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Concept Empiricism: Vehicle, Meaning and Intentionality

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1. Introduction

In the following *Magisterarbeit* I am going to develop a Concept Empiricist model of conceptual thought, which is in its technical core primarily inspired and motivated by Larry Barsalou's Perceptual Symbol Systems Theory (PSST) (1999, 2008a). But it is not a theory of concepts in the genuine sense only, but it also expands naturally on related topics like the ontology of mind and the problem of intentionality. This is not arbitrarily chosen, but a natural consequence of any contemporary Concept Empiricist theory, for those theories are in kind direct outgrowths of an embodied approach to cognition which yields these consequences – the natural extension to related topics – as will be shown.

The roadmap for the *Magisterarbeit* is going to look like this: First I will delineate the embodied cognition framework. Within embodied cognition there is a plethora of differing attempts at explaining the diverse phenomena of higher and lower cognition which differ in the meanwhile tremendously from each other. Therefore it will be very useful to set clear boundaries between the differing approaches, which range from strong neural embodiment on the one side to a very promiscuous extended mind hypothesis on the other side, in order to make a clear case for Concept Empiricism. It will be also very helpful to set my favoured version of grounded cognition off against classical attempts at the phenomena which are to be explained.

Following that I am going to present Larry Barsalou's Perceptual Symbol Systems Theory in more detail. I will do that to an extent which allows for an appropriate discussion of concept related phenomena, but which is not too lengthy. I will spare the reader with unnecessary psychological or neurobiological details as long as it is not really necessary for explaining or clarifying the phenomena with which I deal here.

Having done this I will discuss at great length conceptual meaning. In doing so I will present a presentational theory of meaning which is anti-realist, internalist and imaginistic. In advertising for this theory I will recur to conceptual methods, intuition as well as to the empirical record. Next and related to this I will develop a resemblance based theory of intentionality which differs also widely from the already established theories of intentionality so far given. Indeed it possess a feature which makes it very distinct and this is, besides its reliance on pattern mapping, the statistical grounding of resemblance which allows a cognitive theory of resemblance which is definite and therefore not open to the counterarguments generally mar-

shalled against related theories, which stress the importance of resemblance. A very distinctive feature of this theory of intentionality is additionally that intentionality is seen as a capacity which emerges naturally form the mental mechanism involved. As we will see, this is a distinctive advantage of it in comparison to other proposal in the field.

A discussion of the ontology of mental states follows which is however primarily a discussion of mechanistic explanations and Bechtel's and McCauley's Heuristic Identity Theory (HIT). Those theories from philosophy of science and philosophy of cognitive science do not only deliver models for the ontology of mental states, but also epistemic criteria for evaluating a theory as superior or inferior. Especially the idea of *productive continuity* plays a role of pivotal importance in my *Magisterarbeit*. It might be a bit unfortunate that that an important consideration is discussed nearly at the end of the *Magisterarbeit*, since I refer to it very often, however, I considered it as equally unfortunate to delay the discussion of meaning and intentionality, which is already protruded by the overview chapter and the more technical parts, even more. Therefore I plead the reader to refer to later parts of the *Magisterarbeit* when it is necessary in order to understand earlier parts.

In the course of writing I have gotten second thoughts regarding the adequacy of an ontology of mental states altogether, especially from the background of the theory of meaning and intentionality delivered here. Therefore I tried to accommodate for ontological concepts by means of a tentative phenomenological interpretation of them. Similar ideas influenced my deliberations regarding meaning too. I hope that this transition towards Phenomenology runs smoothly and that the high level of coherence which is my primary concern and something which I always strive for first is preserved.

Further, I have dedicated a main chapter of the *Magisterarbeit* for possible and actual critics of the ideas brought forth by me. Besides the more classic standard objections there you can find a recent critique of the authors on which I refer most often. Naturally I try to refute any single criticism brought forth and I hope that the reader will approve my objection to the objections.

I will round off the *Magisterarbeit* with some concluding remarks and prospects for future research.

2. From Embodied and Embedded Cognition to Grounded Cognition: Overview chapter.

This chapter should be seen as a primer for the rest of the discussion. Its aim is to provide a short overview of Embodied and Embedded Cognition (EEC) for those who are not familiar with the theoretical landscape. Its character is therefore mainly reconstructive. Many terms are introduced which I will refer to in the rest of the *Magisterarbeit* but normally I will not give thoroughgoing definitions of them in this chapter but will do so in later parts of the thesis.

The framework in which Concept Empiricism is embedded is Embodied and Embedded Cognition. It aims at a new understanding of the phenomena of mind and cognition and has an all-embracing scope regarding the philosophical problems involved, ranging from description and explanation of the ontology of the mental, to meaning, action, consciousness, self, etc. At the moment there is a huge variety of differing names and leading ideas behind this framework and in order to give a better understanding of the methodological, conceptual and ontological underpinnings of concept empiricism I am going to elaborate on that special version of Embodied and Embedded Cognition I am advocating.

One major idea behind Embodied and Embedded Cognition is that the mind is a biological phenomenon which is embodied in the sense of being the brain (embrained) and the body or parts of them or being realized or brought about by them in a unique way only the species specific body can do (for the species specific cognition). It is clear that the brain is part of the body but the respective roles of the (extra-neural) body and the (neural body) brain in explaining and ontologically defining the mind are differing much in different approaches. Therefore it might be helpful to differ between the respective parts of the whole organism.

To have a grasp of what it means that the mind is embodied it is illuminating to call on the Johnson-Lakoff Program (Johnson 1987, Lakoff 1987, Lakoff and Johnson 1980, 1999). Mark Johnson and George Lakoff have tried to explain a large array of cognitive phenomena by embodied representations and their metaphorical mapping on even the most abstract thought. For example, they have argued that concepts like UP and DOWN make only sense for a being with a body and a cognitive system for which these directions are salient in relation to their embodiment which might be very different for e.g. a jellyfish or a human. Fur-

thermore, they proposed that almost all of our concepts are metaphorically mapped from more "visceral" body-representations, but more on that later.

Another important idea behind EEC is the importance of action for and in thought. There are many statements from different theories which claim that cognition and with it forms of conceptual thought evolved *for* action. This claim comes in different degrees of strength. One very strong claim is that all forms of higher cognition are *directly* evolved for action which is reflected in their structure and function. This strong claim is exhibited in theories which reduce for example concepts to affordances (cf. Glenberg 1997) where "affordance" is a term coined by J.J. Gibson (1979) and means possibilities of acting offered by an object to a specially embodied organism. To give a mundane example of this, take the different action possibilities *afforded* by a chair to a baby and a standard adult. Chairs afford for adults in standard situations primarily sitting but also more exotic possibilities of action as repelling an angry dog. None of this is the case for a baby which will maximally take a chair as a kind of shelter in the case of the angry dog. The idea is now to reduce concepts as bearers of meaning via affordances where affordances are the meaning of objects.

Affordance theory properly reflects the importance of bodies, action and the evolutionary principle that cognition evolved for action. The importance of affordances is of a very high degree as we will see in the later parts of the *Magisterarbeit*, nonetheless they are only a subset of what concepts are.

The importance of action can be seen in other areas of philosophical interest as well. Take the self for example. There is a large philosophical industry to underline the self-sustaining and generating role of action. Be it the role of bodily action in the generation of a kind of self[1] like the generation of the embedded self in Neisser (1988) or the importance of the sense of agency for mental and bodily function (cf. Gallager 1995). There is an important distinction between those approaches which emphasize the role of action and those which primarily emphasize the sense of agency which stresses anew the importance of embodiment and in this case especially the importance of neural embodiment because the sense of agency can be seen as a neuro-representational mechanism alone, decoupleable from real action.

The idea of the prevalence of action in cognition has another interesting philosophical implication. Many attempts at concepts, intentionality and meaning within philosophy and cognitive science concentrated primarily at objective representation, e.g. usable for engaging in

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[1] Recently it is often assumed that there is no unitary core self but many selves with different roles.

realist metaphysics and epistemology. Examples for this are abound as in the idea of concepts as necessary and sufficient conditions, extensional definitions of concepts, semantic properties like reference and truth-functionality, etc. If higher cognition is however something that evolved for bringing about action or at least relies on mechanisms that evolved for that aim then this attempt at the phenomena listed above becomes less plausible. The stance which stresses the cognition specifying role of species specific bodies is the second strand which attacks realist conceptions of cognition which is exhibited in different versions of body specific anti-realist or embodied realist sense-making (cf. Lakoff and Johnson 1999, Varela et al. 1991, Clark 1997). So EEC also delivers a fresh new look at the realism − antirealism debate by taking action and embodiment seriously.

Additionally, EEC is committed to environmental embeddedness of cognitive systems. This idea is different from that of giving action a pivotal role in cognition because it does state more than that there is an environment which an agent is acting upon. The environment can serve proponents of ECC as (i) a mind enhancing structure or (ii) as something in which the mind extends itself. (i) The idea of the environment as an enhancing structure is relatively straightforward. A nice example to illustrate that stems from Rumelhart el al. (1986). Imagine multiplying two large numbers, e.g. 7491 with 3954. This may be done under normal circumstances with pen and paper, utilizing environmental structures. More classic approaches would have engineered AI models which would have done this task totally internally. Rumelhart et al. (1986) assume by contrast that only primitive numbers are combined by e.g. rote learning and larger memory resources are spared by utilizing paper as a kind of memory store. Another example comes from Clark and regards playing Tetris. Classic theories from cognitive science would have made playing Tetris a representational project totally internal to the cognitive system understood as a computational system within the brain without outsourcing some of the cognitive load on environmental factors. Contrary to what people normally do, namely heuristically pressing buttons of their gaming device in order to bring the tetrominoes (the rotatable blocks) in an appropriate position, which are then compared to the already existing structures by simple pattern mapping, you would have, according to GOFAI[2], rotated that blocks within your brain bound cognitive system[3] alone.

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[2] Good old fashioned artificial intelligence.
[3] The fact that within GOFAI that system is normally supposed to be brain bound is primarily a result of plausibly restricting the bounds of the cognitive system to the most plausible bearer of cognitive states: the brain. This does not entail for GOFAI proponents that this cognitive system must reflect structural features of the brain.

Another instance of that environmental involvement in cognition would be cultural scaffolding. Cultural scaffolding is exhibited in kinds of cultural memory and learning were language allows for overcoming the limited cognitive capacities of single human memories and thereby saves those memories beyond the death of the single individual. Theorists like Donald (1991) and Tomasello (1999) take this capacity to culturally externalize knowledge and to be able to learn that knowledge as one of the few distinctive cognitive capabilities distinguishing humans from their evolutionary ancestors[4]. (ii) The second claim that the mind is distributed over brain, body and the environment may sound somehow outlandish but it is indeed an ontological position adhered to and defended by many contemporary philosophers. And indeed it is the proper consequence of the assumptions of classic Functionalism together with the assumptions from GOFAI if they are taken seriously[5]. This ontological position is called the Extended Mind Hypothesis or Extended Functionalism (cf. Clark and Chalmers 1998, Wilson 2004, Wheeler forthcoming). I believe that it is not of greatest importance with regard to the content of my project to discuss this position here in more detail but I will come back to it in a while in order to make my place within EEC clearer which may be of considerable intrinsic value.

Some approaches at embodying cognition are more specific with regard to the vehicles of thought involved and are thus committed to claims about the ontology of mind in a manner more precise than some of the approaches already mentioned. With that I mean that they propose concrete inter-level mechanistic models (cf. Machamer et al. 2000) of cognition with the vehicles of thought mainly reflected by the parts of those mechanisms. Those more concrete approaches are advocated by Lawrence Barsalou (1999) or Vittorio Gallese and George Lakoff (2005). Their way of working seems to me to be the right kind of scientific procedure for it entails a model of an inter-level Heuristic Identity Theory (HIT) (cf. Bechtel and McCauley 1999) which allows for more thoroughgoing ontological reflection and comparison with other philosophical theories of the ontology of mental entities. It will be helpful to do some com-

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[4] It is possible to imagine many other cultural influences on stable biologically realized phenomena. For instance we can speculate that secure and stable environments which are a product of social societies reduce stress and that this enhances intelligence. Another idea which is in principle inspired by the work of Elias (1994) is that processes of cultural disciplining which might be owed to means of social distinction might have yielded a durable enhancement of attention which is paramount for higher cognition. What is important with regard to any of these suggestions is that we can explain them with regard to important individuals involved via a kind of social psychology. We need not refer to obscure abstract external structures and processes which magically transcend individuals.

[5] To be honest it does not seem to be the "proper" consequence out and out in all the cases discussed by proponents of extended mind. Some of those cases allow for extending the mind because of a very coarse grained and often sloppy functional analysis or because of a confusion of task analysis with causal role analysis.

parative work here, comparing EEC with Functionalism, to get an impression of the differences. However this comparison has to be rather sketchy for the mechanistic model of Barsalou's perceptual symbol systems (PSS) can be expanded only at later parts of the *Magisterarbeit* due to organizational problems of length and space.

I start this comparison with a short delineation of the central points of what can be called the philosophical doctrine reflecting the classic GOFAI paradigm: Functionalism. Functionalists assume, as do those scientists committed to GOFAI, that mental states or events are normally realized by neural states or events but that this is also merely a contingent fact. This is so because mental entities are not identical with biological entities but only realized by them. Mental entities are in their essence functional states, individuated e.g. through their causal role. This motivated naturally some tenets of Functionalism: The vehicle-content distinction (cf. Dennett 1991, Millikan 1993) and the anti-reductionist argument from multiple realizability (cf. Fodor 1974, Putnam 1967). The vehicle-content distinction claims in its most rigorous form a total distinction of vehicles of contents and contents themselves which is a clear case for arbitrary symbols like those of natural languages. The content DOG could be carried within a natural language by every other adequate word, e.g. "refrigerator". To extend this picture of the mind there has to be something very similar to a Language of Thought (Fodor 1975) or at least similar to amodal arbitrary mental symbols, which plays an important role within the mind. It is clear that this distinction varies strongly depending on the theoretical embeddedness. If content is individuated via classic semantic entities as reference or truth-functionality it is somehow clear that there is a strong distinction. The distinction becomes less clear if contents are also mental states which is not only so in embodied theories of semantics but also with varying degree in the GOFAI paradigm, e.g. in (solipsistic) functional role semantics (cf. Block 1986, Harman 1973) or microfunctionalism (cf. Clark 1993).

The argument from multiple realizability is eventually the motivating principle for Functionalism and so it is somehow difficult to say what comes inferentially first: multiple realizability or Functionalism? In spite of that indeterminacy of mutual support it can be claimed that multiple realizability is even today the stronghold of every anti-reductionist (cf. Wilson and Clark 2009) and therefore it is worth taking a closer look at it[6]. Putnam (1967) proposed eventually first that mental states are multiple realizable. His example was a comparison of pain in different biological genera where he concluded that the different neural implementations of pain in the different genera notwithstanding, the same mental state of pain is prevalent in the dif-

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[6] I discuss multiple realizability in the chapter on the ontology of mental states at length.

ferent cases. For example: A bird can feel and exhibit pain and so do I despite our different bodies, both neural and extra-neural.[7] So pain is an identical mental state or event which is different from its physical realization.[8]

A different and much more compelling example for multiple realization comes from Jerry Fodor (1974). It roughly goes like this: Think of what you can (i) do with money and think of what can (ii) serve the realizing function of money. (i) is roughly the functional role of money and is in most cases expressed in the form of buying and exchanging things. This, which is relatively agreeable the main function of money, is very different from its realizers, e.g. bills, coins, credit cards, magnetic stripes or even shells in more archaic societies. So it seems that the function is what makes money money. The same way of thinking is analogously adapted to the realm of the mental. What is interesting of a mental process is its functional description made by philosophers or psychologists and not the correlates of these functional states in the brain. Nonetheless, almost no one working in the field of philosophy of mind entertains doubts about the fact that the brain is the realizer of the mind or at least a very important part of it. What than is that new and revolutionary about EEC when it states that the mind is a biological phenomenon?

The in my opinion most interesting versions of EEC, those who emphasize neural embodiment of mental states, are those who have an answer to that question. These theories are denying multiple realizability, the content-vehicle distinction and the whole functionalistic program in its classic form or at least give the material at hand which allows denying them. The key to this procedure comes from taking mechanistic explanations and Heuristic Identity Theory seriously. I will explain later in the course of the *Magisterarbeit* what a mechanistic explanation and HIT are. For now it will suffice to know the following: Mechanistic explanations and HIT together allow for specifying and adjusting different levels of explanation, reaching from the behavioural level to neurobiological one, by a kind of reflective equilibrium principle[9] (cf. Rawls 1971, Stich 1993). This model utilizes neurobiological data beyond its classic correlative interpretation[10] and instead uses them to specify the contents and vehicles of higher level thought at a level higher than the biological one but nevertheless constraint by it. This is for example exactly what Larry Barsalou (1999) is doing in his Perceptual Symbol

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[7] It is somehow awkward that Putnam as a founding father of functionalism talks of pain and related mental states in birds and humans since both exhibit massively differing behavior.

[8] For a related view on multiple realizability and pain cf. Lewis (1980).

[9] The authors involved do not mention the reflective equilibrium principle in their theories. I mention it here in order to give the reader a hand with regard to imagining what those theories could be about.

[10] Compare Abraham et al. (2008) for a very old fashioned correlative interpretation of neurobiological data.

Systems Theory when he determines the vehicles of thought by means of the brain areas in which higher level thought is enacted and then searches for an adequate vehicle which intelligibly combines higher level thought with neuronal implementation. In this case the vehicles of thought constrain higher level thought by virtue of their structure and the role of function is primarily grounded in explanatory practice but not in ontological specification.

Here we have a clear ontological statement regarding the vehicles of thought which differs massively from the varieties of non-reductive materialism like Functionalism. Explanations of the mechanisms involved in cognition are overwhelmingly constrained by lower levels. This new account is brought about by new findings in the behavioural and neurosciences as well as new models in philosophy of mind and philosophy of science.

Before I carry on with the discussion of EEC I want to state a further important difference between classic approaches in philosophy like Functionalism and EEC. The versions of EEC which stress the prevalence of embodiment have partly abandoned the language metaphor so dominant in philosophy for the last century. Language as the model of thinking was not only dominant in philosophy but also in cognitive science. This was surely primarily motivated by the ability of language to give a systematic picture of thought by means of syntax (cf. Fodor 1975, Pylyshyn 1984) as well as by the circumstance that language was thought of as a primary vehicle of meaning. Especially the latter[11] however became seriously challenged (Harnad 1990, Searle 1980), but more on that later. For now it is important to see that those who take embodiment seriously predominantly abandon the language metaphor of mind which was hold in high esteem for nearly a century. An alternative model with regard to the processes underlying thought as well as to concepts understood as bearers of meaning is proposed on the pages to come.

In order to give a rather comprehensive account of EEC it might be of interest to mention the schism lately emerging within the movement and as already mentioned above it might be of some discriminative value with regard to my own position to take a stand for one of the positions in the running. As eminent philosopher Andy Clark (2008), the founding father of the Extended Mind Hypothesis, correctly states, there seems to emerge a major separation within EEC along the lines of embodiment and embeddedness. On the one side those philosophers rally round those who stress the fact that the neural and non-neural structure of our bodies has overwhelming impact on how we conceive of cognition. The other side maintains the impor-

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[11] For a refutation of the former compare: MacWhinney (2005) or Langacker (2005).

tance of the strongest form of embeddedness, namely the Extended Mind Hypothesis. Both sides are indeed committed to massively differing suppositions regarding the mental. The adherents of the Extended Mind Hypothesis are obliged to a very promiscuous understanding of information processing (cf. Adams and Aizawa 2008), on classic Cartesian representations at least in off-line cognition (cf. Wheeler 2005) and to a computational theory of mind with regard to the processes involved in order to express their thoughts about the distributed nature of thought. This is now totally at odds with what could be called the major tenets of embodiment and generally seems to be a counterrevolutionary movement in order to preserve an extended version of Functionalism[12].

Therefore a new array of names for different movements, which are more or less committed to one side of the continuum between the embodied and embedded extremes, has originated. Now, those who stress the vital role of embodiment rally round the flag of embodied grounding (cf. Semin and Smith 2008) or grounded cognition (cf. Barsalou 2008b). I will do so too and will call the position defended in this thesis from now on *grounded cognition*. The commitments on my behalf to embeddedness are more of a methodological and instrumental kind whereas the entities underlying the phenomena are constitutively located almost exclusively in the brain (contra Hurley 1998). This *Magisterarbeit* should be seen moreover located in the overarching field of Neurophilosophy (cf. Churchland 2002, Northoff 2004), which tries to explain most phenomena of philosophical interest by means of neuroscience and scientific psychology as does Analytic Philosophy with the help of linguistics or folk psychology[13].

3. Perceptual Symbol Systems

Here I want to introduce Perceptual Symbol Systems Theory as my favourite model for the explanation of concepts, meaning, mental processes, mental vehicles and intentionality. Before I argue for the superiority of PSST and its consequences with regard to these topics I just

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[12] There are additional problems as well which may be turned on the topic of a neuro-ontology (cf. Metzinger and Gallese 2003, Gallese and Metzinger 2003). Questions of high importance like the epistemological nature of space will eventually be treated with regard to the ontology and methodology involved very differently on both sides of the schism. For example: Is space ontologically primarily determined through physical space or through neuronal space? Is neuronal space a truth-maker for many statements via space perception and pattern mapping or is space something to which we need epistemic access?

[13] It should be pointed out clearly that folk psychology is not the exclusive subject of Analytic Philosophy or philosophy more generally. It is dealt with in many fields of psychology, but primarily in social psychology (cf. Heider 1958, Nisbett and Ross 1980, Fiske and Taylor 2008).

want to reconstruct PSST with regard to its main assumptions which allows for a smoother and more comprehensible discussion of the points mentioned above later in the text. In doing so I will concentrate on three of Larry Barsalou's essays on the topic: *Perceptual Symbol Systems* (1999), *The Similarity-in-Topography Principle: Reconciling Theories of Conceptual Deficits* (2003, together with W. Kyle Simmons) and *Abstraction as Dynamic Interpretation in Perceptual Symbol Systems* (2005). These essays seem to deliver the most detailed architectural approach at a Concept Empiricist understanding of the mind so far given.

PSST is a theory of concepts and of those things which are carried by concepts: meaning, knowledge (in the non-epistemic sense), intentionality, etc. Its special contribution is its new look at the architectural features and vehicles which constitute the mind. It is important to appreciate that PSST is not a theory of concepts at the neuronal level alone. To the contrary, it is a high-level functional account of the systems that show how the brain could implement a conceptual system with the help of sensorimotor mechanisms (Barsalou 1999, p. 582).

The main ideas behind PSST are that conceptual thought is quasi-perceptual and that meaning is grounded in perception. PSST tries to show that conceptual functions like type-token mappings, categorical inference, etc. can be exhibited by quasi perceptual-systems, at least with regard to the main vehicles involved[14].

PSST is motivated by neuro-behavioural as well as by philosophical assumptions. The empirical assumptions are that there is no evidence at the behavioural and neurological level for classic arbitrary amodal language like models of concepts and that the conceptual processing of normal as well as neuronally impaired people accords well with imagery-like processing. The philosophical assumptions are concerned with the nature of meaning and intentionality and the idea that meaning as well as intentionality are only conceivable if they are grounded in imagery. Further philosophical assumptions stem from the area of philosophy of science and concern the explanatory nature of classic models of conceptual thought. The suspicion is that classic models are not falsifiable by empirical evidence and that they are overly ad hoc (see also Kosslyn et al 2006.).

