – only theorized upon. My question is then if hypergeneralizations are only coincidental happenings following the encounters of surprising outcomes? Or could we talk about orienting the eye of our minds intentionally as Plato did with his prisoners? Here, Plato cultivated the prisoners' intuition due to his full control of signs, situations and experiences presented to them and thus their possibilities of creating signs, hypergeneralizations and thus meaning. Could we do the same with our own intuition or collaboratively cultivate our clients' intuition?

An inductively generalizing pathway to hypergeneralization

Originally my research endeavors were initiated by my experiences of social mobility in a township in South Africa. Here, children were born and socialized into culturally consistent meaning making patterns largely governed by culturally given schematic narrative templates of poverty and social stability and not social mobility and the inability to affect this dynamic. This partly constrained their subjective meaning making processes. Schematic narrative templates are certain patterns of narrating

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human being we need to propose non-linear models of being and meaning making instead of reproducing the insufficient and rigid linear models (Campill & Valsiner, 2021, p. 2).

and making sense of encountered situations and thus constrainers of the meaning making process (Wertsch, 2002, p. 60f). Thus, our meaning making processes are guided by our past experiences being hypergeneralized into sign fields in a certain community of certain structures that offers certain participative opportunities thus also constraining or at least guiding our way of experiencing the world (Dreier, 2009, p. 195; Hundeide, 2005, p. 242). However, as we have seen, through abductive generalization we are able create new hypergeneralized sign fields guiding our pleromatic and intuitive feeling in to this world and thus our intuitive meaning making process. This was apparent in the township. Unlike their peers, the badminton players seemed to expand their hypergeneralized LoC and they seemed to abductively break with the culturally prevalent schematic narrative template of primarily external LoC beliefs by effortful participation in the practice and automatic investment in their own futures by investing in educational efforts (Bisgaard, 2020, p. 14). Again, as we have seen above this process of abductive generalization is initiated through a subjectively significant experience and was originally termed by Peirce (1979, p. 137) to be a surprising experienced outcome of the encountered situation leading to a new generalization of experience. Here, my intuitive experience and explanation of the township mobility (e.g. the methodology cycle in figure 2) was that the participation in badminton gave rise to new participative opportunities and thus access to new ways of experiencing the world paving the way for new significant experiences being hypergeneralized into a more flexible broad-ranged LoC belief. The same retrospective explanation seems apparent in Nelson Mandela's (see above) experiences of participation in sports and how this hypergeneralized into a more broad-ranged LoC belief urging persistence, patience and self-discipline. From this I started to wonder: *"Could intuition be cultivated through intentional pursuit of inductive hypergeneralization of sign fields?"*

Let us return to Plato's guiding of the eye of the mind. Here, his prisoners' assumed intuitive meaning making processes are guided through what is presented to them. Thus, the educator can cultivate and educate their eyes of their minds through what is presented to them and thus their participative opportunities. However, we do not have such controlled and excluded societies in a modern world. All societies are intermingled and interchange meanings reciprocally as a field of forces surrounding the subject (Lewin, 1951, pp. 256-268). However, we might be able to educate and cultivate our intuition by reflection and continuous attention to our values and if and how we automatically and intuitively follow these when being under pressure (Lykkeskov, Askildsen & Eckerdal, 2020, p. 96). This cultivation idea is largely founded upon the ideas of ACT (Acceptance and Commitment Therapy). When acting intuitively either in everyday life or in situations under pressure and under

severe time constraints we have seen that we are largely guided by our hypergeneralized sign fields orienting our pleromatic feeling into the world. The fundamental idea of ACT is to question these intuitive meaning making processes when these are not felt as workable and thus satisficing (Hayes, 2004, p. 651) and are thus creating tensions post-reflectively or immediately in our meaning making processes. One of the core interventions in ACT is then to identify desired values to pursue in order to live a meaningful life and reach your desired goals in the future. This is particularly pursued by reflecting upon what value based actions could be so that you are able to act value based when meeting adversities or when registering that you are intuitively making decisions or acting in a way not workable in order to reach a certain desired future (Hayes, 2004, p. 647). Following semiotic mediation, values are hypergeneralized sign fields onto-and micro-genetically developed in an interaction with the world and these establishes the basis for acting and knowing. Thus, values are guiding our meaning making process in the encounter with and pre-adaptation to the uncertainties of the future (Branco & Valsiner, 2010, p. 247f). And it is further proposed that individuals can exert intentional enhancement of affective fields and thus try to promote signs to enhance a particular feeling. A person might try to induce a certain feeling and generalization to be hypergeneralized (Branco & Valsiner, 2010, p. 250). And this could be pursued through imagery of a certain problematic or challenging situation and further imagination of acting value based in that situation (Lykkeskov, Askildsen & Eckerdal, 2020, p. 88). Then, if enough significance is felt this might lead to hypergeneralization of that experience guiding our future intuitive meaning making processes through pleromatic feeling in to any new situation.

