Parts of Systems

Mereological Decomposition and Parthood Semiosis
as Steps towards a Mereophenomenology of Systems

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Preface

Wholes and parts play a role in theories within numerous different fields, including literary theory, cognitive science, sociology, scientific methodology, systems thinking, mathematics, physics, psychology, sociology, metaphysics, ontology, epistemology, and organizational psychology. Though this investigation touches, to a greater or lesser degree, on all these topics, the primary focus is on how we experience parts of wholes, particularly systems. I believe that the ideas of mereological decomposition and especially parthood semiosis developed here, shows some promise in contributing to the vast amount of research in phenomenological psychology and cognitive science with particular focus on embodiment and organizational psychology.

Experiencing parthood is not something new and unheard of, but most classical mereologies and formal ontologies, including mereological models, struggle to account for parthood at the level of experience. The proposal here is to outline the main features of plug-in modules for such mereologies, in a way that they may be developed to aid an analysis of the immediate experience of what it means to talk about parts of systems, including being parts of such systems and, in one sense or other, being the very system that has parts . The focus of this work is therefore, as the title indicates the relation between systems and its parts. It forms a rather bold attempt, I think, to rethink the notion of wholes and parts, issues that has been discussed at least since Plato. But it does so, I hope, without dismissing the history of thought and conceptual development, that has been build up in that time.

The work that lies before you is the result of an effort that began more than 20 years ago. It originated by a comment by a peer of my master's thesis on identity in 2004, that in that thesis the concepts of whole and parts appeared in a non-standard interpretation. My peers were, as it is often the case when you receive comments from peers, right. Consequently, I decided to take up the challenge to develop the intuition that I had in a systematic way and justifying this notion of wholes and parts as complementary to the more "standard" accounts found in the literature.

In 2008, I secured a position in the research department of a pharmaceutical company. I endeavored to further develop my ideas of wholes and parts, which had by then evolved into a theory of mereological decomposition applied to models of synergy and synergic interactions in pharmacology and biological systems. Simultaneously, I could not neglect the cognitive dimension, so I applied to be admitted as a Ph.D. student under the supervision of Professor Achim Stephan at the Cognitive Science Department of the University of Osnabrück.

I have encountered many theories and models, possibilities and pitfalls, that have been discussed, developed, considered, and some rejected, during these many years, and I firmly believe that the models and theories that have survived my investigation and that I develop in this dissertation, present no less than a significant novelty to the old and long-standing problem of the relationship between a whole and it's parts, having the potential to contribute significantly to contemporary research. I do however not harbor the illusion that the ideas outlined here, have already reached their final form, nor that there should be no errors or fallacies hidden in the pages that follow. Nonetheless, if the thoughts presented here may give rise to new considerations on the subject matter with the patient reader, I shall consider my overall purpose satisfied and all the many years of work justified.

Ørby, August 2023,

Peter Lütken Hertel-Storm

Acknowledgements

It is said that Aristotle studied with Plato at his Academy in Athens for almost 20 years.[1] And it is comforting to think that philosophers that one admires, have also undergone long journeys in their pursuits. For as mentioned in the preface, this dissertation has indeed been a long time under way, as I received my letter of acceptance on august 26, 2008. In the 15 years that have passed, many people have been a source of inspiration, help and support during various stages of the development of the dissertation. Several versions of the work or parts thereof have been presented at conferences and research colloquiums, and I am grateful to friends and colleagues who have patiently provided feedback on various drafts and ideas. Naturally, none of these persons can be held responsible for any flaws, misguided ideas, or misunderstandings that may occur in the present work; for any such errors, I alone bear the responsibility.

I would particularly like to express my gratitude to Professor Achim Stephan at the Cognitive Science Department, Universität Osnabrück, who has served as the supervisor on this project with endless patience and support over this period. His sharp comments and constructive suggestions have been instrumental in shaping the present work.

Also, I extend my thanks to Professor Johanna Seibt of the University of Aarhus, who willingly contributed her extensive knowledge on mereology in discussions of ideas and review of drafts, always in a spirit of friendship and support, along with valuable criticisms that helped overcome some of the theoretical issues and problems that arose along the way.

My thanks also go to Professor Emeritus, Klaus Robering from the University of Southern Denmark, with whom I have engaged in many discussions on these topics. In 2007, he was the first to invite me to present my ideas at a research colloquium at the University's campus in Kolding and later he encouraged

[1] Guthrie 1998, p. 19.

me to write a Ph.D. dissertation on the issue. It was Robering, who originally directed my attention to the works of Kevin Mulligan, Barry Smith, and Peter Simons.[2]

I am also indebted to Erik Staunstrup, with whom I engaged in endless discussions on systems and organization theory, particularly in relation to how the application of mereological decomposition could influence our understanding of leadership, management, and employee motivation. Some of these discussions had an impact on the final chapter of this work, although not explicitly included.

I would like to express my heartfelt thanks to my wife, Stefanie, for her patience and forbearance with a husband who was always at the computer writing instead of being with the family, particularly during the final stages of this work.

Finally, my deepest appreciation goes to my three children, Sophie, Simon, and Louise. They have never known a father who was not working on this project, and now that it has finally taken the form of this dissertation, I dedicate it to them.

[2] Smith 1982, Simons 1987.

Contents

0. Introduction

How can we explain the *experience* of being a part? For example, it feels different to be a part of a family where I am the mother, compared to being the assistant marketing manager at the company I work in, or the reserve goalkeeper of the handball team I play in. To take a more grotesque example, suppose a hand that have been cut of the arm of the person it used to be attached to. Imagine further, that this hand is now just lying there on a table before me. Perhaps it is even making signs to me with its fingers, the experience feels like something from a horror movie or a short story by Edgar Allan Poe, or something else that contain amputated limbs moving around on their own. In contrast, looking at a hand appropriately placed on a person, doing things that is expected by hands of persons, is in normally far from revolting. And looking at my own hand, a part of me, myself, in contrast to the gross hand on the table and the nice but unacquainted hand of another person, is indeed again a completely different experience. The difference of these experiences depends on, or so I shall argue in this thesis, an essential reference to the whole it is considered a part of, a reference that changes our understanding of the object. This reference is labelled "parthood semiosis." I can experience parthood from different perspectives: being a part of a system, having parts, that is, being a system myself, and perhaps observing parts of a system conceived as external to me.

The notion of a 'system' implies having proper parts which are to some degree integrated in a way that creates a sense of unity: An arbitrary collection of objects lying around is not a system, and neither is a unity without discernible parts. Systems can take on various shapes, forms, and kinds. Although systems theory will briefly be mentioned when relevant, the primary focus here is on parthood and participation, exploring both mereology and phenomenology.

'Mereology' refers to the logic of parts and wholes. There have indeed been extensive discussions from at least Plato and onwards about the nature of wholes and parts, and many philosophers have used ideas of parts and wholes as prerequisites for various theories in other fields. Atomism, material constitution, aesthetics, monism and pluralisms, mechanism and causation, information systems, sociology, set theory and many other fields have been influenced by various mereological models and theories. One of the main questions, at least from Aristotle and onwards is what Peter van Inwagen has called the "special

composition question," a question of what it means for a group of objects to compose a whole. Compositional approaches traditionally follow a "bottom-up" logic, starting by assuming the relevant parts and discussing how they constitute the whole in the relevant context.[3] And it is indeed this way of thinking that is challenged by the introduction of a revised concept of "mereological decomposition" below.

'Phenomenology' is the study of immediate experience. Although it is often proposed to be founded by Edmund Husserl as a independent field of study, Husserl draws significantly on earlier philosopher's phenomenological thinking (and terminology), from Aristotle over Descartes and Kant, to Goethe, Hegel and perhaps Kierkegaard, Schopenhauer and Nietzsche. Like the case with mereology, we could point to, that there has been an interest in phenomena and immediate experience among philosophers, at least since Plato. Particularly among the phenomenological tradition, there is an underlying logic of regarding phenomenology as a first philosophy, that is, that we may begin philosophical thinking with the outset in immediate experience, which is something we can analyze without preconditions, which in turn in some ways appear similar to what the empiricists claimed about sense-data, when with Locke argued, that there is nothing in the mind that does not stem from sensations. [4]

In order to create a systematical way of making sense of the immediate experience of parthood, it is argued that another logic can complement both mereology and phenomenology, that is function as a supplement to both approaches or "logics." This is achieved by introducing two concepts: Mereological Decomposition and Parthood Semiosis.

Mereological decomposition is a top-down operator, that can be introduced in a mereological system as an inverse to mereological composition. Mereological decomposition follows a logic of assuming some whole, to assess the nature of its parts, while composition assumes some parts and assesses the nature of the whole they compose.

Parthood semiosis on the other hand, refers to the referential property of a proper part that identifies the assumed whole as belonging to a certain whole that has been mereologically decomposed. In simpler terms, the interpretation of the nature of a proper part can vary depending on the whole of which it is

[3] For a general introduction to contemporary mereology, see Cotnoir and Varzi 2021.
[4] It is hard to point to one single proper introduction to phenomenology covering all the features and elements that is relevant here as background knowledge. Zahavi's introduction to Husserl's phenomenology in Zahavi 2002 is one of the best concerning Husserl and more generally Merleau-Ponty's introduction to his *Phenomenology of Perception*, see Merleau-Ponty 1998, pp. 3-63.

supposed to be a part. This notion follows a "decompositional logic" and can be seen as a counterpart to "emergence" in more compositional approaches to systems.

A key feature of Parthood Semiosis is that it allows parthood to be experienced, or more accurately, it enables us to mereologically analyze experiences of parthood, including experiences of the kind stated in the opening of this introduction. The chapters aim to develop and describe these two concepts from relevant logical and phenomenological perspectives to create an overview of their understanding and deployment. The goal is for these concepts to form the basis for a *Decompositional Mereology*, combining mereological decomposition and parthood semiosis with assumptions and axioms from compositional mereology. This, in turn, may give rise to a *Mereophenomenology*, a phenomenology of wholes and parts, providing tools to understand experiences of observing, having, and being proper parts. The overall claim is that compositional mereology is more suited to examine the nature of wholes, not parts, which is why current mereological thinking is considered in relation to contemporary phenomenology, if at all.

When David Lewis in 1991 published his *Parts of Classes*,[5] he made his analysis of the relation between wholes and parts with the purpose, to offer an alternative to set theory.[6] By doing so, Lewis made himself a successor of a tradition that had developed since the mereological works of Lesniewski,[7] a tradition usually referred to as "classical extensional mereology", or CEM for short.[8] And though Lewis's work belonged in the CEM tradition, his approach to wholes and parts attempted to rethink the subject matter, even though it was still dominated by the overall mathematical purpose, to which his theory was designed to contribute.

Simultaneously, another competing tradition within this field of wholes and parts evolved maintaining a purpose of developing a formal ontology that would account for the material constitution of objects. Drawing inspiration from the works of G.E. Leibniz[9] as well as Edmund Husserl's third and fourth logical investigation,[10] models of material constitution evolved, often as a branch of identity theory, and several intense discussions took place between philosophers developing a mereology of constitution, and others developing a mereology to replace set theory.[11] Just prior to Lewis' publication, these discussions

[5] Lewis 1991.
[6] Set theory as a unifying mode of explanation had been under pressure since Bertrand Russell in 1902 sent his famous letter to Gottlob Frege announcing his set-theoretic paradox, see Russell's letter to Frege in Van Heijenoort 1967, pp. 124-125.
[7] See especially his *Foundations of the General Theory of Sets [or manifolds]* from 1916, translated from the Polish in Leniewski 1992, pp. 129-73.
[8] See for example Cotnoir & Varzi 2021, pp. 21-55 for a recent account.
[9] The inspiration from Leibniz originated for a large part through the works of David Wiggins, especially Wiggins 1968, 1980 & 2001.
[10] Husserl 1993, pp. 225-340, Smith 1982, Simons 1987.
[11] See Rea 1996.

had culminated in Peter Simons' seminal work, *Parts* from 1987, providing an outline of the various discussions and formal systems developed up to that point, defending Husserl's mereology with a somewhat Aristotelean reading.

Similar to how works in mereology can be classified based on their purpose or agenda, the present work falls into a specific area of mereology due to its particular purpose. The proposal is to rethink the mereology of systems with a specific focus on developing a phenomenology of a system's having or being a part, thus contributing to the understanding of such systems' behavior. The approach taken here is not primarily mathematical, although it can be given a mathematical form, nor is it solely ontological, although it may have implications for ontology and metaphysics. The primary academic field to which this investigation belongs could be argued to be epistemology in general, and perhaps the philosophy of psychology, sociology, and cognition in particular, because of its focus on the logic of experience and phenomenology.

The title above, *Parts of Systems*, therefore, hints at David Lewis' classical masterpiece in two ways. It does not only indicate its belonging to a certain tradition but also highlights the substantial differences between classes and systems. While classes are mere mathematical entities, systems are generally considered structured objects with ordered parts that function together in a particular way. This work attempts to propose a new mereological field, a phenomenology of systemic mereology, by examining fundamental concepts particularly directed at the mereology of systems.

0.1 Mereological Decomposition

The theory proposed here distinguishes between "compositional mereology" and "decompositional mereology." Compositional mereologies work "bottom-up," assuming the parts and then discussing the nature of the composed whole. On the other hand, "decompositional mereology" assumes a whole to discuss the nature of its parts. A proper decompositional mereology, it is suggested, should work with both concepts as inverse but complementary formal operations. A solely compositional mereology focuses on the constitution of wholes rather than offering a theory or model of parthood.

Though one may find a similar point in contemporary works like in Cotnoir & Varzi 2019 and 2021, the novelty begins to unfold when we examine the nature of decomposition not as compositional principles, but as an inverse to composition. It is here argued that decomposition involves a logic that is somewhat different from that of a compositional one. Particularly it is not satisfactory to define decomposition as principles in a compositional logic, as for example supplementation principles, because this does not

make sufficient reference to the whole decomposed, or so I argue. For if decomposition is to investigate the nature of parthood, it cannot ignore the whole, which in turn implies that mereological decomposition cannot be thought of as a division that involves a destruction of the whole. Instead, it is proposed to think of mereological decomposition as preserving the whole, while sorting out *all and only the parts*.

For readers not intimately familiar with mereology, this may sound rather self-evident and intuitively compelling. But a notion of all and only the parts contain many difficulties. Do we for instance allow for only immediate parts or do we also include intermediate parts, that is, parts that can be decomposed into other parts? This is fundamentally a question of transitivity of parthood, and what is proposed here is to follow the path of decompositional thinking that we have engaged in. How would this look like from a decompositional perspective?

If we do not think of decomposition as a division, we can think of it in terms as a *dimensionalization* or *explication* of the whole. Popularly speaking, we look at the parts while being in the whole: We do not remove them. Not even conceptually! That means that the parts must contain an essential reference to the whole, a semiosis that points back at the decomposed whole making us understand the part in a different light or context. We are now heading back to the beginning of this introduction: We can understand a person as a romantic partner, a colleague, a tennisplayer depending on what whole we associate the person with, that is, what semiosis is at play when we experience the person.

But this line of thinking has consequences. First it means that 'all and only the parts' designate both immediate and intermediate parts. It also suggests that parts are not individuals, except perhaps in extreme cases where the whole is nothing more than the sum of its parts. For the integration of the whole cannot be disregarded, and in our definition of systems there are always some level of integration at play. Hence, this seems to suggest that if we accept the notion of semiosis, it is always at play to some degree when we consider decomposition of (proper) systems.

In turn this suggest that we cannot, except in perhaps a few special cases, make a full list of the parts. For the number of parts would be infinite. What we have, however, is a concept that demarcates parts from non-parts, and that therefore provides a tool for discussing the nature of parthood of a particular system. Mereological decomposition is therefore not transitive, simply because it always-already arrives at *all and only the parts*.