In order to get a grasp of PSST we should start with the most primitive functional component encountered within the theory: so called perceptual symbols. Perceptual symbols are records of neural states that underlie perception (Barsalou 1999, p. 582). As that they exhibit two important properties which distinguish them from e.g. language-like vehicles. They are both

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[14]But see my discussion of amodality below, chapter 5.5 Meaning, subchapter (I).

modal and analogical. Being modal is the property to be instantiated in the systems of the brain which are mainly dedicated to sensory processing. Being analogical means that they are somehow corresponding to the perceptual states, which they are records of[15], in structure or representational format. A further feature which is entailed by that is that they are non-arbitrary. They are constrained by the format of the perceptual vehicles in play.

As records of neuronal states that underlie perception they are not the vehicle or set of vehicles underlying a perceptual state themselves. Rather they are schematic records of those states. Those schematic records correspond to that what is filtered out by selective attention during perception.

At this stage of analysis of PSST we encounter a first conceptual problem. Barsalou supposes that the stable and in this sense recorded parts of PSS are convergence zones which are themselves neither modal nor analogical. The areas which instantiate perceptual states as well as perceptual re-enactments in the sense of perceptual symbols are feature maps which do not record but only simulate perceptual symbols with the simulation instructions coming from the convergence zones. It is perfectly legitimate to talk of perceptual symbols as derived records which depend in their being records on a convergence zone, but this seems to me to be an unnecessary move which only diminishes clarity. A further point of clarification is in order which is not totally unrelated to the one above. Perceptual symbols are schematic re-enactments which do not re-enact or simulate by themselves. This is done by the higher order structures.

It is interesting to see what Barsalou says about perceptual symbols in comparison to images: "Perceptual symbols are not like physical pictures; nor are they mental images or any other conscious form of conscious subjective experience" (Barsalou 1999, p. 582). This is supposed to be an assertion about the vehicles underlying thought. They are not picture like or anything resembling images but they are biological structures in the brain. Nonetheless these are the implementation parts of mechanisms that give rise to conceptual processes that are with regard to functional description very near to mental imagery (cf. Kosslyn et al. 2006) and best understood as exhibiting image- or picture-like properties at a functional level of analysis. Therefore the best suited and most intelligible explanation of conceptual phenomena will recur to image-like talk which is totally consistent with and even endorsed by proponents of

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[15] They need not be records of perceptual states but can be brought about by other processes too. But normally they will be brought about by perceptual states and be records of them.

mechanistic explanation and Heuristic Identity Theory[16]. Nevertheless it is clear that there are no real images in someone's brain.

These image-like entities, perceptual symbols, are at the functional level somehow best comparable to single instances of schematic images. They are re-enactments of perceptual states which only re-enact schematic aspects of images which means that they never are re-enacted as representing single individuals but only generic aspects of them. It is quite clear that this alone is no satisfactory account of the plethora of conceptual functions of higher thought. Therefore Barsalou argues for further structures, which systematically exploit the resources offered by perceptual symbols, in order to explain conceptual phenomena. This can be done with more emphasis on both neurological explanations and functional ones. I will advance here with a greater emphasis on the functional aspects as is in accord with the general conception of PSST as cited above. Nonetheless I will draw on the neurological record when it is necessary or helpful.

Perceptual symbols alone won't do for conceptual function and more complex meaning phenomena so it is necessary that they are organized in some higher order structure. This structure is a frame in PSS. According to Barsalou a frame should be conceived of as "an integrated system of perceptual symbols which is used to construct specific simulations of a category" (Barsalou 1999, p. 590).[17] A frame is a kind of higher order integration structure. Many single perceptual symbols, which are about very similar things in the world by virtue of their structural feature similarities between percepts and perceptual symbols at the neuronal level and by virtue of imagery at a higher level, which is indeed determined through the statistics at the neuronal level, are integrated into a functional unit, the respective frame. Frames allow for architectural order within the representing of single categories and thereby allow at the structural level for the functional properties of concepts.

It might be convenient to see frames as concepts but Barsalou believes that simulators are the functional equivalent to concepts. Simulators can be understood as a combination of frames and simulations. Simulations are depended on frames in the sense that they are processes which run on frames. Simulations are re-enactments of parts of feature maps and thereby re-enact at least one perceptual symbol. The complexity of simulations varies in the sense that they can be relatively primitive re-enactments of simple category instances as well as relatively complex simulations of schematic but nonetheless relatively concrete situations. It is

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[16] I will expand on this later when I concentrate on the ontology of mental states and mechanistic explanations.
[17] *Simulation* as an architectural feature of perceptual symbol systems is explained later.

crucial to see that simulations are context bound in an environmental and in a neurodynamical sense (cf. Spivey 2007) and are thus never the same. In different situations I will simulate different frames according to the environmental context I am embedded in. If I am making a weekend trip to a zoo and watch the ice bears in their enclosure I will instantiate the respective perceptual symbols via a simulator that correspond to the respective perceptual scene plus those that may be elicited by the context. These may be for example cuddlesome baby bears which are cute and afford petting. The emotional reactions which are also part of the simulator and brought in via convergence zones may be such as happiness, etc. However, if I encounter an ice bear in its natural habitat with no special preparation on my side, than this simulation might look very different from that in the zoo. Another important factor which makes every simulation a different one is that the brain is a complex dynamical system which is always in a specific state in a complex state space which partly defines the next state the cognitive system is in. This suggests that people will exhibit different simulations even in same environments because of the intrinsic complexity of the brain alone. This suggestion was behaviourally confirmed by Barsalou (1989, 1993) showing that people almost always list different features with regard to a concept over time.

Now, frames are binding diverse perceptual symbols with the help of convergence zones. Convergence zones are themselves amodal. They are higher order structures which combine different feature maps (cf. Zeki 1993) from perceptual brain areas with cortical areas which are more of the associative kind (cf. Damasio 1989, Damasio et al. 2004, Simmons and Barsalou 2003). They also construct different hierarchical structures among themselves so that there are convergence zones which combine visual and auditory processing areas, which themselves are products of the hierarchical organization of feature maps, holistic convergence zones, analytic convergence zones and modality convergence zones, up to cross-modality convergence zones (Simmons and Barsalou 2003, p. 461). Convergence zones form new kinds of conceptual structures by combining feature maps from different modalities and lower level convergence zones. It should be nonetheless clear that these structures are not able to construct meaning on their own and that they cannot perform the vast array of conceptual tasks if those are depended on meaning. I cannot really argue for these points here, since I have not treated meaning so far, but I will show later on that meaning is conferred to perceptual symbols alone, which is a result of their image-like character and their special kind of organization. For now it will suffice to state that these structures utilize feature maps in normal modes of cognitive processing. They may also create emergent cognitive products but they are in that always constitutively dependent on perceptual symbols.

Within the convergence zone architecture the above mentioned analytic and holistic convergence zones deserve proper treatment. They are the mechanistic lower level counterparts of subclasses of the aforementioned simulators. What does this mean? Within simulators there are property simulators which *fill in* detail for diverse categories. So for example we may have at the moment as a cognitive system only a holistic perceptual symbol of e.g. a cola bottle which corresponds somehow to a holistic convergence zone of the respective entity. This holistic perceptual symbol delineates the rough form of the bottle dependent on the richness of the perceptual symbols involved in the simulation where the richness of the perceptual symbols involved is normally a function of the mode of the perceptual encounters with cola bottles. Now let us turn to the filling-in. The property simulators which correspond in the above mentioned way to analytic convergence zones provide the cognitive system with more fine grained imagery regarding the cola bottle. For example, when I read about a cola bottle and thereby simulate a cola bottle more or less offline than I might for instance "take special notice" of the red lid and the white emblem on red ground so characteristic for most cola bottles. This special filling-in is provided by property simulators which are bound via analytic convergence zones to holistic ones and to many others maybe as well, depending on the respective simulation in play.

It is of highest importance to note something which is a matter of course for those familiar with cognitive science in general and the imagery debate in particular but which might not be as obvious for the rest. Images, pictures, mental animation, etc. need not to be conscious and non-schematic. Normally both won't be. I already mentioned the prevalent aspect of schematism but because of its great importance for the rest of the *Magisterarbeit* I will expand on it here again. To suppose that images must be conscious is mixing up images brought about by perceptual states and to some part even those provided by mental imagery with the images that underlie cognition[18]. And in this confabulation lurks a second misunderstanding regarding schematic structure in PSS, mental imagery and the ones from sensory processing:

"In addition, the picture metaphor wrongly implies that images are perceived much as pictures are perceived. Unlike pictures, *images are preorganized into objects and properties of objects* – which explains why when we forget part of an image, it is not a random part. It is not as if a corner is torn from a photographic picture in the head. For example, if our image of a room is incomplete, it is not missing half a sofa or half a lampshade. Rather, images seem to be organ-

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[18] At least with regard to the point of unconscious schematic structure.

ized into meaningful parts, which in turn are remembered in terms of spatial relations among them" (Kosslyn et al. 2006) (my italics).

This preorganization which is the talk of here can be somehow compared to the property simulators in PSS which combine to create schematic structure.

Schematic structure and contextualized simulation give PSS its wide scope of applicability. The schematic at the functional level of explanation makes PSS able to instantiate conceptual functions. It might be helpful here to visualize that (Barsalou 1999, p. 593):
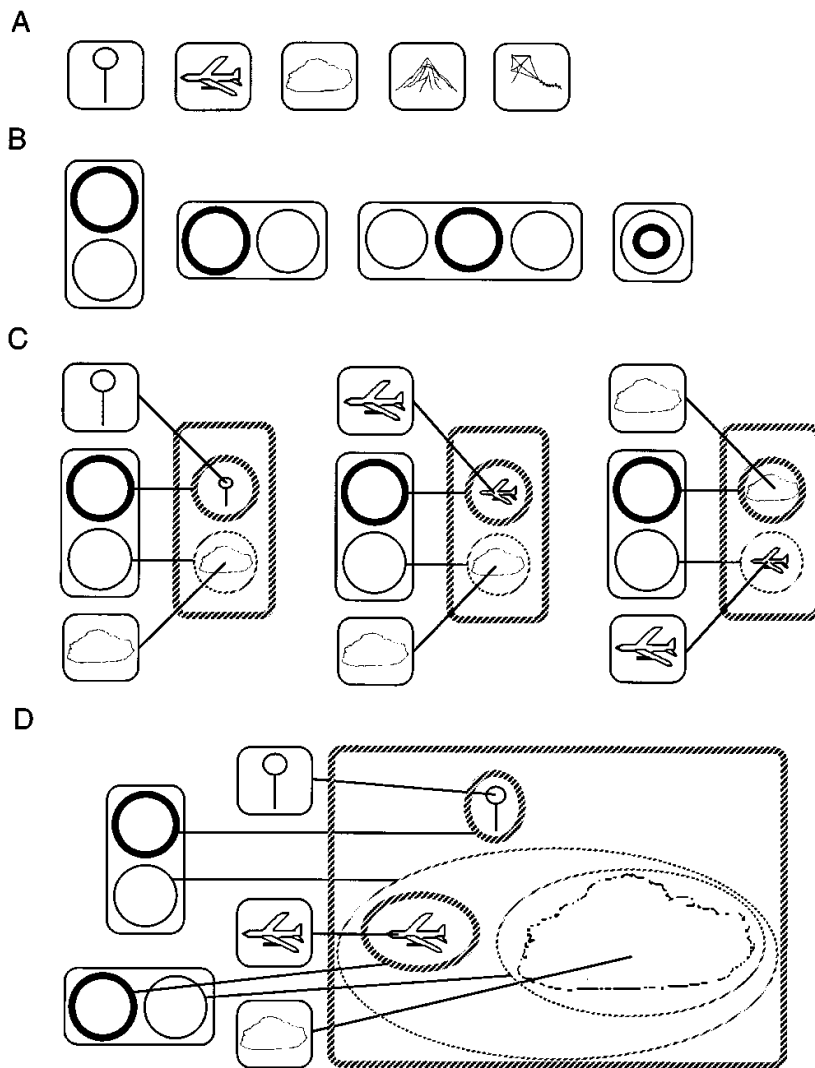
This graphic elucidates how we can conceive of classic symbolic/conceptual functions within PSS due to schematic structure on a functional-static level of description using images. For example, the image exhibits above/under or left of/in the middle/right of relations as well as more nested structures in (D). It is clear that there are no images like that in the head but it is

proper to conceive on a functional level of images for reasons of intelligibility as well as from evidence from neuroscience and behavioural studies.

I hope this short introduction to PSST is sufficient to understand my application of it on classic philosophical problems in the rest of the *Magisterarbeit*. I will recur on more evidence from neurobiology and behavioural studies in the course of the text when it is needed to clarify a point or if it makes a case for my project. Now I will go ahead and expand on the philosophical position called Concept Empiricism.

4. Simulation, Emulation and Neural Exploitation

Here I would like to expand on some organizing principles and processes which are of pivotal importance for the EEC program. These are simulation, emulation and neuronal exploitation. Simulation is a relatively widely accepted organizing process of the brain (cf. Goldman 2006, Barsalou 2008b) which should in my opinion be seen as the most important one which might help to dethrone more classic core processes referred to in cognitive science. Emulation (cf. Wolpert et al. 1995, Grush 1998, 2004) however is not that widely accepted as an organizing principle but gains more and more currency in e.g. theories of motor control (cf. Jeannerod 1995) or schizophrenia (cf. Blakemore and Frith 2004). The conception of neural exploitation is rooted in the idea of evolutionary exploitation like it is developed in Gould and Lewontin (1979) and is adapted with regard to higher cognition by Gallese and Lakoff (2005). As is correctly argued by Glenberg (2008) it seems that these conceptions fit nicely together and help in developing a powerful theory of higher cognition.

4.1 Simulation

We dealt already with the concept of simulation above; therefore I will concentrate here on the general importance of simulation for cognition. For reasons which will become clearer later, I would like to go without computation and information processing as organizing principles of cognition. This however necessitates successors for the purpose of explaining cognition. In my opinion "simulation" should stand at the forefront of this project. Simulation is

with regard to cognition working at a much higher level and less wide in scope as e.g. information processing, which should be seen as one of its advantages: It is not as inflationary or uninformative as information processing. Simulation is mute with regard to more underlying processes which are examined at a neurobiological level and which are explained mechanistically. It is therefore not epistemically daring at all as is e.g. the assumption that computation or information processing underlie cognition. Simulation is observed in a plethora of cognitive processes be it in conceptual processing (cf. Barsalou 1999), motor cognition (cf. Jeannerod 1995, 2006), memory research (cf. Rubin 2006) and social cognition (cf. Decety and Grèzes 2006). The simulation hypothesis is not that daring since it rests upon the unproblematic observation that special online processing areas in the brain are re-enacted in cases of e.g. offline situations or other online situations: e.g. perceptual systems are activated in conceptual processing and in memory retrieval; motor areas which are activated during action are activated in case of action planning or motor imagery and e.g. areas dedicated to emotional or motor processing are activated in the course of observing actions of others. Because of this simulation is highly compatible with the idea of emulation and neural exploitation which together deliver elegant and parsimonious theories of cognition.

4.2 Neural exploitation

Neural exploitation can be seen as a subclass of an evolutionary organizing principle in which parsimony is writ large. The principle states that some processes are realized by structures which might be evolved for different purposes. E.g. concepts are based on structures which developed for e.g. better movement and coordination in such and such an environment. However, these structures might be relatively decoupable in processing from these circumstances because of e.g. a wider emergence base (as in the case of emulation) or intrinsic possibilities of decoupabllitiy which are exploited though they were not evolved for that purpose.

This principle explains nicely why simulation is that pervasive and it also suggests simulation as a plausible candidate for the explanation of higher cognition. Here neural exploitation can be seen as a kind of evolutionary why-explanation that constrains how-explanations of cognition (cf. Cummins 2000) and which favours those explanations which are working according to it. It is clear that e.g. PSS is favoured by models of neural exploitation whereas explanations which are less parsimonious drop out.

Moreover, neural exploitation circumvents elegantly the problem encountered by all those theories which state that concepts have evolved for action but which have nonetheless to explain how concepts figure in offline thought or dreaming. This is no problem for theories which adhere to neural exploitation for the reasons mentioned already above.

4.3 Emulation

The idea of emulation is based on both neural exploitation and simulation and shows that simulation is not only restricted to offline thought but may be a pervasive feature of online intelligence too. The assumption that something like an emulator exists might be primarily based on the problem that feedback from motor action is too slow to guide normal action effectively. Therefore it is assumed that an efferent copy of an action intention is fed into an emulator which predicts the possible outcome of an action and gives thereby a faster feedback than proprioception and kinaesthesia could do (cf. Grush 2004).

Taking the details of the exact implementation by the side, what is important here, is that we have a candidate structure for offline thought processes which evolved for mundane online thought, which might be, according to neural exploitation, be exploited for offline thought. The involvement of an emulator in perceptual processes is obvious if we consider the strong ties between action and perception and the overriding capability of perception over proprioception and kinaesthesia (cf. Cole and Paillard 1995).[19]

5. Concept Empiricism

Now I want to make the case for Concept Empiricism[20], the philosophical agenda based on grounded cognition and especially PSST. PSST is the backbone of Concept Empiricism; nonetheless it is amenable to any straight theory from grounded cognition proper. Concept Empiricism is in my opinion a general philosophical theory which may deal with a large

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[19] Additionally Rick Grush (1998, 2004) developed an emulator structure which allows for perception as a processes more complex than mere sensation and which is dependent on emulation. After this system has evolved for the sake of better action control, decouplable imagery capacities can run on that simulator too.
[20] The name is eventually coined by Jesse Prinz (2002).

amount of philosophical problems. However my conception of Concept Empiricism differs widely from that of its foremost proponent, Jesse Prinz (2002, 2005, Boroditsky and Prinz 2008). In what follows I will delineate the main idea behind Concept Empiricism as I conceive of it and then I will spell out its respective contribution to main philosophical topics like the ontology of mental entities, meaning and intentionality.

First of all, some clarifications regarding the name. Prinz coined "Concept Empiricism" especially with regard to his view that concepts are never innate: "All (human) concepts are copies or combinations of copies of perceptual representations (Prinz 2002, p. 108). This strong anti-nativism is not plausible for there is ample evidence that children exhibit conceptual capabilities from birth on (Bloom 2000). A good example is the early possession of animate and non-animate concepts (Molina et al. 2004). Furthermore, it is not necessary to state concept nativism in order to obtain concepts grounded in perception or what Prinz calls the modality-specificity hypothesis: "Concepts are couched in representational codes that are specific to our perceptual system" (Prinz 2002, p. 119). Sometimes it could seem that Prinz's anti-nativist stance might be suggested by Barsalou's definition of perceptual symbols via analogicality, too: "The structure of a perceptual symbol corresponds, at least somewhat, to the perceptual state that produced it" (Barsalou 1999, p. 578). But it is relatively easy to accommodate this view in order to make it less anti-nativist. We can say that perceptual symbols are schematic re-enactments in feature maps. This is less committal to views regarding innateness because innate convergence zones can bring about perceptually grounded concepts nonetheless. So I use Concept Empiricism primarily to express the idea that concepts are grounded in perceptual systems.

To be clear here: The overwhelming part of our conceptual repertoire will be not innate but acquired through experience in interaction with the world and this is a very important motivation for and assumption of any Concept Empiricist view. Still it is possible for any Concept Empiricist view, defined over grounding concepts in perception, to allow for innate concepts, for a bunch of them clearly seems to exist.

So, as already anticipated, the paramount tenet of Concept Empiricism as I conceive of it is its commitment to the assumption that all conceptual thought and with it all higher thought is grounded in perception. But it is important to note that this is not tantamount to the suggestion that all vehicles of thought are modal or only that this would hold for conceptual or higher thought. This is according to Daniel Weiskopf (2007) the alleged claim of Concept Empiricism or at least for that what he has dubbed Strong Global Empiricism (SGE). In my opinion

this claim was not stated by anyone working in the field of grounded cognition so far and Barsalou, who is discussed together with Prinz by Weiskopf extensively, is very clear about this point: "Although mechanisms outside sensory motor systems enter into conceptual knowledge, perceptual symbols always remain grounded in these systems. Complete transductions never occur whereby amodal representations that lie in associative areas totally replace modal representations (Barsalou 1999, p. 583).

It is now clear that both anti-nativism and SGE are not well suited candidates for the Concept Empiricist's agenda. Hence let us come back to my favourite idea for defining Concept Empiricism. I should be more specific about which property of concepts I am interested in. It is their meaning carrying property. What I would like to argue for is that it is the first and foremost tenet of Concept Empiricism to assume that meaning is a kind of mental imagery. A much related statement comes from Gallese and Lakoff (2005, p. 2): "[…] understanding is imagination, and that what you understand of a sentence in a context is the meaning of that sentence in that context."[21] Gallese and Lakoff state an important point here which I want to make clear from the beginning. Imagination, understanding and meaning are the same thing. But more on this in the chapter on meaning. For the moment it is enough to have a feel for what I call Concept Empiricism.

But I believe there is a further motivation for naming this view Concept Empiricism for it entails a consequence which is epistemological in nature and regarding this aspect in accord with classic Empiricism. We are not forced to restrict the label "cognitive" to only the processes which involve perceptual symbols or imagery. There are distinctive ways of cognitive processing which use language only and which work by a kind of associative processing which is very similar to an idea of a usage based account to meaning. And though we are not forced to restrict our usage of the label "cognitive" to these cases, we are nonetheless entitled to restrict labels like "meaningful thought", "deep processing", "explanation" or "understanding" to them. This is so because thoughts which are merely associative in nature lack meaning and if they lack meaning they lack understanding and thoughts which we do not understand cannot be seen as for example justified thoughts which figure in explanations or descriptions, etc[22].

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[21] It is important to note that this quote shall show that sentence meaning is totally derived from psycho-neural meaning of „the brain's concepts". Gallese and Lakoff do not mix things up here. The incorporation of linguistic meaning in this context is only exemplary.

[22] An example for what I criticise here is "objectively observable understanding", e.g. to be able to make a mathematical proof or to pass a philosophy exam without cognitive processes that utilize rich imagery, etc..

So what I am on at is that we get new criteria of understanding and knowing if we adhere to Concept Empiricism and those criteria are satisfied in a respective situation by a respective kind of mental imagery. According to this a parrot which is able to instantiate diverse imaginistic red episodes has an understanding of RED[23] regardless of what he can do verbally, whereas a human who utters sentences like "the sun is red in the evening" or "red is the colour of tomatoes" and the whole bunch of accepted red related utterances in a language does not understand what RED is if he cannot imagine red. Here the one who parrots is not the parrot. It might here be convenient to mention LSA or HAL (cf. Landauer und Dumais 1997; Burgess and Lund 1997), statistical language programmes, which are able to create and answer sentences by means of the statistical patterns in which different words are embedded. Those programmes can perform linguistic feasts at an inferential level which is already now impressing. Sooner or later they might be able to pass something like a Turing Test. They are however relatively primitive machines which only extract patterns of regularity in patterns of contextual co-occurrences.

Another important point regarding the nature of concepts involved in cognitive systems is that differently embodied conceptual systems will yield different ontologies. For example, as we will see later, it is quite conceivable that we get a totally new understanding of abstract entities if we reflect on the nature of perceptual symbols and their integration in different convergence zones. What I propose here is anew a table turning manoeuvre. We should start by our understanding of neural concepts and apply this to abstract entities instead of using our vague ideas of abstract entities and apply them then to the examination of nature of concepts.

This kind of understanding need not be given by mental imagery or conceptual processing but can proceed according to more superficial modes of processing. So for example I might be able to make mathematical proofs according to associative processing only or might pass some exam in philosophy by giving answers with regard to the functional role of the words only. For example: I might answer questions successfully because of the reliable co-instantiation of some words in some discourse or language game where a language game is no meaning defining entity as in Wittgenstein (1953) but as the name indicates best, a playing with words but not with concepts. In this case: On the question "why are mental states no neural states" I might answer that mental states are functional states which are multirealizable or on the question "why psychology cannot explain meaning" I might reliably answer, that it cannot do so "because meaning is a semantic phenomenon and no psychological one and that Frege had seen this already". I might have definitely no idea what this is supposed to mean and correspondingly lack any mental imagery whatsoever but can nonetheless pass the exam by means of playing some superficial language game. This version of understanding could eventually be described best as some procedure which is successful according to easily observable behavioural criteria whereas the understanding I am talking about and which is very similar to that of Gallese and Lakoff (2005) is primarily defined over instantiating an episode of mental imagery and which is in the first place not to be thought of as normative as is the former case where normative is simply seen as public or at least accessible by public procedures.