Accepting this process of pursuing certain values consciously following ACT-inspired approaches being empirically tested and showing supportive but not yet conclusive results (Gaudiano, 2011, p. 12f; Öst, 2014, p. 116), we might have to expand the semiotic mediational approach of regulatory hierarchies of signs to not just be founded upon abduction but also induction[21]. This could pave the way for understanding how we can cultivate intuition. Either by opening for new participatory opportunities as in the South African example with the township players allowing them to experience significant situations being hypergeneralized and thus expanding their hypergeneralized sign fields guiding their future intuitive meaning making processes. This is similar to Plato's original guidance or the eye of the mind as an external agent. Or we could draw inspirations from ACT and aid the overcoming of non-workable intuitive actions guided by hypergeneralized sign fields through the intentional pursuit of hypergeneralizing a new value inductively and thus cultivating intuition as

[21] Hence the intuitus originarius human being as prescribed by Kant (see p. 15).

is the case in several sport psychological approaches to performance (Diment, Henriksen & Larsen, 2020, p. 27f; Henriksen et al., 2016, p. 72; Henriksen & Hansen, 2016, p. 78).

Following the underlying assumption in semiotic mediation of human beings as emotionally invested and goal-oriented human beings, and the aim of ACT-inspired approaches to reach a desired future, I find it useful to apply sport as a fruitful field of investigating the cultivation of intuition due to the innate goal-directedness and emotional investment following participation in elite sports. Maybe other fields could be used as catalysts as well. Yet, the field of sports and here badminton has indicated advantages in order to cultivate intuition – both in the South African example, in my part time job as a mental coach and badminton coach, and in the pilot case study that I will briefly discuss in the following.

The pilot case study

Hitherto in this thesis, I have been moving through the top 3 aspects in the methodology cycle (see figure 2) and I found the theoretical accounts and appertaining methodologies insufficient in grasping the complexity of a feeling based intuition. In order to move closer to a method of studying intuition and the cultivation of intuition through hypergeneralization of new values I did a pilot-study in the fall of 2020 at a Danish boarding school. This boarding school is for talented athletes across several disciplines – among others badminton. Inspired by the works in South Africa and the reconceptualization of Rotter's locus-of-Control (LoC) model into a dynamic range like model (Bisgaard, 2020), I hoped to induce a hypergeneralization of broad-ranged flexible LoC where the students would be enabled to flexibly pre-adapt to the adversities encountered both in the sport and in everyday life at the boarding school by rapidly and intuitively identifying what factors to control and what factors to accept when encountering challenging situations. Throughout their practices, I would present them to different challenges relevant to the field of badminton ranging from intermittent and arbitrary long breaks, bad shuttles, loud noise, seemingly unfair judgements from line judges, restrictions upon what strokes to use, and they were further encouraged during the practices to induce frustrations intentionally upon each other if felt appropriate. The total length of the pilot study was of three months with an initial workshop upon LoC and their perceived evaluation of the necessity of flexibility in the range between internality and externality in LoC beliefs. After four weeks, this workshop discussion was repeated once more and again after eight weeks and at the end of the pilot study it was repeated once more. One special feature of the workshops was imaginative discussions of challenging and frustrating adversities to be encountered in everyday life as well as in the badminton hall and how to