However, a weak sense of transitivity can be argued for, conditioned by introducing a distinction between sortal decomposition (SD decomposition), which is a decomposition into some of the parts, and decomposition simplicitér (MDS decomposition). SD decomposition involves second order sortal

predicates, sorting out objects that are the result of a particular MDS decomposition. Since it is the MDS decomposition that generates the semiosis, we can formulate a transitivity of parts from SD decompositions within the same MDS decomposition, as it follows from a decompositional logic, that something cannot be the same part of two different wholes. I have attempted to show the concepts and their relations in figure 1 below:

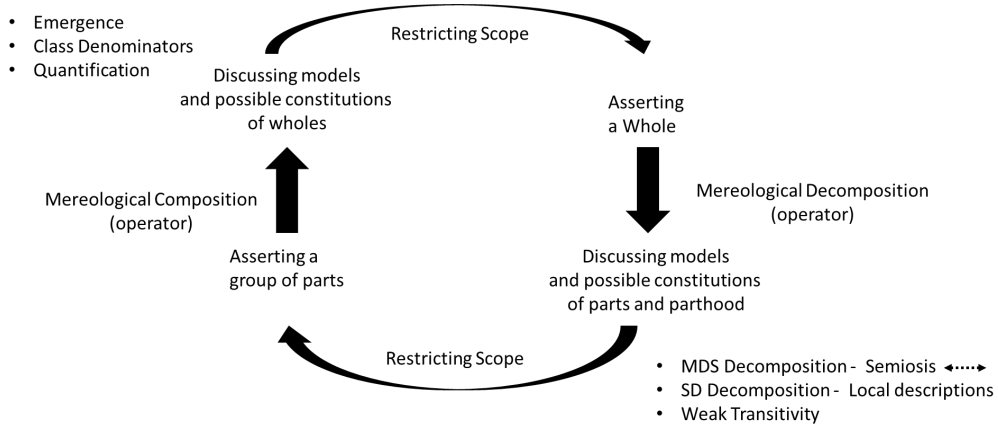

Figure 1. Concepts and Distinctions related to Mereological Decomposition

At the center of the figure, are the inverse relations of composition and decomposition, and how they restrict each other into an intensional mereology. On each side is listed a few central topics to illustrate the key concepts involved that, though the lists are far from exhaustive, indicate the different logics involved.

0.2 Parthood Semiosis

The notion of *Parthood Semiosis* defended here is that there is a semiosis involved in the proper parthood relation of systems. Semiosis is conceived as an essential referentiality, meaning that you cannot understand what a part is without understanding what the whole is and what the participation consists of. However, the idea that the whole is simply present as an idea or potential in the part is deemed to be plainly false.

Building on the notion of mereological decomposition, it can be argued that the amount of semiosis involved corresponds to the level of integration of the part within the whole. If the parts are highly integrated, it becomes difficult to think of them independently of the whole. This relationship is illustrated in Chapter 2, where the object is stretched out in a whole-part dimension, making the integrating, or

connecting relations forming the whole more visible. These relations are referred to as "semiosis." Semiosis involves the alteration of components into parts as a particular category of non-individuals to form the whole. Thus, 'parts' and 'signs' become somewhat like "sister-categories," both involving an essential reference to something different than themselves, something from which they obtain essential features of their identity.

Some might be skeptical if such semiosis-parts are supposed to exist in the real world, as it could potentially introduce various fanciful categories of objects into out ontology. It might be argued that we thereby would open to all kinds of fanciful categories of objects in our ontology. However, the claim here is not a metaphysical one about whether such parts exist in the real world, but rather about the *explanatory power* of such a semiosis. The notion of parthood-semiosis makes parthood something that can be *experienced*. For as the change of identity of the partaking object, we can make sense to that, what is experienced as the part changes in concert with the image of the associated whole.

The experience of parthood-semiosis, especially when talking about high-level semiosis of proper parts of integrated wholes, is expected to be possibly "thick" with meaning. If a proper part of an integrated whole plays a complex role in, for example, a biological system, the references to the whole that determine the participation of the part might indeed be complex. Figure 2 illustrates the three main approaches to the experience of parthood, representing the semiosis that leads us to identify an object as a part of a whole.

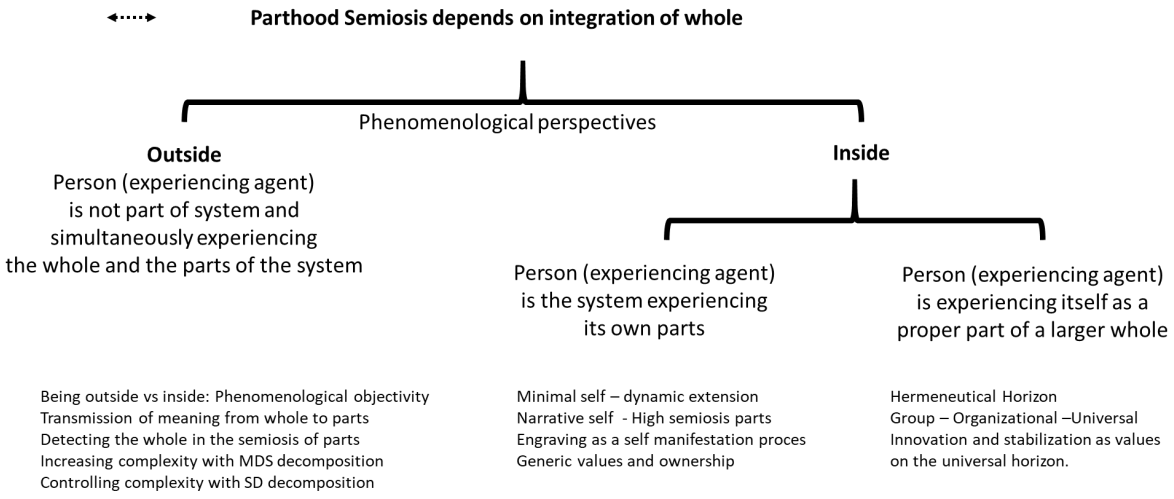

Figure 2. Concepts and distinctions related to semiosis and a person's experience of parthood

We might expect that there is a difference of the experience of the semiosis of a part, depending on whether the "experiencing agent" is looking at the system, from an outside perspective, in contrast to inside perspectives. Inside perspectives cover for example if the agents are themselves the whole of which the parts are participating or if the agents are themselves parts of a larger system. In chapter five to six, "the experiencing agents" are instantiated by "persons," that is, living and perceiving human beings, to exemplify these perspectives with a form of experience that is recognizable to the reader. In chapter four, a key example is used of a Jigsaw puzzle, to analyze how an outside perspective can experience whole parts relations. In chapter five, the experience of a person's own parts is discussed as parts of a narrative and minimal self, mind-parts, body-parts, and extensions of bodies, cognition, and emotions. Finally in chapter six, examples are discussed where the whole is not immediately given in experience. Instead, the parthood semiosis serves as a hermeneutical horizon, from where an idea of the whole can be derived from the apparent phenomena.

0.3 The Structure of the Dissertation

The dissertation is organized into six chapters, each contributing to the development and understanding of the concept of mereological decomposition and its connection to experience and parthood semiosis.

Chapter 1 delves into the discussion of composition and building in contemporary mereology and ontology. The goal is to show that there is theoretical room to introduce the notion of mereological decomposition as an inverse concept of mereological composition. The distinction between division and decomposition is a key point, allowing the logic of mereological decomposition to unfold.

Chapter 2 further develops the logic of mereological decomposition in contrast to composition. It highlights that decomposition cannot be seen as a process of destruction or disintegration, but rather the parts must be viewed in the light of the whole. The notion of semiosis is introduced, linking the part to the integrated whole it is supposed to be a part of. The chapter compares this notion with predecessors like Goethe, Hegel, and Husserl, and with the standard semiotics of Saussure and Peirce.

Chapter 3 explores the idea of non-exhaustive mereological decomposition and introduces two types: Mereological Decomposition Simplicitér and Sortal Decomposition. The relation between the two allows for the notion of "weak transitivity of parthood" to be specified under certain conditions.

Chapter 4 focus on the experiential aspects of having a part and applies mereological decomposition as a tool for phenomenological and psychological analysis. The example of jigsaw puzzle-solving is used to demonstrate how the understanding of a part is derived from the transmission of meaning through a mereological decomposition.

Chapter 5 continues the discussion of experiential aspects of parthood, this time emphasizing cases where a person is regarded as a system experiencing its own parts. The difference in experiencing a system from the inside and outside is analyzed using mereological decomposition and distinctions between the minimal and the narrative self are introduced as an alternative to the distinction between mind and body. Extensions of the self are then considered from such a 'mereophenomenological' approach.

Chapter 6 considers the experience of being a part. In such cases the parthood semiosis can be regarded as a hermeneutical-phenomenological horizon, and such horizons are differentiated with respect to a sense of distance that in turn may constitute a conception of levels.

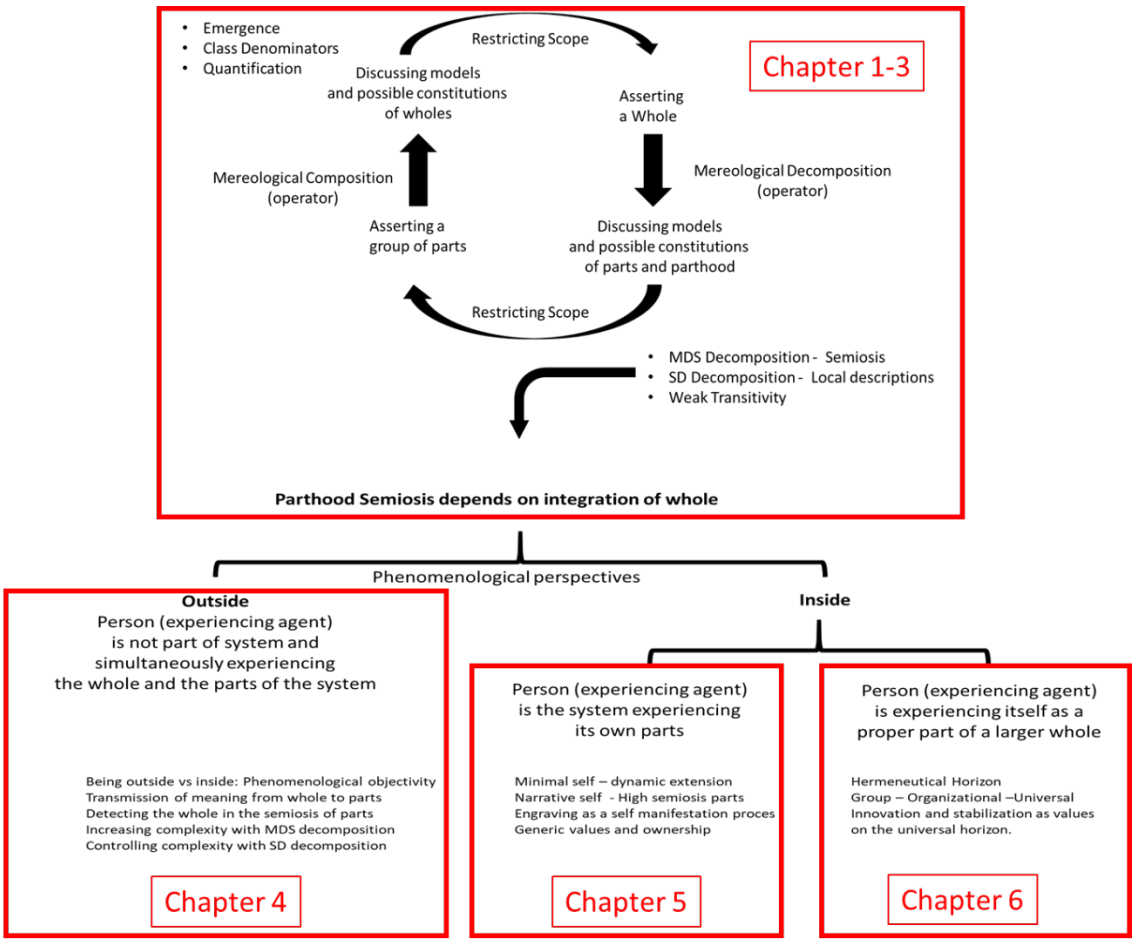

Figure 3. Overview of the structure of the dissertation

There is a particular logic of mereological decomposition that can be explained philosophically, described formally, and applied to systems theory as well as phenomenology. Consequently, it may have an impact on our approach to complex systems in general, cognitive systems in particular. Developing this notion of mereological decomposition is the first step to understand 'participation' in this new way. Furthermore, it is noted that the coupling of mereology and experience has implications for research and discussions in the philosophy of cognitive science, shared intentionality, extended cognition, and affectivity. The concepts developed in the dissertation can help analyze and understand the transition from individual subjectivity to intersubjectivity in various contexts.

The work also attempts to show how mereological decomposition and mereophenomenology can be relevant to modern psychology and social science, particularly in situations involving groups and the phenomenology of being together. While certain theories and discussions are not explicitly covered in the dissertation, the focus is on illustrating and developing the main notions of mereological decomposition, semiosis, and the experience of parthood.

Chapter 1. What is Mereological Decomposition?

> *I see nothing strange in that, Zeno, nor yet in a proof that all things are one by having a share in unity and at the same time many by sharing in plurality. But if anyone can prove that what is simply unity itself is many or that plurality itself is one, then I shall begin to be surprised. ,…,*
>
> *When he wants to show that I am many things, he can say that my right side is a different thing from my left, my front from my back, my upper parts from my lower, since no doubt I partake in plurality. When he wants to prove that I am one thing, he will say that I am one person among the seven of us, since I partake also of unity. So, both statements are true. Accordingly, if anyone sets out to show about things of this kind – sticks and stones, and so on – that the same thing is many and one, we shall say that what he is proving is that something is many and one, not that unity is many and that plurality is one;*
>
> Plato *Parmenides* 129b-e (translated by Francis M. Cornford)

In this chapter it is argued that the notion of decomposition might be developed to play a much larger role in mereology than is currently the case. The notion of decomposition is regarded as an inverse operation to the mereological notion of composition, which could shed new light on the notion of parthood as well as complementing the standard compositional mereology and formal ontology.

The first section aims to illuminate the logical space of mereological decomposition through a comparison of discussions on the mereological foundations concerning whether a whole is only the sum of its parts, Plato's one-many problem, and the idea of inversibility borrowed from arithmetic.

The attention is then turned to Peter van Inwagen's "Special Composition Question", to elaborate on which notion of composition, the notion of mereological decomposition is supposed to complement. It is argued that mereological decomposition cannot be conceived as a mere division that involves a disintegration of the whole it is supposed to decompose. An intuition pump is provided in order to strengthen the intuitive significance of such a claim.

Finally, the notion of decomposition is compared to various notions of building and emergence. It is argued that the notion of a particular mereological decomposition relies on a previous understanding of a particular whole and its composition. Consequently, a mereology that relies on such a notion of decomposition cannot serve as a first philosophy. Rather, it can be regarded as an explication of prior assumptions regarding the nature and ontology of a particular whole.

1.1 The Logical Space for Mereological Decomposition

In the philosophy of wholes and parts, composition has always been a central issue. Although there is extensive literature within ontology and mereology,[12] and although modern developments involve considerable formal work, composition is rarely introduced as an operator or function in mereological systems. Instead, it is often used implicitly, or as a meta-concept, encompassing the ideas of parts making up wholes on the one hand and serving as a medium for asserting fundamental assumptions about this "making up" on the other.

At the core of most considerations of composition lies the question of whether a whole is the sum of its parts or not. Like many other debates in contemporary philosophy, its origins can be traced back to the Greeks. Aristotle, in his metaphysics, posited that the whole is more than the sum of its parts, while Plato's position appears to be more ambiguous[13]. It could be speculated that the difference between their views might be due to Plato's engagement with a mathematical approach and Aristotle's focus on issues

[12] The discussions go back to at least Plato. For good overviews of the discussions, see Burkhardt et al. 2017. The standard works of the formal developments counts particularly Simons 1987 and Cotnoir & Varzi 2021.