[23] I am not versed in that topic but I would suggest that a parrot does not instantiate RED as humans do at all because of its very different embodiment. Let this therefore be an in-principle-case.

This should suffice to get a grasp of what Concept Empiricism as I conceive of means and how it will structure the further debate. Now I will start with a prolonged discussion of meaning.

5.1 What meaning is for?

This question is of pivotal importance if we want to discuss meaning today. My suspicion is that *meaning* is often misconceptualized in that we talk of many alleged aspects of it but not about why it is important and in some sense causal for a cognitive agent in a so and so specified environment. Hence it seems to me that we have lost track of the phenomenon of meaning.

To visualize what I mean and what is an important assumption of the whole EEC program consider the following situation. You stand in a room and want something to drink, let us say a delightfully fresh cola. Now think of a usage based approach at meaning (cf. Wittgenstein 1953). It is not really clear how the knowledge of the use of words gets you started. You seem to know the meaning of cola because you know the use of the word "cola" in the language you speak or even in many languages you speak. You are a full blown member of your language community or even of foreign language communities. But how does this allow you to stand up, get in the kitchen and grasp for the soft drink of your choice. What is the contribution of this knowledge of the usage of words to your actions? Nothing! Since how does this knowledge of a usage pattern does communicate with your motor system or with your perceptual system? How does it relate to your visuo-spatial map which provides you with knowledge of the location where your cola containing refrigerator stands? How was the salient knowledge retrieved from memory that the cola stands in usually in your refrigerator? This is a bit unsatisfying if we consider that every part of our condition should have evolved for action or at least be implemented by processes that are evolved for some kind of action or other (cf. Clark 1997, Varela et al. 1991). This does not mean that we should look for an evolutionary psychology[24] approach at meaning; certainly not. One should be very clear about the explana-

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[24] Evolutionary psychology understood as the inquiry of psychological phenomena by means of reverse engineering and evolutionary theory (cf. Barkow et al. 1992). This is an approach I reject wholesale for its methods are epistemologically speaking at least "risky" and its one to one mapping of naively individuated psychological phenomena on expressions of genes in phenotypes is as problematic as the one to one mapping of naively individuated psychological phenomena on brain states by means of correlative data and without mechanistic

tory status of evolutionary explanations with regard to the project encountered here. These explanations only constrain our mechanistic explanations of concepts and hence meaning in the sense of what is plausible and what is to some degree possible (cf. Cummins 2000). But this is very important notwithstanding and we can be sure that evolution did not select concepts for the "the space of reasons".

Now a defender of a usage based account might counter that it is important to know how I can get my Cola but that this has nothing to do with meaning. Fair enough! But then, what is it that you can do with meaning? What is its causal role and where is its place in nature. And why do you call that x that you individuate via a usage based account "meaning"? You can say that the use of a word is that word's meaning but what can you do with this? An answer may be: communicating. But what exactly do you communicate and what is the function of communication? A plausible candidate for the function of communication is that you exchange the meaning of thoughts. But this is not what you do according to a usage based account unless you believe that thoughts are the same as natural language usage. But to communicate only the meanings of words by using them (maybe using them correctly) in the act of using them does not seem to make sense and this not only from an evolutionary point of view.

My suspicion is that proponents of other theories of meaning do not fare better. What can be assumed is that other proponents are better suited for dealing with special domains within philosophy, namely for special versions of ontology and epistemology. Many accounts seem primarily motivated by enabling for special kinds of ontology or epistemology or to suffice the common practice in these areas of work. A very good example is here Jerry Fodor's theory of content (cf. Fodor 1987, 1990a). Let us take a look at his suggestions regarding content specification. According to Fodor concepts receive their content by means of reliable causal covariance with a respective category, kind or individual. Now Fodor encounters the problem that the same concept qua mental entity may reliably causally covary not only with the entity it was originally supposed to do so but also with entities very similar to that. This seems for many proponents of that causal semantics view outrageous. But why? If concepts were for acting or something else, which is a plausible candidate for natural selection or at least exploitative systems, than it is no problem at all that the same concept is activated for things very similar. Maybe it might be problematic if those very similar entities are very salient in our environment and for example we need to decide between our most important foodstuffs,

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explanation. This objection holds for many philosophical projects in the philosophy of mind too. I will use evidence from evolutionary biology in this text only in the constraining way Cummins (2000) speaks of.

let us say some very nourishing mushroom, and its highly poisonous and similar looking relative[25]. But we can see that this is not the problem Fodor and others have in mind besides the circumstance that the natural solution to that problem would more plausibly occur on the level of e.g. optic or haptic discriminative abilities in combination with something like PSS instead of that described by Fodor and colleagues. What they are in my opinion really worried about is that the same concept does not denote the same kind and that this is a kind of ontological imprecision in our thinking which would not accord well with strong realism. That this seems to be the worry here instead of the worry for adaptive action becomes apparent when we take a closer look at the proposals for solution which are in the running, which will be done in the chapter on intentionality.

It is also important to note that this case of causal inefficacy is not comparable to that of mental states with regard to supervenience and the related phenomenon of supervenient causation (cf. Kim 2005). Even if something like a supervenient mental state is not causal in the sense of "getting things done" it is nonetheless clear that the physical state on which that mental state supervenes is in this sense causal. For example, imagine a functional explanation of someone getting his cola. Even if we specify the mental states involved here relatively classically and assume for the sake of the example that there is a clear cut supervenience relation established between the mental states qua functional states and the neurobiological states, it is clear that the functional analysis describes causally efficacious events in the sense of getting things done; in this case: get the cola. This is not the case for meaning as it is conceived of for example in the usage based approach. In this case we do not really know what meaning is for or in order to state it more directly, we do not know what we can do with meaning, besides allowing for entities which play a role in some philosopher's objectivist world view or whatever.

It is in my opinion highly problematic that most analytic theories of meaning are not supposed to work for action, understanding, imagination, etc. As I will try to show in later paragraphs, they do not seem to work for even that what they may eventually be supposed to be or anything else or they may describe important phenomena which do however not qualify for the name "meaning" as in the case of mere linguistic processing as a cognitive heuristic (cf. Barsalou 2008b) or in the case of a usage based account which may be utilized in language learning or in the description of language in general (cf. Tomasello 2003). But now it might seem

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[25] This problem would eventually not occur at all in natural situations for that a hostile environment with regard to a single species would surely not have allowed for the evolution of that very species.

to be in order to ask anew a question which is not asked that often. What does it mean to qualify for the name "meaning"? Sure, you may say, what you conceive of as meaning is important and interesting in many respects but it is not meaning, because meaning is this and that. The same may work the other way around for me when I state that what you are talking about is not meaning, because meaning is this and that. And eventually we might agree upon that this is only a terminological quarrel. And indeed, in some respect it is only a terminological quarrel but in many other respects it is not.

What does justify the use of the word "meaning" for what I am fostering here is that the mechanisms I present here explain understanding, interpretation, explanation, aboutness, action, etc.[26] The here individuated concepts as vehicles of meaning and thought allow for new explanations in epistemology, ontology, theory of action, etc. and accommodate, eliminate and widen the functional roles fulfilled by earlier theories of meaning. This, surely, is to be shown on the pages to follow. Nonetheless, this does ultimately justify the use of the word "meaning" for that what follows.

In recapitulating the aim of this chapter on "what meaning is for" it should be clear that many of the assumptions made here are very important for starting a philosophical exploration of meaning. If I am not aware of what I really want to clarify and am just captured in the maze of philosophical tradition and therefore make only associative adjustments to what was proposed before I will surely end up in a muddle. The project of explaining meaning via psychological concepts as well as any other approach at meaning needs to start with a clarification of its foundational assumptions and conceptualizations. I am not suggesting that I did this here but I think it is a good start to begin with delineating the motivation, the explanatory scope, everyday phenomena and functional equivalence classes between new and old theories in order to get a better grasp of the phenomena.

5.2 Problem of Symbol Grounding

One principle motivation for adapting a view of conceptual meaning that is grounded in imagery is the symbol grounding problem (cf. Harnad 1990, see also Searle 1980). The symbol grounding problem can be understood as a philosophical problem proper which is relatively independent from experimental evidence from science. Harnad and Searle both approach the

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[26] Things which are in our everyday lives conceived of as meaning or meaningful events.

problem with the help of mundane thought experiments. With mundane thought experiments I mean that they do not leave in principle the order of biology or of physics as we know it.[27] These thought experiments are in addition to it heuristically motivated in that they try to simulate one's own mechanisms in play with regard to the phenomena described.[28]

I will quote Harnad here at full length since this passage summarizes the symbol grounding problem well:

> "My own example of the symbol grounding problem has two versions, one difficult, and one, I think, impossible. The difficult version is: Suppose you had to learn Chinese as a second language and the only source of information you had was a Chinese/Chinese dictionary. The trip through the dictionary would amount to a merry-go-round, passing endlessly from one meaningless symbol or symbol-string (the definiens) to another (the definiendum), never coming to a halt on what anything meant. The only reason cryptologists of ancient languages and secret codes seem to be able to successfully accomplish something very like this is that their efforts are grounded in a first language and in real world experience and knowledge. The second variant of the dictionary-go-round, however, goes far beyond the conceivable resources of cryptology: Suppose you had to learn Chinese as a first language and the only source of information you had was a Chinese/Chinese dictionary! This is more like the actual task faced by a purely symbolic model of the mind: How can you ever get off the symbol/symbol merry-go-round? How is symbol meaning to be grounded in something other than just more meaningless symbols? This is the symbol grounding problem" (Harnad 1990, p. 339-340).

Harnad sees the central difficulty lying in learning a new language which one does not already master and this only with the help of a dictionary which explains words in this language merely with the help of other words from this language. This might first look like a problem

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[27] Thought experiments which are not mundane are such which make e.g. awkward assumptions about biology or physics and then state that it is nonetheless possible that those systems instantiate for instance special psychological capacities because they have arbitrarily defined them this way previously (cf. Chalmers 1996). These thought experiments are in my opinion paradigmatic for the implausible entailments of classic semantic theories which expect pondering about possible states to be semantic phenomena conceived of as linguistic. Interestingly these theories often need very metaphoric or psychological vocabulary as "grasp" in order to make their claims intelligible as in the case of "grasping" the "proposition."

It is clear that from a point of PSS these non-mundane thought experiments boil down to a schematic combination of quasi-perceptual states – for instance – schematic human + lack of schematic biological state x (image schema for negation (cf. Johnson 1987) + mental states (phenomenal ones)). That this should yield anything interesting about things in the world instead about our capacity for imagination is very doubtful.

[28] Another respect in which they differ from non-mundane thought experiments. The letter depend more on predefined "intuition pumps" (cf. Dennett 1995) whereas the mundane ones try to invoke one's own phenomenal capacities.

on its own, independent from the discussion of meaning. And somehow it is, but as we will see, what is entailed by the assumptions made here is highly relevant for our discussion of concepts and meaning. An intuitive assumption is that the solitary words you had to learn are meaningless. I think this is an assumption everybody can be comfortable with and even if you should believe that the words qua printed dots possess meaning[29] by themselves, they do not posses meaning for you. To be clear here, I definitely do not think that these printed dots possess meaning at all. Only bio-psychological entities do that and words only in the moment of being processed by cognitive systems. I just want to open the base of tolerance for the argument a bit here. If you than combine these meaningless units, in this case words, you have nothing more than a large amount of meaningless units. Nowhere meaning emerges willy-nilly. It is important that this argument is stated against conceptual models from AI and philosophy of mind but not against classical theories of meaning. This is so because classic theories of meaning often suppose entities of a relatively exotic origin so that Harnad has surely no interest in dealing with them at all. But my discussion will try to deal with those more classic theories as well.

The argument really lives from the circumstance that you take the thought experiment seriously. Try to imagine that you sit in front of a Chinese/Chinese dictionary or any language you are not in any respect faintly familiar with. Now, even if you imagine that you can learn with tremendous effort any single entry in the dictionary and thereby learn a plenty of connections between words, it seems rather problematic to say that you know what these things mean. And this shows perfectly the relatively intuitive sense of "mean": You do not understand what the words are about because you have no imagery of them. Now you might reply that aboutness might be a property or relation that can be brought about without imagery, only by means of causal covariance. But how do you understand causal covariance in that particular case? In order to understand for example "nfanfsd", which means in our language "tree", what relation of causal covariance is necessary to understand it? The most plausible candidate is causal covariance between the word and an image of a tree. And what else could it be? What is a non-imagery candidate for a structure, which is not at least mediated by the senses and the underlying neural machinery, which causally covaries with the word and thereby yields meaning?

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[29] Somehow the same problem as that asked by Putnam (1981) with regard to the ant "foodpainting" Churchill in the sand.

It might here be in order to make a qualification. Harnad suggests in his thought experiment that you cannot learn the language from the dictionary. This is a bit problematic for we should ask us what it means to have learned a language when it does not mean to master a language. A classic criteriological approach at language mastering might say that you master a language when you can communicate as proficient as any standard member of a language community. Another example might be to pass a test successfully. For example something like a Turing Test or rather more mundane, the Toefel Test. Statistical language programs like LSA are already able to pass the letter very successfully and those programs learn languages exactly the way Harnad does not consider it possible. And is it not possible to think of a person who lacks any functional sense organ and their respective brain areas and is nonetheless able to master our language perfectly[30]. I believe we can make here a point on Harnad's behalf. It seems most plausible to define language mastering as grasping the meanings of words - where the meaning of a word is some imagery structure, PSS, whatever - because if language is for communication it is most plausible to assume that language does not communicate its own pattern of use but meaningful thoughts by virtue of eliciting mental imagery in others. So we might say that neither LSA nor any alleged subject which does not have learned the meanings of words has any proficiency with regard to a special language. What LSA or some imagined subject might have learned in such a case is a pattern of use but nothing more. So we can grant Harnad the point that no one could ever have learned that way a language[31].

It is clear that this problem naturally extends to amodal accounts of mental concepts which are neatly structured analogically to language. The counterparts for the words for example might be the following structures x_1, x_2, x_3, x_4, x_5, x_6, …, x_n. Classic GOFAI accounts of the meaning of mental concepts as well as famous philosophical attempts at those phenomena assume these arbitrary symbols. They do not carry meaning by means of their intrinsic structure but by virtue of the information they carry; which makes them arbitrary as words. They are also not grounded in perceptual systems, whatever this would mean within a GOFAI approach. They are certainly connected to sensory systems but the sensory systems normally have only the function of bringing them about or of helping in categorization. So in offline thought the meanings one possesses are totally represented by those arbitrary structures. Now

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[30] Yes, it is indeed possible to think of that.

[31] In my opinion no not-impaired human could ever learn a real natural language the way it is learned by LSA. It would be unbelievable difficult to memorize subpersonally this huge amount of information which is neither relevant nor structured relative to a kind of mental imagery.

assume that those symbols get meaning through functional role. Then the same objection can be raised as in the case of the learner of the natural language[32].

But let us take now a closer look at the symbol grounding problem from the view of Searle's (1980) Chinese Room argument, which is a thought experiment, too. I give a short quote from Searle (1999) which properly summarizes the argument and is in that form taken because of its concise depiction from Cole (2004):

> "Imagine a native English speaker who knows no Chinese locked in a room full of boxes of Chinese symbols (a data base) together with a book of instructions for manipulating the symbols (the program). Imagine that people outside the room send in other Chinese symbols which, unknown to the person in the room, are questions in Chinese (the input). And imagine that by following the instructions in the program the man in the room is able to pass out Chinese symbols which are correct answers to the questions (the output). The program enables the person in the room to pass the Turing Test for understanding Chinese but he does not understand a word of Chinese." AND "The point of the argument is this: if the man in the room does not understand Chinese on the basis of implementing the appropriate program for understanding Chinese then neither does any other digital computer solely on that basis because no computer, qua computer, has anything the man does not have."

Because of its high similarity to the example of Harnard's I will only summarize shortly what Searle wants to show here. Searle supposes that a computational system like the Chinese Room, which is with regard to the processes involved isomorphic to an idealized GOFAI computer system, is not able to understand semantically what the symbols it processes are about. It neither knows its inputs nor its outputs even though it passes the Turing Test. Searle believes that this system lacks meaningful processing because it lacks intentionality. It is also a kind of critique of functionalistic theories for we have dedicated input – output systems involved as well as a well defined symbol manipulation processes but nonetheless anything similar to a human mind.

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[32] External approaches to meaning are criticized later on when I deal with intentionality.

5.3 Mental imagery

Because of giving an account to meaning in which a wide conception of mental imagery plays an important role it is necessary to concentrate on images and their status within Concept Empiricism. It might be helpful to compare my approach with that of Kosslyn et al. (2006) regarding depictive representations in order to clarify my position. As will be shown, my conception of content and vehicle differs widely from that used by main proponents of mental imagery and their critics.

What must me stated first and foremost is that mental images as we deal with here are not identical to those images or pictures which we encounter every day. These images out there are constructs of our brains and the physical properties they are made of whereas mental images can be products of the brain alone and have underlying features which allow for the perception and imagination of pictures but are by themselves not comparable to images at all. A great deal of discussion in philosophy with regard to the mental imagery debate concentrated on the features which make mental imagery differ from images as we encounter them in daily in the world. After this was done it was inferred that there cannot be anything like mental imagery in the mind-brain since mental imagery is not comparable to images (cf. Dennett 1969). This however is a fallacy or an inference from false assumptions regarding the features of mental imagery defined ahead. This whole discussion is paradigmatic for the debate of representation in general where it is often assumed that there is no principled difference between representations "out there" and "in the head". But this is a fatal flaw derived from an overly archaic understanding of cognition where the brain is considered to be a kind of functional bucket wherein representations like words are to be found.

Before I compare my approach to that of Kosslyn et al. (2006) I will try to refute the most classic critiques of mental imagery and thereby try to clarify what mental images are:

One classic critique is that of the homunculus (cf. Pylyshyn 2002). The homunculus objection is not only brought forth against mental imagery accounts but indeed against most accounts of cognition at least with regard to action planning. But let us discuss it here with regard to mental imagery. The general idea is that something or someone has to perceive the products of mental imagery anew because of their perceptual nature,[33] as if a percept were an image on

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[33] And normally this something or someone is conceived of as a little man in the head, the homunculus. Most often it is also assumed that this homunculus has similar cognitive abilities as the one in whose head he is sit-

the retina[34]. I do not want to state the more specific arguments against homunculus objections here but a more general objection against the homunculus fallacy which brings down the more specific objections too. The whole problem seems to depend on a special conception of an agentive self which is nowhere found within the brain or classic GOFAI models. But if we embrace self-organization there does not seem to be a problem anymore for we are not committed to *a single locus* of action planning or perceiving[35].

Another classic critique of mental imagery stems from Wittgenstein (1953) and regards the ambiguity of mental imagery:

> "I see a picture; it represents an old man walking up a steep path leaning on a stick – How? Might it not have looked the same if he had been sliding downhill in that position? Perhaps a Martian would describe the picture so. I do not need to explain why we do not describe it so." (p. 54, n. 139 [b]).

It is clear that this is a kind of confabulation of a mental process with an external representation like a picture which might indeed be ambiguous. But it is mental imagery in the form of dynamic mental animation (cf. Hegarty 2004) which is as dynamic as perception itself which makes a thought about all the possible varieties of that scenario determinate. What this example maximally[36] shows is the insufficiency of pictures as a kind of means of communication. But this does not seem to be of interest for us.

Wittgenstein's (1953) duck/rabbit figure can be treated the same way. You have a determinate pattern of activation in your brain with regard to the picture which determines the way you perceive it to a special time t. The ambiguity is in the external picture with regard to the way we interpret it perceptually. But this is no objection against mental imagery which is determinate in every instance[37].

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ting. This then shall normally construct an infinite regress argument because the homunculus needs a further homunculus within his head and so on and so forth.

[34] For a critique of this simplistic view of perception compare Zeki (1993).

[35] What certainly is abandoned by accepting self-organization is the classic single locus of control sometimes conceived of as the self. But if we accept that the self it individuated primarily by what we phenomenologically conceive of daily there is no need for eliminativism with regard to the self as a phenomenological phenomenon but only with regard to a Cartesian discrete self.

[36] Maximally, for it cannot be argued that language is always unambiguous. Indeed, in many cases it is most ambiguous.

[37] Determinate does not mean that there is always a clear interpretation of the world. Indeed, the construction of a percept is a statistical process which is much less stable as we might think of. However, if one subpersonal interpretation has made the race against other interpretations – i.e. if it is the stronger attractor in a state space – this delivers a determinate outcome.

Dennett (1969) proposed the famous argument from indeterminacy:

> "Consider the tiger and his stripes. I can dream, imagine or see a striped tiger, but must the tiger I experience have a particular number of stripes? If seeing or imagining is having a mental image, the image of the tiger must – obeying the rules of images in general – reveal a definite number of stripes showing, and one should be able to pin this down with such questions as "more than ten?", "less than twenty?"" (Dennett, 1969, p. 136).

First of all, we can state in accordance with Leibniz that there are no images in the brain and there is no reason to believe that mental imagery must exhibit the same properties like images. But let us nonetheless concentrate on the argument. The different neurological features of perception and mental imagery give a hint regarding what Dennett has here in mind. Perception is more controlled by bottom-up processes because its neural implementation base has stronger connections to the retina whereas mental imagery has not and therefore vanishes much faster. Otherwise we would often have serious hallucinations (cf. Ganis et al. (2004)). This explains to some degree the problem we have in interpreting mental imagery. We have worse phenomenological access to mental imagery than to perception and it therefore seems to us that mental images are indeterminate.

What I would like to stress here is that I conceive of mental imagery in a very wide way so that it encompasses PSS too. This means that it possess a dynamic, perception like nature, which is schematically constructed. Talk of mental images might be generally unfortunate but it might be that we are somehow confined to it by means of the working techniques which are used in academic circles. If we could utilize videos more often, eventually an academic culture would have emerged in which we would have talked of mental animation from the beginning, instead of mental imagery because we do not deal with concrete, static representations here. What we have are dynamic and temporally extended structures.

5.4 Kosslyn

Eventually the most important insights into mental imagery stem from the work of Stephen Kosslyn. He conceives of depictive representations as the format underlying mental imagery whereas the content is the information conveyed by the format (Kosslyn et al. 2006). And here it is where the strongest differences between my approach and the common versions of

mental imagery emerge. According to Kosslyn there are also propositional representations which can also carry information where information is content. Propositional and depictive representation differ in that what they make explicit and accessible. Here it is relatively clear where the approaches differ or what I am generally proposing respectively:

It seems to me more plausible to draw different boundaries. Instead of format it might be better to speak directly of the vehicles where vehicles are neurological structures[38]. These neurological structures carry content which is mental imagery. Mental imagery is what emerges from the enactment and re-enactment of feature maps and has functional and phenomenological properties related to precepts. Mental imagery is here thought of as the meaning of mental states and is not comparable to the attempts at mental imagery proposed by Kosslyn and others working in the field. It is important that this does not get confused. To be clear: what I am disputing is not the idea of a functional mental imagery which might be different from a conceptual system in processing some cognitive task, like a mental map. What I am disputing is the format/content distinction drawn there. I use the term mental imagery in this *Magisterarbeit* for both: The special cognitive function (cf. Kosslyn 1994, Farah 2000, Finke 1990, Martin 2007, Mahon and Caramazza 2009) and a very important part of meaning[39].