flexibly handle these situations according to a broad-ranged flexible LoC. Due to the non-verbal qualities of both the hypergeneralized sign fields and our pleromatic feeling in to the world I videotaped every practice in order to multimodally analyze changes in their immediate reactions to the situations encountered (Goodwin, 2000, pp. 1517-1520). These changes could then be perceived as revealings of their non-verbal intuitive meaning making processes if we follow the line of embodiment (Bechara, Damasio & Damasio, 2000, pp. 295-297; Moran & Toner, 2017, pp. 362-368; Nedergaard, 2019, p. 287). Further, following Bamberg's (2012, p. 82) interactive-performative narrative analytic approach, we are narratively constructing meaning and these meaning making processes are revealed through informal everyday life situations opposed to the constructed narratives appearing in formal interview settings (Bamberg, 2012, p. 77f). Therefore, I implemented training diaries after each practice in order to get as close to their immediate and intuitive experiences during the practices where they were faced with adversities as possible in order to depict how they positioned themselves on the range between internal and external LoC beliefs when facing these situations (Akinci & Sadler-Smith, 2012, p. 118). I wanted to see, how they revealed their hypergeneralized sign fields by analyzing why they are telling exactly this point in their diary now. Yet, in order to qualitatively interpret and analyze changes in the revealings of the hypergeneralized sign fields through the subject's narratives, I needed to get close to the life space of the individuals in order to understand their reconstructions of their pasts and how these reconstructions enabled them to make sense of the situations encountered at the boarding school in their move towards the uncertainties of the future (Lewin, 1942, p. 229f). We are as human beings situated historically, socially and physically in a life space where several surrounding forces are affecting the way we see and make sense of the world. This is both forces as communities, persons, events, media, school policies etc. (Lewin, 1942, p. 215). Thus, there is a constant interaction in the subject's life space between forces in the field affecting the meaning making process of the individual and at the same time a reciprocal affection from the individual's actions and behavior to the forces in the field (Lewin, 1942, p. 215; Lewin, 1951, pp. 252-268). For this reason, I needed to get as close to the life space of the individuals by both being present at the boarding school to observe the dynamics happening at the school but also by doing narrative interviews with the most consistent students according to their participation in badminton in spite of Covid-19 pandemic to be able to get closer to mapping the field of forces in their life spaces (see pilot study design in appendix 2).

As seen above, our hypergeneralized sign fields are in constant interactive loop with the pleromatic intuitive and conscious schematic perception of the encountered situation and these all happen in a field of forces in our life space where we are enable certain participative opportunities. With the pre-assumption that these students at the boarding school was highly emotionally invested in making the best of their badminton career due to the choice of a boarding school for elite badminton players, I constructed certain participative opportunities in which they had to flexibly adapt and inhabit both internal and external control beliefs at the same time in order to identify what had to be accepted and what had to be controlled in the encountered situation in order to successfully handle the situation encountered and inductively (hyper)generalize a flexible LoC. Following both videotaping of each practice, training diaries, participative observation, workshops, group discussions and individual interviews I had the opportunity to both analyze the micro-genetic changes of adaptation and pre-adaptation to the adversities encountered through inhabitation of flexible LoC in that situation (Valsiner & Van der Veer, 2000, p. 302f). The methodology of the pilot study was necessarily short term longitudinal in order to see not just how they handled one situation but how these experiences were potentially hypergeneralized over time and thus came to govern their pleromatic feeling in to and pre-anticipation of the uncertainties of the future. I extended the "present" and performed both a micro-genetic study and analysis of every practice, workshop and interview and a meso-genetic study and analysis of change over the course of three months while a macro- and onto-genetic study was not relevant due to the aim of studying the dynamicity here and now during the pilot study. I wanted to study the micro-genetic changes in their reactions towards adversities in order to depict the revealings of processual changes in their intuitive meaning in the moment and throughout the whole study period in order to qualitatively reveal their hypergeneralized sign fields through their intuitive actions and changes herein. Accordingly, introspective informal methods were employed in order to see these revealings and positioning of their LoC-range. Thus, it is not as experimentally designed and reversely inferring as the cognitive approaches above evaluating outcome. I wanted to get closer to the process and capture indications of change during this process of pre-anticipation and feeling in to the situation.

The emergence of RICA

During the first half of the project the students seemed to have a hard time adapting to the adversities and frustrations encountered in the badminton hall – even though we had had workshops and discussion upon the necessity of flexibility. Seemingly, their hypergeneralized sign fields of a skewed LoC

range to either internality or externality were made available and guiding their pleromatically felt intuitive meaning making and their following actions were of frustrations (cursing, dropping the shoulders, throwing rackets, increasing the tension of their muscles causing them to move more mechanically on court, increasing their rate of mistakes and showing discomfort in their facial expressions) and withdrawal from the exercises by giving up, scolding the exercises and thus not indicating effort in solving the exercises. This was too apparent in their training diaries (See appendix 3 for examples). The handling of adversities and frustrations were not immediately and flexibly adapted to and it seemed that the students needed help in both discussing how to handle the situations encountered flexibly and further to initiate the schematic perceptive pathway to reflect consciously upon how they intuitively perceived the situation and if this was workable and satisficing according to exercising a flexible LoC and not a skewed LoC and how to act flexibly. From this an ACT-inspired model aiding their schematization of experiences according to flexibility emerged.