[13] See the famous passage from Aristotle *Metaphysics* book seven, (Z.17) where he writes: *As regards that which is compounded out of something, so that the whole is one – not like a heap, however, but like a syllable, - the syllable is not its elements,* **ba** *is not the same as* **b** *and* **a***, nor is flesh fire and earth; for when they are dissolved, the wholes, i.e. the flesh and the syllable, no longer exist, but the elements of the syllable exist, and so do fire and earth.* (1041b11-16, emphasis orig., trans W.D. Ross from Barnes 1995) Plato considers several options of whole and parts in various dialogues, and I believe that he also here set the agenda of future discussions, even though I believe it is likely that he himself ends up in an aporia. See Harte 2002 for an overview. Harte herself argues that Plato should be read as defending a top-down approach: The identity of a part is determined only in the context of the whole of which it is a part (Harte 2002, p. 277). The view Harte attributes to Plato is defended in Koslicki 2008, also against the objections Harte herself raise to Plato's view (see particularly Koslicki 2008, pp. 100-21). As I read Koslicki she eventually understands Plato's discussions as a precursor to Aristotle's view (See Koslicki 2008, chpt 6, pp. 122-164). Certainly, Plato seems in the *Timaeus* (30a2-6) to suggest a semi-Aristotelean (i.e. compositional) approach with his image of the demiurge weaving cosmos (that is, order and structure) out of treads of chaos. The aporia that, as I read Plato, is never settled in Plato's works, is not about structure and parthood, but rooted in the question if primacy should be given to a top-down or bottom-up approach, that is, as it would be conceptualized in the present work, a compositional or decompositional approach. I have elsewhere argued a reading to the *Timaeus* passage as pointing to a *creative act* (Storm-Henningsen 2014, pp. 103-5) a notion that is here argued to be fallacious if interpreted as mereological composition. I believe that Plato's works in general, and the *Timaeus* in particular, do not really settle on a particular claim on this issue.

of the material constitution of objects, which could contribute to their respective conceptions of composition.

In contrast, decomposition is a less frequently discussed mereological concept. This might be surprising to newcomers in the philosophy of wholes and parts, as there seems to be a natural inclination to think that if composition is about how parts make up a whole, there should also be a complementary relation—decomposition—concerned with how a whole relates to its parts. Since the purpose of the present study is to investigate the joint use of composition and decomposition, many criticisms directed at composition (and implicitly at decomposition) do not fully apply here. Nonetheless, they are essential as they indicate the need to develop the notion of decomposition and help guide the logical implementation of such a concept. On this ground we might begin by placing 'decomposition' in the context of the three other constitutive mereological terms, composition, whole and part.

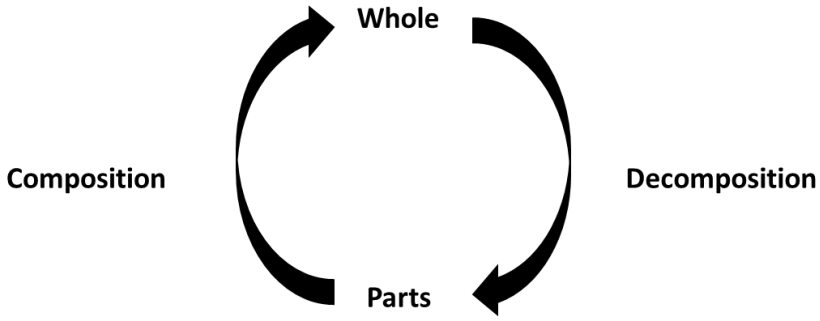

Figure 4. Four central concepts in a decompositional mereology

Though it is intuitively clear that these four concepts are interdependent, we must be careful here at the beginning, not to jump to conclusions by stipulating what constitute their exact dependencies, if any. On the contrary, we shall begin by considering a potential objection to this whole scheme of introducing a mereological notion of decomposition, an objection that this whole notion is based on a misconception.

It might be argued that it is in fact a conceptual fallacy to include decomposition on the level of composition as well as whole and parts: A 'whole' is an expression that denotes an object made up by individual parts, and composition is about, how this is achieved. Composition is therefore not a relation of *creation*, that begins with the parts and ends with the whole. In other words, the parts and the whole are not temporally differentiated. But in a certain sense, they exist simultaneously within the same temporal framework: If all the parts exist at a time T_1, the whole also exists at time T_1.

Therefore, our critic might continue, the concepts of 'composition' and 'decomposition' must essentially denote the same set of relations. Introducing the notion of decomposition as a relation between a whole and its parts is either misleading or redundant, as the conceptual framework of considering these relations are already occupied by the notion of composition: The difference between talking about part-whole relations as contrasted to whole-part relations is merely a manner of notation.[14]

Also, if the introduction of decomposition is not to be confused with the process of *creating* the whole out of the parts but is instead about how the whole is *constituted* or *composed* of the parts, both the parts and the whole must be always-already there. Therefore, the introduction of the notion of decomposition is fallacious, since it seems to propose an *inverse* top-down process that is supposed to "go in the other way" than composition.

Though there might be some readers, who would disagree with parts of the objection, as it is presented here, I think it is relatively intuitively stated and that it is therefore easy to follow the reasoning behind it. Though it is not important how to frame the details, it is important to notice, however, that no matter what intuition we might have on the objection, it must be taken very seriously, as it points to a potential misconception that arguably threatens to misconstrue the logic of our philosophy of wholes and parts.

Let us return to Plato for a moment. To begin to answer the objection above, it is useful first to point to the groundwork about the two other concepts in figure 4, wholes and parts. One of the classical puzzles in the philosophy of wholes and parts, is Plato's riddle whether a whole of parts is one or many: On the one hand, being a whole is being *one* thing; a unified object, an individual. On the other hand, being a whole is (contrasted to a simple thing) something that is *composed*. Our intuition tells us that a whole is a composite of several other things, and we say of these things, that they are parts of the whole in question, that is, the *one* thing we are considering to be the whole.

As Plato points out in the opening quote from the *Parmenides*, the question is only indirectly about physical objects, since there is generally not much of a problem in claiming that such objects can have different properties (what in Plato-lingo can be paraphrased as 'to take part in an idea or form') at the same time, in the same ways a ball can be both round and red simultaneously. The problem is rather on the notion of parthood itself: If we argue that a thing has parts, we seem to imply that it *is one and many* 'an sich', in the same respect – by the same ontological token. In fact, it would seem to involve an identity statement of the following sort:

[14] But see Cotnoir and Varzi 2019 & 2021.

Suppose a group of objects let us call them, the xs. Suppose further that there is *one* object Y. If we argue that the xs jointly compose Y, it could be suggested that we could formulate this formally as a relation

1. Relation of Composition

$$xs\ comp\ Y$$

(the xs compose Y)

Seen from an extensional perspective, where the xs and Y is nothing but what they denote, if you have all the xs, you will also have Y. And if so, the following statement apparently must be true as well

2. Composition as Identity

$$(xs\ comp\ Y) \rightarrow (xs = Y)$$

(If the xs compose Y, then the xs are (jointly) identical (intersubstitutional) with Y)

This is sometimes referred to as the claim of "composition as identity", and it seems to entail that there is nothing more to the whole than the parts themselves. The claim is, of course, not that any of the xs or subgroup of the xs would compose Y, but instead reads that all the xs would compose Y or that Y is a *sum* of the xs. This does not rule out, strictly speaking, that a subset of the xs could also compose Y. And it does not rule out either, that there might be another group of objects, the zs, which also jointly compose Y. All it states, is that the xs jointly compose Y, that is, that *if* you have all the xs *then* you also have Y. Therefore, even if nothing else were to be said about composition, we could at least decide that it has the logical structure of an implication, as it is shaped as an if-then conditional: *If* the parts, *then* the whole.

This is a cornerstone in the argument that there is a logical space for mereological decomposition: For if composition holds parts-to-whole, we can think up a conditional where the parts can be denoted by the antecedent proposition and the whole denoted by the consequent proposition, you can also think up a corresponding decomposition-conditional that holds inversely whole-to-parts, in the sense that the antecedent proposition denotes the whole and the consequent proposition denotes the parts. This is the same idea that one may find in other polar concepts; they are defined in opposition. Examples cover concepts like creation-destruction, analysis-synthesis as well as arithmetical inverse pairs of operators as division/multiplication and addition/subtraction.

Polar concepts like high and low, fast and slow, night and day, man and woman, living and dead, do not have the same implicative logical structure, and are not inverse in the same sense, if at all. But there seems

to be something vague about this notion of composition still. Because if only *some* of the xs would compose Y, all the xs would be equivalent to Y plus a remainder, namely the subsection of the xs that is redundant to, or plays no part in, the composition of Y.[15]

On the one hand, such an idea of composition is often put in the center of extensional mereology, as it seems to be formally neat and ontologically innocent. On the other hand, this intuition only works for what is called *proper parts*. A proper part is often defined in terms of weak supplementation in the following way:[16]

3. Weak Supplementation

$$\forall x \forall Y \exists z\ (x \ll Y) \rightarrow ((z \ll Y)\ \&\ (\neg(zox))$$

(If x is a proper part of Y, then Y must have at least one other proper part z, that is disjoint from (does not overlap with) x)

But we still have not made a transition from composition to parthood. If we are thinking in relation to set theory, it seems intuitively compelling, that the 'xs compose Y' obviously entails that any of the xs would be a proper part of Y:

4. Composition: Membership and Parthood

$$\forall x \exists Y(xs\ comp\ Y) \rightarrow ((x \in xs) \rightarrow (x \ll Y))$$

(If the xs compose Y, and an x belongs to the collection of xs, then x is a proper part of Y)

The reason is, that if the xs are *identical* to Y, then it follows that

5. Identity: Membership and Parthood

$$\forall x(xs = Y) \rightarrow ((x \in xs) \rightarrow (x \ll Y))$$

(if the xs are identical to Y, then, if x is a member of xs, then it is a proper part of Y))

[15] The discussion on the vagueness of composition has particularly turned on notions of restricted composition and is therefore often used as a *reductio ad absurdum* counterargument against criticisms of extensional mereologies, particularly the principle of unrestricted composition. See Sider 2003, Merricks 2005, Barnes 2007.

[16] See Simons 1987, p. 28. and Cotnoir & Varzi 2021, p. 114 for competing formulations of the weak supplementation principle.

For in that case, the 'xs' are simply equivalent to Y. But if we follow Aristoteles' view, that a whole is more than the sum of its parts, then we need extra restrictions on the notion of composition to make the inference in (5) above, that if x belongs to the xs, it is part of Y. On the other hand, we should pay attention to the fact that, if we assume that composition is identity, then we are at risk to blur the distinction between membership and proper parthood. For in that case, we can derive that

6. Membership implies Parthood 1

$$\forall x(x \in xs) \rightarrow (x \ll Y)$$

(if x is a member of xs, then it is a proper part of Y)

and

7. Membership implies Parthood 2

$$\forall x \exists Y(x \in Y) \rightarrow (x \ll Y)$$

(If x is a member of Y, then x is a proper part of Y)

by simple rules of substitution of identicals (from 'xs=Y). The difference between membership and parthood have become almost indiscernible since they can be intersubstituted between parts and wholes at will. In other words, wholes are treated as sets or classes, and we can then perhaps feel the major impact of Plato's argument from the *Parmenides* above.

What is agued here is fundamentally just a grouping of objects and the whole as an individual seems to become somewhat elusive. It is only a coming-together of certain objects, and perhaps not even that, because we might acknowledge wholes that are scattered topologically. For instance, we might have parts of a company, that is located in various countries of computer simulations that is simultaneously run on servers located in very different places in the world. In any case, it is not essentially *one*. And how can an identity relation hold between something that is *one* and something that is *many*.

The most pressing commonsense answer to this, that the xs may be of a different kind than Y, is already convincingly dealt with by Plato in the Parmenides-quote: That it is one car, but different wheels, seats, bolts, etc., is simply sidestepping the issue, because there must be some kind of integrating factor, that makes the car *one*.

From the perspective of extensional mereology, it could be argued that any plurality, can also be seen as *one* plurality, *one* sum, *one* group or *one* set and that we do not need to invoke some mysterious factors like integrating properties, sets, classes, functions, universals in order to account for the nature of wholes and parts. Especially Donald Baxter and David Lewis have made some interesting arguments in favor of this point, that I believe is anticipated both by Leonard and Goodman and in the works of Lesniewski.[17]

To make a general outline of this way of thinking, we could consider the introduction of identity as a parthood relation. Extensional mereology often works with this kind of parthood relation, called *improper parts*. This notion invokes (self-) identity as a parthood relation, by stipulating that Y is always *some part or other* of Y, though not a *proper* part. Where $Y = Y$ (self-identity) and $Y < Y$ (Y is some part or other of Y) is necessarily true, then $Y \ll Y$ (Y is a proper part of Y) violates the principles of supplementation of proper parts. Therefore, identity, introduced as a parthood relation, can operate as a limit for sets and subsets of proper parts. If the xs compose Y, it therefore means that the sum of the xs (the proper parts) will converge towards Y.

It seems clear that the way we think composition determines which kind of objects we may allow as wholes, and that, therefore, composition can be seen as model of the conditionality of forming wholes. If we assume a particular group of parts, which kind of whole would they produce? For, if all objects are parts of wholes, since the wholes are supposed to be exactly whatever collection of objects we can find, then the parts are whatever objects make them up, and the improper parts (identity) functions a limit for inclusion into the class of parts. Even in this case of unrestricted composition, we are assuming the parts and discussing the nature of the whole.

This gives us a preliminary answer to the conceptual objection: On the one hand, we may agree with the 'static presuppositions' of the argument, that composition is not creation. Even so, we can argue that composition is indeed a concept shaped as an implication that can be used to investigate the question of the nature of wholes, based on an assumption of whatever parts.

In this sense it seems to be justified, that there is a conceptual space for the introduction of decomposition as an inverse of composition, and that this may have the logical shape of an inverse implication of composition, asking about the nature of parts and parthood, based on the assumption of whatever wholes. However, taking the supposedly inverse nature seriously, the nature of mereological decomposition must in one way or another be dependent on the notion of composition deployed.

[17] Baxter 1988, Lewis 1991, Leonard and Goodman 1940, Lesniewski 1992.

1.2 Mereological decomposition and the special composition question

To effectively model the conceptual counterpart of mereological decomposition, we need to delve deeper into the ontological notion of composition. However, this line of reasoning regarding decomposition may lead to some counterintuitive implications:

On the one hand, if we argue that everything has parts, these parts would themselves seem to be composed of parts, that is in turn composed of parts and so on indefinitely, and we are ending up in a world of "gunk", and in the end we might be forced to hold that nothing really exists.[18]

On the other hand, we may argue a principle of unrestricted composition which holds, that any two or more objects compose a whole, the number of wholes in the universe is multiplied infinitely. This, it is sometimes argued, is not a problem, as the concept of a whole is "ontologically innocent", in just the same way, that many believe sets or classes are.

But from a perspective of mereological decomposition, unrestricted decomposition does not to make much sense, as the parts would always be restricted within the frame or context of the whole. If any grouping could be a whole, we would not know where to start, because we are always already back with the parts, or in fact, we never left. Hence, there is nothing to decompose mereologically. If the whole in this sense is just its parts, composition and decomposition seen as relations or implications is not necessarily false. They are just uninteresting to a degree that brings Frege's discussion on informative identity statements to mind. Why would we need to consider composition, if the result is the same as the assumptions we started with? But on the other hand, we could also produce an argument that if we are arguing against that all the parts together are not identical to the whole, we would be at risk of misconstruing composition as an act of creation.

This is the conundrum we seem to face in our mereological investigations. And though the discussion of the ontology of sets and classes has taken its own path in the philosophy of mathematics, we could have reasonable grounds to defend the ontological innocence of wholes, by maintaining an extensional mereology with improper parts. Thereby, we also stress the apparent illusiveness of wholes, as they seem to become purely instrumental concepts for identifying and grouping objects. However, composition as identity seems to be a fly in the face of common sense. Take as an example any physical object or thing in your everyday lifeworld, and the assumption would seem to be plainly false.

[18] Gunk is an expression for objects that are infinitely divisible into parts. For modern discussions of gunk, see particularly Sider 1993, Zimmerman 1996, Merricks 2003, Hudson 2007 as well as Cotnoir and Varzi 2021, pp. 142-158.

Suppose a table: We may argue that the involved parts are a table-top (or a plate), 4 table legs and some nails. But the *structuring* of such parts would also be essential to it if the table as a whole can be said to exist. For it *does* matter, one may argue, how these parts are joined together: Are they just randomly thrown in a pile, it is hardly a table, as the whole of the parts does not possess the functionality that is part of tables. Even if we argued that the pile is actually a table, though it is momentarily disassembled, we would still have to emphasize that the parts may be put together, in a way that would compose the table as it is supposed to be. We would have a mental image of a table and its function and aesthetics.