Mental imagery in the sense of meaning need not be conscious[40]. In most cases it is not. This is definitely not a contradiction to the definition of mental imagery given here and eventually not even to that from more classic approaches, if we consider that nobody seems to have a problem with unconscious propositions controlling cognition.

Because of dismissing information as a good candidate for content it might be fair to say here why I think so. If we accept my definition of meaning, which I give below, it is clear that anything which has the same functional role as information boils down to quasi-perceptual meaning. Information might be called an external entity which brings about, by being perceived, meaning or content in the quasi-perceptual sense, but not by being something more abstract. For example, the proposition the "apple is green" and a picture of a green apple might be said to convey information that some apple is green but in order to be conceivable by a consumer system, this information better has to create a conscious percept or a kind of mental imagery which is presentational in nature.

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[38] Or at least the ontologically real vehicles. Within mechanist models there are also functional vehicles which are functionally similar to schematic image structures.
[39] In case of misunderstanding or confabulation I will mention the difference.
[40] But see my discussion on consciousness and meaning below.

5.5 Meaning

In the course of dealing with concepts and meaning I have become more and more aware of the circumstance that it might be fortunate to eventually get rid of the concept of meaning without sacrificing many of the core phenomena we might associate with it in everyday life. The problem with the concept MEANING is that it is claimed by too many different approaches in philosophy and the sciences as well as by stances in everyday life. What I intend here is that MEANING as well as many conceptualizations of it might correspond to an umbrella term with an eventually contradicting structure. Therefore I am going to present here some theoretical entities which are in accordance with the theories so far dealt with and which intersect with some of the phenomena which were conceptualized in different areas of preoccupation with which was dealt as MEANING. Some of those phenomena will be consistent with the considerations so far made in the course of the *Magisterarbeit,* while others will be discarded.

The phenomenon which is naturally at the forefront with regard to meaning is understanding. Understanding is to be considered here not in a strict epistemic sense of the term, neither theoretically nor practically. With understanding I do not mean the comprehension of something by means of a well performed skill which is performed as instructed or the explanation of something in accordance with scientific methods which are seen as imperative. With understanding I mean minimally the subjective feel of having at least a weak mental image of something and maximally the existence of rich perceptual symbol systems as well as a plethora of motor imagery. This kind of understanding contains both forms of understanding of the epistemic kind mentioned above but is in marked contrast with those since it can be much simpler. In its weakest sense it can be seen as an interpretative attempt, whereas it can be regarded in its strongest form as a kind of full blown knowledge with indefinitely high epistemic status.

This understanding is in my opinion only in a weak sense representational whereas it is primarily presentational. To be more concrete, it need not be representational[41] at all, though it is it in most cases for sure. What I mean with that is this: This kind of understanding will be in the most cases about something in the world which we may take as a thing-in-itself. However, what gives us an understanding of this thing is totally internal to us, *presented to us* in a con-

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[41] Being representational is seen here as an intentional stand-in property.

structive way by perceptual mechanisms. In consequence, what I propose here is a strictly internal conception of a part what is regularly called meaning. The meaning of UNICORN and correspondingly our understanding what a unicorn is or is supposed to be is probably a mental image or a re-enacted perceptual episode of something like a horse which has a horn on its forehead. This understanding is totally presentational without a representational component. What brings in the representational component in the case of a concept like APPLE is intentionality which is a relation between a cognitive system and some concrete entity in the world. But intentionality is a component which is active only in concrete situations and brings about understanding only in a generative sense or allows for action only in cases were understanding is already established; but more on this later in the chapter on intentionality.

What is important to grasp here is that meaning has the capacity to be about the world but that it is not a feature which explains its meaning; as in the case BOOK, BOOK is not individuated as a book concept because it is about books. What makes a BOOK concept, what it is for a cognitive system, is the perceptual state which is presented to it. Phenomenologically speaking, I understand what a book is by the books presented to me in perception.

It seems to me clear that understanding of this kind is in our folk understanding of the world tied to meaning. Therefore, this kind of understanding, which is explainable through a theory like PSST, can be seen as intersecting with the "vicious" umbrella term MEANING.

I conceive of this kind of presentational understanding as that what should primarily be seen as meaning. This however poses a plenty of questions I would like to answer on the pages to come:

It must be clarified, what conceptual meaning is supposed to be, if we conceive of meaning as a kind of perception-like presentation, where a presentation can be a concrete perceptual episode, an episode of mental imagery or animation which all depend constituently on feature maps. A preliminary answer to this question might look like that: Perception-like presentation is dependent on conscious attention, in the sense that only what is sensed under conscious attention is presented. If we are committed to PSST, then it follows for perception that during the perceptual action a simulator is build up or that the perceptual experience is integrated into an already existing simulator. This means that we can say that any perceptual experience leads to a kind of conceptual structure and that conceptual meaning is thereby established. In this sense every presentational mode leads to a concept and every meaning instantiated is conceptual.

This qualification necessitates remarks on perception as well as perception-like states, attention and consciousness; but each in turn. Perception and perception-like states have many phenomenological, functional and neuronal properties in common which was already shown when we dealt with PSST. When we encounter perception and perception-like states we face at least two problems. How do we separate non-conceptual and meaningless mere sensual awareness from conceptual and meaningful full-blown perception and to which degree do perception and especially perception-like states dependent on consciousness? In order to differentiate perception from sensation or sensual awareness it might be useful to take a look at functionality or attentional processing or top-down processing with regard to subjects of examination. To differentiate perception from sensation by means of functionality could look like this: Perception occurs at a conscious level if a sense modality is utilized for the achievement of a cognitive system's goals whereas at the unconscious level functionality might yield the integration of sensory processes in subpersonal processes which have metabolic or higher order functions which might be defined via e.g. survival at the most basic level or a more context specific task demand in the respective circumstances.

Attention is a further process by means of which we can differentiate perception from sensation. If we allocate attention at the conscious or unconscious level on some internal or external entity, we thereby not only sense something or are aware of it, but we have normally a rich percept of it, which is tied to conceptual processing. However, a further question looms large here: To what extent is attention present in the case of unconscious perceptual processes? In my opinion attention is there in conscious and unconscious perceptual processing. In the unconscious case attention is a functional and subpersonal process which might be definable over allocation of cognitive recourses, as a noise filter, etc. E.g. the allocation process can be seen as the unconscious obverse of what we phenomenally experience when we concentrate on a mental episode or an entity in our vicinity consciously.

At this stage it should be clear that what was said about perception counts also for perception-like states with the distinction that we need not differentiate perception-like states from external sensory processes but eventually from involuntary sensual awareness as in the case of involuntary daydreaming. I believe however that the distinction made for the former case does also apply to the latter one.

Top-down-processing is an additional means with which we can separate perception from sensation – yet it might be a not that easily graspable distinction criterion because it only allows for a gradual distinction. It should be clear that there is a large amount of bottom-up

processing in the case of sensation too. But the grade of neural higher order resource allocation is in the case of perceptual processing much larger and might be integrated in an emulator, whereas sensation alone has no access to that an higher order structure. It is moreover controversial whether the top-down-processing criterion is a criterion which is accessible phenomenologically or only function-neuronally which is however fortunately no problem we have to worry about here.

As was already suggested above attention is a process with which we can differentiate perception from mere sensation. It is also in accord with PSST that attention is necessary and sufficient for concepts. I already assumed that attention is a process which is possible unconsciously. Therefore it must now be asked whether presentation is only dependent on perception and attention which might be given even unconsciously or whether it is also dependent on conscious experience.

It is indeed problematic to conceive of presentation independent of conscious experience. But this seems to be a problem because it would be unsatisfying if such a pervasive phenomenon like understanding would be dependent on consciousness since such a plethora of cognitive processes works independent from consciousness. There is indeed a partial answer to the problem which is motivated by the two-visual pathways hypothesis version of Milner and Goodale (2006) and the target conception of consciousness of Campbell (2004). If we integrate the conception of meaning presented here as mainly constructed in the ventral stream and if we then assume that we consciously target aims of our actions by means of the ventral stream too, it might be possible to ascribe the role of understanding to the ventral stream and correspondingly to conscious experienced presentation alone whereas we ascribe to unconscious visuomotor representations which are brought about in the dorsal stream the role of fine grained action execution. I.e. direct affordances are decoupled from concepts. But this seems to be problematic, too, unless we do not assume a further well-nigh conceptual system for visuomotor action which comprehends its own repertoire of visuomotor action understanding. If this were true we had a much disintegrated knowledge system at the functional and neuronal level which seems very integrated at the phenomenological level, because the knowledge of actions would be primarily at an unconscious visuomotor level whereas the knowledge of things like it is presented to us at an conceptual level is consciously and perceptually given and that which we really experience in everyday life.

This might be generally a very interesting position but I must confess that I am not versed enough to claim that it is true. Further, we might also push back part of the problem to another

more simple level but it nonetheless remains partly existent since it is to be clarified what the structure of visuomotor understanding is and, what seems to be the real problem here, that which is only partly pushed back, how that understanding relates to consciousness. Things are even more complicated since it does not seem clear that we can cut that easy between conscious presentation and unconscious processing systems. Many processes at the non-visuomotor level seem to be working unconsciously too. At the transition between unconscious and conscious processing we see the core problem for the approach delivered here. How do we best conceive of the non-visuomotor higher cognitive processes which are not consciously experienced? This is one of the core problems of phenomenology (cf. Gallagher and Zahavi 2008). It is surely not sufficient to assume that both processes are the same, one of them just conscious while the other one isn't.

However, eventually PSST delivers a satisfying answer to that problem which is couched in the functional properties of PSS, mental imagery or mental animation. If we were able to show convincingly and over a wide area of phenomena that unconscious higher mental action reverts at a very fine grained level[42] to the same functional structure as it does when it reverts to conceptual thinking like it is according to PSST than we would have a case for a presentational theory of meaning at an unconscious level. A further candidate for overcoming the conscious-unconscious divide is the neuronal structure which is also individuated to some respect functionally. Feature maps which allow together with the further "correlates of consciousness" for a conscious presentational mode and which are the most primitive entities in PSST too might be especially apt as the function-structural candidates for an unconscious presentational mode.

Similar ideas might be applicable to visuomotor processes and conscious motor imagery which would allow for dealing with more mundane affordances too. And eventually Jeannerod (2006) has already done that. While we're already on affordances and eventually even on a presentational theory of affordances which might be delivered through a similar high level functional theory as PSST is one, it might be fortunate to mention here a further aspect of our umbrella term MEANING which is conceived in our everyday thinking as a skilful coping with the world and which is also part and parcel of the conception of meaning according to the ecological theory of vision (cf. Gibson 1976) and its theoretical successors (cf. Glenberg 1997, Noë 2004, O'Regan and Noë 2001) and which might also be very similar to the approach regarding action-oriented representations taken by Wheeler (2005). Especially

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[42] Which might nonetheless abstract away from time.

Glenberg (1997) states the preponderance of affordances and conceives of them as the meanings of objects in a way I showed with the help of the chair example in the overview chapter. Now, I am somehow indifferent to the actual status of affordances. They are in my opinion definitely of utmost importance and higher thought like it is exhibited in PSST is certainly primarily subsuming affordances. But what I am not sure about is what functionally or neuronally explains them best. Eventually a theory like PSST can do that job or we need a special theory which especially stresses the visuomotor nature of affordances which might deserve a special treatment (cf. Goodale and Milner 2004). What I want to show here is merely that it might be possible to account for that important an aspect of our mental nature by a phenomenolocially motivated functional theory like PSST or something very similar and eventually to even overcome the conscious-unconscious divide which is very pervasive with regard to affordances too. Moreover, we have spotted a further candidate for unravelling MEANING. With regard to this we can consider affordances depending on further theoretical commitments as an important subclass of UNDERSTANDING or as a more autonomous part.

However, affordances should not be confined to visuomotor representations. They are also present at a higher cognitive level in the form of functions where functions are presented through e.g. mental animation with regard to structures which are salient to a cognitive system in a special circumstance.

There is surely a plenty of other aspects which were in philosophy subsumed under MEANING. Possible candidates are truth-functions, use, reference, causal covariance, etc. Reference and causal covariance get a proper treatment at later stages of this *Magisterarbeit*. The use theory of meaning was "treated" at some places before. I also won't deal with truth functionality for I am not versed in these theories. Nonetheless I would be surprised if especially a truth-functional theory would make a case against what I said here or would make assumptions which were less metaphysically daring then those made by its competitors[43], especially if we consider the role and status which might be attributed to truth as would seem natural from the background of PSST. Therefore I confine my considerations regarding meaning here to understanding and affordances.

It should again be noted that what qualifies understanding and affordances as the primary heirs of meaning is the rich role both play in our inner cognitive lives as well as in our encounters with the world. Both are metaphysically unpretentious for they both are brought

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[43] I would suppose that rather the reverse is the case.

about by neuronal structures which exist indisputably. Both are in accord with the empirical record as I will again show shortly.

5.5.1 Meaning internalism

Additionally I will make some remarks concerning the internalism-externalism debate which has a rich philosophical history and which is of pivotal importance in many debates (cf. Putnam 1975, Burge 1979). What I am proposing here is a strict meaning internalism. Affordance theorists are normally stating the total opposite of this and remarks on that topic from the side of theoreticians which emphasize the embodied nature are at least equivocal[44]. What is however important – independent from philosophical preferences and fashions – is that affordances and those structures underlying understanding are meaningful in the presentational sense, which I described above, especially in cases of strong offline thought in the manner of e.g. dreaming. Therefore I absolutely see no reason for en vogue statements of the kind we encounter in the meanwhile daily in the respective literature, like, e.g. it is clear that meaning/thought is a unbelievably complex structure which comprises brain, body and environment[45]. In opposition to these views I stress the overwhelming role of the brain in meaning generation which justifies speaking of meaning as internal. It is clear that meaning is also dependent on a body which carries and nourishes the brain, while this body is in turn dependent on an environment and that in turn is dependent on gravity and so forth. But in order to give an interesting explanation and categorization of meaning it might be favorable to treat the brain as an open system that has many relations to the world (cf. Wilson 2002) which nonetheless need not lead to this sort of infinite-regress-argument-externalism of which extended mind is one version (cf. Clark and Chalmers 1998). The argument that our brain is adapted to the shape and structure of our bodies (cf. Gallagher 2005) seems to be a non-starter too for the brain is indeed brought about by adaptive evolution and mind-body interaction but a car is also brought about by a whole assembly line procedure, mechanics and machines and a process of "evolutionary adaptation" brought about by market research, consumer attitude, governmental subsidies, etc. To function it must be "nourished" with gas and oil and a car is indeed dependent on the ground on which it can stand and drive. But we have a very good

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[44] Or are at least more moderate than my proposal made here (cf. Lakoff and Johnson 1999, Gallese and Lakoff 2005).
[45] This is a general pattern of a sentence which is to be encountered overwhelmingly often. A good example for this is Gallagher (2005) who uses this statement inflationary often even after a triviality of the kind that people who exercise regularly have a better attitude to their body which then affects the remaining cognition.

understanding of cars without making cars entities which span the car frame, engine, etc. and also comprise the mechanic which produced it, the road on which it can drive, the factory in which it was produced, the factory in which the robot was produced which in turn produced the car, the field in China from where the claim stems out of which the bricks were produced which are partly constituting the factory in which the robot which produced the car was produced, etc. Also, the assumption that meaning is primarily internal is not in opposition to the claim that meaning evolved for action or is based on mechanisms which evolved for action. This is totally compatible with the assumption that the whole action of which meaning is a part is interactionist and has thereby external and internal parts of which meaning is an internal one.

5.5.2 Some empirical evidence

But let us now take a closer look on the other reasons for conceiving of meaning in terms of mental imagery and related structures. Structural reasons which dictate to do so are that there is no evidence for language like structures in the brain whereas there are many modal structures which fit well with higher level explanations (cf. Barsalou 1999). There is also ample evidence from the literature on brain impairment that people who suffer damage to especially dedicated brain structures are not able to grasp the meaning of some entities[46]. For example, concepts of living things like mammals are likely to be lost if damage occurs to visual areas of the brain whereas losing one's concepts of manipulable tools like pliers is increasingly probable in cases of damage to motor areas (cf. Warrington and Shallice 1984, Damasio and Damasio 1994, Humphreys and Forde 2001). There is further evidence from neuroimaging studies which suggests the modal nature of meaning: As is already suggested by the lesion studies above it is shown in neuroimaging studies that concepts which rely in behavioural tests as well as phenomenologically heavily on vision activate neural areas for vision whereas concepts which rely heavily on procedural or motor knowledge activate areas normally activated during motor cognition (cf. Martin et al. 1996). Further, colour concepts activate colour areas like V4 (cf. Chao and Martin 1999) and concepts which are about social relations and

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[46] This talk of "grasping the meaning of special entities" sounds relational which is somewhat in contradiction with my brain centric understanding of meaning. It the chapter on intentionality I will however clarify that there need not be any contradiction in that at all.

interactions activate areas like the mirror neuron system or the prefrontal cortex (cf. Decety and Sommerville 2003, Gallese 2003).

From the behavioural level there is evidence that many people perform as if they were manipulating imagery during cognitive operations which must be seen as involving meaning[47]: For example, the size of an object during property verification tasks influences the time the participants of an experiment need to verify or falsify a property (Solomon and Barsalou 2004), and gives a special perspective on an object in sentence comprehension tasks (Zwaan and Madden 2005). In general, imagery adapts the embodied perspective of the human agent (Zwaan and Madden 2005, Talmy 2000a, b) and this natural perspective influences often in a kind of feedback process the position of the respective parts of the eye: in case of thinking about clouds the eyes tend to look up whereas in the case of floor they tend to look down. Further, Wu and Barsalou (in press) observed occlusion effects in feature listing tasks. For example, ROLLED-UP LAWN produces properties such as ROOT or DIRT which are not normally listed in the case of LAWN and which are not to be expected from the compositionality of amodal language-like symbols. There are also perceptual shape effects to be seen in property verification tasks. Solomon and Barsalou (2001) found out that verifying MANE for HORSE yielded facilitation effects for MANE for PONY whereas it did not yield these effects for MANE for LION which speaks for the perceptual structure of the MANE concept involved because an amodal concept of MANE would not yield the exhibition of the effects described above on the behavioural level. In addition, modality switching phenomena which result in temporal cost or delay are also found in property verification tasks. So, processing in one modality is faster than processing across many modalities and the switching between concepts in verification tasks which are related to different modalities take correspondingly longer (Pecher et al. 2003). Furthermore, there is evidence for an influence of movement comprehension in sentences on reaction times in embodied evaluation of the correctness of sentences (Kaschak and Glenberg 2002). Very nice further examples are the semantic priming effects on behaviour which are observed in social psychology. For example, being primed on the main characters in stories about hooligans, professors or elderly people respectively, yields that those, who are primed on these character types by listening to the story, exhibit behaviour of the kind which is typical for the characters about which the stories are. People who were exposed to a story about elderly people will normally show signs of going slower, more stooped, etc. whereas people who heard the story about hooligans will exhibit signs of

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[47] This means deep processing and not only superficial, fast one.

more aggressive behaviour than usual (Bargh et al 1996, Dijksterhuis and Bargh 2001). There is an enormous range of other findings which show the pervasiveness of embodiment phenomena for example with regard to the activation of musculature in thinking about sport activities, dancing, playing piano, etc. as well as the activation of emotional phenomena in thinking about emotions (Niedenthal et al. 2005).

Let us now turn to the evidence for embodiment effects from cognitive linguistics. Here I draw especially on the metaphor theory of Lakoff and Johnson. Both argue convincingly for a strong metaphorical structuring of most concepts. E.g. Lakoff and Johnson (1980, p.4) give an analysis of the argument-is-war-metaphor:

Your claims are indefensible.
He attacked every weak point in the argument.
His criticisms were right on target.
I demolished his argument.
I've never won an argument with him.
You disagree. Okay, shoot!
If you use that strategy, he'll wipe you out.
He shot down all of my arguments.

What is generally proposed by Lakoff and Johnson (1980, 1999) is that a vast part of concepts is structured metaphorically from more basic, embodied concepts which are primarily grounded in the biomechanical engagement of the body with the world or diverse modality specific representations (see also Fauconnier and Turner (2002) for a somewhat different conception). This break down of our concepts into metaphorical constructions was neurocomputationally implemented in the KARMA model of Narayanan's (cf. Feldman and Narayanan 2004) which modelled talk of international economies in terms of embodied action as well as health and well being.

5.5.3 Implications of this view of meaning

In the following paragraphs I am going to delineate shortly some of the implications and consequences of the view of meaning developed above.

(a) Nonconceptual content

Nonconceptual content does in the meanwhile play a very important role in the discussion of meaning and mental representation and so it is necessary to devote some remarks on it (cf. Bermudez 1998, 2003; Peacocke 1992; Tye 2005). A problem which is directly encountered is the distinction at the assumption's very heart; the distinction between nonconceptual and conceptual content. Everything on which we can concentrate by means of attention is conceptualizable according to PSST. Therefore there does not seem anything to be which can be granted to a nonconceptual content.

(b) Classic semantic properties

Those classic semantic properties like truth-functionality or reference do not play any longer any significant role in specifying meaning or belonging to meaning within Concept Empiricism. Further, reference is according to my version of Concept Empiricism something that boils down to concrete intentionality which will be shown in the chapters on intentionality.

(c) Dreams, daydreaming, offline-pondering

Though it is surely true that concepts evolved for action, that they are primarily brought about by experience and that they are very often involved in situated conceptualizations it might be important to note that this is not the whole thing about concepts. It is somehow comprehensible that many researchers stress especially these features of concept research which were neglected for a long time but it is dangerous and in my opinion plainly wrong to define concepts and with them meaning over situated action alone.

There are indeed many situations in which concepts are processed relatively independent from the environment in which the respective cognizer is embedded, though they might nonetheless be brought about by interaction with it. Philosophical practice is a very good example for that. But not only philosophical practice is an example for that, there are indeed many mundane cases. You just need to go for a walk and suddenly think of your most beloved beverage, cola,

without being thirsty, for example. There is no interesting environmental constraint in this case as well as in hundreds of other situations like that which we encounter every day.[48]

Other interesting cases involve fantasizing, dreaming, etc. Our conceptual machinery is activated in all of these cases but at least in the case of dreaming some of our senses are not even reactive, far less active.

(d) Affordances

Meaning is often constituted by the mental imagery that allows for specific actions with regard to special objects. The meaning of HAMMER is for most adult humans to a large part determined by the motor imagery involved in the normal use of hammers. "Affordance" as it is used by Gibson (1979) however is much wider as the invocation of past experience only. It is first and foremost understood as the knowledge of the possibilities of action afforded by objects with regard to one's embodiment and one's position in space. It is relatively clear that a view of concepts like PSST delivers a structure which is highly compatible with affordance theory (cf. Glenberg 2008) or makes it even more plausible as in its original formulation which is in its commitment to direct perception in the strong sense more or less implausible.

(e) Normativity and meaning

If we adapt Concept Empiricism it seems rather awkward that meaning should be in any sense normative. And so it is. The idea that meaning is normative stems from a confabulation of language use and its aim of communication, which sets the norm, with meaning. Meanings by themselves are not at all constrained by norms and why should they be?

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[48] Thoughts related in nature might have let Clark and Grush (1999) eventually to some similar thoughts with regard to the role of representation and action in more "Cartesian" styles of thinking.

(f) Meaning and communication

An often made objection against views of meaning which allow for a high degree of subjectivity and privacy is that communication would not be possible at all. This is indeed an awkward position. What indeed is supposed to be the aim of communication? And why should it always function for every kind of communicative purpose? For example, one aim of communication is the promotion of common action. With regard to mundane entities which we encounter every day there does not seem to be any problem if there is a large variety in mental imagery because of the high degree of similarity in perception of the things we regularly encounter in similar environments: Similar experiences lead to similar concepts.[49] But what about less mundane cases which depend much stronger on introspection and internal imagery generation as well as on complex events? For example, what enables proper communication with regard to abstract thoughts like LOVE or JUSTICE?