The RICA-model (Register, Identify, Control/Accept, ACT) was introduced to support the players' reflection upon how to handle adversities and hypergeneralize flexibility (see figure 13). According to ACT, we need to register and defuse from our thoughts and feelings in the encountered situation in order to employ value-based actions (Gaudiano, 2011, p. 8) instead of our intuitive actions guided by our hypergeneralized sign fields not aiding our move towards the desired goal in the future. Another key factor of ACT is to acknowledge that you are not your thoughts and feelings. They are instead constructed upon your mediation of past experiences (Hayes, 2004, p. 656) and this further allow you to defuse from your thoughts and feelings and identify the feelings arising and maybe what is causing them (e.g. the schematic generalization in level 2 and 3 in semiotic mediation). Following this identification of thoughts and feelings and potential causing factors to your frustration, you will now be able to accept these inevitable unpleasant feelings and uncertainties of being human (Hayes, 2004, p. 656). But I would then add following a flexible LoC that you would following this process also be able to identify factors able to be controlled and invest your energy in these factors while accepting the uncontrollable factors in order to act value-based in the encountered situation.

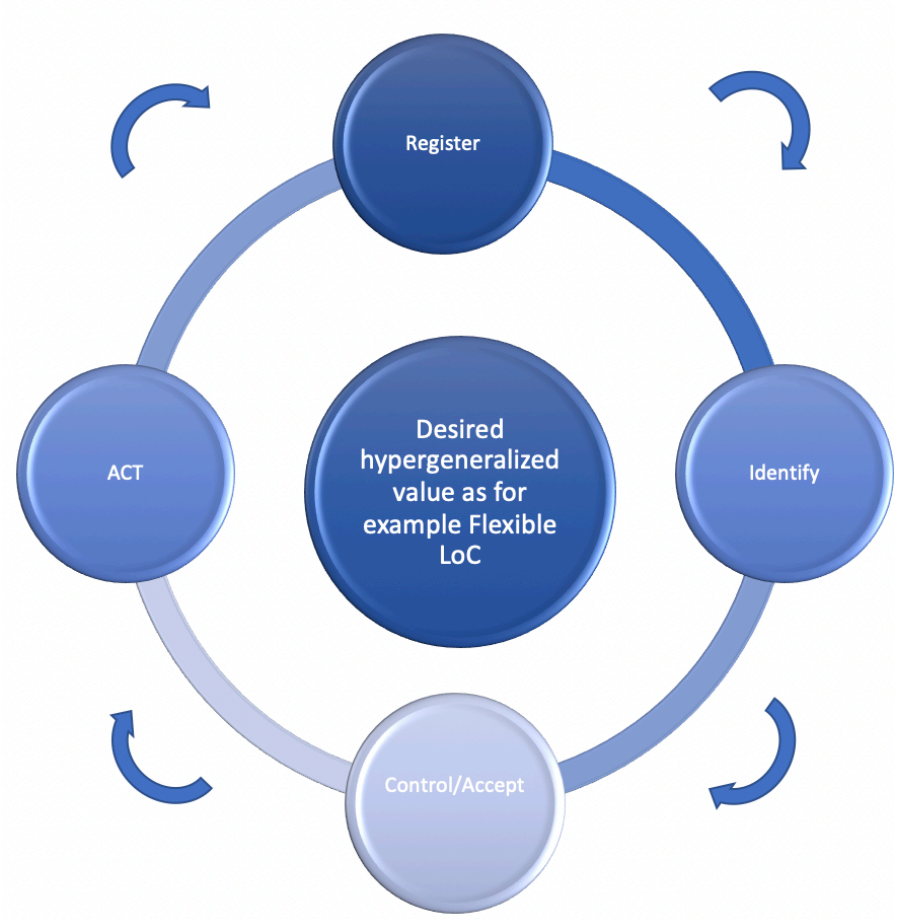

Figure 13 - The circular RICA-model to the hypergeneralization of values.