On these grounds, it could be argued with Aristotle, that the whole is more than just its parts, or the sum of its parts. But this would also make the mereology of this kind of material constitution intensional. For it would restrict the notion of what could qualify as parts of a particular whole, and perhaps also the state-space area the system can undergo through time (without loss of identity).

A counterargument from the extensionalists could be, that this must imply the material existence of 'functionalities' and 'purposes', which seems to be spurious if considered as material objects. Alternatively, it might be argued, that if the table and its parts are not identical, they would have to exist at the same place at the same time, which is arguably impossible for material objects like tables, since there can only be one material object in the same space at the same time.

Both positions seem to start out with commonsense intuitions that lead into conflicting scientific and philosophical intuitions. However, they would generally agree on at least three fundamental ideas:

First, mereology is a "first philosophy", at least in the sense that some principles can be developed as part of what we can use to describe or understand in the world. As such, it is *a priori* and does not depend on anything else. Everything else depends on it.

Second, there can only be one thing, in a certain space, at the same time. Though this example is typically prominent within discussions of material constitution, and that one *can* find philosophers that beg to disagree, the idea that a space or 'domain' can only be occupied one time by a certain object, is still predominant.

Thirdly, following the arguments above, to be a part is to belong to the composition of the whole, and therefore, understanding the nature of composition is indispensable. An important component here is that of a proper part, that is closely associated with the idea of a remainder or supplementation, as shown above as the weak supplementation principle (3).

However, a question might be raised as to when composition *actually* takes place. This is the ground for "the special composition question", which formulation is normally attributed to Peter van Inwagen[19], and it is of special interest to us, since if we can agree on one or more a restriction of composition, we would have more hints to go on when we are to develop a complementary notion of decomposition.

According to van Inwagen, this question asks in what circumstances x is a proper part of y, but must be formulated in terms of composition so that the formulation becomes somewhat like "when is it true that the x's compose y?"[20] and that this would, still following van Inwagen, roughly translate into the following practical formulation:

Suppose one had certain (nonoverlapping) objects, the ***x****s, at one's disposal, what would one have to do – what* ***could*** *one do – to get the* ***x****s to compose something?* [21]

Different answers have since been given to van Inwagen's question, along with a major discussion of them, and van Inwagen considers himself many in his book. Most answers do, however, fall within the scope of Plato's problem, in the sense that they would commit to either *composition as identity* or that the whole must be something more, or different, than the sum of its parts.

Notably, van Inwagen himself argues an Aristotelean view, but restricts composition to occur only in organisms. Inanimate objects, like chairs and tables are eliminated using a gunk-like argument. [22] Others have argued in favor of a multiplication of wholes that are illusive, or at least "ontologically innocent", others again are forced to hold that several material objects can exist at the same place at the same time.[23]

Van Inwagen's position seems to be convincing indeed: If we are concerned with organisms, we are also including complex biological processes of metabolism, energy consumption and transformation, self-organization and emergence, interactions between micro- and macro-organic levels. In contrast, inorganic objects fall for a gunk-like argument, since they are, as I read van Inwagen, either infinitely divisible or simples, since there is no structure, process or interaction that, in a sense, can 'glue the parts together'. He writes:

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[19] Van Inwagen 1990. Van Inwagen himself points out this understanding (ibid. p. 31) and this adds to the Plato scholar Verity Harte's argument on Plato's essential influence on the modern discussion, Harte 2002, see esp. pp. 26-32.
[20] *Ibid*, p. 2.
[21] *Ibid*, p. 31, emphasis orig.
[22] Ibid, pp. 98-107 see also Merricks 2003 that further expands and defends van Inwagen's eliminitavist view.
[23] See e.g. Wiggins 1968.

The thesis about composition and parthood that I am advocating has far-reaching ontological consequences; that every physical thing is either a living organism or a simple. (For suppose there is something that is neither a simple nor an organism. Since it is not a simple is has proper parts. Since it is not an organism, then, if the thesis I am advocating is correct, it has no proper parts.)[24]

Many have argued against this position, among others Peter Simons,[25] who has argued for an *essential* parts theory based on an Aristotelean reading of Husserl's theory of wholes and parts in the third and fourth logical investigation. According to Simons, some dependent parts, or 'moments' as they are called with Hegel and Husserl, are *emergent* parts that integrate the whole and create its overall *gestalt* or nature. But as Husserl saw, even moments can be seen as composed of moment-parts, and therefore this Kantian antinomy of infinite divisibility applies here too. [26]

One proposal to address the model's inability to capture inanimate objects is to expand the model. This is where the introduction of mereological decomposition becomes significant. We might pose the question: "What happens if we answer van Inwagen's special composition question with: *The xs compose Y, if and only if all and only the xs belong to a mereological decomposition of Y*?"

1.3 Mereological Decomposition as Inverse to Mereological Composition

First, the notion of decomposition has many meanings in vernacular usage. We talk of decomposition of the bodies of dead persons and animals, we talk about functional decomposition in software engineering, we talk about nearly decomposable systems, and some recent mereologists talk further about decomposition principles.[27] Is this the same intuition governing the sense of the term, as the one we are here looking for?

They certainly seem to be diverse commonsense understandings, and as we have seen above, the philosophers seem to have identified a variety of problems regarding the relations of wholes to parts: To the ontologist the term "whole" designates an individual, while to extensionalists like Goodman it designates a class. However, as Plato says, it is a *one*, while the term "parts", or 'xs' as van Inwagen would

[24] van Inwagen 1990, p. 98.
[25] Simons 1987, pp. 324-60.
[26] See Husserl 1993, bd II/1, III §25 and Kant 1998, pp. 99-100. These references are further discussed and elaborated in chapter 2, sec. 2.2 and 2.3.
[27] See for example Hayman & Oxenham 2016 for a fine piece on the decomposition of the Human Body after death. A discussion of decomposition of systems can be found in Simon 1996. In addition Cotnoir and Varzi 2021 discuss decomposition principles

have it, designates a group that seem to do a particular activity or have a particular property, "composing". It would seem, that while 'wholes' and 'parts' designate objects, in the singular or in the plural, composition and decomposition seem to be relations, relations between the wholes and the parts.

In as much as composition and decomposition is used to ask questions in philosophical mereology, it would be likely to expect, that when we ask about composition, we are asking what kind of wholes some parts could, well, compose. What is a whole? What kind of wholes? What would be their ontology? Are there emergent structures? etc. And inversely with decomposition. Here we would assume the whole and ask about the parts. What is a part? What kind of parts? What would be their ontology? Are they indefinitely divisible (gunk, continuity, etc.)?

That mereological decomposition is supposed to be inverse to mereological composition, has so far rested on the intuition that, while composition takes you from the parts to the whole, decomposition seems to take you from the whole to the parts. Seen as logical relations, the way they take us from wholes to parts or from parts to wholes, is by forming "mereological implications": Composition can be regarded as involving a transition from parts to wholes. We may assume a group of objects and discuss on this background in what sense such objects may compose something. And when we consider decomposition, we can regard this as a transition that goes in the exact opposite direction. We assume a whole, and discuss on this background in what sense the whole may have parts.

Mereological composition and decomposition can therefore be seen as functions, that lend some similarity to the fundamental operations of mathematics, addition, and its inverse subtraction, multiplication (that can be viewed as a continued addition) and its inverse division, as well as integers (that can be viewed as continued multiplication) and its inverses: roots and logarithms.[28] As we can see with these inverse relations in arithmetic, such functions must be made out individually, but yet they restrict each other when introduced together: As an example, one cannot divide by 0, because 0 multiplied with any number is always 0. And you cannot add anything to an infinite number because the subtraction of a natural number from an infinite number always equals the infinite number, and the subtraction of an infinite number from an infinite number always equals itself or 0. [29]

[28] See Cullberg 1997, pp. 113-131.

[29] Perhaps there is an exception if the infinite number can be regarded as a convergent series, and some would perhaps argue that the theories of larger and smaller infinite sets of Dedekind and Cantor forms an exception of this example. See Boyer 1949, particularly pp. 292-8 for an overview.

Yet, the assumptions and considerations, concepts and principles, move around in the whole system once they are made, simply because it is circular. If we, for instance assume that composition is identity, that it is a fusion or it involves emergence of parts, this will have a major influence on how we think decomposition, because we have already fixed our understanding of the relationship between the whole and it's parts in our consideration of composition.

Assumptions concerning which kind of objects that may serve as parts are dependent on which kind of whole-part relations are available, and in turn how exactly to understand mereological composition. Mereological decomposition, must therefore be formed by an analysis of wholes and parts, that begins with an assumption and explication of the nature of the whole to make a determination of which kind of parts are involved, and hence to shed light on the whole-to-part relation. But in doing so, the way we should design our mereological decomposition, must be sensitive to our conception of composition. If we argue that composition is identity, we find that composition and decomposition must both be expressing identity. If we associate composition with the emergence of a structure, we should think decomposition as investigation into what parts are underlying this structure and what their constitution as parts must be.

Aaron Cotnoir and Achille Varzi[30] have recently argued a similar view, that it is essential in mereology to work with composition and decomposition principles, that attempt to characterize the nature of wholes and parts, respectively. They write:

As a theory of parts and wholes, mereology should tell us three sorts of thing. It should say:

(i) what sort of relation parthood is;

(ii) what sort of conditions govern mereological composition (i.e., intuitively, what happens when we "add things" mereologically together to form a larger whole);

(iii) what sort of conditions govern mereological decomposition (i.e., intuitively, what happens when we "subtract things" mereologically from a given whole).

Cotnoir and Varzi argue further, that mereological composition and decomposition should be considered as "two sides of the same coin". In discussions of decomposition in Cotnoir & Varzi 2021, they rely on a notion that makes some principles decompositional, while others compositional, and through the

[30] Cotnoir and Varzi 2019.

characterization of such principles, they attempt to indicate the nature of decomposition and composition.

At the center of their understanding of decomposition, are principles of supplementation, complementation, and residue. And further they have a discussion of gunk which could have led them to a critical assessment of division as a mereological term, that seem to be one of the few ideas central to almost all kinds of decomposition. And they go somewhat down that path, as they acknowledge the overall intuition, that wholes *cannot* be decomposed into one single proper part[31] and discuss whether some such supplementation principles should be included in the meaning of 'part'. However, in Cotnoir and Varzi 2021 they do not develop further a notion of decomposition as a *restriction* of composition, though they do suggest complementation. What Cotnoir and Varzi show, is that some principles are essentially decompositional, some are compositional and some again have to do with ordering.

We tend to think that simple objects and elements have an ontological primacy over composites, and true or not, this does not suffice to determine a characterization of parthood and choosing inclusion criteria of parts, with respect to various kinds of objects and systems. It is when we talk of the relation of the whole, to *all and only the parts*, we may have two jointly symmetrical relations, since if the whole is decomposed into all and only the parts, all these parts would jointly compose the whole. In turn this reasoning leads us to be able to express principles governing relations between the two.

The question is exactly how strong this interdependence is supposed to be. It seems intuitively compelling that if a whole is decomposed into all and only the parts, these parts would form a composition of the whole. But this principle builds on a necessary assumption that the decomposition of the whole would result not only in *all* the parts, but also *only* the parts, of the whole in question. That means, that the resulting sum of parts which we may call "the decomposition of the whole", may not contain any object which is not supposed to be a part of the decomposed object in question. Furthermore, there must be no part of the decomposed object that is not contained in the sum of parts referred to, as the decomposition of the whole. Henceforth, we might spell out the principle of inversibility of composition and decomposition thus:

If an object Y is decomposed into all and only it's parts, the x's, then the x's form a sufficient condition for the composition of Y.

[31] Cotnoir & Varzi 2021, p. 116-21.

Let us call this kind of decomposition involved in a simple decomposition, or a *decomposition simplicitér*, as it can be conceived as a decomposition into parts without any further restrictions, or qualifications. It is tempting from a commonsense point of view, to argue that the result of a mereological decomposition simplicitér are nice parts[32] like for example the word 'Key' can be decomposed into three letters K-e-y, or a jigsaw puzzle can be decomposed into all and only the pieces (then you can see on the outside of the package how many there are supposed to be).

Obviously, this is not *all and only the parts*, or at least that depends on what we mean when we use the word 'Key' or understand the jigsaw puzzle: Several lines formed the letters of 'Key', and are they part of the word as well, due to the transitivity of parthood? And we might add the semantical content of 'Key'. Is that a part? And what about the image of the Jigsaw Puzzle? Or the correct ordering, that governs the pieces of the puzzle? From a compositional perspective, this might be open to an ontological debate, but from a decompositional perspective it must depend on the exact nature of the object we are decomposing.

Therefore, mereological decomposition simplicitér contributes to the *explication* and understanding of the (assumed) nature of the whole, by the impact it would have on what would count as parts and how the parthood relation would look like. The proposed inverse relation between composition and decomposition, therefore, suggests a measure of comparison between top-down and bottom-up approaches, that translates these approaches into the same relation. As such, this approach is not decisive to either one of the approaches, but simply states that maintaining one approach, may have an important impact on the other.

If the whole is identical to all and only the parts, in the sense that it forms the same plurality as the phrase "all and only the parts" would suggest, then the whole and the parts can be regarded as two representations of the same object, or using a Fregean terminology,[33] two "senses" (Sinne) of the same "reference" (Bedeutung), while the notions of composition and decomposition is interpreted as a kind of "principles of translation" between the representations or "senses".

[32] This notion was introduced in Lewis 1991.
[33] Frege 1892.

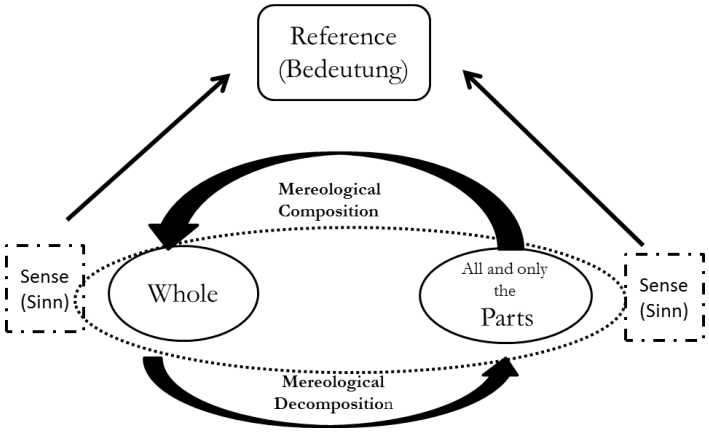

Figure 5. Mereological composition and decomposition and Frege's Sinn und Bedeutung

But in the case, where we understand composition as involving some kind of emergence, the question remains to what kind of decomposition that would correspond as an inverse relation to it. For though composition takes us from the parts to the whole, we sometimes encounter wholes in which light we seem to have another understanding of the parts. And this is the real purpose of including decomposition: that we have a model where we can examine the parts from the idea, assumptions, or experience of the whole. Examining the notion of parts from a top-down perspective rooted in a concept of decomposition and asserting the inversibility of decomposition to composition, we can construct a framework for considering parthood without generically committing a specific ontology. As we might grow gradually more hermeneutical, we are also moving from ontology to epistemology.

This epistemological turn is, I believe, essential. *Mereological decomposition as it is conceived and developed here, addresses more epistemological questions than the corresponding notion of composition has done.* Certainly, in the history of the philosophy of wholes and parts, many discussions have been made that relate as much to psychology and epistemology, as to ontology and metaphysics. Many of those theories seem to involve some kind of top-down approach, though it varies as to the degree of which this approach has been systematically developed almost served as a guiding intuition. This should not be taken to imply that mereological decomposition cannot be used in ontology, as it does not imply mereological composition cannot be used to shed light on epistemological questions. But it does suggest that this turn is a common, if not natural, component of top-down mereology.

1.4 Why Mereological Decomposition is not Division.

One of the reasons why decomposition has been a rather neglected concept in systems theory and mereology is, that the use of the concept in systems theory has been criticized from various sources.

Drawing on a few but influential examples, I shall argue that this criticism is indeed justified, but also, that we might rethink the concept in a way that does not fall prey to this criticism.