What seems peculiar to me is how and why anything like even a remote fit between concepts in different subjects should be brought about during communication especially with regard to abstract concepts. In the case of concrete concepts communication often succeeds because actions are what satisfy the communicative intent. In order to give me an apple your APPLE concept can be relatively far remote from mine with regard to many features which are not relevant in the respective interacting context. In the case of ROMANTIC RELATIONSHIP however where the concept structure is much more complex and maybe in some persons primarily emerged from cultural narratives like novels or poetry[50] it is quite likely that your concept might differ from that of someone else. Indeed this is what makes many relationships not that fortunate.

What is so striking odd about the idea that communication needs the same or very similar concepts are the everyday encounters with friends and partners which often exhibit little match between one's own and other's concepts and often yield some kind of quarrel. Even more interesting is that point of view from a philosopher's standpoint if one considers the high degree of mismatch of positions even within the same paradigm. Another peculiar mis-

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[49] I do not deal here with the related problem how different concepts get the same names because there is a rich psychological literature on the mechanisms which allow for that (cf. Bloom 2000). Modes of joint attention seem inter alia especially apt for explaining that problem (cf. Sabbagh and Baldwin 2005). Moreover, the problem I deal with is more controversial and is more open to philosophical revisionism than the related problem mentioned above.

[50] Which rely heavily on associations from different already existing imagery structures and are not primarily driven by primary and personal experience.

apprehension behind this idea is the conception of evolution involved. Why should language be a perfect communication structure which enables perfect fit between the communicative intent of someone and the understanding of it in somebody else? From the standpoint of evolution it is enough when communicative abilities are enhanced or made a little better with regard to the generation before. Language might be a very sophisticated means of communication if we compare it to the communicative means which are available for most animals. But so is bow and arrow with regard to predation. It is better than nothing but it also worse than a rifle. There is nothing perfect in evolution, only better or worse with regard to some environment and earlier generation.

My point here is not that some philosophers denied the possibility of miscommunication but that they thought that successful communication needs a fit of concepts. Language is indeed never able to do this because it is infinitely poorer than the concepts which underlie it (cf. Zeki 1999) and concepts are not public[51] but private (contra Fodor (2004)).

(g) Privacy of thought

In the 20th century, many philosophers pointed out the importance of the publicity of thought and meaning (cf. Wittgenstein 1953, Ryle 1949). From the point of view of the Concept Empiricist however it makes sense to stress the privacy of thought. The respective meanings are not the same in different subjects and they are not accessible to other subjects. There is no principled way of accessing the meaning of someone else's concepts.

(h) The classical definitional view of concepts

That concepts are not structured by means of necessary and sufficient conditions is now rather clear (cf. Murphy 2002). It is nonetheless interesting to consider why that many philosophers adhered to that thought that long. Anew it seems to me that we encounter here a usurpation of the theorizing about meaning by strong realist considerations with regard to objective knowledge of the world.

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[51] Or at least not public at the moment. It should not be precluded *in principle* that neuroscience will develop means to make PSS more public though it is to be pointed out that nobody really knows at the moment what this really means or how this shall look like.

Only if concepts are supposed to be realist representations of an objectively specifiable world it does make sense to speak of concepts as defined by virtue of necessary and sufficient conditions. In any other case it does not seem very plausible to let definitions play a role with regard to even classic conceptions of concepts (cf. Rosch and Mervis 1975).

(i) Context sensitivity

Explaining context sensitivity is no real problem for Concept Empiricism which is a great advantage for it over its competitors from philosophy of language and linguistics. Imagine for example a daily restaurant scene: You are ordering a hamburger at a diner (cf. Searle 1978). Now there are many problems arising if you belief that language or language-like structures do the cognitive work behind this order. It is relatively uninteresting here whether you are a proponent of literal meaning approaches or a contextualist. In both cases you are not able to *explain* how this is done if language is your model of thought and meaning. What the contextualist can do and does is demonstrating the plethora of problems which arise in any situation by means of context for language approaches to meaning. In other words, he is *describing* an effect. What he cannot achieve is to explain how language can afford all that feats. Assuming that there is something like a background is indeed no explanation at all. It is only restating the problem. But let us now take a look at the plethora of problems I am speaking of: Suppose you are ordering at a diner by saying the following words to a waiter: "I take a hamburger." For example how do you or the waiter know how big the hamburger has to be? Is it 15 cm or 5 meters in diameter? How do you or the waiter know when the burger shall be delivered? Now or in 4 days? Or may it happen, as Searle (1978) suggests, that it could follow that the burger is delivered, "encased in a cubic yard of solid lucite plastic so rigid that it takes a jack hammer to open it" (p. 216). There are indefinitely many other cases. Take for example your desire to get in your house with the key to your front door. Language alone, even if it could mean something by itself, would nevertheless be that underdetermined that it would yield the most absurd actions. Eventually you would gain access to your house but not by opening the door with the key but by cutting a hole in a window by means of a sharp edge of the key. Or maybe you would try to dig a tunnel which leads into your basement using the key as a shovel.

The problem is even much more complicated than it might seem on the first look. Especially contextualists try to answer these delicate questions with reference to some kind of relevance theory (cf. Sperber and Wilson 1986). However this does not seem to work for any systems which work (compute) with language-like structures because those systems, mainly computational ones, are notoriously encountering the frame problem. It is indeed hard to conceive of a device which works with language-like entities and does not encounter the frame problem due to its structural properties

The Concept Empiricist is in the fortunate circumstance that he can draw on PSST here as well as on DST[52] and complexity theory[53] naturally which allows for the explanation of context sensitivity by means of biological relevance and concrete mental imagery. Eventually however we should first distinguish between two versions of context sensitivity which are often confounded with each other. (1) Strong context sensitivity in the sense of long-ranging aims and the allocation of cognitive resources as well as the control of perceptual inputs and motor outputs. (2) Weak context sensitivity in the sense of that which we are confronted with in the literal meaning – contextualism debate: The sheer endless interpretability of concepts which is due to the circumstance that classic concepts encode relatively few invariant features.

PSST alone answers (2). I'm not that sure if it answers (1) without further specification. However, if it is embedded in a picture of the brain which abandons the computational metaphor and the related picture of the sense-represent-plan-move cycle (Wheeler 2005) like it is done when we adhere to ideas from complexity and dynamic systems theory in the sense of giving the brain a dynamic process ontology in which every brain state is constrained by the state space history of the previous brain states which are in causal vicinity (cf. Spivey 2007) as well from perceptual input which is determinate, but complex and itself constrained by the brains history, like in PSST, we can accommodate for (1) easily.

(j) The phenomenological and ontological nature of language

It might be objected that the assumption that language plays no important role in conceptual thought must be rejected on phenomenological grounds. Isn't the inner monologue a perva-

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[52] Dynamical Systems Theory.
[53] It is clear that the computationalist can do this too. But brains are much more plausible candidates for that than classic computational accounts (cf. Freeman 1999, Spivey 2007).

sive phenomenon of our phenomenology? Yes it is, but if we ponder about that this might be a point for imagery and not for the classical view. For what is the phenomenological nature of language in these cases? It is dynamic auditory imagery which is comparable to other dynamic cognitive processes like mental animation. Let me cite here at some length a delicate passage from Spivey (2007) to get a grasp of what I mean:

> "Humor me now and say out loud, in an appropriately chiding manner, "Spivey waxed philosophical." That sentence took two or three seconds to say, and would probably take two or three seconds for a listener to understand. However, despite it clearly being an event stretched out in time, sentences are often treated as though they are static, whole things with no temporal properties whatsoever. Theoretical linguistics regularly draw static upside-down tree structures that illustrate the grammatical branching of the noun phrase and the verb phrase of such a sentence, and then the nested branching of the verb and adverb within the verb phrase. That kind of static illustration is typically intended to be an abstractly isomorphic proxy for a representation that a person has in their brain once they've understood such a sentence. The meaning of the sentence is often treated similarly, as symbols in the head that are accessed and placed in some kind of attended processing arena that resembles all too much a Cartesian theatre [...] (p.204)."

and,

> "While a person hears a sentence, it is obviously not the case that their brain is doing nothing until the sentence is finished and then it constructs some static representation. As the sentence is unfolding in time, the listener's brain is undergoing changes in its patterns of neural activation that are significantly driven by environmental auditory input. If we describe these averaged firing rates of many neurons as locations in a neural state space, then the changes over time comprise a continuous trajectory through the state space. Thus, the understanding of a sentence is here conceived of as an event in the mind, not an object (p. 204)."

This can be read not only as a piece of dynamic neurobiology but also as a phenomenology of sentence comprehension and language processing more general. Language is always conceived of dynamically as a process over time and never instantly as a whole.

Language is phenomenologically properly perceived as related to a special modality with the related temporal phenomenology. Inner monologue, especially with regard to a language we are highly familiar with, is most often felt as auditory. The point is that language is never

conceived of or perceived as language directly, whatever this is supposed to mean, but mediated by at least one sense modality or its related mental imagery. Language isn't foundational but only accompanies thought and is therein dependent on mental imagery, i.e. it is the auditory product of the same processes which allow for conceptual thought. The pervasive nature of inner monologue might therefore rather be best explained by e.g. the more or less functionally random activation of auditory language imagery which might be owned to strong neural connections with concepts which might itself be owned to the pivotal role of communication for our success of living. This seems natural if we consider the whole evidence for non-linguistic processes marshalled here against propositional accounts of meaning and mental processing.

(k) Abstract concepts – abstract meanings

Even so you might admit that the meaning of concrete objects might be based on imagery you might be somehow sceptical how this might work for abstract concepts and their meanings (e.g. love, truth, university, etc.). It is indeed supposed that the understanding of abstract concepts and their meanings works another way than that of more concrete concepts (Barsalou et al. 2005, Barsalou and Wiemer-Hastings 2005). Nevertheless, nothing outside mental imagery gives rise to those meanings. What is different between concrete and abstract concepts is that abstract concepts are more dependent on the simulation of whole events and scenarios instead of single property simulations and that they involve more often introspection and emotion where emotion itself can be considered to be a kind of a sense modality (cf. James 1884, Prinz 2004). So let us take as a first example LOVE. LOVE might involve special feelings which are involved in special acts and relations regarding other persons or objects. Also it might involve events like people kissing, sleeping with each other, making gifts, etc. LOVE also shows in a neat way how concepts and meanings change through developmental processes like sexual maturation and experience. Your concept of LOVE is quite different in all ages of your life, depending on your bodily fitness and wellbeing as well as on your grade of maturation if we especially grant love with regard to mates a special role. As a child you might conceive of LOVE primarily in terms of parental love or care for siblings or toys. In adolescence it might be that especially sexual arousal dominates your concept of LOVE whereas in a very high age or in cases of diseases like impotence your concept of LOVE might change tremendously. You may also adapt a special version of LOVE by adhering to a cultural narrative

from novels or television. The depicted events are imagined by you and might then be part of your concept LOVE.

Another example might be UNIVERSITY (contra Ryle 1949). For someone who has never studied at a university, UNIVERSITY might be a concept which is developed relatively poorly. He might conceive of people in academic gowns, of refectories, of people reading books and lecturers giving talks. Someone however who studies or works at a university has a much richer concept of UNIVERSITY with a lot of imagery from different occasions.

Now it might be objected that a university is an institution and that this institution might be a functional entity which is not the sum of its parts and so the concept of UNIVERSITY cannot be a collection of loose mental imagery. Therefore UNIVERSITY has to be about the functional entity university[54]. My answer here is that nobody knows or understands what this is supposed to mean nor why this should be the case. Besides the plenty of behavioural evidence which states that people conceive of abstract entities concretely and differently over time, it seems to me metaphysically and phenomenologically speaking wrong to adhere to that classic abstract entity talk. Not only is it very problematic to give a satisfactory account of abstract entities that is richer as the common practice to state a discrete word and confabulate it with the entity or the concept thereof, it is even more demanding to give an account of the relation between cognitive systems or vehicles of meaning and "abstract" entities in the world. And this account should better offer something more satisfying than the classic or naturalized reference relation because both seem more grounded in magical or platonic thinking than in a proper naturalistic worldview as I will argue in the chapters on intentionality.

(l) The role of amodal connections and process structures for concepts and meaning

The pivotal role of convergence zones in the structuring of concepts states the question if it is really that fortunate to assume that amodal structures play no role in meaning. Here we need to draw a concept – vehicle distinction as well as a distinction between phenomenological and structuro-functional individuation.

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[54] This does not mean that our concept of university hasn't functional structure. What I criticize here is the very idea of an functional entity and the relations in which we can engage with it, not the idea of a functional concept.

As I mentioned in the introductory chapter of this *Magisterarbeit* Concept Empiricism is not committed to the vehicle – content distinction in the same way as its rivals. Nonetheless it is not only plausible but also necessary to draw the distinction in Concept Empiricism, too, however with strongly differing assumptions regarding the distinction.

It is plausible to draw the line between content and vehicle as the line between mental imagery which is also accessible to consciousness and the neurobiological mechanisms underlying imagery. This is not that strong a distinction as that made classically (cf. Millikan 1993, Dennett 1991) because the mental imagery is totally determined through the structure of the neurobiological mechanisms which bring it about. In classical models the vehicles that carried the content did that arbitrarily and not by means of their structure but by means of e.g. nomological covariance or because of the circumstance that they are supposed to do so[55], etc.

I believe we can now make the point that meaning is modal even when we accept the major role of convergence zones. Mental imagery is the product of the joint collaboration of feature maps and convergence zones. Feature maps are modal, convergence zones are amodal. Both together are the neurobiological vehicles of mental imagery. Mental imagery is grounded in both but what makes it imagery in the first place is the sensory re-enactment in the feature maps[56].

5.6 Concept Empiricism and intentionality – Action and experience

Till now it might seem to some reader somehow disturbing that I advocate Concept Empiricism as a model of subjective and somewhat solipsistic meaning. Wasn't exactly that considered as one of the most problematic assumptions of some of the most paradigmatic classical models? Yes and no, since what I have proposed here as subjective and solipsistic differs much from that what was proposed under that labels in the past (cf. Fodor 1980). But this is not important for now. What is important is that I believe that meaning is an internal structure

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[55] Because of the course of evolutionary history or the personal learning history of a single individual (cf. Papineau 1993).

[56] I confess that this distinction is a bit arbitrary. But this is not that problematic since I do not believe that that much depends on that distinction if we conceive of the amodal structures as convergence zones which are best described as structuring mental imagery according to principles which are functionally described in accordance with e.g. PSST and are therefore not linguistic.

which is *normally* brought about by experience[57] and is very often utilized to enable action. However it should be clear to everyone that meaning is highly decoupleable from action and that it is also possible that new concepts are created through mechanisms in the brain which lead to new emergent meanings[58]. Further, I want to preclude the possibility of innate concepts neither. Therefore it seems to me best to make here a distinction between meaning on the one side as an internal structure and intentionality as a capacity[59] which allows for action and which brings about most concepts through sensual experience and is in this sense paradigmatically external.

To state it most easily, this chapter is about how the mind connects to the world and vice versa. I will delineate a model of intentionality[60] which is a combined approach inspired by the architecture of PSS and deliberations from mechanistic philosophy of science. PSST shows how we can conceive of intentionality whereas mechanistic models justify why PSST is better than its competitors[61]. In the course of doing so I will draw attention to models of intentionality and reference from philosophy of mind and language and try to show their weaknesses.

First, intentionality is within Concept Empiricism to be seen as a kind of default position and nothing which must be brought in artificially by ad hoc assumptions in order to connect world and cognizer. Intentionality emerges within Concept Empiricism from conceptual systems being grounded in sensorimotor ones. It seems to be that we can say frankly that the senses as well as our motor systems are the most direct way of contact with the world we can get. So, every time we are encountering an entity we have a concept or are building up a concept of

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[57] But can also be brought about by innate concepts.

[58] This new emergent meanings are also in some way driven by experience in that way that experience provides the concepts of which the new concept are made of but experience is not the driving process source with regard to the emergent structure in such cases.

[59] A capacity is an effect which is of primarily psychological nature (cf. Cummins 2000).

[60] I should note here that there is a further very interesting model of intentionality which conceives of intentionality as a kind of conscious awareness towards objects the primary characteristic of which is directedness (cf. Freeman 1999, Newton 1996, Panksepp 2003). I am very sympathetic with this model and believe that it should be at the core of every understanding of intentionality. The boundaries of this *Magisterarbeit* are unfortunately very restricted and so I cannot discuss this model here. Nevertheless I would like to make a short statement here which tries to combine motor intentionality and the sense of directedness. Research on schizophrenia shows strong connections between a loss of sense of agency with regard to bodily movement and with regard to thoughts (Frith 1992). The fact that thoughts lack a sense of agency isn't sufficiently explained in forward models which regard thoughts as classically representational (cf. Walter and Spitzer 2003). If however we conceive of thought as exhibiting felt directedness towards objects which might be planned by premotor cortex, etc. than we can explain with forward models how and why thoughts might lack a sense of agency in schizophrenia. This shows nicely how different fields of research might be fructified mutually within grounded cognition and how motor intentionally can figure large in thought.

[61] It also helps to clarify at a more abstract level the explanatory structure of e.g. PSST. In other words, it makes the implicit structure explicit.

the entity encountered. And every time we want to act on the world we can do so by means of sensorimotor concepts which guide our actions towards the world. This is a simple consequence of PSS and related systems in the brain. We can say that Concept Empiricism gets intentionality for free.

What we get here is a model of intentionality that is elegantly emergentist in being explained by the structure of the body as well as the world. It therein differs strongly from classical approaches and it is here, as we will see, where one of its special philosophical strengths lies. To show this strength let me delineate why intentionality is that a big problem for classical approaches whereas it comes for free for Concept Empiricism.

In classical approaches in cognitive science as well as in philosophy intentionality does not arise as an emergent property of the entities and activities[62] of the mechanisms involved alone. Suppose a cognitive system that is modelled according to the philosophical Representational Theory of Mind (RTM). To be clear here, there is no one RTM but many different ones which however share some core tenets which I will refer to here. Suppose that the system encountered is a conceptual system that is not grounded in sensorimotor systems but is a representational system which is primarily a syntactical one in order to adhere to the computational metaphor of classical cognitivism as well as to philosophical (folk) belief-desire psychology modelled by language. With syntactical I mean here a system that has some established rules which are then applied on symbols. To get a grasp of that this system is able to do the following by means of its structure:

If g desires p

And g beliefs that she needs to bring about q in order to get p

Then g does q.

Now the idea is here that these simple logical rules can be run computationally on brains and that they are what makes up a mind. But it is utterly unsatisfying that the symbols involved here do not possess meaning at all. Something is needed to give those symbols content and this is where theories of intentionality like causal semantics, informational semantics, teleosemantics, etc. come into play.

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[62] See my chapter on mechanistic explanation for an explanation of entities and activities.

What is important to note here is that these theories are necessitated to make additional claims regarding intentionality and that intentionality does not seem to be entailed by a detailed description of the cognitive system alone.

I want to discuss here Jesse Prinz's (2002) account of intentionality because Prinz tries to remedy the most problems encountered by his predecessors and so in discussing Prinz I will discuss the more classical approaches too.

Prinz's version of the intentionality relation and intentional content looks as follows (2002, p. 251):

"X is the intentional content of C if

IC1 Xs nomologically covary with tokens of C and

IC2 an X was the incipient cause of C."

Prinz's talk of nomological covariance is a variant form of causal covariance which is within the project of naturalizing intentionality the most prominent assumption. IC2 is supposed to answer the disjunction problem where the disjunction problem is the problem that within models of causal covariance a problem is encountered that stems from high degree similarity of encountered entities that deliver the respective intentional content, but more on that later.

What seems for me problematic here are the following considerations: (1) Xs nomologically covarying with tokens of C is no actual but a dispositional property which cannot specify content in cases where X is not actually covarying, (2) the covariation relation is often not made clear, (3) it would be more plausible if intentionality were an emergent property, (4) IC1 does only seem to restate the general conception of intentionality and does not seem to explain it, (5) IC1 seems to be trivial and uninformative for causal covariation is too pervasive to be useful for an explanation, (6) an intentionality theory should influence our metaphysics and epistemology and not the other way round, (7) IC1 is primarily a representation relation but no one for action, (8) IC2 is overly ad hoc and as bad an explanation as teleofunctions, (9) it is not clear why Prinz adheres to that model at all if we consider his commitment to PSST, (10) IC1 cannot explain how thoughts are meaningful in the absence of the entities they are sup-

posed to be about, (11) IC 1 has no serious conception of learning and (12) IC1 isn't able to account for abstract entities - meanings[63].

(1) If we accept mechanistic explanations as the only acceptable ones from an epistemological as well as a metaphysical point of view we cannot allow for a lack of productive continuity[64] unless we are prepared to allow for meaning as only possible in cases of encounter with the thing it is about. It is also suspicious how that a version of content specification can handle the various forms of offline intelligence discussed above.

(2) It is often not clear what the covariation relation is. What is needed to bring that relation about? In many examples which intentionality theorists give the relation is of perceptual nature, particularly of visual nature. For example, the perceiving of a horse instantiates the HORSE concept. But how does that happen? There is no theory of the mechanisms behind these processes delivered. Therefore classic intentionality theories are often no better off than stating that there is a point p (a symbol) which is somehow covarying with some other point s in the world (an entity)[65].

(3) It also seems at least desirable if intentionality were a capacity which emerged from the parts and processes of the mental mechanisms involved together with the world instead of being brought in by further more or less causally impotent "mechanisms"[66]. Causal/nomological covariance is indeed causally efficacious if the mechanisms involved are structurally able to relate to the world, as in the case of PSST or other approaches from grounded cognition. But in classical approaches causal covariance is often not sufficient and needs to be extended by subsidiary assumptions like the one that something is evolved to represent, incipient cause, etc. This does not allow for emergence from a closed mechanism only[67].

(4) In my opinion IC1 is only restating in more general terms what is the problem of intentionality instead of delivering an explanation of it. I am not saying that IC1 and the statement of the problem of intentionality are the same but that they are very similar. Someone might

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[63] Criticism of the form that I discuss IC1 and IC2 often separately instead of in conjunction doesn't hurt my style of argumentation here. As you will easily see, a possible discussion of the conjunction of both principles does nothing to rebut my arguments and in proceeding the way I do I spare the reader much redundancy.

[64] See my chapter on mechanistic explanation for an understanding of what productive continuity is.

[65] This indeed seems to be the most abstract imagery which underlies idea of causal covariation.

[66] Indeed, what brings in intentionality isn't a mechanism at all. I can hardly guess what is supposed to play the implementational – realizing role with regard to intentionality.

[67] The mechanism is closed with regard to explanation and some kinds of experience. It is however an open system in the sense of Wilson (2002, p. 630) and in this sense open to the world.

count it as an advantage of IC1 that it states the relation between world and mind in more general and eventually naturalistic terms but (1) I do not believe that this style of redescription gets anything started and (2) that it is formulated too widely to be informative[68]. Too many things stand in the relation depicted by IC1 and so it widens the relation in a way that is not conducive for any philosophical project.

(5) IC1 is, as noted by many proponents of it themselves, somehow vulnerable to trivialization arguments. The problem is that too many things stand in the relation expressed by IC1. For example, the moon is causally covariant with a special state of the tide and the sun is causally covariant with some place of the earth illuminated at a special time, as is the well being of my arm with its not being broken, etc. etc. Now you might believe that my functioning arm represents its well being or that the moon represents the tides but this is in my opinion not only awkward to believe, if you believe like me that something like the position of moon and tide depend on our neuronal ability to construct space and that the very ideas of moon and tide are dependent on our mental imagery, etc. Therefore some theorists made an additional assumption which states that something that stands in an IC1 relation is only able to represent if it also evolved for doing so, if it were selected for that, etc.