This whole process of RICA is a schematizing and cognitive endeavor taking place at level 2 and 3 of abstraction – see figure 12. But every new experience has the potential of interacting with the hypergeneralized sign field and maybe altering this field and if enough significance of a particular experience is subjectively felt a new hypergeneralized sign field is created. This circle might have to be attended to several times before hypergeneralization due to the subjectivity of the feeling of significance needed to hypergeneralize a new sign field. But when this hypergeneralization is created we do not any longer have a conscious schematization of RICA with that certain value in the center. It is instead becoming a non-conscious pleromatic cloud-like field of intuitive meaning making guided by the hypergeneralized value (See figure 14).

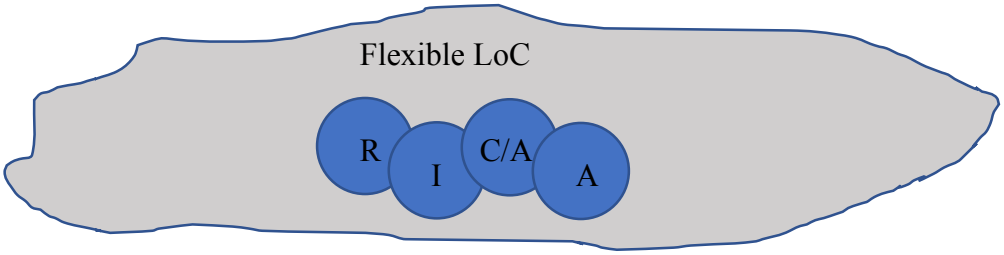

Figure 14 - The cloud-like field of hypergeneralized Flexible LoC with intermingling intuitive processes of RICA

In this boarding school case, I introduced this model before every practice during the last half of the pilot study and we discussed potential value-based actions to adversities before each practice and at the workshops in order to aid their identification of possible actions to perform following their schematic analysis of what to control and what to accept in the encountered situation in order to reach a desired future. Here, handling the adversity and improving your badminton game. Further, I encouraged the players to take a break during practice to initiate this circular RICA-model in order to have time to both employ schematization and not only pleromatization by expanding the time available to make sense of the situation encountered.

Exactly by using badminton, I hoped to tap into significance due to their assumed desires of developing expertise in this field and thus their desires to being able to handle adversities flexibly and only invest energy in factors they are able to control. Following the introduction of the model, I saw with some of the players that they started to automatically and intuitively adapt to the adversities encountered. For example, one morning I met early and made the hall a complete mess and hid in the janitor's room following the surveillance camera to see their actions. Some players started to clean up and initiate warm up routines while others stayed at the bench waiting. Having one of the other coaches next to me in the janitor's room he reported that this seemed as a change since they all normally just waited on the bench until the usual coaches and teachers initiated a warm up. The same indications followed from monitoring their participative efforts in practices on the video recordings in spite of adversities and frustrations encountered in the practices and through reading their training diaries (see appendix 3 for examples). And this was both apparent in practices with scheduled time for initiating RICA in between exercises and in practices where this was not scheduled and induced. Lastly, this tendency of a move towards flexibility and intuitive appliance of RICA and the flexible move of what to accept and what to control was indicated in the second interview with one of the players. The interviews were supposed to be semi-structured narrative interviews however this interview turned out to be a discussion initiated and largely performed by the player of what to control

and not to control in a challenging situation on-going outside the badminton court in the dormitory room and with the group[22] (see appendix 1).

Since this was a pilot-study nothing can be concluded but I saw indications that hypergeneralized sign fields might not only be abductively but also inductively generalized. And as with the South African experience inspiring this whole move towards the cultivation of intuition, sport was used as a catalyst for creating subjective significance and could serve to be a relevant field for the inductive generalization of hypergeneralized sign fields[23]. For this reason, similar studies as the above need to be conducted in order to investigate the new hypergeneralizations through their revealings in pleromatic intuitive feelings and actions and thus to investigate the process of intuition and changes herein. Following the writings of this thesis two new questions to be investigated has risen: *How do we create the significance leading to hypergeneralization? Could sport or other similar fields be catalysts for significance?*

One thing is sure. We need to study the process and not the outcome in order to understand the changes in and cultivation of intuition.