Herbert Simon for one, argues when introducing his now classic idea of "nearly decomposable" systems, that we can understand the mechanism of the system as the sum or product of the subsystems of the system: [34]

In a rare gas the intermolecular forces will be negligible compared to those binding the molecules - we can treat the individual particles for many purposes as if they were independent of each other. We can describe such a system as ***decomposable*** *into the subsystems comprised of the individual particles. As the gas become denser, molecular interactions become more significant. But over some range we can tract the decomposable case as a limit and as a first approximation. We can use a theory of perfect gases, for example, to describe approximately the behavior of actual gases if they are not too dense. As a second approximation we may move to a theory of* ***nearly decomposable*** *systems, in which the interactions among the subsystems are weak but not negligible.*

The description of complex systems in terms of subsystems, will often, if not always be an approximation. The reason is, that we are simply not able to provide a clear understanding of all the immediate and intermediate parts of a system, because of their continuous and complex interaction. We can describe them in terms of elementary particles, but in this case, we would have no chance of predicting their behavior, that is, exactly what whole they might compose. Hence, a theory of decomposable systems cannot account for complex interactions.

Following Simon, more and more skepticism grew towards decomposition. Notably William Wimsatt as well as William Bechtel and Robert Richardson[35] have developed Simon's view of decomposition into a criticism of its use as a scientific methodology or heuristics in the understanding of complex systems. But during these endeavors, the concept of decomposition also becomes clearer. Bechtel and Richardson define it as a scientific heuristics and coin the term in the following way:

Decomposition *allows the subdivision of the explanatory task so that the task becomes manageable and the system intelligible. Decomposition assumes that one activity of a whole system is the product of a set of subordinate functions performed in the system. It assumes that there are more than a small number of such functions that together result in the behavior we are studying and that they are minimally interactive.*[36]

If one contrasts the quote from Bechtel & Richardson and Simon along with the one from Cotnoir and Varzi above, it is apparent that they are expressing compatible views. In both cases there is indication of

[34] Simon 1996, p. 197 emphasis orig.
[35] Wimsatt 1986, Bechtel and Richardson 2010.
[36] Bechtel and Richardson 2010, p. 23, emphasis orig.

a supposed inversibility between decomposition and the "making up" which is the way I interpret "...functions that together result in…" Though by the reading of Simon and Bechtel and Richardson, it may be suggested that the notion of decomposition deployed, is one that involves a destruction of the whole, like the one found perhaps most explicit with Crawford Elder,[37] based on the idea that interaction of parts and hierarchical organization seems to pose a problem for performing a decomposition.

And this makes perfect sense. The word 'decomposition' has its roots in the disappearing of organisms. When an animal dies, its body decomposes into other substances, and hence the organism disintegrates and disappears. Should we follow this line of thinking in our understanding of composition and decomposition as inverse relations, decomposition would amount to something like dividing or cutting the whole into *all and only the parts*. But when we are looking at composite objects, we are also talking about the parts that they *have*, not the objects that could follow from their destruction or the conditions that is needed for its creation.

As noted above, it would also seem that mereology is *static*, as it is fixing its subject matter in an unchanging state, by making a decompositional analysis. If there is a change of parts, there must also be a change in the whole and if there is a change in the whole, there must also be a change in the parts. This argumentation can be applied to Leibniz Law as well, and for the same reasons.[38] The question of how static a model we are developing, is also dependent on the notion of transitivity, that is discussed in more detail in chapter three. For if parts of a whole, have parts that are not part of this whole, a change in such parts would not necessarily affect the whole, though it *could*, if it would affect the relevant status, identity, or participation of the part of the whole, that it is a part of. To take an example to be considered in chapter three, if a soldier is part of an army, and we argue that the soldiers right hand is not part of the army (because the army only consists of soldiers), then if the soldier loses his hand, it might still affect the army, as he is not able to perform his duties in the same way.

We are faced with the question, how to understand mereological decomposition as inverse to composition, if we cannot understand it as division. For if composition is a relation from part to whole, we cannot ignore the parts, as they make up the constituent condition of our analysis. Similarly, if

[37] Elder 2000.

[38] In Storm-Henningsen 2004 I have argued in favor of a way out of this seemingly eleatic ontological implication: If the inertial system, or the subject, is itself in motion, what will appear as fixed or static will be relations between the subject and object that is ordered in such a way, that the relation itself appear unchanging. The subjective experience of its own motion is then perhaps what we may refer to as the experience of 'the passing of time'.

decomposition is an implication from whole to parts, we cannot ignore the whole, because it also works as a constituent: It is the condition upon which we can have the discussion at all.

The question therefore naturally presents itself, of what counts as wholes. What about processes and objects enduring and perduring through time. They are also wholes, and how can a mereology that is apparently static handle a whole-part analysis of such objects?

A solution would be to argue in favour of static time[39] or perhaps a Hegel-style historicism. Hegel writes in his foreword to his *Phänomenologie des Geistes*, that:

Das Wahre ist das Ganze. Das Ganze aber ist nur das durch seine Entwicklung sich vollendende Wesen. Es ist von dem Absoluten zu sagen, daß es wesentlich Resultat, daß es erst am Ende ist, was es in Wahrheit ist; und hierin eben besteht seine Natur, Wirkliches, Subjekt, oder sich selbst Werden, zu sein.[40]

In a spurious eleatic fashion, "what is true, is the whole". This whole includes, not only the spatial universe in its current state, but includes also, among other things, its own history of development and we need, Hegel says, to include that in our understanding of the universal whole (das Ganze).

There is obviously a difference to what would be the result of a mereological decomposition, or, what would be all and only the parts, of the whole universe, depending on whether we talk about the physical universe, with its electric "particles", stars, planets and galaxies or if we are talking about a Hegelian whole, that includes history, minds and perceptions.

A whole W_1 that is a fixed object in the sense that all that is true of it, is true, and a whole W_2 that has W_1 as a proper part, but also has its history of creation and destruction as parts, are very different wholes, even though W_2 may be said to explain W_1. We may find an argument in favor of a decompositional holism, in Hegel's statement, that is things are connected in an interdependent way, like e.g. in most biological and computational systems, we need to understand the whole to understand and use the parts properly. In this sense we might say that mereological decomposition perhaps can be regarded as an *explication* of the whole, an idea that is going to be developed in what follows. For the parts must always-already be immanent in the whole in some sense, even in the case where we would suggest that *all and only the parts* can only be a model of the whole.

Now, when we have made an epistemological turn in our mereology, by reinterpreting mereological decomposition from being a formal ontological relation to becoming a mereological operator, we stand

[39] Static time is the idea that time is a temporal dimension. The view is, justly or not, often associated with McTaggart and defenders of Minkowski space-time. See Turetzky 1998, pp. 121-155 for a discussion and overview.
[40] Hegel 1988, p. 15 (18-19).

with the following question: What if our knowledge of the whole is false or erroneous? Would it not lead us into a false and erroneous conception of the parts? For even if we can never say, understand or comprehend the whole in its complex totality or absoluteness, we can from our stipulated truth of the whole, deduce conditionally partial truths for particular parts in question, that stem from their very participation in the whole in question. This must be the purpose of a mereological decomposition.

So, the answer is yes. This is an issue, and I believe, a very practical one that lead many people in a variety of social settings to make erroneous judgements. This is why chapters 4-6 of the present work are devoted to the consideration of a mereophenomenology of systems. But for now, we might point to the inversibility of mereological composition and decomposition: If we consider how the parts may compose a whole, and what nature and extension this whole can or must have, then we are also weighing our knowledge of the parts against our assumptions of the whole. And these two conceptions may correct each other, in much the same intricate way theory and data often interact in field research, or the way one can test one arithmetical operation, say multiplication, with an inverse operation, say, division.

But it is important to emphasize that the inversibility also suggests a *mutual restriction of both composition and decomposition*. If decomposition is not destruction, then composition conversely is not a creation. Instead, we may view 'composition' as being about the constitution of the whole in question, as it is lying before us in our analysis; and decomposition conversely as an analysis of the constitution of the parts in question, as it is lying before us in our analysis. Though we maintain our mathematical approach, we also move towards an intensional mereological system.

Therefore we need also to carefully distinguish between creation and composition in a decompositional mereology, because we need to pay attention to the inversibility as a governing principle, which restricts our notion of composition. Pointing to the intuitive nature of decomposition, therefore restricts the inverse compositional relation to be intuitive as well. Having a composition as is extensionally understood, would similarly demand extensionality of the corresponding mereological decomposition.

An objection could be, that it is hard to see how we could have a mereological decomposition that is not disintegration, as the integration of parts seems to be involved in almost all kinds of composition. After all, composition holds exactly between many (the proper parts) and one (this is for instance often the case in what David Lewis calls "Fusions").[41] Here, the parts are not "nice parts" in the sense, that they fall naturally into topological individual units, but are blended like in a mixture. However, as Lewis rightly observes, it is not the composition as such that integrates. The object/whole in question is already

[41] Lewis 1991.

integrated (fused) to a higher or lesser degree – or it is not. Composition is a model of how the parts compose the integrated whole. Composition does not integrate, as decomposition does not disintegrate, but together they may map the mereology of integrated objects.

1.5 The Lady and the Vase.

The idea that decomposition is not division, may still appear controversial to some. Yet, it is at the heart of what is here proposed as mereological decomposition, and later developed as a foundation of decompositional mereology and mereophenomenology. Even those who find the arguments above intellectually appealing, might be discouraged by a lack of intuitional clarity: What is this about? – one might ask: If decomposition does not involve division or disintegration, is that not simply to advance a Leibniz-style argument, that no unities (monads) have proper parts?

I think not. And to make my case, I shall use a couple of intuition pumps, as Daniel Dennett has called them, to show the intuitional feasibility of the notion of mereological decomposition in this chapter, as well as the notion of parthood (in chapter two) that comes with it. Let's consider such an intuition pump; consider the following story:

There is an old lady in her living room. In the room there is also a window out to the garden, and on the windowsill, she has placed a vase with flowers. The vase was a gift from her children, and she values it therefore highly. Accidentally one day, when she is wiping dust in the room, the vase falls to the floor and breaks in two halves. Fortunately, the vase is broken in such a way, that the lady is able to attach the two halves carefully together, without gluing them. After the operation, she is even able to replace the flowers in it. When the vase now again stands there in the windowsill, it would be impossible for any visitors to spot anything out of the ordinary, and it is the lady's hope that her family, the ones that gave her the vase in the first place, will never find out about the accident.

The overall question that concerns us now, is whether the accident of breaking the vase, corresponds to a mereological decomposition? For the sake of argument, let's suppose that these two parts of the vase that is reassembled, will correspond to all and only the parts, in some sense or other. Let's call the vase before the crack V_1 and the vase after the break V_2.

On the one hand, V_1 and V_2 have the same material parts, as it is the same ceramics and the same geometrical structure that is there before and after the accident. On the other hand, they are, if we follow Leibniz' Law, not identical, for there is a change in properties of V_1 and V_2, as V_2 is more fragile than V_1.

It would likely take a lesser blow for the two parts to fall apart in V_2 compared to V_1, because the bonding between the particles at the border of the break differs from V_1 to V_2. But suppose, for the sake of argument, that there are no ceramics missing. So, the material substance underlying the structure in the two worlds is the same.

We could of course also ask about temporal coherence, arguing that V_1 and V_2 are two different temporal parts of the vase, and that they are therefore different in properties. However, it would be the *same* vase in the sense, that it has the same enduring essential parts or moments, that are the defining feature of the vase through time, combined with its coherent history from when it was created, until it is finally going to be disintegrated (destroyed) sometime in the future.

But if we argue, that the breaking of the vase is a mereological decomposition in our sense, or an image thereof, we would have to argue that it is in fact divided into two *parts* by the accident, two parts that jointly can be made to compose or re-compose the vase. But is the crack itself an added part? Or a removal of parts? In other words, does this accident change the composition of the vase? This must be the essential point, if we take the assumption of inversibility between composition and decomposition seriously. For in this case of decomposition, the whole is assumed, and the nature of the parts discussed. Therefore, if we through decomposition change the nature of an assumed whole, the premise of the mereological operation is changing all together. Thereby we have arrived at the crucial point in the example because I shall argue that whatever we choose, it does not make sense to see the accident as a mereological decomposition.

First, if we argue there is *no* mereological difference between V_1 and V_2, the accident cannot have been a division into parts, because if it were, V_1 would have the same crack as V_2, that is, it would have had these two partitions to begin with. Which, from this perspective, it had. But then the crack itself is irrelevant to the decomposition – from a mereological perspective, it is not really there, since the crack is not included in *all and only the parts*.

Second, if there *is* a mereological difference between the parts of V_1 and V_2, at least one part must have been added, subtracted and changed in a sense that led to a corresponding change in the structure of the whole. This part is of course either due to the crack itself, that is an invisible but not undetectable part of V_2, but not of V_1. And even in the case where we would not accept cracks as parts, the crack at least represents a mereological change of property of the whole. For example, one change that could be argued could be, that the adding of the crack involves creating two *nice* parts, parts that the whole is naturally

divided into without remainder, the left half, and the right half. It could perhaps be argued that we have made the vase into a 3D jigsaw puzzle with only two pieces, by the decomposition.

The idea of mereological decomposition, is not to create partitions in this way, destroying or at least disintegrating the whole that forms the basis of our analysis. Rather creating such partitions, even in theory, would be distancing ourselves from our object in question. If there is a mereological difference between V_1 and V_2, that is, the mereological decomposition as a formal operation has added or subtracted a part, we would run into problems like in quantum mechanics, where the measurement itself affects the measured object.[42] But if mereological decomposition is based on the idea of an explication of the whole, V_1, then the mereological distancing of V_2 is unfortunate, because the explication itself is creating a change. It must therefore be rejected unless the change can be accounted for by the inverse mereological composition. Such a compositional account, however, need to rely on one of the two following claims:

1. The crack or the two resulting nice parts were in some sense already there. Perhaps there was a weakness in the vase?

2. The ceramics itself should be regarded as tiny pieces surrounded by a myriad of "cracks"? Hence the crack emerging from the accident, is simply an explication of the mereological structure that is already there.

Ad. 1: The immediate response from what we have considered so far, would be that in the first case a weakness is not a crack, and that predicting causality is not a mereological structure. If we think about the inversibility, we can also say, that if a whole can be decomposed to all and only the parts, these parts are the sufficient condition for composing the whole, which can then be decomposed and then again composed. But in this case, even if the composition can explain the crack made by the decomposition and the crack will become part of *all and only the parts*, and therefore it will not re-compose the vase. To be clearer, the composition of V_1 might be sufficient for the decomposition into V_2, but V_2 is not sufficient for the composition of V_1. For in this case, V_1 would be the whole, and V_2 would be *all and only the parts*.[43]

[42] A lot has been written about this aspect of modern physics. See particularly discussions on the so-called *Copenhagen Interpretation* of Quantum Mechanics (Niels Bohr's Theory of Complementarity and Werner Heisenberg's Indeterminacy Relations) See for example Hebor 2005 for a philosophical discussion.

[43] This is under the assumption, that the decomposition is supposed to be a *decomposition simplicitèr*, that is, a decomposition into all and only the parts. For this is a necessary condition for the inversibility, which again must be implicitly assumed when composition is considered an explanation for the decomposition.

Ad 2: If the crack is seen as an explication of a structure already immanent in V_1, V_1 and V_2 must have the same mereological structure. There is therefore not a mereological difference.

To sum up, with this example – or intuition pump – I have attempted to provide an argument in favor of the claim, that mereological decomposition is not division and that – when thought through, this is perfectly in accordance with common sense. This, due to the inversibility, might have implications for a corresponding notion of composition. Also, looking more detailed into the notion of composition, might give us grounds for a further development of mereological decomposition.

1.6 An Emergence/Building-sensitive Design of Mereological Decomposition

If we want to keep the possibilities of different versions of composition open, we also need to consider the possibility, that we might operate with various corresponding versions of decomposition. As some design thinkers might phrase it, we require to have a *composition-sensitive* design of decomposition. This is not to argue, that composition has a primacy over decomposition, but simply to engage into unexplored territory from the more well-known, and discussions of composition and related concepts have been many up through the 20th century development of mereological thought.