This seems to be a very unsatisfying argument. Compare it to other cases. For example you give an explanation of digestion. Now, instead of explaining digestion by a mechanistic explanation – which means showing what it does combined and constrained mutually with giving an account of its structure – you say something about it that is that general that it has it in common with e.g. immune defence and respiration. In order then to let it differ from those processes you just state that it was not selected for the tasks carried out by immune defence or respiration because what it makes digestion is that it evolved for that. This is that bad an explanation of digestion that nobody would ever dare to give it. Indeed, according to a naturalistic reconstruction of what explanation is in the biological sciences it is not even an explanation. I believe there is no reason to treat explanation in psychology or philosophy different and there is surely no reason to be satisfied with that an argument in philosophy too[69].

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[68] Indeed I believe that it is the most significant phenomenal characteristic of the whole intentionality debate that you have this uneasy feeling of not being informed in any interesting way from the outset you deal with it.
[69] It is clear that teleo-functionalists do not claim that they deliver full-fledged theories of mental representations and their contents. As Millikan (2004) writes: "When the bare teleosemantic theory has been spent, the central task for a theory of intentional representation has not yet begun. Teleosemantic theories are piggyback theories. They must ride on more basic theories of representation, perhaps causal theories, or picture theories or informational theories, or some combination of these" (P. 66). But even if we conceive of teleo-functionalist

(6) It might be somehow justified to proceed in ethics by stating traditional positions like "thou shall not kill" and then try to justify that position in a top-down manner with the ethical postulate up and psychology and anthropology down.[70] But this order seems devastating with regard to epistemology or metaphysics. For example, it is surely not essential for anybody's wellbeing that something like "metaphysical realism is true" must be defended on any ground by imposing a schema on our theories of perception or meaning in order to let this thesis come out true.

In my opinion the order of procedure has to be turned upside-down. I believe that a theory of concepts is at the core of every other project in theoretical philosophy. It seems plausible that we start with a layout of our cognitive machinery and then develop a metaphysics and epistemology which corresponds to that machinery instead of defending metaphysical and epistemological positions which are a combination of antique anthropology and wishful thinking.

But indeed the reverse is happening in much theoretical philosophy today which may indeed be the reason why many theoretical constructs today are not that far remote from antique ones, e.g. propositions and platonic forms seem to have terrifyingly much in common. It is very important to make that point because much of the debate in philosophy of mind and language seems to be motivated by defending strong objectivism or realism or what have you. Indeed, I believe that concerns of metaphysics and epistemology are the core motivations for many assumptions in semantics which are never laid bare.

However, I do not want to be understood wrong in this connection. Questions of realism, objectivity, knowledge, etc. are of utmost importance and interest and rightfully core disciplines of philosophy. Though I have to consider that it might be unbelievably more fruitful and above all more justified to build up metaphysics and epistemology from a theory of concepts, action, perception, etc. and not doing that in the reverse order.

It might be helpful to get a grasp of what I am intending here by discussing one of the problems of the intentionality debate of high significance: the disjunction problem. It arises in cases in which different categories are disjunctively connected in a single content, that is to say when the content gets disjunctive. For example, imagine you walking down along a meadow. Suddenly you see something in the great distance which instantiates a HORSE concept in you, though it is nonetheless a cow and it does so regularly under great distance. But if

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theories as piggy-back theories they are nonetheless unsatisfying for the reasons mentioned above. The additional qualifications which they make are to be criticized for the same reasons already mentioned.

[70] In fact, I do not believe that this is the right procedure.

the thing, in this case the cow, causally covaries, as in this case, with your HORSE concept, your horse thought is about cows and at least a proponent of causal semantics is forced to modify his original definition of intentionality or so it seems. The solution Fodor chooses is the asymmetrical causal dependence assumption which roughly states that concept C which is reliably caused by b is nonetheless about c if b is in its bringing about C asymmetrically dependent on c, i.e. when e.g. b brings about C only because of its similarity to c which is the "rightful" cause of C by means of e.g. incipient cause or proper function or what have you. The idea of a rightful cause is only seldom made explicit but seems in my opinion to be the core assumption behind all these problems and is a blend of normative epistemological and metaphysical thinking.

Besides not being intelligible to me since this does not explain why something has to be about something else and not other and how it does that except with enlightened explanations of the kind that DOG relates to doginess, etc, it seems to be an ad hoc explanation which only tries to save a strong kind of realistic objectivism. There is absolutely no need for a concept to be about a special kind (whatever this is) in order to function properly. If your concept of aard-vark is regularly instantiated in contact with boars than it is so. That this might be unfortunate in some circumstances is regrettable but so might be the circumstance that I cannot jump 5 km high in other ones. Making concepts finer grained is cognitive and epistemic work and is not coming and need not come for free. The function of concepts is not to allow for correct objective representation but to enable efficient action.

The same is seen in the case of Jesse Prinz's (2002) solution to the disjunction problem. He makes assumption "IC2 an X was the incipient cause of C" additionally to his nomological covariance assumption. But this is besides being causally inefficacious like Fodor's proposal also overly ad hoc and only plausible an assumption if one tries to incorporate with all means a realistic moment in one's theory.

 (7) Even if it should be slightly imaginable that offline cognition might proceed by merely representing via intentional contents it is indeed difficult to do so for action. How do intentional contents help in bringing about actions? This indeed is regularly perceived as the major flaw of classic theories and many philosophers believe that we need to augment our models to implement online thought.

(8) IC2 is actually also an ad hoc explanation as for example a teleo-functionalist is one. But it seems to me even worse. If we have a structured or an unstructured representation at hand,

how is something like an incipient cause specifying content? This problem is somehow similar to one which is encountered by a causal theory of naming (cf. Kripke 1972). An incipient cause, be it a first being brought about or a baptizing act, is causally inefficacious as long as it has no possibility of productive continuity within a mechanism. This is inter alia how causal-historical explanations from evolutionary biology differ from those presented here by Prinz or Kripke. The former exhibit continuous productivity through genes whereas the latter do not exhibit it at all.[71]

(9) It is of great interest here that Jesse Prinz beliefs that intentional content is a desideratum of every theory of concepts and that therefore his version of Concept Empiricism has in order to be a proper theory of concepts to exhibit precisely this. But this is definitely at odds with his theory of concepts which is modelled according to PSST. For what is intentional content and how does it relate to something like a complex structural concept approach which can be seen as primarily motivated by grounding meaning in quasi-perceptual systems. What is it that intentional content does in this theory? I believe it is an eclectic move of Prinz and an incoherent one in addition to it.

It is precisely the quintessence of Concept Empiricism that we need not adhere to causal semantics in order to explain meaning as well as referential relations to the world. This is done by a mapping of concepts with precepts as I will argue later. Plausible reasons why Prinz might adhere to intentional content nonetheless are assumption about realism which he states at the beginning of his (2002) and a misconception of the revisionist potential of PSST as it is revealed in Boroditsky and Prinz (2008):

There they make indeed a commitment to the essential quasi-perceptual nature of the content of our thoughts which also nicely states another advantage of PSS over language-like feature lists or summary representations:

> "But consider such feature lists a bit more closely. Imagine that you do not already know what ducks are and are told that ducks have feet, and a bill, and feathers, and can swim. How would you know that the feet on a duck were not like the feet inside your shoes, or the feet on a pig or a dog or a bathtub? If you do not already know what duck feet look like, simply knowing that ducks have feet would leave open infinite possibilities. Surely ducks do not just have feet, they have *duck* feet. Further, how would you

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[71] And even then the former is not enough for the purpose at hand, as we have seen. They deliver nonetheless an interesting historical explanation how or why those things evolved.

know where on a duck the feet go? And how many feet? Beyond knowing that ducks have duck feet, you also need to know that they are in number appropriate for a duck and attached like on a duck. And clearly ducks do not just have feathers, they have *duck* feathers – relatively small and smooth and in a particular duck feather shape, attached like on a duck. And when ducks swim, they do not just swim, they swim like ducks swim. They do not do the backstroke, for example. What seemed like a sensible list of features turns out to be vacuous unless one already knows what ducks are like. Every feature in the list must be grounded in perceptual information that an individual already has about ducks, or else it would be useless" (Boroditsky and Prinz 2008, p. 100-101, italics theirs).

and,

"The perceptual details specific to duck feet and feathers and manners of motion are not simply extra information, they are the essential content or our knowledge that allows us to distinguish a duck from a Las Vegas show girl, for example, who also likely has feet and feathers and can swim" (Boroditsky and Prinz 2008, p. 101).

This seems very reasonable if we consider PSST. But then both cite two[72] alleged limitations to sensorimotor grounding which indicate that the essence of PSST was not grasped by both of them:

(a) Their first argument is that it is for some large categories hard to keep track of which are its members if they are spanned perceptually widely (e.g. category: vehicle; members: car, hang glider). It seems clear what they are going for here. Car is probably a feature-technically typical member, whereas hang glider is not. What keeps the category together is function.

Now let us first consider if this argument is anyway well deliberated. What I have not already stated may be some unfortunate confabulation in this argument of super ordinate concepts and categories. There is no reason to believe that a super-ordinate concept like VEHICLE represents a category in the world. Or is VEHICLE supposed to be a natural kind: "For example, consider some super-ordinate level concepts, such as vehicle. [...] To keep track of the fact that these belong in the same category as cars, trucks and boats may be difficult when we are restricted to perceptual features alone" (p.104). It seems rather unfortunate to make a natural

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[72] In fact they cite more than two but the both I discuss here seem to me to be the best of those they bring forth.

kind of VEHICLE even if you are a realist. So it might be more appropriate to conceive of VEHICLE as a concept that is at least partly structured due to human interests.

But this might not be that a serious deficit and merely owed to an unfortunate use of language. What is more serious a problem indeed is the point that PSST or alike should not be able to deal with functions. And how is language supposed to do that? Now suppose Boroditsky and Prinz might answer here that language does this by giving the concept a functional role, i.e. vehicles are things we drive with, vehicles are things we use for transportation, etc. But how makes language these sentences intelligible? This is exactly the problem we are talking about the whole time. What makes such sentences intelligible is the mental imagery underlying them. It is also mental animation which allows for an understanding of the meanings of the events in these sentences. Language does not explain anything here. It is only the phenomenological noise you cannot get rid of which often suggests the nominalistic feeling that words are the essences of things.

Also, one of the most natural versions of the idea of function emerges from the affordances which are compound of your embodiment and your wishes to act on the environment.

(b) Their second argument is, dependent on how you interpret it, somehow more compelling. It regards the processing costs of cognition and the fact that some concepts may depend on behavioural scripts which won't be retrieved any time you need to process the concept.

On one side it might be correct here to give a role to language as I did already above, namely in cases of superficial processing. However it should be minded that meaning is nonetheless totally reserved for PSS and not for language. On the other side most concepts as they are conceived of in PSST are complex and there is no reason to believe that in many cases language does play a role in conceptual processing. That this is possible and reflected in behaviour is one of the core ideas of PSST and properly expressed in context dependent or situational processing on the fly, i.e. that concepts are always instantiated by context specific online simulations in working memory. Another objection to Boroditsky and Prinz might be that the abstract concepts like DEMOCRACY, which they discuss, are in many people conceptually less complex than most concrete concepts like APPLE. Further, assumptions about the brain's possibilities for conceptual processing, which are most often inspired by computers (cf. Cherniak 1986) might be a bit adventurous if we mind the huge differences of computers and brains with regard to their working properties (cf. Edelman 1998).

(10) A further problem, which Fodor (1990b) calls the "really terrible problem", is that classical theories cannot explain thinking about things absent, if content is supposed to be necessary for thinking, as it most often surely is. This is bitter, especially if we consider that even if classic theories are not supposed to handle cases of online intelligence, they are most often supposed to deal with offline intelligence relatively well (cf. Clark and Grush 1999, Wheeler 2005). Why the problem emerges seems to be clear. If nothing is there to cause a concept as in the case of thought about absent things than there is no content in these cases and in this sense no thought whatsoever.

(11) With this point could also have been dealt with in the chapter on meaning and understanding but I decided to discuss it here for it is especially nicely illustrated against the background of a causal theory of meaning or intentionality. Learning seems often to be a very demanding activity, as everybody might confirm from her own experience. It seems to be very tightly bound to understanding in the way I am talking about in the whole course of this *Magisterarbeit*. For example – I learn the whole evening about signal transmission in the brain and laborious hours later I have enhanced my understanding of neurotransmitters. I now conceive of the process of signal transmission as little differently colored and shaped spheres which migrate over a cleft only in order to take in their place in a mould which is corresponding to their shapes. If I am asked what a neurotransmitter is the first what comes to my mind is this – this is how I conceive of neurotransmitters and this is how I understand what a neurotransmitter is. When I encounter some complex chemical formula in an essay describing properties of neurotransmitters I can only make sense of it when I am also activating my dynamic imagery described above. Moreover, take an example from philosophy, e.g. reference: After a longer course of unconscious learning processes I ended up with an understanding of reference as some arrows emitting from something to a word or vice versa.

But how do I learn according to a theory of meaning or intentionality which is primarily based on causal covariance. Especially, how am I able to learn something about neurotransmitters though I have never seen or heard a single neurotransmitter? Eventually I have a causal relation to the neurotransmitter which allows me to gain rich neurotransmitter meaning because the causal relation which is given in those who have seen them via a microscope was conveyed by those researchers to the ink which gives rise to the words and illustrations in my neurobiology textbook by means of an baptizing act of the kind "Hereby I declare that you, ink, now bear causal relation so and so." And when I am lucky enough that the causal relation wasn't lost during transportation to the book store or was accidentally vacuumed during

cleaning my book shelf, it might have reached my brain via visual relations of an unspecified kind.

Moreover, how does this approach account for the circumstance that we do not instantaneously learn by means of a correct causal covariance relation? For example – if I haven't understood what a gene is – supposed I could take a look at it – is this due to my inability to establish a causal covariation relation proper? Eventually we should educate children differently in school by buying better laser pointers for teachers so that they are able to teach more effectively by allowing for finer grained causal covariance relations by means of better pointing.

(12) Finally, IC1 cannot explain how we conceive of abstract entities[73]. This is again an amusing conjuncture because a point of critique which is very often marshaled against frameworks like Concept Empiricism is that they eventually might account for concrete entities but that it is difficult to understand how they allow for understanding the meaning of abstract entities. If we account for abstract entities in a way different from that proposed by me earlier the opposite of which would lead to a collapse of causal covariance theories anyway, than it is very hard to imagine how we establish causal covariance between a concept and an abstract entity – for an abstract entity is according to a more classic view never reducible to the sum of its parts (cf. Ryle 1949). To make this more graspable imagine how you might have a concept bearing the meaning UNIVERSITY according to a causal covariance view. What is the entity in this case to which you have a causal covariance relation? A special building on the campus? The bureau of the dean? It is obvious that causal covariance cannot account for abstract entities like they are normally conceived of.

This list of 12 points can be certainly continued. I hope nonetheless that these 12 points alone have given a feel of the deficiency of the approaches which are commonly taken when philosophers want to dealt with intentionality[74].

5.6.1 Really naturalized intentionality for a non-magical world view

Now it might be time to expand on my own conception of intentionality. First and foremost I do not see the necessity to let concepts refer to categories in the world and thereby establish

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[73] This point is somehow related to point (10).
[74] Or at least if they want to deal with intentionality in the Analytic tradition style.

conceptual meaning. It might be more in accordance with PSST to let meaning be constructed by the brain:

> "[…] categorization is embodied—given by our interactions, not just by objective properties of objects in the world, as a long philosophical tradition had assumed. Without us - without the way we sit and the way we form images - the wide range of objects we have called "chairs" do not form a category. A simple sentence like "Some chairs are green" is not true of the world independent of us, since there are neither chairs nor green things independent of us. It is, of course, true relative to our body-based understanding of the world. Our concepts must also be characterized relative to such a body-based understanding" (Gallese and Lakoff 2005, p. 12[)].

This is reflecting my remarks on the subjectivity of meaning made above. It is nonetheless clear that in many cases the concepts engage with things in the world. The world however does not intrinsically bear meaning or content in the form of categories. It is totally sufficient to assume out there is something like things-in-themselves.

It is also important to specify the relation more properly with regard to internal processes. In classic approaches we often had a one way relation only. In Concept Empiricism this relation has at least three places at a coarse grained level of analysis. There is a relation between a concept and a percept and a percept and the world.

To illustrate this imagine that you have attentional visual contact with the world at a specific prolonged moment in time. You are perceiving what is presented to you as a tree by the senses and the respective areas in the brain and which is also conceptualized as TREE because of previous contact with it. Now what makes your believe that there is a tree in front of you about that thing presented to you as a tree. It seems to be a mapping between the concept and the percept with respect to schematic aspects of the concept and the actual physical relation between your sensory system which bring about the percept and the thing which is presented to you perceptually. What we have here is a concrete version of intentionality which is continually productive because there are no parts of the whole system, which in that case encompasses your body and the world, which are not connected through continuous operations on them.

This model without alteration also allows for handling truth. Your believe that there is a tree in front of you is true if what you have so and so conceptualized as TREE is presented to you by the senses in virtue of standing in front of you and if a mapping between the respective

schematic features is successful. It is clear that this cannot be the entire story for what is also needed is a model of the representation of space and time. But this is unfortunately beyond my capacities here. It is nonetheless the case that the model above is within its confines a neat naturalistic approach at truth and truth-makers. Within this naturalistic framework we have plenty of truth-makers: For example "the cat is on the mat" can be true if e.g. a specific spatial relation holds between the cat and the mat which is true with respect to e.g. an ego-centric spatial framework or if cat or mat are in respective ways corresponding to CAT or MAT via the percept cat or mat.

My approach can be seen partly as a resemblance account to intentionality and truth. Partly because the relation does not pertain for a resemblance between something in the world and a concept but between a concept and a percept. As already mentioned, the relation between the percept and the things-in-themselves can be described in physical terms via the entities involved like photons or sound waves, which ultimately grounds experience in the world, but this relation description has to be quietistic with regard to nature of the entities. It is clear that photons or sound waves are not natural kinds but what underlies them are of course things-in-themselves too. But this is not important as long as we have a mode of description which shows that there are experimentally manipulable entities which engage in relations between cognitive systems and other entities.

The concept and the percept resemble each other if they have some degree of fit between schematic features which are in both cases implemented in feature maps. Resemblance should here not be seen as reflected in deliberate and conscious estimates of resemblance but as a subpersonal processes which is determined by means of an in every case totally neuronally specified mapping process between the schematic feature map properties of an in a special instance related percept and concept and where the resemblance between the specific percept and concept is judged by neurological statistical processes only. This yields that resemblance is here seen as a cognitive process which is determinate through pattern mapping and which also gives a cognitive theory of resemblance.

This makes this version of intentionality through resemblance not vulnerable to the most classic argument against resemblance theories of intentionality or representation: According to this argument resemblance is ubiquitous. Everything resembles everything (cf. Goodman 1954). For example, a sand corn in China resembles a polar bear in the Arctic in instantiating the property of sometimes being here and sometimes being there in an unspecified frame of time, etc, etc. This is according to my view of resemblance not the case. Resemblance as we

need it for intentionality and most cognitive processing is a phenomenon at the subpersonal level totally determined in every case by means of a statistical mapping between a percept and a concept where the respective feature maps of both deliver the grade of statistical match. However it might be nonetheless useful to make here some comments on more classical accounts to resemblance. If we concentrate on the sand corn – polar bear example it seems anew clear that resemblance is nothing in the world independent of cognitive agents. If we make a resemblance judgment which is at the personal level than we need mental imagery as well as representations of space and time in order to make it, since the individuation of salient features in the world is dependent on the nervous system. Another cognitive agent with a different brain would eventually have a perceptual system that would lead to a different individuation where there were no sand corn but only something which we have no imagination of. Moreover, for the spatial representation of here and there we need a special spatial schema which is dependent on our brain too. For example we imagine and perceive space 3-dimensionally because the structure of delta-neurons sets our space 3-dimensionally (cf. O'Keefe 1993). So, even this deliberate and personal level resemblance judgment is dependent on the structure of our cognitive system.

It might now be objected that resemblance like I conceive of at the personal and the subpersonal level are different and that it might not be appropriate to count them as the same. On this however does not depend much. You might call that what I identified at the subpersonal level resemblance$_1$ whereas that what is a encountered at the personal level resemblance$_2$. Then I have developed a resemblance$_1$ theory of intentionality here, but not a resemblance$_2$ theory. And when this resemblance$_1$ theory of intentionality has not much in common with more classic resemblance$_2$ theories of intentionality: Just as well! I do not make here a claim about words or historic succession.

Another fact of importance is that the relation between the world and the mind delineated here is different from the classic reference relation in that it is a concrete relation which means that it obtains in cases of direct sensual contact only. There are no magical connections between mind and world of the kind that some thought bears a relation to the world in offline thinking let alone as dispositional thought. This entails that in cases where no direct contact exists between a specific object and the mind there is no intentionality. For example if I now ponder about Alpha Centauri and have no contact to visual contact to it by means of a telescope it does not make sense to say that my thoughts are in contact with it. There is no reference relation in this case between me or a thought of mine and Alpha Centauri.

This is an important point which is especially directed against any theory which advocates classic semantic properties. What can it possibly mean that my thoughts are in contact with something in the world like it is presumed by those theories? How is this done? How is my WATER concept really about H_2O though I have never heard anything about chemistry? What are the parts and processes which are productively continuous that allow for something like that a connection? Is there an arrow like relation between these things and from where does this arrow commence? And not less mysterious, how is it that something like water is actually semantically determined through H_2O, a structure which is only intelligible from the background of model based and analogical reasoning developed in the natural sciences? How is possible that this should help individuate my thoughts about water? Eventually by means of reference rays?

5.6.2 Intensional Contexts

Before I am going to discuss the ontology of mental states involved here I would like to discuss one especially notorious example from classic philosophy of language with regard to intentionality: That intentional sentences are intensional (cf. Chisholm 1957):

For example:

(1) X believes that Berlin is one of the largest cities in Germany.

(2) X believes that the city in which the Brandenburger Tor stands is one of the largest cities in Germany.

Both sentences are supposed to be intentional for both are expressing propositional attitudes, in this case "I believe". The propositional content of both sentences is supposed to be influenced by that circumstance for it is argued that without the propositional attitude both sentences were interchangeable because both are coextensional[75]. However, in the case of that intentional attitude both sentences are in an intensional context and are not interchangeable. The intension (cf. Carnap 1947) of both sentences is different and it cannot be ascribed to X that he believes that both sentences have the same referent.

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[75] "Berlin" and "the city in which the Brandenburger Tor stands" are supposed to refer to the same entity.

What I now want to argue for is that this conception is wrong. According to the Concept Empiricist understanding of intentionality there is nothing like a reference relation which objectively is a property of a sentence or a proposition. It also does not seem to make sense to speak of sentences as if they could carry meaning or any other semantic property by themselves as is suggested by the idea delineated above. According to the conception of meaning as it is developed here it is only sensible to conceive of sentences if they are supposed to be meaningful as processed by the cognitive system and hence be intentional.

For example,

(3) Berlin is one of the largest cities in Germany.

(4) The city in which the Brandenburger Tor stands is one of the largest cities in Germany.

might be better conceived of as,

(5) X knows that Berlin is one of the largest cities in Germany.

(6) X knows that the city in which the Brandenburger Tor stands is one of the largest cities in Germany.

Sentences are not "co-intentional" or true by themselves but only with regard to a cognitive system that insanities them. In the case of (3) and (4) the interchangeability is due to the abstract knowledge which is maybe related to social sources only. But the case of Berlin does not really fit with the idea of concrete intentionality as developed above. It might make sense to talk of "co-intentionality" only in cases where concrete intentionality is possible like in:

(7) X knows[76] that bananas are tasty.