[22] A group is in this situation a small group of students (around 10) across sports and classes that live together in 2 groups of 2 rooms each next to each other in the hall of dormitory rooms.
[23] Hence the catalytic ideas introduced in page 10.

Chapter 7 – General conclusion

The aim of this thesis was to understand the non-conscious parts of human reasoning – especially intuition. Why did I react differently in the Township experience? Why did the players in the township approach life differently than their peers? And why did the players at the boarding school start to seemingly react intuitively different to adversities? Therefore, I put forward the research questions: *"What constitutes intuition? And is our intuition shaped by a coincidental accumulation of experienced situations and events, or could our intuition maybe controlled? And if so how?"*

In order to understand what constitutes intuition, I performed a theoretical review and analysis of the prominent theorizations on the field throughout the last century. From this analysis, I could extract that theorizations has largely been skewed towards realistic approaches towards intuition opposed to more relative approaches. Grounded in the questioning of rationality during the first half of the 20th century, Simon's bounded rationality and satisficing principle became a crucial approach founding the cognitive turn in understanding intuition. During the cognitive revolution, several investigations searching for what is a good enough alternative – satisficing – were initiated. Here, three prominent contributions in the cognitive psychology were in my analysis seen as largely affecting how cognitive psychological theorizing has largely turned intuition to be a realist outcome-oriented cognitive ability of perceiving the truth of *a reality* non-consciously and rapidly. Further, my analysis indicated, the black boxing of satisficing and thus intuition has not yet been fully opened since we could not conclude when and how we know what is a satisficing and good enough alternative. We only know how to evaluate the outcome of the intuitive meaning making process following these cognitive approaches. The cognitive side of reasoning should not be neglected but to be able to grasp the complexity and richness of human intuition as an inevitable process of choosing a good enough alternative we needed to go beyond a cognitive outcome evaluation. Here, feelings were identified as preceding conscious and deliberate reasoning and in order to conceptualize a dynamic approach to intuition we need to move beyond an outcome-oriented ability approach to a feeling based relative approach seeing intuition as an inevitable process meaningful to *your reality.*

In order to grasp this inevitable process intuition meaningful to your reality and thus bridge the gap between a cognitive and feeling based approach to intuition, we have through my analysis and discussion of the elaboration of a semiotic mediational approach seen how we

can conceptualize intuition as a feeling based in our pleromatic feeling in to the situation guided by our past subjective significant experiences being hypergeneralized into sign fields. Thus, satisficing will be a pleromatic feeling guided by our hypergeneralized sign fields. Yet, in order to capture the dynamics of human meaning making process the featured discussion of the semiotic mediational approach showed that we needed to remodel the semiotic regulation of dynamic fields to a constant dynamic flow of experiences following the constant loop between pleromatization, schematization and hypergeneralization. Every new situation should be seen as potentially creating enough tension between our pre-anticipation to the future and the actual experience of this future and thus potentially creating new hypergeneralized sign fields no matter the level of abstraction. Therefore, we should understand semiotic mediation as a non-linear feedback looping model between schematization, pleromatization and hyper-generalization and under pressure schematization is bypassed and we act intuitively through pleromatization guided by our hypergeneralized sign fields. Yet, in everyday life our pleromatic intuition is in a feedback loop with our more conscious and rational schematization pathway. And from here new hypergeneralizations can abductively emerge.

Thus, in order to see what constitutes intuition, we can from this thesis conclude that we need to move beyond intuition as a cognitive realistic ability to seeing intuition as an inevitable process pleromatically feeling what is the good enough alternative.

Lastly, we can from the perspectival discussion grounded in my pilot study at the boarding school see indications that we might add an inductive generalization pathway to the semiotic mediational approach hitherto only relying on the abductive generalization pathway in order to understand the potential cultivation of intuition indicated in the featured pilot study. Yet, in order to conclude this cultivation of intuition more micro-genetic process oriented studies are needed. However, we have seen indications of that turning to an ACT-inspired approach through the RICA-model might enable intentional cultivation intuition. Further, this cultivation might either be a process initiated by ourselves through the conscious pursuit of hypergeneralization of certain goal-oriented values or by using sport as a catalyst for subjectively significant experiences leading to hypergeneralization through new participative opportunities as with the pilot study and as experiences in the South African example.

Ultimately, three interesting questions arises in the end which I will pursue in my future endeavors as a psychologist: “What determines significance? And how do we create significance? And what role does sport play as a catalyst for significance?”

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