Fortunately, we do not require a historical walk-through at this point since we have already touched upon some issues above. For we have pointed out that if composition is identity, decomposition must be identity too. Though mathematically possible, introducing the inverse pair of composition and decomposition in this case would simply add formal complexity without explanation, but like in extensional mereology, decomposition as identity may serve as a mereological limit, though in a slightly different way than the mathematical limit of infinite series. Such considerations will be taken further in chapter two.

Karen Bennett[44] has suggested the term of "building" as a framework for understanding the ontological question of how some things can be made up of others. This suggestion is worth considering, as it addresses some of the underpinnings relating to, how the larger (whole) can be made up from the smaller (parts), what we so far have been labelling "composition".[45]

Getting into Bennett's analysis, she seems to be making a point that apparently is directly in opposition to my idea of a "static" notion of composition/decomposition. I believe, however that this opposition is

[44] Bennett 2017.
[45] *ibid*, p. 7.

merely superficial, but it certainly requires a comment or two. Let us begin with Bennett's argument, that in any building-relation, there is an element of causation, what at least on the surface of it, appears to be in direct contradiction to what is argued here. She writes:

The thought is that there are two quite different types of 'because' and 'makes it the case' talk. One corresponds to my notion of building: for example, a certain pattern of low-level physical activity makes it the case that my coffee mug exists and has the mass that it does. The other is causal: my throwing the mug in a certain direction makes it the case that there is a big splatter of coffee on the wall. That distinction turns up, implicitly or explicitly, all over philosophy. Indeed, we have a deeply ingrained spatial metaphor for it. Causal determination is horizontal, and noncausal building is vertical. [46]

Bennett then goes on to argue that this supposedly clear-cut distinction is somewhat flawed for two reasons: Causation is itself a building relation and many of the other building relations involve particular elements that are at least partially causal.[47]

I agree that there is a large grey area here, but I shall argue that there is an extra factor that adds further to muddling this clear cut distinction: Causal relations have parts and these parts are even often conceptualized functionally, and can be seen, if causation is sensitive in Mackie's sense, as if causations can be decomposed as a complex open system.[48] In that sense, causation is horizontal building, but it is a perduring object, that is, an object whose integrating structure is distributed over a certain timespan. As such, it can be decomposed, because it can be treated as any other perduring object.

What Bennett really points to is, that composition may not always be vertical, and that causation *can* be vertical, and indeed often is. Think of emergence and downwards causation as examples. This leaves my epistemological claim above untouched, that composition is not creation. For when we talk about the (horizontal) composition of causation, we are not talking about the causes of causation, but about the structure of causation.

As an example, suppose for a moment that I decide to draw a house. First, I draw two lines, to make up the walls of the house.

[46] *ibid*, p. 67.
[47] *ibid* p. 68.
[48] Mackie argued that various conditions may compose a cause or a so-called INUS-condition. See Mackie 1980.

Figure 6a. Drawing a house.

Then I make a go for the roof, but in my first attempt, I accidentally draw the line crooked and misplaced.

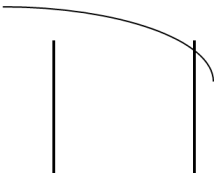

Figure 6b. Drawing a house.

but I learn from my mistake. I erase the crooked and misplaced line and decide to replace it with a triangle.

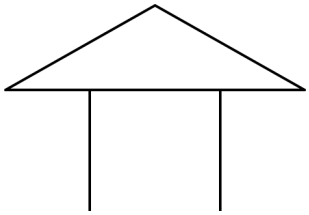

Figure 6c. Drawing a house.

Finally, I put some small squares to represent two windows and a door and add a line to mark the horizon. Now, my drawing is finished.

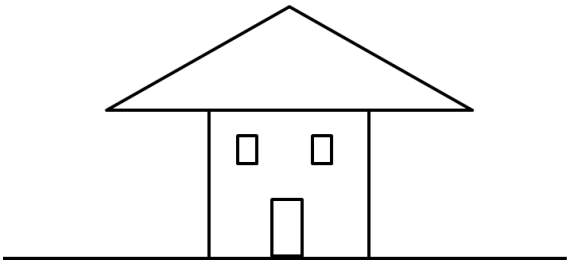

Figure 6d. Drawing a house.

Suppose now that you look at the drawing and ask me how the picture of the house is "made up". I could give you two kinds of answers, corresponding to the two examples in Bennett's example. One could be, that it is made up of lines, and squares and a triangle, explaining the symmetry, the thickness and color

of the lines and how this affects the overall impression of the whole. The other would be to tell you how I decided to make this picture with computer-generated lines because I'm so awful in drawing myself, and how I still managed to make a misplaced and crooked line in figure 6b, that I had to delete, and how I finally came up with the picture in figure 6d.

These two explanations have little, if anything, in common. The first explanation is about *what it is* (and perhaps *how it is*), and the other is about *how it came to be*. What is even more important: In the first mode of explanation, we straightforwardly explain the parts in the drawing of the house and how they relate to the drawing of the house as a whole. That means that both the parts and the whole are simultaneously in the scope of our explanation. To put it in another way: at a certain time or temporal span defining the scope of explanation, both the whole as well as all the parts are there. But when we talk about causation, as a creation or change extended through time, the "whole" must be the result, that is, the effect of the process or cause. The effect replaces the cause and cause and effect do therefore not have a simultaneous presence. First, I draw the house, and then the drawing is there.

In this case, the cause and the effect alike must be regarded as parts that build up the causal relation, which, then, is jointly to be considered a whole. It would not suffice to think of the cause as building the effect, for that would not explain the causal relation as a *whole*, but only give a causal explanation to the effect. The same thing would go for INUS conditions, though the analysis of those would be more complex and less linear.

Mereological composition, seen as an explanatory or ontological relation, can therefore not in itself be a relation of change or creation, even though it can be applied to processes of change and creation. This means that mereology in general, and composition in particular, is not a building relation of the same kind or category as causation.

The remaining question to Bennett is, if composition or building is the most fundamental relation. I would agree that building relations can be decomposed into parts, since they do, at least, contain that which is built and that which it is built of. And often they are vertically or temporally ordered, or both. But when you decompose something, you explicate a particular meaning or understanding of the individual whole in question. The key lies in the term parts or mereology.

Even if building to a larger or smaller degree contains an element of causality, as far as this building is *mereological*, that is, when you make something up of its *parts*, these parts could be temporally or vertically distributed and connected, but only in as much as we are referring to an enduring or perduring object. This is more in line with, what we above have referred to as a *Hegelian whole*, a whole that includes its own

evolutionary history, and from this kind of whole, *all and only the parts* can be distributed over various temporal domains. There is a substantial difference between the drawing of the house, that is a perduring object, and the picture of the house that is an endurant object. And their respective decompositions would therefore be different indeed.

These considerations may lead to some Heideggerian-style fundamental-ontological questions like, Is there a building of building?[49] What is composition composed of? Can there be a decomposition of decomposition? Let us take composition and decomposition first. It seems reasonable to suggest, that they may both be composed of two kinds of elements.

First, they are structured logically like conditionals. Furthermore, they are inverse, which implies that they restrict each other. Second, they are situated. From the discussions so far, it seems clear that exactly what kind of operation decomposition is supposed to be, depends on the task placed on the inverse operation of composition. If it is a temporally or horizontally extended whole, the decomposition into *all and only the parts* would be different from the situation where we would examine the mereological constitution of a system at a particular point in time.

To give an overall framework of characterization of different kinds of composition, Bennett's work is of much help. Bennett suggests an unexhaustive list of six forms of building and she later goes on to characterize these notions, while exercising caution concerning the generality, as there might be kinds of building that are exceptions. The six building relations that Bennett highlights are

A. Composition	*B. Constitution*
C. Set-formation	*D. Realization*
E. Microbased determination	*F. Grounding.*

I believe however, that Bennett's distinctions here become somewhat unclear, even more so than she herself seems to argue in her book. But for the present purpose, what distinguishes them from each other, is to what extent they involve emergence of structure or systemic properties.

[49] Bennett discusses this question at length, *ibid*, pp. 187-213.

A&B. Composition and constitution

Composition and constitution, in Bennett's understanding involves emergence, in the sense that the whole is more than the sum of its parts, but while composition holds many-to-one, constitution holds one-to-one. That means that composition here is construed as a system: It has systemic properties, i.e. properties that no one of the parts have,[50] as well as distributed properties, i.e. properties that are 'carried' by the parts. Constitution on the other hand, is an ontological relation where something x constitutes or underlies y. An example is Alan Gibbard's classical example of a statue and a lump of clay that is making it up.[51] The lump of clay and the statue have different persistence conditions and are therefore discernible according to Leibniz' law. However, they are composed of the exact same material.

If we look at these examples from a decompositional perspective, *all and only the parts* of the system must be the parts that are required to compose the system. But we start with the whole and are faced with the above-mentioned issue of the systemic properties. We have several strategies to pursue in order to account for such irreducible properties, emergent parts, improper parts, emergent properties, and of course an eliminitavist/reductionist approach, that may argue that the systemic properties are not really there, after all. It is worth noticing, that 'parts' are in this context by no means only considered material parts. If we work with connectionist emergence,[52] activities and processes and causal chains might be included as parts, iff it is allowed as an explication of the understanding of the whole. In chapter two I shall in addition to these, develop a suggestion based on the *decomposition-is-not-division* thesis: That there is a kind of 'semiosis' involved in parthood, that may account for such properties.

In the case of the constitution of the statue, we might argue, that we must point out, that we begin with the whole, the statue. The point is now, what we mean by this statue: Is it a particular form of portrait of Goliath, say, and could the *same* statue be cast in bronze, gold, or stone? If the *same* statue, could be instantiated in different materials, the philosophers that argue that the clay is not part of the statue, is right. Because the statue is an abstract object, a particular recognizable image. But if we by statue mean, the *thing* that stands before us, then the clay is part of the statue, but so is the instantiated form with its tear and wear, crack in the fingers and parts of the nose missing.

[50] Stephan 1998.
[51] Gibbard 1975.
[52] Stephan 1998, pp. 56-7.

C. Set formation

Set formation is the relation whereby objects come together to form a set. Bennett points out[53], following Lewis[54], that composition combined with a notion of singleton-formation, is sufficient to account for set formation. But if the building relation is exclusively regarded as an ontological relation of how the small makes up the big, following Lewis is a risky path to take: Lewis' notion of fusion conforms to the principle of unrestricted composition, and thereby Lewis obtains its ontological innocence. Furthermore, Lewis agrees to the principle of composition as identity, or rather fusion as identity, which enables him to account for all kinds of sets, except perhaps the null set. [55]

Exactly because of the proposed ontological innocence, it is hard to see how set formation can count as a metaphysical building relation. In fact, I find it reasonable to suggest, that it collapses into the notion of composition in so far as it is regarded as an ontological notion of building. And even when it is used as a methodology to capture insights and make descriptions of areas in linguistics or aesthetics etc. composition and constitution do equally well, compared to set formation.

On that basis, it would be tempting to simply dismiss set formation from any relevance for mereological decomposition, or to use it as a limit like identity in extensional mereology. However, we might suggest, that from a decompositional point of view, we could make good use of a complementary notion of decompositon into all and only the parts, one that sorts various parts into sets and classes. This is to help us to identify and establish types, tokens, levels and organization of parts of various kinds of systems/wholes. In chapter three this is termed "Sortal Decomposition" or SD decomposition and this process is not unlike set formation.

A set requires inclusion criteria based on, for example, sortal concepts, in which case we operate with a deliberate sorting out of various entities from each other. However, in the case that set formation is used to subdivide elements of an already existing set, class or whole, it is not clear if this is to be considered a proper building relation, as the relation *may* seem to go in the opposite direction.[56] This proposed relation

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[53] Bennett 2017, p.10.

[54] Lewis 1991, pp. 29-35.

[55] Bennett ends her exposition of set formation by pointing out, that the membership relation in set theory is like how composition or fusion stands to the parthood relation. This, however, is inaccurate. We might argue that the membership relation in set theory stands to the parthood relation in *mereology*. Fusion is used as a replacement of the concept of a mereological sum, which in turn is an interpretation of the mereological concept of a whole. Composition, in mereology, designates what we might call whole formation, this makes appear to be similar and might appear similar to a corresponding notion of set formation.

[56] An example could be a selection of test persons of a clinical trial. Suppose a group of students is enrolled in a study based on some physiological parameters, Body Mass Index, hight etc. Before the trial starts a subset of the persons, say pregnant women, are identified and excluded from the study out of safety reasons. We might argue that this is a building relation, but it would be indeed very weak. For an alternative approach, see notably Schaffer 2010.

from the big to the small, would not be unlike decomposition, and the possibility of using sortal decomposition to form sets etc. will be considered in more detail in chapter 3.

D. Realization

The relation of building called realization, as Bennett does not fail to notice, is what Carl Gillett[57] has called "flat realization". The idea is, that several recognizable phenomena with causal properties, as different as pain and defense or flow of information and behavioral patterns, is recognizable as being of the same natural kind, but may be made up of very different processes in different contexts. Hence it is said that one property might realize another. Mentioning a couple of examples above, such phenomena may arguably be realized by very different kinds of processes, whether we consider cell behavior in biochemistry or the war in Syria.

Inasmuch, as this concept is supposed to be a one-on-one realization by instantiation of properties, this notion appears to me vague and perhaps a little mysterious, as long as it is seen as distinct from both constitution on the one hand and from micro-based determination and emergence on the other.

However, examples in this matter have been the subject of mereological efforts, especially so-called non-well-founded mereology. This non-standard approach is very often focused on the particular cases where neither of the other mereologies seems to fit. In what sense is, for instance, a picture part of a painting, the culture part of a group and a mind part of a brain? These difficult questions has animated to suggestions concerning the whole-part relations, where objects can be proper parts of each other.[58] An example could be to allow for parthood relations beyond proper and improper (identity) parthood, like "irregular parts",[59] that would allow for aesthetic qualities like Arthur Danto's claim, that being an artwork is a part of the object,[60] or perhaps also in the case where it is argued that the picture is part of a painting.

For all practical purposes, I think that it would not add further to the notion of decompositon, though I readily would love to hear suggestions on that part: There is always a chance, that things you do not quite understand hide possibilities and insights that can become important to the subject matter. But in the time of writing, this notion appears to me redundant.

[57] Gillett 2003.
[58] Cotnoir 2012.
[59] Null 1995 and 1997
[60] Danto 1981. See Storm-Henningsen 2017 for an overview of discussions of wholes and parts in theories of Art

E. Micro-based Determination

Micro-based determination as Bennett choose to call it, comes in two flavors, either with realization or with emergence. The realization kind is discussed mainly in Jaegwon Kim 1998 and Sidney Shoemaker 2007. The idea is that some properties of the whole are based on the properties of its parts, and it seems to me very close to what Stephan calls *weak synchronic emergentism*.[61] The shape of a shoe is micro-based on the shape of the parts of the shoe. If the parts of a shoe are put together in certain ways and they have the particular shape that they have, then the shoe *would have to have* (determination) the overall shape that it actually has. As I see it, it is the minim criteria of composition.

F. Grounding

I believe that the concept of grounding is by heart decompositional. To the extent that we begin with wholes, in order then to progress to 'deeper' or 'lower' level foundations. It is mainly used to explain how some kinds of existence is founded on something more basically fundamental. Furthermore, grounding is not an exclusively ontological concept, but also used in psychology.[62] However, it is not an exclusively mereological notion. Some ideas of grounding are related to the Presocratic archaic philosophy, where the idea of an underlying substance or principle was prominent[63] and eventually developed into Logos in Greek thought. So, some kind of grounding, might be identified through a decomposition, even though most ground will go beyond the mereological domain.

Composition and decomposition themselves can perhaps be seen as grounding a mereological analysis of a system or object. If composition is defined as a relation that holds part-to-whole, it is a relation that is important or at least deployed in terms of explaining and understanding the nature of wholes. The claim of some essential properties of a particular whole in question must depend on some implicit assumptions of

a) An understanding of the nature of the whole as an individual

b) A compositional analysis, how the whole is made up of parts and what therefore must be characteristic of the whole, both epistemically and ontologically

c) A decompositional analysis that includes a characterization of the parts, their parthood, their nature, and organization.