(8) X knows that the yellow fruit which is of crooked form is tasty.

And even here it might be problematic to speak of real co-intentionality for what is here converging are two descriptions in a language whereas the meanings behind the sentences are the same, e.g. in both cases an image of a banana. It might be useful to speak of something as exhibiting co-intentionality only where someone has strongly differing meanings that are not bound to one concept and where a relation of identity is only brought in play by abstract

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[76] That knowing is not a propositional attitude alone but has epistemic status is no problem for my account. First, epistemic status in this case might be intrinsic and not dependent on social attribution and second, the intrinsic epistemic status of the propositional attitude illustrates nicely that normal veridical sentences are always dependent on a kind of hidden intentional entity. The latter is exactly what I want to show here.

model based reasoning like in the case of chemistry. In many other contexts the thing called coreferentiality is eventually more a social procedure of relating different linguistic labels.

5.7 Concept Empiricism and the ontology of mental states

Concept Empiricism can be seen as a claim about the ontology of mental states too. It is highly different from Functionalism in that it bounds contents to their vehicles and thereby grounds mental states in the sensorimotor systems of the brain. But it is also different from classic identity theory in that it does not merely state identities between mental states and sensorimotor states. Concept Empiricism seems to fit nicely in the scheme of the heuristic identity theory and mechanistic explanations more generally.

5.7.1 Mechanistic Explanations and Heuristic Identity Theory

Mechanistic explanation (cf. Bechtel 2008, Craver 2007, Machamer et al. 2000, Wimsatt 2006) as a model from philosophy of science together with the Heuristic Identity Theory (cf. Bechtel 2008, Bechtel and McCauley 1999) deliver a straightforward model of an ontology of mental states. As an ontological project it is justified by something like naturalistic reconstruction (cf. Stich 1996) which considers those ontological commitments as justified which are derived from our best sciences. Before I am going to discuss both conceptions directly I will discuss multiple realizability at some length in order to resolve some of the doubts which might be entertained against a project of the kind delineated here.

5.7.2 Arguments against multiple realizability

Arguments from multiple realizability are classically seen as the strongest defenders and motivating principles of non-reductive materialism. Therefore it is necessary to hunt them down. This is everything else as a desperate endeavour as it might have been during the heyday of Functionalism. Many authors criticize multiple realizability relentlessly and as I will show

with much cogency (cf. Polger 2004, Bickle 2003, Bechtel 2008, Bechtel and Mundale 1999, Shapiro 2004).

To show the flawed reasoning behind multiple realizability assumptions it might be convenient to demonstrate the shortcomings with regard to two classic example delivered by Fodor (1974) and Putnam (1967).

Fodor tries to make a case for multiple realizability and therewith for Functionalism by demonstrating that money is best described functionally and as multiple realizable instead of structurally, i.e. by means of the material realizers of money. This seems very reasonable because money is indeed dependent on different means like shells, bills, credit cards and whatsoever and it is surely more interesting to explain money by means of what you can do with it instead of explaining it with regard to what it is made of, e.g. shells.

Putnam's argument is more relying on your sympathy for animals other than humans and their seemingly plausible functional susceptibility to pain. Putnam argues that it is chauvinistic to restrict ascriptions of pain to humans only and that it is most plausible to assume that other animals like birds or octopuses suffer pain too.

Let us begin with Fodor's argument. Besides being initially intuitive it suffers from the circumstance that it ignores that money may get its function and meaning from human purposes and not by broader functional relations. What I mean with this is that money may not be reducible to the means of payment but to concepts in people's brains. This is a general fact I deem plausible with regard to entities of social ontology (cf. Searle 1995). Money is only money because people make it to what it is and this is done by the meaning generating systems of individual humans. There is no collective mind which represents MONEY, but only individual minds which constitute money through similar conceptualization and respective action.

Now, surely someone could object that especially these mental states which constitute money are functional states. But here kicks in a plethora of objections against this as well as the grade of plausibility you attribute to the previous considerations stemming from Concept Empiricism. Besides the mentioned evidence from grounded cognition there are points of critique which are especially responsive to the claims made about multiple realizability. The eventually strongest counterargument to multiple realizability is that which takes the grains of analysis seriously (cf. Bechtel 2008, Bechtel and Mundale 1999):

"[...] researchers have employed different grains of analysis in identifying psychological states and brain states, using a coarse grain to identify psychological states and a fine grain to differentiate brain states. Having invoked different grains, it is relatively easy to make a case for multiple realization. But if the grain size is kept constant, then the claim that psychological states are in fact multiply realized looks far less plausible. One can adapt either a coarse or a fine grain, but as long as one uses a comparable grain on both the brain and mind side, the mapping between them will be correspondingly systematic" (cf. Bechtel and Mundale 1999, p. 202).

This can be exemplified in the case of the Fodor and Putnam examples respectively. Though I am inclined in the case of the Fodor example to ascribe the most interesting features of money to human psychology it is nonetheless interesting to apply the fineness of grain argument against Fodor's analysis of the means of payment. For it seems clear that when we refine the grain of argument that e.g. shells and e-cash respectively allow for very different kinds of economy. For example it does not seem plausible to belief that modern economy like it is instantiated in stock trading would be possible if shells were the means of payment. Only e-cash seems to allow for the huge amounts of money to move easily between the continents in an appropriate time. What I want to say here is that the realizer matters much and has intrinsic structural properties which are not easily multiple realizable.

This kind of argument can be brought force against Putnam too. At eventually the level of coarsest grain of analysis it might be plausible to see commonalities between the respective mental states like pain or hunger in humans, birds or octopuses. But at a finer grained level of analysis we see immediately massive differences between these animals even at the behavioural level or at least it seems quite difficult to comprehend similarities between the pain behaviour of birds and humans, not to mention crocodiles or insects. What might allow for an ascription of pain states or events to other animals might be evolutionary considerations with regard to the function of pain in combination with studies of homologue structures in the nervous systems of the respective animals.

A further problem might be to assume that mental states are discrete and the same over the course of time. Presumably no mental state or event is identical over time. Our ascriptions of mental states are made discrete by similarities among that mental states or events. But a neu-

rodynamic perspective suggests that there is nothing like an identical mental state or event over time even within a single cognitive system itself[77].

Another important counterargument is developed by Shaprio (2004). Shapiro delineates the massive biological constraints which make multiple realizability implausible an idea. He elucidates this using the example of vision. For example, the topological organization of parts of the visual cortex is explained by Shaprio by the constraints which follow from early evolutionary structures as well as from the laws of conductivity of cables which are applicable to the neurons in the brain too. There is a plethora of further examples which show how specific modes of human vision are bound to the mechanisms that underlie it. Only if vision is individuated most coarse grained then it happens that these specific features of human vision vanish. If we mind however the reports of impairments of vision as they are exhibited in hemineglect, simultan agnosia (cf. Robertson 2003), optic ataxia, etc. which reflect connections to action and other very special visual features in especially human vision as well, as do the special impairments of blindsight (cf. Weiskrantz 1990) it seems more and more clear that higher level phenomena are massively constrained by what underlies them in very specific structural ways[78].

Considerations regarding constraints are not as conclusive as the argument from finer grain because the former might not totally exclude the exhibition of some mental states to be very similar at the functional level though they might be realized differently[79]. But as Bechtel (2008) states:

> "Although numerous alternative designs may be possible for relatively simple machines, such as a corkscrew, when the machines get more complicated and the demands on how they function grow, the number of alternative designs seems to drop quickly. For example, a large number of highly inventive designs for manual typewriters were developed before settling on the one that became common by the first decades of the twentieth century. Even though some of these designs went into commercial production,

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[77] We do not need to widen the boundaries of the dynamic system which describes the cognitive system with a massive amount of environmental variables in order to make that claim true. Even if the cognitive system is confined to the boundaries of the respective animal's brain it is unlikely that the system will be structurally in an identical state which is not only owed to the circumstance that the time variable is every time different.

[78] Only a most primitive picture of vision which accepts a unitary retinal interpretation of vision is in accord with intuitions from multiple realizability with regard to vision.

[79] However, these metaphysical or logical possibility arguments are often only based on ignorance of empirical knowledge (complex models which combine and constrain different levels mechanistically) and are therefore awfully vulgar. In addition to it, logical possibility arguments are in my opinion with regard to their ontological implications as interesting as skeptical considerations with regard to concerns epistemological, i.e. not at all.

most exhibited performance shortcomings that led them to be discarded. There may simply not be as many workable designs as philosophers envisage from their armchairs" (p. 141).

A further point which should be taken note of is that classic multiple realizability theorists restricted the functional analysis unjustifiable to the behavioural level which often led to a kind of tacit equation between behavioural and functional descriptions. There is however no reason for this special role of the behavioural level and the neglect of inner processes, might they be neuronal or hormonal or whatever. This seems to me to be a strong case against Functionalism and multiple realizability which is somehow acknowledged in microfunctionalism (Clark 1989, 1993) which then yields in return a relaxation of the related content-vehicle distinction.

5.7.3 Mechanistic explanation

Let us now focus on mechanistic explanation. Though mechanistic explanation is originally a model of good[80] explanation in the biological and behavioural sciences it has also plenty of implications for the debate regarding the ontology of mental states which are additionally very different from what is on offer traditionally:

"Mechanistic explanation, in seeking to explain the behaviour of a mechanism in terms of the operations of its parts, is committed to a form of reduction. But mechanistic reduction, as I will argue in this chapter, is Janus-faced. As William Wimsatt (1976a) proposes, it is possible to be both a reductionist and an emergentist" (Bechtel 2008, p. 129).

It is now necessary to show what is meant with mechanistic explanation. First, the entities with which mechanistic explanations deal are not data, but *phenomena*, where phenomena are singular or repeatable occurrences in the world (Bogen and Woodward 1988). Second, mechanisms are composed of parts upon which, third, operations are performed: "By parts I designate the structural components of a mechanism whereas by operations I refer to processes or changes involving the parts" (Bechtel 2008, p. 14). Fourth, the interplay between the operations is the organization of the system. In order to identify parts and operations it is nec-

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[80] Good in the sense of epistemologically demanding.

essary that mechanisms are decomposed structurally and functionally at different levels. This is how Bechtel (2008) conceives of mechanisms and mechanistic explanations.

An alternative conceptualization which is nevertheless the same in spirit comes from Machamer et al. (2000): "Mechanisms are entities and activities organized such that they are productive of regular changes from start or set-up to finish or termination conditions" (p. 3). In this model entities are the vehicles of properties and activities the producers of change. It is stressed here from the very beginning that productive continuity is a feature which every good theory has to exhibit:

"Complete descriptions of mechanisms exhibit productive continuity without gaps from the set up to termination conditions. Productive continuities are what make the connections between stages intelligible. If a mechanism is represented schematically by A→B→C, then the continuity lies in the arrows and their explication is in terms of the activities that the arrows represent. A missing arrow, namely, the inability to specify an activity, leaves an explanatory gap in the productive continuity of the mechanism" (Machamer et al. 2000, p. 3).

Conceptual systems as I conceive of in this *Magisterarbeit* are properly described as mechanisms, indeed as very complicated mechanisms[81]. Inter-level explanations, i.e. explanations which span different modes of explanation which are bound by a phenomenon of interest, are applied to PSS and related systems which helps to bring functional-phenomenological-behavioural explanations together with biological-structural ones. This indeed seems to be the core advantage of mechanistic explanations which brings us to the reductive or eliminative relations which are yielded by that kind of an approach.

As Machamer, Darden and Craver write:

"Theory change in neuroscience and molecular biology is most accurately characterized in terms of the gradual and piecemeal construction, evaluation and revision of multi-level mechanism schemata...[...]...Elimination or replacement should be understood in terms of the reconceptualization or abandonment of the phenomenon to be explained, of a proposed mechanism schemata, or of its purported components. This contrasts with the static two-place relations between different theories (or levels) and with the case of logical deduction" (p. 23).

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[81] For a similar view see Bechtel (2008, p. 195-200).

This is indeed very illuminating a passage. Mechanist explanations, in their being inter-level based, differ from classical approaches in that that they do not assume more or less unrelated theories at different levels whose vocabulary cannot be easily translated into one another. To the contrary, what they assume is that single phenomena are explained at different levels instead of different levels individuating different phenomena; as Wimsatt (2006) states: "Reductive explanations are driven by referential identities [...] or localizations [...] – not by theoretical similarities" (p. 450), where those inter-level reductions are part of a *single theory only* [my emphasis]. Thereby the respective phenomena are in "piecemeal" fashion refined by bringing the different levels of explanation together. This is indeed highly compatible with the picture of meaning which was developed here. Property simulators which include biological models as well as behavioural ones of perceptually individuated phenomena are mutually constraining each other in the course of a refinement of one's knowledge. Here the referential relations are set by the perceptual phenomenon via concrete or derived intentionality[82] and not by alleged semantic referential relations which individuate higher or lower level phenomena. It might be allowed to infer from this that elimination or reduction are everyday cognitive processes which are to be expected from dynamic knowledge structures like PSS.

As the latter might indicate we can conceive of an ontology of mental states as constructed around the phenomena of our perception[83]. So the here proposed model states that mental entities are complex multi-level mechanisms. For example, a perceptual state x is the parts, operations and the organization among them at a phenomenological, functional and structural level. This might not sound very parsimonious from an ontological point of view but it is in my opinion the best model we have of mental states since it incorporates how we can ultimately conceive of things-in-themselves against the background of our cognitive embodiment.

A question which is not that easily answered is, how we differ between mental states and non-mental states. But this is a problem each account in the field has[84]. This might be due to the circumstance that there is no real definition of cognition which is more informative than stating that cognition is a combination of computation and information processing (cf. Adams and Aizawa 2008). Besides being uninformative this definition suffers from widening the scope of cognition to a lot of entities which we would normally not conceive of as mental.

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[82] In the sense of derived from concrete intentionality and not in the usual sense found in the literature.

[83] I will examine a bit later in the text if we can speak here of ontology any more or if we should embrace the conceptual framework of phenomenology.

[84] Without eventually a Cartesianism regarding mental states which categorizes all phenomena which intuitively seem to be mental as a res cogitans.

Therefore it might be due to future research to give embodied definitions of cognition which might maybe primarily defined over perception, motor processes and mental imagery.

But let us come back to our core concern: If we conceive of that as a model of reduction it might now be adequate to state how nonetheless emergence fits in this picture. If we conceive of emergence as Bechtel (2008) does we seem to have no problem at all: "Emergence, as I use the term here, simply recognizes that whole systems exhibit behaviors that go beyond the behaviors of their parts" (p. 129). Or consider Wimsatt (2006) who conceives of emergence as the opposite of aggregativity where aggregativity can be seen as the classic claim that the whole is nothing more than the sum of its parts. This view of emergence is compatible with the reductionism proposed here and is exhibited in many complex systems as PSS.

What is also important to know about mechanistic explanations is that they do not explain via laws. Indeed, this might be seen as a distinctive criterion of mechanistic explanations compared to models used to explain the phenomena of interest for e.g. particle physics (cf. Cummins 2000). Laws are within the vicinity of behavioural sciences more comparable to descriptions of effects or capacities like the McGurk effect. They have a different explanatory status from that of mechanistic explanations in that they only state regularities like in the case of the McGurk effect, but they do not explain why it occurs.

A few remarks are in order regarding the identities involved by the reductions made here. We can conceive of them as heuristic identities according to Heuristic Identity Theory (cf. McCauley and Bechtel 1999, Bechtel 2008). They are very different in spirit from the classic understanding of identity like it is proposed by Leibnitz as the following quote shows:

> "According to HIT, psycho-neural identities are not the conclusions of scientific research but the premises. The logic behind their use looks to the converse of Leibniz's law. Instead of appealing to the identity of indiscernibles, this strategy exploits the indiscernibility of identicals. What we learn about an entity or process under one description should apply to it under its other descriptions. Scientists do not advocate hypothetical identities because the two characterizations currently mirror one another perfectly. On the contrary, they advance them precisely because they do not!" (McCauley and Bechtel 1999, p. 753).

The identity is here delivered by e.g. phenomena as points of fixation on which other descriptions converge. The phenomena might be refined in this process and be therefore not stable

points of fixation but be in flux. This is a dynamic which is reflected in the underlying conceptual systems as well.

5.7.4 Phenomenological considerations

The account of the ontology of mental states delivered above is not without its problems. Its rightful commitment to phenomena might entail that we cannot really speak of an ontology of mental states anymore. And indeed, I am more and more convinced that it might be fruitful to secede from ontological commitments or at least from an ontology of mental states as we know them from the discussion in philosophy of mind. It might be that the project of an ontology of mental states is not compatible with the Concept Empiricist view developed here and its conception of understanding, since it seems clear that we cannot really understand e.g. the mind without a phenomenal, a functional and a structural perspective on it – this reflects properly the practice in the sciences which ultimately motivated the development of the mechanistic explanation framework.

An ontology of mental states seems also committed – at least in its interesting sense – to a realist conception of meaning. Indeed, the whole considerations made regarding intentionality within the classic paradigm seem to justify a realist ontology and nothing else. However, as was shown, this picture does not seem to make sense. Understanding, as it was developed here, is necessarily multi-level and always phenomenological. A perceptual, non-referential theory of meaning does not seem to be compatible with a view that allows for a third-person "scientific" ontology which is made possible by transcending human embodied cognition by means of reference relations which are as scientific as the holy spirit and animism. Every scientist and philosopher who takes embodiment seriously, is necessarily committed to a kind of antirealism or embodied realism which does not seem compatible with the project of a classic ontology if classic ontology is understood as the project of making assumptions about general entity classes and structures which are independent from human cognition, instead of a project like a neuro-ontology which is interested in how cognitive systems project an ontology or ontologies on the world (cf. Gallese and Metzinger 2003).

How well does this fit with that what I said before on Functionalism, multiple realizability, mental states as mental mechanisms, the content-vehicle distinction, etc? I am not really clear about that point. This might primarily be owed to the circumstance that I came to adapt this

position relatively recently, but be it as it may. What I would like to suggest is that we should interpret reversely the ontology of mental states debate in a way that makes it compatible with my phenomenological remarks. For instance, the content-vehicle distinction can be seen as an explanatory and not as an ontological commitment. If we adapt a computationalist perspective and know simultaneously not that much about brain function it might be totally legitimate to state that distinction from the background what we know first-personally about behaviour and about brains. However, if we have new insights from behavioural studies and know more about brain function we see a stronger connection between brain and behaviour at a more fine grained level like it is done in modern cognitive neuroscience[85]. This picture has the advantage that it is plausible from the phenomenal background of one's own learning and that it makes these distinctions more dependent on a flexible psychology instead of a rigid ontology. Therefore, if we use "content" and "vehicle" in order to designate different modes of presentation regarding similar or same phenomena, then the distinction remains intelligible[86].

The same goes for multiple realizability too. If we know not much about brain function and have an intellectual heritage which is rooted in an anti-materialistic picture of the mind, it seems clear that we cannot connect many of our experiences in a coherent way. But, the more knowledge we acquire about brain function, i.e. the more sophisticated our mental imagery gets in correspondences to the phenomena we observe, the easier it is to connect the experiences. We are in none of the cases committed to a strong ontology but can at least partly integrate many important conceptions within a phenomenological framework[87].

5.8 Arguments against Concept Empiricism

Here I want to discuss some of the arguments which were advanced against Concept Empiricism and PSST. I will start this discussion with those arguments in mind which were directly

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[85] At a less fine grained level we see only correlations between activity in the brain and behavior which is instantiated synchronously.

[86] Eventually even more intelligible as before. For the best understanding we might have of content and vehicle at a less psychological level is that of e.g. words and the meaning which they carry. However, this is no fortunate analogy for the explanation of meaning more generally, as we have seen in the course of the *Magisterarbeit*.

[87] I believe we should generally conceive of theories as psychological entities. If we do that it seems clear that many of the rigid distinctions which are often seen as ontological in nature are due to our psychological inability to connect different models or conceptual structures which we have stored in memory. This in reverse might be due to different causes. Eventually one is that the memory structures are too far remote stored in the structures which store them, whereas another might be a lack of socially accessible knowledge, etc.

urged against Concept Empiricism in the way it was developed by Prinz and Barsalou. These arguments are collected in Machery (2007)[88]. I will also discuss more indirect arguments from Fodor and Pylyshyn because of their classic status.

5.8.1 Fodor and Pylyshyn

Here I want to state some of the classic points of critique of Fodor but also of Pylyshyn against non-propositional models of the mind. The most classic one is that which states that compositionality[89] is supposed to be the core architectural feature of any model of the mind. Less prominent but also of interest for us is Fodor's argument how psychology has to look like if it wants to be taken seriously as a science.

However, compositionality first: "But, in fact, you need a further assumption, which we'll call the 'principle of compositionality': insofar as a language is systematic, a lexical item must make approximately the same semantic contribution to each expression in which it occurs. It is, for example, only insofar as "the", "girl", "loves" and "John" make the same semantic contribution to "John loves the girl" that they make to "the girl loves John" that understanding the one sentence implies understanding the other" (Fodor and Pylsyshyn 1988, p. 28 (internet draft)).[90]

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[88] For related points of critique see Markman and Stilwell (2004). Another author who discusses the especially vehicular consequences of Concept Empiricism is Weiskopf (2007). Originally I planned to discuss Weiskopf's critique of PSST here. However, due to the fact that Weiskopf strongly misconceives the assumptions made by PSST I finally deviated from that project. The problem with Weiskopf's interpretation of PSST can be quickly summarized in the following four points: First, he conceives of concepts as primarily concerned with inference and categorization which omits the pivotal role of concepts for action. Second, he does seem to make the content-vehicle distinction in a way that is not really compatible with Concept Empiricism – his distinction between vehicle and content is so strong that there does not seem to be an influence of the vehicle on the content by means of the structure of the vehicle. Third, content is for Weiskopf intentional content which is to some part compatible with Prinz's position but not with that of Barsalou when it is properly interpreted and even less with the whole consequences of PSST if they are properly clarified. Fourth, Weiskopf seems to differentiate percepts and concepts in that he says that if a percept comes under spontaneous control, then it is a concept. But this is surely not how percepts and concepts are distinguished within PSST. Concepts are functionally equivalent to simulators and those are very complex structures of which perceptual symbols are only a subpart. And even perceptual symbols are not the same as percepts because they are schematic in nature.

[89] I won't discuss systematicity or productivity here for both do not seem to be worth a mention for an elaborated theory of mind. Compositionality however is more of an interesting assumption, may it be only for the reason that it is discussed so pervasively.

[90] It is somehow opaque to me how Fodor can deal with semantic compositionality if we consider his position with regard to intentionality. How are concepts which depend with regard to their semantic properties on causal covariance easily compositional?

This quote from the locus classicus of the defence of language-like "brick" compositionality is regarding the architecture of cognitive systems something like the holy grail of philosophical contributions to a GOFAI conception of the mind. However, there is no behavioural evidence whatsoever for it as I argue with regard to the discussion of Machery below. Here I confine[91] myself to more phenomenological contemplations by Prinz and Clark (2004) who consider compositionality to be one of the "two dogmas of Fodorism"[92].

Prinz's and Clark's attack against Fodorism is levelled on the distinction between concept rationalism and concept pragmatism where concept rationalism confers to concepts the function of representing for higher intellectual pondering whatsoever whereas concept pragmatism stresses that the main function of concepts is to subserve action. Here is an example of what might follow from this according to Prinz and Clark (2004, p. 60):

"Suppose concepts are collections of action-oriented abilities. Suppose they are structured representations of features that allow us to sort, draw inferences, and physically coordinate behavior with objects in the world. How do concepts of this kind hold up against Fodor's dilemma? They certainly do not qualify as definitions, so they are not likely to combine compositionally. Take the concept 50 POUND EGG. If asked to consider such a monstrous entity, several features might come to mind. We might imagine that it is quite durable, in contrast to more familiar eggs, and we might imagine that it was laid by a huge creature, perhaps a dinosaur. Neither of these features, durability or being laid by a dinosaur, are plausible components of the concept EGG or the concept of WEIGHING 50 POUNDS. They emerge from background knowledge. Fodor thinks this is a problem. He thinks the only thing we really know about a 50 pound egg is that it is an egg and that it is 50 pounds. Adding extra information prevents concepts from combining in a way that will support systematicity and productivity."