[61] Stephan 1999, p. 49.
[62] Examples cover many areas in psychology and philosophy of mind, se Gordon 1987 as an example in emotion theory.
[63] See Kirk, Raven and Scofield 2007, pp. 76-2013, Guthrie 2000.

1.7 Decompositional mereology as a first philosophy?

To sum up, the main argument of this chapter is an introduction according to which the notion of mereological decomposition rests on the assumption of inversibility. The essential relation or operation is *Mereological Decomposition Simplicitèr*, that is a mereological decompostion into *all and only the parts*. This follows from the inversibility alone.

Decomposition is situated because it is dependent on the specific nature of a *particular* whole. The respective notions of mereological composition and decomposition, are therefore also restricting each other, which in turn makes a decompositional mereology, developed on these premises, intensional in nature. In addition it is argued, that mereological decomposition is not division, and it can therefore not be regarded as a mere heuristics or analysis, hypothetical or actual analysis, where the parts are removed and individually examined, in order to be re-inserted or synthesized the original whole. In that case we would miss out on the essential nature of parthood itself. However, it would be possible to develop a supplementary notion of what we could call "Sortal Decomposition" with inspiration from what Bennett has called "set-formation", a decomposition that focuses on the classification of kinds of parts. Such a notion will be developed further in chapter 3.

The conception of mereological decomposition, the understanding or "grasping" of what it is, should be like an "explication of the whole". Mereological decomposition starts with the nature of a whole, a whole that is perhaps already known, perceived, thought of, imaged, or construed and the nature of decomposition then relies on the particular nature of the whole. Since mereological composition is therefore also restricted from assumptions of the whole, though indirectly, and furthermore on assumptions on the parts, since composition originates in the parts, any decompositional mereology, be it conceived as an epistemology or an ontology, must always already require a preliminary understanding of parts and wholes.

This means a mereological decomposition is always theory-laden, at least in the sense that we have some kind of preliminary understanding of the nature of the whole, to guide us through a decomposition process. This situatedness does not rule out that decomposition might be a valuable supplement to philosophies of wholes and parts. It does suggest, however, that mereological decomposition, as such, is difficult to place in metaphysical theory, understood as a first philosophy. For even when composition and decomposition are introduced as a pair of complementary operations, decomposition does not only rely on the notion of composition, but also on assumptions prior to the mereological operations.

In other words: If decomposition is key to understanding the parts and their parthood, and composition is key to understanding the whole, we must know something about the whole, what it is, its natural kind, etc., to make sense of a decomposition, while we do not necessarily need this for composition. Composition, taken as a stand-alone and unrestricted operation, as it might be if regarded as a first philosophy, could be about whatever parts and how they compose whatever whole.

But if we include mereological decomposition in the logical operations, composition will be restricted: For the whole we make up, must be dependent on the parts. And applying mereological decomposition, the parts are no longer just assumed, they are reached by performing a logical operation. Neither composition nor decomposition can therefore serve as a first philosophy, but must be placed into a previously known domain, in order to create a better understanding of the world and us as participants in it.

Chapter 2. Individuals and the Semiosis of Parts

In this chapter it will be argued that parthood involves some kind of *semiosis*, in the sense that mereological decomposition transfers meaning from the whole to the parts. Though the term originates in Peirce's semiotics, it is not claimed that parts are literally signs or that signs are literally parts. Rather, the suggestion is that parts and signs belong to the same family of objects, making them of the same natural kind. Three related claims will be argued in support of this idea:

First, this idea of a semiosis of parthood either follows from, or is supported by, a proper understanding of the notion of a mereological decomposition simplicitér and its inverse relation to mereological composition, argued in chapter 1.

Second, we may distinguish between levels of semiosis of parts – some parts have more semiosis than others – and that how much semiosis a part may have, depends on the level of integration of the whole.

Third, individuality can be seen as a limit of parthood, in a similar way as extensional mereology sometimes considers identity to be. But in this version, following the main claim of semiosis above, it is argued that if there is no semiosis at all, the object in question is an individual, not a part.

One of the main claims in the preceding chapter was, that mereological decomposition cannot be division since it cannot involve the disintegration of the whole. The claim was founded on a construal of the concept of mereological decomposition as inverse to composition and as well to the intuition that composition cannot be creation. This is argued despite the acknowledgement, that the exact understanding of the mereological pair of concepts of composition and decomposition, may be situated. Situatedness is here to be understood in the sense, that some objects, be they integrated wholes or mere aggregates of parts, might be of such diverting nature, that the composition and decomposition might be of such different varieties, as to correspond with the wholes and parts in question. After all, a decomposition is here regarded as an operation *explicating* the whole decomposed.

Though this idea of considering parts as something else than individuals, as "carrying a reference to" or "pointing towards" the whole, may seem strikingly controversial to some modern philosophers of wholes and parts. I shall therefore point to, that there is in fact a line of philosophy of wholes and parts, that can be said to anticipate this point, notably focusing on Goethe's works on morphology, Hegel's considerations in the *Phenomenology of the Spirit* and in the *Logic*, as well as some of Husserl's works, particularly the *third logical investigation* and the *lectures of inner time consciousness*.

I do not argue that the notion of parthood advanced here, is also found with these three thinkers, but only that a rationale is developed that may support the understanding and acceptance of overall approach. I shall then turn to a semiotic analysis of parthood arguing that decomposition can be viewed as a *dimensionalization* of objects, and that it is mainly useful in cases where we work with objects that are not fully integrated and also not fully disintegrated. And such objects we normally label simply as 'systems.'

2.1 Mereological Decomposition, Parthood and the Question of Individuals

To understand the notion of parthood, that is involved in a decompositional mereology, at least as I have attempted to construe it here, let us begin with the familiar notion of individuals. As classical extensional mereology is at the heart of a calculus of individuals, as we find it particularly with Leonard and Goodman. In this system, parts are considered individuals and wholes as sums, fusions, or classes of such individuals. And wholes are often argued to be ontologically innocent, that is, wholes do not exist, only individuals do.

This leads to many questions. Can classes, sums and fusions not be parts? Is there anything we can think of, that is both a part and a whole, something that our common-sense intuition would certainly suggest? What is an individual, really? And how do we account for organisms and other systems, that have many parts, of which some are integrated into subsystems that involves complex interactions?

According to Leonard and Goodman, individuals are distinguished from wholes by suggesting that the notion of a whole involves a suggested subdivision into a particular group of individuals, while the notion of an individual does not. The notions of individuals and classes (wholes) is therefore interrelative to each other. As it is written in the opening of their paper:

An individual or whole we understand to be whatever is represented in any given discourse by signs belonging to the lowest logical type of which that discourse makes use. What is conceived as an individual and what as a class is thus relative to the discourse within which the conception occurs.[64]

An individual is therefore anything that can be subsumed into a class or set and treated in mathematical logic. That means, that it is in Plato's sense *one*, and can be counted by a quantifier, that is a list of possible values of variables in first-order mathematical logic. In second-order mathematical logic we may translate this into anything that is self-identical and satisfies Leibniz' law:

[64] Leonard and Goodman 1940, p. 45.

A=A is a tautology and therefore always true, and though some discussion has been on Leibniz' law[65], this definition is also so broad, that when the use of mereology goes beyond mathematical theories of sets and classes, it is a fly in the face of common sense.[66]

The reason is, that it is hard to discern individual parts from mere relations or properties. For Leibniz' law serves a principle of predication, and both parthood, relations, qualities can be predicated. But an individual might be a mereological atom, and still have properties and relations, which indeed does not make it a composite object.

Obviously, we may recur to the Fregean distinction between Sinn and Bedeutung, as many would in formal ontology. But this does not help us much, as we require parthood as a restricted predicate to avoid this problem. In other words, we need to be able to distinguish parts from predicates unless Leibniz' law will lead the way into mereological essentialism, the idea that a whole has all its parts necessarily.[67] In a similar vein, it is not enough to identify individuals as the extension of logical subjects, since anything could serve as the extension of a logical subject, including a class.

The counterargument could be, that this is not a problem. Rather, it is exactly the point: The reason why individuals only need to satisfy being able to be represented as logical subjects, is that mereology (seen from most extensionalist perspectives) is ontologically innocent. So, anything you want to say something about, is an individual inasmuch as it is represented by a logical subject. Hence it can be counted, compared, and sorted into various classes and sets, which is in fact the basis of a mathematical description of an object, rather than a multiplication of objects in the domain in question.

Therefore, also classes can be individuals, if these classes are the lowest logical type considered, and can be quantified, counted, and classified. And all individuals are parts of larger wholes, i.e. a class of objects which include them as objects. The reason this works, however, is because the calculus of individuals is often expressed in predicate logic. It is perfectly consistent, but the downside is, that the calculus of individuals does not really tell us anything. If *everything* can be a part, then the concept of parthood becomes almost insignificant.

[65] Leibniz Law is a logical principle of identity, stating that iff A=B is true, then whatever is true of A is also true of B. It has been a much-discussed principle, famously defended by Frege in 1892 and 2014. See also Hill 1997 as well as Storm-Henningsen 2002 & 2004 for discussion. It involves the principle of the identity of indiscernibles, that have been much debated as it seems to have contra-intuitive implications, like the impossibility of identity through change.
[66] Paul 2002.
[67] Chisholm 1973 & 1976. See also discussion in Simons 1987, pp. 255-89.

Let us begin with a point, notably argued by L.A. Paul, that the idea of the indiscernibility between properties and parts are a fly in the face of common sense. I shall use my own example to illustrate the point made:

Suppose an apple. It is red and yellow. And it is juicy, sweet, and crunchy. Are the colors parts of the apple? We may argue , with Locke and Newton,[68] that though the *perception* of the colors occurs in the mind of the perceiver, or perhaps in the relation between the perceiver and the apple, the colors as a property of the apple, can be reduced to a surface structure of the apple that reflects and refracts light in a certain way, so that it under normal viewing conditions give rise to a color perception. Let us, for the sake of argument, ignore that this conception seems to propose that the mind is able to create a perception that is qualitatively different from itself and the world, which to me seem somewhat suspicious, and simply point to the fact, that the aspect of the color that is a part of the apple is not the qualitative color hue, but its material basis and its structure.

A similar argument can be said to account for that the taste, the sensation accompanying biting in the apple, is not part of the apple, while the sugar and the flavonoids in the apple, are. It seems then, that what is part of this apple is only its material parts and perhaps their structural organization, simply because we have a preconception of the apple as a material object. So, seen as an individual, we do not need to consider the relational aspects of it, but only its parts…or so it would seem.

This attitude, I believe, is not restricted to materialism or material objects. If we consider an individual word, like 'Apple' it contains five letters, a gestalt structure, perhaps a sense or meaning, and, if we are lucky, a reference. But the interpretation and use of the word, seem not to be part of it, itself. It has to do with other objects as well, and therefore we do not count those as part of the objects. They may form the basis of their existence, but we can discern between them as well as between relations and processes of which they are a part.

Hence, we might arrive at the following suggestion. An individual is an object that can serve as a logical subject of the lowest order and have clear boundaries to the exterior context. It is epistemically self-subsistent, an object clearly demarcated from the rest of the world. It is, in other words, a whole. Not necessarily a whole of parts, as it may only have one part: itself.

But a whole in the epistemic sense of an object of analysis: Descartes points out in *On Method*,[69] that we can try to understand what this whole is, by taking its parts or elements, apart from each other and

[68] Locke 2008, chpt. 23, pp. 179-96 and Newton 1979.
[69] See Descartes 2001, particularly the second part, pp. 16-18.

examine them on their own (analysis), for then afterwards to put them back together again (synthesis). As we have noted earlier, this analytic method is not without problems as formulated with Descartes, but it gives us a relatively clear idea of the intuition governing an individual for which Leonard and Goodman are arguing, perhaps simply in virtue of its extensionality. For the whole is the sum of the parts, its behavior must likely be the sum of the behaviors, processes, and interactions of *all and only the parts*.[70]

Understanding individuals as intuitive wholes, instead of an extensional understanding of wholes as the sum of individuals, is by no means a mere definitory stipulation or innocent play with words. First, individuals were in Goodman's terminology an expression that denoted parts, it is now an intuition of the epistemic quality of an object in question, that resembles an ontological wording of self-reliance and *sui generis*. In a very important sense, the individual is argued to be itself. I am not at this point stating that parts are *not* individuals, but simply that what we call individuals are objects *intuited as wholes* in this autonomous sense: They are indeed self-relying. [71]

Mereological decomposition makes it easier to ask the question what the constitution of parts are, both in terms of a general parthood relation and as special decomposition question. The perhaps most central issue that confronts us when we are talking about decomposing integral wholes, is the following: If a composition involves emergent properties, parts, or integrating moments or systemic properties, how can we make a mereological decomposition simplicitér that satisfies compositional inversibility, when decomposition does not involve disintegration or division, that is, the destruction of the object? Is it not essential, that if composition involves emergent integrative parts or moments, these must disappear when we decompose into *all and only the parts*? When we look at the parts, we do in fact not look at the whole.

[70] This is indeed a tricky discussion. Defenders of emergent or supervening properties might object to this point, arguing something like, that there is a systemic level of behaviour that cannot be reduced to the behaviour of the parts. But often they seem to fall prey to, what we might call an extensionalist trap: The extensionalist position does exactly not discriminate between inclusion of kinds of objects that may serve as parts. Therefore, such emergent properties that are due to the behaviour on the systemic level of the whole, are always also attributable to a part, namely the whole itself. The discussion therefore transforms into a discussion of what ontological innocence exactly is supposed to entail (as this is often assumed to be a prerequisite of unrestricted composition) or indeed, in what sense one might work with properties that are not themselves parts, and furthermore irreducible to any part or subset of parts of the whole.
Another argument could be, that this only count under a *ceteris paribus* clause, disregarding the influence of possible external factors. I think however that such an argument suffers from the weakness, that if an external influence does not cause an internal change in the object, the object is left unaffected or "immune" to the influence from the external source. Hence, relating to this particular discussion, we can take external factors into account by simply noting their internal effects, if any.
[71] It might be argued that this is a stipulation more than a proposal of a strong line of argumentation. And I agree, but I believe, that the distinction is too fundamental, and that a reader that is not convinced by the argument, that what we talk about is intuitions closer to common sense, will not be convinced by any argument that may be produced at this level. This reader, I shall ask for patience, as when it is clear what this new line of thinking can do, she might be convinced by the potential of this overall decompositional approach.

The only answer that seems to be available, is that the self-identity of the whole has to be transmitted through a mereological decompostion simplicitér. Or in other words, the position I have defended seems to be committed to this view, for if the whole is not destroyed, it must still be there.

Though this might appear counterintuitive and perhaps unreasonable to some, the question is of course, what that is supposed to mean or rather, if it is possible to make such a position intelligible. I think so. And I shall use what remains of this chapter to argue just that. And like in the preceding chapter, I shall begin by using an intuition pump.

2.1.2 The scissor and the torch

I take a T-Shirt out of my closet. To find out how it is made, you could take a scissor and cut it apart, before you afterward sew it back together again. Normally, of course, one would not do that. Instead, the attention would be more closely on details, that is, focus on particular sections of the cloth, how is the collar sewn on. The shirt might be turned inside-out to observe particular details. But the shirt would be kept intact, and one would always have the whole of the shirt in mind. Perhaps, if a person wants to know how the cloth is woven, he might stretch it out. When this is done, the individual threads become more visible, and it is also easier to see how they are connected in a pattern.

This looks like a decompositional analysis, at least to the degree that it does not involve disintegration or destruction of the whole. On the contrary, it contains identification of (all and only) the parts *as well as* the whole. It reminds of what Richardson and Stephan 2007 have referred to as "zooming in".[72] When you zoom in on a system, you are able to look at it at various grades of resolution and with a certain degree of tolerance. The image is useful, because it is an example of the idea that you do not leave or destroy the whole, when examining the parts.

If we compare to the case of a mechanic in a garage, trying to figure out what is wrong with a costumer's car, what he cannot simply do, is to "take the parts away" from the car, that is, remove them from the whole in order to examine them in isolation. Because that would instantly induce the disintegration that we want to avoid, and the mechanic would have no chance of discovering any systemic errors at play. He therefore examines the parts, *while assembled*. He examines the wheel without taking it off and observes the engine "while it is running", so to speak.