I often find it difficult to discuss these topics without regard of empirical evidence but in this case it seems phenomenologically clear how we process a compound concept like 50 POUND EGG. From an evolutionary standpoint which may also be detached from direct behavioural evidence it does not seem to make sense to conceive of concepts the way Fodor does either.

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[91] The overwhelming part of the *Magisterarbeit* so far yields in its consequences a critique of compositionality since it criticizes the very structure which allows for something like compositionality the way Fodor conceives of. It is therefore silly to spell this out again and hence I confine my remarks concerning compositionality to the directly related remarks of Prinz and Clark (2004).

[92] Besides the dogma of analyticity.

It is in my opinion one of the most peculiar phenomena how much attention a position like that of Fodor received for such a long time if we consider its behavioural and phenomenological implausibility though it must be admitted that Fodor might be, together with Stephen Stich (1983), the one who has spelled out the consequences of the premises from the GOFAI paradigm with most rigour and consistency. If we accept the propositional account how it might culminate in the Language of Thought Hypothesis (Fodor 1975) it might be comprehensible why there is that a great commitment to compositionality. It is a kind of necessity if we accept the core assumptions of that paradigm. However the paradigm does not seem to be substantiated by empirical evidence from psychology, neuroscience and those branches of linguistics which mind how people really perform.

Another assumption of Fodor's is that psychology has, in order to be taken scientifically seriously, to assume that concepts are atomistic. This were due to the circumstance that only atomistic concepts allow for law-like generalizations where those are the subject of any scientific practice proper.

In consequence, in order to adhere to a law of psychology[93] someone has to regularly behave in accord with folk-psychological generalizations and the concepts utilized in that schematic generalizations have to be identical over different instances. This indeed seems to be problematic for three reasons. First, if the world does not fit massively in a scientific explanation model it is awkward to claim that nonetheless the model has to apply in order to work scientifically. Second, even if concepts were unstructured like Fodor proposes it would be highly improbable that someone would proceed the same way because of massive context phenomena like the residual cognitive system, the body and the ecological system in which the respective actor is embedded physically and biologically. Third, this model of scientific explanation is old fashioned and does not match with the mechanistic models proposed by philosophers of science and the actual practice of psychologists and neurobiologists whose scientific competence should be beyond dispute.

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[93] To adhere to a psychological law is surely nothing normative but akin to "adhering" to a law of physics. Eventually "adhere" is therefore a bit unfortunate and we should better talk of "amenable" or "subject to".

5.8.2 Machery's critique of Concept Empiricism

I will argue relatively extensively here against Machery (2007) because it is one of the very view articles which tries to deal with Concept Empiricism on a large array of topics and thereby comprises many possible points of critique.

One argument marshalled against Concept Empiricism, which might be very elusive to GO-FAI proponents, assumes that many perceptual representations could in fact be linguistic (cf. Pylyshyn 2002). Therefore it is not adequate "to contrast amodal and perceptual representations by means of the contrast between linguistic and analogical representations" (Machery 2007). This does not seem very compelling to me. In principle it might also be possible that images are in fact linguistic and that the linguistic representations are indeed platonic forms which are themselves ideas in the mind of god. But why suppose this? What we can say relatively for sure is that the vehicles that carry images are biological areas in the brain. Why should we assume something between the image which does the explanatory job and for which we have phenomenological and behavioural evidence and the biological vehicle which does the causal job? Only the assumption from GOFAI that the computer-analogy is the best explanation for the mind might suggest that language underlies a good explanation for cognition. But exactly this assumption is attacked by grounded cognition on good grounds.

Another argument from Machery (2007) is that "Barsalou and colleagues' findings provide evidence against specific predictions derived from specific amodal models of the cognitive processes involved in the experimental task, not against the amodal approach." What Machery states here on behalf of the amodal approach is indeed one of its major weaknesses. That the amodal approach can continuously adapt to empirical findings brought forth by Concept Empiricists merely shows that the amodal approach is not falsifiable.

A further problem with this view is that it underestimates the evidence which Concept Empiricism as a paradigm can marshal against the classic paradigm in its entirety. It is like supposing that Materialism or special versions of it cannot provide evidence against mentalism as a whole but only against special versions of it; eventually against Platonism, but not against Plotin's Platonism. But if we suppose that there is nothing extra-physical than there is no place for Plotin, too, as there is no place for any amodal theory with regard to e.g. meaning when there is no plausible conception of what a causally efficacious version of meaning can be that is not imaginistic.

One of Barsalou's findings is direct evidence for "perceptual work" which speaks against strong compositionality which is assumed by many classic approaches in GOFAI and analytic philosophy of language. Barsalou et al. (1999) found out that people do not simply add features in a compositional way when they combine words as in the case: half + watermelon → half-watermelon or rolled-up + lawn → rolled-up lawn or smiling + face → smiling face. In a property listing task Barsalou and co-workers showed that people list typically the features for a special word or combination of words which are salient from their imaginistic properties. For instance: For "watermelon" most people listed green or rind while they listed for "half-watermelon" primarily seed or red where "half" should only have affected the amount of the watermelon according to classic assumption regarding compositionality. However, half-watermelon leads to imagery of an open watermelon in which case the red pulp and the seeds are salient features. This strongly suggests that concepts are grounded in perceptual symbols which yields this imaginistic recall. Machery does not believe that this is strong evidence for PSST because he believes that there are amodal models which can account for that, too:

> "Of particular interest is Costello and Keane's C3 model of concept combination (e.g., Costello & Keane, 2000, 2005). A detailed exposition of this model is beyond the scope of this article. In substance, complex concepts, such as HALFWATERMELON, are produced in such a way as to satisfy three pragmatic principles, plausibility, diagnosticity, and informativeness. The third principle, informativeness, is important for present purposes. Costello and Keane write (2005, p. 212, Machery's emphasis): *[T]he informativeness constraint requires that a listener interpreting a compound phrase should construct a combined concept which contains new information that could not have been conveyed by either of the constituent words. This requirement is justified by the pragmatic assumption that the interpretation intended by the speaker who produced the phrase is one for which both words in the phrase are necessary (otherwise, the speaker would have used fewer words).* In brief, the informativeness principle supposes that when a speaker uses a noun phrase such as "half watermelon", she intends to convey as much specific information as possible about the referent of this noun phrase. This principle explains why subjects do not follow the simplest strategy for producing complex concepts, which is illustrated by the Selective Modification Model. For instance, it explains why, when people produce the complex concept HALF WATERMELON, they do not merely modify the amount dimension of the concept WATERMELON. This would violate the informativeness constraint: The interpretation of the noun phrase "half

watermelon" would not contain as much specific information about half watermelons as possible" (Machery 2007, 26-27).

Here Machery overlooks the distinctiveness of PSST with regard to mechanistic explanations, those explanations which are epistemically desirable. Costello and Keane's model does only describe what is required for a conceptual model to work effective or to work according to behavioural evidence. This is somehow comparable to that what contextualists like Recanati (2004) do in the philosophy of language. This however is different from explaining something by specifying the mechanism which brings those phenomena, which are only described in non-mechanistic accounts, about. And this is exactly what PSST does and what makes it epistemically superior to models which only describe.

A further counterargument against PSST from Machery is this: "It is important to realize that our knowledge about the perceptual properties of objects need not be encoded modally, that is, by means of perceptual representations. We can have amodal representations of the perceptual properties of objects. Indeed, many natural languages sentences, such as "the apple is green", represent the perceptual properties of objects in an amodal manner" (Machery 2007, p. 27). This is indeed grotesque. To argue against PSST by simply stating that something like THE APPLE IS GREEN is represented by a sentence in an amodal manner is simply to assert something which is under attack by PSST and to invoke it against that theory without justifying it.

It seems clear that Concept Empiricism can accommodate very well for context sensitivity because of its underlying dynamical biological mechanisms. This seems to be a very important feature of PSST which makes it truly superior on the architectural level compared to any classic theory. But Machery sees a problem for PSS, too, and does not believe that it does the job better:

> "It is erroneous to believe that context-sensitivity comes for free for neo-empiricist theories of concepts. It is one thing to say that re-enacted perceptual representations are tailored to the current circumstances (e.g., Barsalou, 2003, p. 1180); it is another thing to explain what mechanisms underlie the context-sensitivity of re-enacted perceptual representations. After all, we could re-enact contextually-inadequate perceptual representations. Now, if one tries to spell out which mechanisms underlie context-sensitivity in the context of neo-empiricism, one encounters exactly the same problems as when one explains context sensitivity in the context of amodal theories. To illustrate, since

anything can be relevant to a given circumstance, these mechanisms have to access all our long-term perceptual knowledge, without succumbing to some form of computational explosion. One needs also to know when to stop searching for new perceptual information, a version of the frame problem. Since relevance is a semantic notion, syntactic views of the nature of our cognitive processes do not seem suited to explain context-sensitivity and relevance. And so on. The upshot is clear: With respect to relevance, neo-empiricism is no better off than the amodal approach" (Machery 2007, p. 30-31).

This argument is not very convincing. Concept Empiricism is committed to the circumstance that brains are the lower level parts of the mechanism which brings PSS about. These lower level parts constrain by their structure higher level properties like context sensitivity. Brains in turn are dynamic, complex and self-organized (cf. Spivey 2007). If we conceive of the brain as being in a continuous state space and every point in that space as constraining the next one because we are always in a specific state we get a model of cognition which is not susceptible to the frame problem for interests are determined through the history of the brain and its respective states which do not allow for everything being relevant for everything. The states in which the brain is in are very complex and context sensitive but they are however finite and confined by means of structure too. These definite structures simply confine the bounds of context sensitivity.

Another important epistemic point from the view of philosophy of science seems to be that a theory is falsifiable. A theory which is not falsifiable is definitely inferior to a theory which is falsifiable. As an adherent of PSST I consider it to be a good case for it that it is falsifiable. Again, Machery (2007) sees that differently:

"However, Anderson's point was not that amodal approaches to cognition can explain any piece of evidence. In fact, he has shown that if one relies only on behavioral data, process models can be found such that imagistic approaches can explain any piece of evidence for amodal, propositional theories of cognition – and vice versa. The correct conclusion to be drawn from Anderson's argument is that amodal theories and empiricist theories are on a par. Viewed independently of specific models of cognitive processes, both neo-empiricism and the amodal approach are unfalsifiable. Instead, what is falsifiable is a specific amodal theory of representation conjoined with specific models of the relevant cognitive processes or a specific empiricist theory of representation conjoined with specific models of the relevant cognitive processes" (p.31).

This is again, a massive misconception of Concept Empiricism. It is exactly that what makes PSST that strong that it is not relying on behavioural data only. To the opposite, it is proposing a mechanistic explanation which is grounded in the brain and that makes it falsifiable. Simmons and Barsalou make also very fine grained assumptions about the structuring of the respective feature maps and convergence zones on a neurological level (Simmons and Barsalou 2003). To make the point clear: If we are conceptualizing meaning by imagery and if we specify the behavioural instances in which meaning is processed then is it possible to determine in cases of behavioural meaning processing which brain areas are involved. If then in cases of genuine meaning processing no brain area is involved which is underlying perceptual processing or imagery then we have a clear empirical case against PSST and it were falsified by the evidence. Additionally, the brain imaging studies which showed that perceptual areas of the brain are simulated during conceptual tasks as well as the plenty of brain impairment studies which showed by means of double dissociation studies that special perceptual and motor areas of the brain are involved in conceptual tasks, motivated to a large part Concept Empiricism. This suggests further that Machery's case is highly unfortunate.

On pages 34-35 Machery challenges Concept Empiricist assumptions on the ground that they eventually methodologically misconceive the phenomena explained. There he discusses Kan's et al. (2003) findings and their involvement of imagery:

> "Remember, however, the issue singled out in this section. Most proponents of amodal theories of concepts and higher cognition recognize that people rely on perceptual simulation to solve some tasks that tap into our higher cognition. If amodal theorists expect people to rely on imagery to solve a given task, evidence that people use imagery in this task does not constitute evidence for neoempiricism and against the amodal approach to concepts and higher cognition. Now, the present task is arguably such a task. Indeed, to decide whether something is a part of something else, a reliable strategy is to visualize it. Relying on imagery is a reliable strategy to solve the part-whole property verification task because in visual imagery, we access some information about the physical structure of objects. This is even the best strategy when the part-whole relation (say, wheels-car) is not part of the concept of the whole (say, of car). If amodal theorists do expect subjects to rely on imagery in the part-whole property verification task, this task is not ideally suited for distinguishing neo-empiricism and amodal theories of concepts."

This objection is very similar to that I made hypothetically in the case of the usage based account theorist above. Machery notices correctly that many proponents of amodal theories are

totally happy with allowing imagery to play a large role in the cognitive economy. But this need not mean that all cognitive functions and especially concepts must exhibit properties typically instantiated in imagery tasks. Fine! But as I objected in return to the hypothetical Wittgensteinian, what role do concepts play, when they do not figure large in the many activities described with the help of mental imagery, which are at the core of our mental life. Now, take a look at the example chosen by Machery: It is deciding whether something is part of something else. If this does not qualify for a conceptual function what else does? This is classically one of the most paradigmatic examples for conceptual function both in philosophy and psychology! And even if we would not look at the history of concepts in philosophy and psychology and we had to start from the very beginning with our conceptualizing work, this cognitive task would surely qualify as a central conceptual function which is important for acting as well as for classical tasks of offline thought.

6. Résumé

I hope that I have made a clear case for Concept Empiricism. Having reached the end of my *Magisterarbeit* I would like to point to some consequences and prospects which might follow from the ideas presented here.

It should be more than obvious that the main ideas which were developed here are at odds with the Analytic tradition in philosophy, since I propose a dethroning of language and language-like structures with regard to the explanation of concepts and meaning, phenomena, which we find involved at the core of discussions of nearly every important philosophical topic[94]. Maybe this is in accord with a more general development which we get aware of at

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[94] In the sense that concepts are at the very core of the phenomenon itself, as in the case of at least reflective self-consciousness, the conceptual self, etc. or in the sense that we are committed to a special methodology which recurs to a very special picture of concepts, like in ethics, epistemology or every other topic with regard to which methods similar to conceptual analysis are utilized. I will shortly discuss here an example from epistemology: The Smith-and-Jones-and-coins-in-the-pocket-Gettier-case. A conceptual model which grounds belief ascription in PSS would for sure come to a different conclusion as came Gettier. I assume that everybody is familiar with this case; therefore I will spare the reader with details here. I assume that a PSS model of thought wouldn't seriously allow for Smith's inference from "Jones is the man who will get the job, and Jones has ten coins in his pocket" to "The man who will get the job has ten coins in his pocket". What Smith would actually believe were a PSS presentation of Jones which were determinate with regard to spatial properties,

the moment, i.e. that many philosopher's in the naturalistic camp embrace Phenomenology happy[95]. General themes from Phenomenology, as the partial abandonment of the distinction between perception and cognition, the perspective character of all thought or the predominance of the first person perspective are indeed to be found in this *Magisterarbeit* too.

I believe that the model delivered here posses a high grade of intuitive appeal. Especially if you start to study philosophy many pseudo problems from analytic philosophy seem to you plain grotesque. An example might be that you normally won't see any great problem related to the circumstance that you can entertain thoughts about things which do not exist. You will ascribe the cause of your thought about unicorns to your creative imagination which is indeed responsible for that thought.

I also suppose that it is intuitively also highly implausible to assume that meaning should be related to truth. If this idea is highly implausible with regard to linguistic structures it is merely outrages with regard to non-linguistic structures which are commonly called meaningful, i.e. works of art, music, etc. Representational analysis of these entities are the straightforward outgrowths of ideas from Analytic Philosophy and in my opinion everything else as intuitive.

We encounter further outgrowths of the Analytic Program in epistemology were we are seriously told that perception is only a causal precondition of knowledge and that knowledge is indeed dependent on e.g. a coherent state of all one's believes (cf. BonJour 1988), whereas ethics boils down to a boring "analysis" of concepts which primarily reflects the intuitions of some Analytic Philosopher's, instead of being grounded in biological needs and emotions. I hope that it is recognizable from that what I said so far that we will encounter a very different

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temporal properties and more general properties of Jones. To be more concrete, Smith would have an instance of mental imagery which would present Jones and which weren't that indeterminate with regard to the actual referent of the belief as were the ambiguous sentence. However, qualifications are in order. This Gettier case is generally a bit sloppy. You could indeed argue that the inference isn't proper even in the classical case since the inferred sentence is much more underdetermined as the sentence from which it is inferred. Further, that Smith does not take enough defeaters into account might be a point against the whole case altogether. What I am proposing goes however a step further. I assume that the model of entailment and inference which is delivered in the Gettier case is psychologically implausible and that an epistemology which would work with a Concept Empiricist model would not deal with such cases because it would have *no reason* for it, though it would even within a Concept Empiricist model be possible to have a more unspecified belief of the sort "The man who will get the job has ten coins in his pocket". This indeed lets the possibility open for a more psychologically realistic conception which works with classic language-like belief models. However, this model would confront the plethora of problems which I listed in the *Magisterarbeit* more generally.

[95] Corresponding to that movement the first (known to me) introduction to philosophy of mind and cognitive science which is rooted in Phenomenology and not in the Analytic tradition was published only recently (cf. Gallagher and Zahavi 2008).

philosophical landscape if we adhere to Concept Empiricism instead of some more or less analytically inspired competitor.

Besides these more or less critical remarks regarding the Analytic tradition I would like to suggest some tasks which have to be accomplished in the future in order to make the Concept Empiricist framework more powerful.

There is for example the problem of a genuine motor- or action-intentionality. My remarks regarding intentionality were primarily concerned with a perceptual relation between mind and world which might indeed support action but which is different from a genuine action-intentionality which might be subserved by visuomotor-representations. It would indeed be interesting to know if there were more than one intentionality relation and how these different intentionality relations relate to the unity of consciousness.

Another problem, as I already stated, is the examination of unconscious processing with regard to meaning and the role of consciousness in the process of meaning generation more generally[96]. This is a very tricky problem and deserves proper treatment. Somehow related is the problem of space and time. A theory of intentionality and meaning should get a massive refinement if those both important aspects of our cognition are incorporated in that theory.

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[96] This is especially interesting if we consider unconscious animals which perform complex tasks, especially those ascribed to target consciousness (cf. Campbell 2004). Are humans or other conscious animals dramatically cognitively enhanced with regard to those tasks or is there no need for target consciousness? What is then the role of consciousness in the meaning generation process?

7. References

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Sonstiges

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Vortrag „Intentionality. Consequences from Grounded Cognition" auf Mind 11 in Berlin gehalten.

Rechtsverbindliche Erklärung

Hiermit erkläre ich, Alexander Jeuk, dass die vorliegende Arbeit selbständig verfasst und keine anderen als die im Literaturteil angegebenen Hilfsmittel benutzt sowie die Stellen der Arbeit, die anderen Werken dem Wortlaut oder dem Sinn nach entnommen sind, durch Angabe der Quellen kenntlich gemacht wurden.

Unterschrift

Deutsche Zusammenfassung der Magisterhausarbeit „Concept Empiricism: Vehicle, Meaning and Intentionality.“

In der hier vorliegenden Magisterhausarbeit entwickele ich eine Theorie von Begriffen und somit auch von Bedeutung und Intentionalität, die in dem *Embodied and Embedded Mind* Paradigma verankert ist. Dabei beziehe ich mich maßgeblich auf die Begriffstheorie von Lawrence Barsalou, die sogenannte *Perceptual Symbol Systems* Theorie.

Neben einer allgemeinen Darstellung des Paradigmas, stelle ich zu Beginn der Arbeit die *Perceptual Symbol Systems* Theorie von Barsalou dar, sowie weitere begriffliche Werkzeuge, die es möglich machen, eine im Körper gegründete Begriffstheorie zu entwickeln: Simulation, Emulation und Neuronale Ausbeutung (*neural exploitation*). Dieser Teil ist primär darstellend.

Der daraufhin folgenden Abschnitte der Magisterarbeit entwickeln primär eine Konzeption von Begriffsempirismus, so wie ich ihn mir vorstelle. Dabei diskutiere ich ausführlich das Phänomen „Bedeutung“ und komme dabei zum Schluss, dass es sich bei Bedeutung um etwas handelt, das radikal verschieden von dem ist, wie es speziell die analytische Tradition in der zeitgenössischen Philosophie gezeichnet hat. Bedeutung ist demnach primär ein sensomotorisches Phänomen, dass für Handlungen evolvierte und dass auf quasi-imaginistischen Mechanismen ruht. Bedeutung ist primär weniger repräsentational als vielmehr phänomenal präsentational und internalistisch. Ich entwickele diese Theorie von Bedeutung vor dem Hintergrund von philosophischen Argumenten wie dem *symbol grounding* Argument oder dem *chinese room argument* als auch vor dem Hintergrund neuropsychologischer Theorien wie z.B. der *mental imagery* Theorie von Kosslyn oder der Begriffstheorie von Barsalou. Neben dem positiven Teil der Theorieentwicklung, diskutiere ich auch eine Vielzahl von Einwänden, die gegen klassische Theorien vorgebracht wurden, die teilweise größere Ähnlichkeit zu der hier entwickelten Theorie haben.

Im Anschluss daran, versuche ich, eine Theorie von Intentionalität auszuarbeiten, die es ermöglicht, dass Intentionalität als quasi emergentes Phänomen entsteht und nicht, wie es üblich ist, durch umständliche und problematische ad hoc Erklärungen eingebracht wird. Dabei gehe ich davon aus, dass die biologischen Mechanismen, die auch Bedeutung erklären, größtenteils dazu beitragen, Intentionalität zu erklären, wobei Intentionalität eine konkrete Relation zwischen einem Ding in der Welt, einem Perzept und einem Begriff ist. Die stark objektivistische

und metaphysisch realistische Tendenz klassischer Referenz und Intentionalitätstheorien wird dabei zurückgewiesen. Für die Kritik an klassischen Theorien arbeite ich 12 Punkte heraus, die es erlauben, schwere Zweifel hinsichtlich eben jener klassischen Theorien zu haben. Ich schließe die Intentionalitätsdiskussion mit einer Betrachtung des Pseudophänomens intentional-intensionaler Kontexte ab und schlage ein Modell vor, dass dieses Phänomen zurückweist.

Daraufhin behandele ich ontologische Probleme hinsichtlich meiner Position. Ich gebe dabei praktisch zwei Lösungsvorschläge ab. Der eine ist maßgeblich durch das Mechanistische Paradigma und die Heuristische Identitätstheorie aus der Wissenschaftstheorie motiviert und setzt Phänomene und Mechanismen in ein enges Verhältnis. Der andere weist ontologische Fragestellungen zurück und bezieht sich dabei vor allem auf die phänomenologische Tradition.

Den letzten großen Teil der Magisterhausarbeit macht eine Zurückweisung von konkreter Kritik am Begriffsempirismus aus. Dabei diskutiere ich neben der klassischen Kritik von Fodor und Pylsyshyn, die relativ generell ist, hauptsächlich Edouard Macherys Kritik, die sich konkret gegen Barsalou und Prinz richtet.

Die Magisterhausarbeit schließt mit einem Resümee, das vor allem die Probleme, die sich aus meiner Position ergeben, darstellt und schildert, was zukünftig in den Fokus philosophischer Diskussion rücken sollte.