[72] Richardson & Stephan 2007, pp. 129-134.

Comparing to the example of the T-shirt, we examine the parts as a section of the clothes, a section that is not sharply delineated: The cloth continues out of our focus, and we understand therefore what we are observing based on our underlying understanding of the whole. That means that we look at the parts while *being in* the whole in some mereologically significant sense of 'being in', contrasted to the spatial usage, we here mean something like 'while participating'.

It is in this sense that we might use the term "semiosis", for this only makes sense with continuous focus on and reference to, the whole. Semiosis is in Peirce's semiotics conceived as a transmission of meaning from the represented to the representamen, the sign. The term 'semiosis' comes from the greek word 'Semeio', which means something like a "mark". In essence, is therefore, that a part *marks* the whole, that is, that it can be regarded as conveying, containing or transmitting a meaning, in this sense, a notion of the whole, to which it "belongs".[73] As such it is not a sign, if 'sign' is supposed to mean an *arbitrary* indexical representation of, or reference to, another completely different object, like a drawing of a dress or a high hat placed on a door, can be a sign of the lady's room or the men's room, if placed at particular doors at, say, a restaurant.

When the mechanic examines the car parts, they do not only perform a function inside the car, but at parts of the car, we can say that they also mark the car. It is a part of the car, meaning that it belongs to the objects that jointly explicate what this particular car is supposed to be, each marks the car as a reference or belongingness to the car. We can also say that our understanding of the individual parts is *pregnant* with the understanding of the whole. From a decompositional perspective we begin with the whole, and then we move on to the parts.

As we are not moving away from the whole, the whole must still be there in our understanding of the parts, transmitted by the mereological decomposition. If the whole is a non-integrated arbitrary sum of individuals, like my copy of Marx's *Das Kapital*, the city of Copenhagen and Steve Jobs, these parts would not be expected to contain much semiosis, simply because the whole is not integrated to any significant degree. But if I refer to an integrated object like a pen or a soup, the participation of the parts for the pen to achieve its functionality or for the soup to achieve its taste and color, only make sense if we consider the parts as related-to-the-whole. The understanding of the whole must therefore in some way be immanent in the parts because the whole is integrated.

[73] Semiosis is a term that stems from C. S. Peirce, that argues an unlimited semiosis in relation to establishing a meaning or content of a sign, see for example his essay "What is a sign?" from 1897, reprinted in Peirce 1998, pp. 4-10.

In this sense, an argument might be made, that semiosis is to decomposition what emergence is to composition: An explication of the level of integration of the whole. This is not entirely accurate, I believe, and I shall indeed criticize such a view below, but it does for the current purposes add some understanding to where we are heading. And we might indeed argue that emergence may in some compositional mereologies model integration in the same way that semiosis can do in decompositional mereology. But I shall also argue against that both can sensibly occur in the same mereology, but instead that emergence can be translated into mereological semiosis and perhaps vice versa.

At this point, to further make this suggestion intelligible and perhaps less controversial, I shall strive to show that this view is not far-fetched but actually has its predecessors among the early phenomenologists.

2.2 Three Anticipations of the Semiosis of Parts: Goethe, Hegel and Husserl

It is worth observing, that these considerations are focused on how the parts are observed, instead of the ontological notion of how the world is build up by parts and wholes. This follows from the epistemological turn suggested when the notion of mereological decomposition simplicitèr was introduced in chapter one. But also, it suggests a mereological approach that is more in the style of the hermeneutical considerations of Dilthey and Gadamer,[74] than of Lesniewski or Goodman[75]. And, as we shall see, even the interpretation of Husserl's mereology proposed by Simons and the ideas and discussions of constitution by Wiggins and Bennett, does not really do justice to such an epistemologico-phenomenological approach that has its initial focus of the appearance of part-whole in perception, though they do not, as I read them, exclude that approach either.

Instead, at the birth of phenomenology, particularly with Goethe, Hegel and Husserl there is a particular focus on perception in the considerations of wholes and parts, but also, in all three cases it is not limited to the mere subjective experience of the individual spectator. Instead, the whole idea of the subjective is pushed towards the idea of the mind (Geist), which compared to our endeavors, resembles the nature of an epistemological turn, that does not exclude ontology. I shall therefore add some comments on Goethe's, Hegel's, and Husserl's approaches in order to aid and develop the above idea of parts as non-individuals. Afterwards I shall attempt a more theoretical characterization, and I shall therefore not attempt a complete exposition of the thoughts of these three founding fathers of phenomenology.

[74] Dilthey 1900 & Gadamer 1960.
[75] Lesniewski 1992, Leornard and Goodman 1940 & Goodman 1966.

2.2.1 Goethe

Goethe's view on morphology, particularly in his morphology of plants, can be seen as a kind of genealogy of structure, where the part is first dependent of the whole, and then in its development is striving to develop into an independent whole. Like a child that strives to be an adult or a seed that strives to be a tree, Goethe introduces a something like a *Will* or *Entelechy*, as a concept that governs development in nature, much inspired by Immanuel Kant's thoughts in *Kritik der Urteilskraft*.[76] This evolutionary conception might pass the idea on to our considerations on mereological decomposition, that the distinction between parts and whole might be converging towards autonomy: A part of a whole, may converge, move or develop from absolute dependence of the whole towards absolute autonomy, where it is then experienced as an independent whole.

I have tried to illustrate this overall idea in figure 7. And though it does not do justice to subtlety and complexity of Goethe's thought, I have made a line from a mereological atom, what Leibniz calls a monad, and have placed two kinds of wholes as examples of intermediary development stages. To begin with, the part is totally integrated in the whole. As it develops, it strives for independence, which it then can achieve into an increasing extent until it reaches its goal of absolute independence. It is now not a child anymore, but an independent individual.

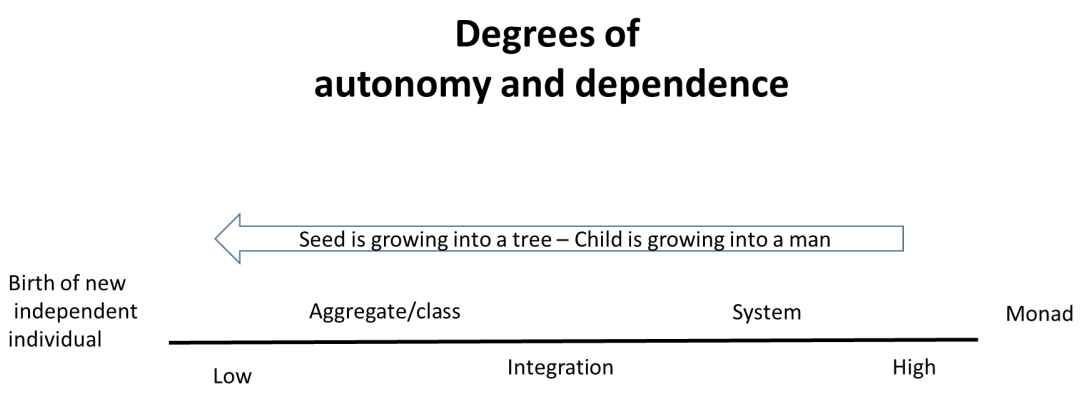

Figure 7. Goethe's evolution of autonomy

[76] Goethe 1987 pp. 273-81 and Kant 2009. I am here partly following Carranza 2020 in my interpretation of Goethe's morphology, see particularly Carranza 2020 pp. 18-52 for the mereological themes. According to Carranza, Goethe identifies the mereological dimension as one among four dimensions, pertaining to descriptions of phenomena in natural science. The three others are the environmental dimension, the normative dimension, and the epistemic dimension. Goethes ideas have obviously been highly influential, and have inspired C. Lloyd Morgan for his concept of "Nisus" in his book *Emergent Evolution*, see Morgan 1923, particularly pp. 30-32.

The dependence, however, is also marked by a presence of the whole in the part. The parents are in some sense present in the child. It looks like them, it behaves like them and we attribute responsibility to the parents for actions committed by the child, and even sometimes to the child for actions made by the parent, which is the case with the inheritance of "original sin" that we find in the old testament.[77]

The notion that there is a natural disintegration taking place in (biological or sociological) wholes, is also found expressed as an idea that is now classic in organizational behavior, and though the phenomenological issue of parts of organizations is treated in chapter six, it is worth a comment here as well.

In comparison, we find influential theories in organizational behavior, that would seemingly argue along similar lines. In Lawrence and Lorsch 1967 it is, for instance, argued that organizations involve differentiating forces that push them towards disintegration. This is natural and mainly a source of growth, but if these forces become dominant, they will destroy the organization. A disintegrated organization will break over into fractions or perhaps collapse entirely, while new startups might emerge in the slipstream. A counter measure is to strengthen the integrative forces, particularly a common goal and an effective coordination of the work. But this must be done deliberately by the strategic management, since the natural will, is for the parts to deliberate themselves from the dependence of the whole.

With Lawrence and Lorsch we find a similar point as with Goethe, that wholes can be found on various levels of integration, due to their historical development and the forces (or will) within them.

But to fully understand the notion of the presence in the parts of the whole, we need to move away from Goethe's bio-morphology in *Die Metamorphose der Pflanzen* and continue to his idea of an *Ur-phänomen*. And here he parts with ideas like the ones we find with Lawrence and Lorsch.

The 'Urphänomen' plays a role in both in his morphology but also in his theory of colors. The idea is that, there is something in what appears, the phenomena, that forms a whole that is a grounding of the perception of the parts. The Urphänomen is therefore only seen through the appearance of the parts, as the meaning of the words appears in the succession of structures before our eyes, when we read a text, or when we perceive a colored object in different lighting. In the latter case, for instance, we can infer that the real color of the object, by comparing different variations. In that sense, we can understand the Urphänomen as something that is seen *through* the phenomena, but also as their source. This presence of

[77] Imke von Maur, for one, has argued that this goes for many other aspects of society as well, because emotions are situated into various socio-cultural practices, see von Maur 2021.

the Urphänomen also integrates the phenomena and may be decisive on which appearance that belongs to the object, and which does not. Which scribbles on the paper is part of the drawing, and which are not. Which noises are part of the melody, and which are not. Which colors are part of the object, and which are not.

It is notable, that many of the examples are objects extended in time, though the arguments are not restricted to temporal parts. The reason is rather the perceptual or phenomenal aspect of the approach. In general, the approach involves a focus on the observable, and observations take place in time and take time. But it is easy to imagine a word that has a meaning as well as the distinction between perceived colors in contrast to real colors (if you are a color realist), while ignoring the time aspect. Again, another approach could be to integrate the historical aspect into this idea and insist on its importance, as we find it with Hegel.

But so far, with Goethe, we can at least make sense of, what it could mean that the whole is present in the parts, as a grounding or perhaps an *archê*, a source of its identity. However, an objection to be made on that account could be, that this grounding relation that we found with Urphänomen is not a whole part relation, because it does not satisfy weak supplementation, but perhaps rather a relation of instantiation.

2.2.2 Hegel

Hegel observes that a whole is an independent and self-contained object. It is *one*, and it is identified by us as a certain object of interest, meaning that we would initially deploy some kind of hermeneutic pre-understanding of exactly what this object *is*, demarcating it from its surroundings. This demarcation constitutes a division from the surroundings, though perhaps only hypothetical, which makes the object's being-part-of-the-surroundings, irrelevant or at least disregarded. In turn, this allows for identity to apply, qualifying the object, the whole in question, as an individual.

It is not just an individual in the partly negative dialectical definition, that it is in some way the opposite of a universal or a class. Because in that sense, we might argue that it is simply a particular instantiation of a universal, and whether or not we would agree to such metaphysics of universals as particulars, like we find it with some Platonists or trope theorists, the notion of individual here seem to be more restricted,

then that it should be simply a particular.[78] Consequently, Hegel argues, this whole must be considered a unity.

This, however, does not follow. We could easily think of situations, like a flock of seagulls or a pile of stones, where we would not necessarily consider any integrating properties, except for the fact that it is of course one flock and one pile, and that the inclusion criterion of the objects making up the whole, like "x is a seagull" or "x is a stone". [79] Hegel notes, that if the whole and the parts do not exist simultaneously, then the notion of "part" and "being-part-of" does not make sense. [80]

In relation to our development of a notion of mereological decomposition, this is particularly relevant, as the inversibility of composition and decomposition seems to propose that both the parts and the whole are continuously relevant. According to Hegel, this is because that any parts, seen in isolation from any external context of the part itself, becomes a whole in its own right at the moment it is granted independence from that whole of which it was formerly considered a part, an insight that he might have borrowed from Goethe.

But this is also the source, Hegel points out, of Kant's problem of endless division.[81] When we look at the parts as wholes, i.e. as self-sufficient and independent, and henceforth subjects of further potential but *independent* mereological decomposition, the parts are only parts in relation to the specific whole of which it is supposedly a part. This means, that the parts must be subordinated to the whole. Again, we can trace reminiscences of Goethe's thought.

Another implicit but important feature is that Hegel's thought also presents an argument against extensionality. For our purpose, discussing the governing intuition behind the concept of mereological decomposition, it is worth noticing, that Kant's notion is much more subtle than Hegel gives him credit for, a subtleness that has additional bearing on the development of our concept.

What Kant writes is:

Der Raum wird als eine unendliche gegebene Größe vorgestellt. Nun muß man zwar einen jeden Begriff als eine Vorstellung denken, die in einer unendlichen Menge von verschiedenen möglichen Vorstellungen (als ihr gemeinschaftliches Merkmal)

[78] This basic idea that the notion of a system rests of the division or demarcation between what is internal, what it is, and what is external, what is the surroundings, is also central in many systems theories, see especially Luhmann 1984.
[79] It may be argued that additional criteria of inclusion must be added, as it is necessary but not sufficient that x is a seagull, to belong to this particular flock of seagulls. Hence this flock presupposes uniqueness that can be regarded as an integrating property. But though this kind of inclusion criteria may be regarded as forming an exhaustive plurality of nice parts, the kind of object that it proposes seems to be not different than that of a class or perhaps a set, and the inclusion criteria does therefore not facilitate integration in the sense of unity as discussed by Hegel and Leibniz.
[80] Hegel 1988, pp. 143-4. I follow here an interpretation suggested by Charles Taylor, in Taylor 1975, pp. 276-8.
[81] Hegel 1934, bd II, pp. 138-144.

enthalten ist, mithin diese unter sich enthält; aber kein Begriff, als eine solcher, kann so gedacht werden, als ob er eine unendliche Menge von Vorstellungen in sich enthielte. Gleichwohl wird der Raum so gedacht (denn alle Teile des Raumes ins Unendliche sind zugleich). Also ist die ursprüngliche Vorstellung vom Raume Anschauung a priori, und nicht Begriff.[82]

Kant's claim that space is *Anschauung*, and not a concept, seems to build on the idea that the parts of space, which we might call spaces (Räume),[83] is always already there in infinite number (though Kant did not phrase it like that) forming up the continuum. And Hegel's diagnose is[84], interestingly enough, that the source of the infinite divisibility, is that the transition from wholes to parts (i.e. what is here identified as mereological decomposition) is thought of as partition, division or intersection, destroying the whole, in turn, leaving the parts to be regarded as independent wholes, to be further divided into subsequent parts. But the parts of space, the spaces, cannot be independent wholes, simply because they are parts and not intersections or divisions.

One way to interpret Hegel's objection, might be that decomposition only makes sense as to self-subsistent individuals, which is illustrated with some remarks on composition in Theron 2012:

"…the logical treatment of wholes and parts must assume identity of parts of the same whole both with each other reciprocally, like body and soul, force, and its expression, and of each with the whole. This is thus no longer a composite nor, qua whole, to be regarded as such. This follows from the Hegelian critique of the scholastic (and Aristotelean, as it was supposed) account of predication as compounding and dividing. This, Hegel points out, is contradicted by this composition being effected by an explicit or implicit identification of the two "parts", subject and predicate, by what was miscalled the copula, as if coupling what it in fact identified. There is in fact no other or separable "is" of "identity". Composition, it follows, is finite appearance, "untruth". [85]

The above quote, though it is intended as a summary of Hegel's treatment of wholes and parts in the *Wissenschaft der Logik,*[86] can be regarded as a further individual argument, that Mereological Decomposition is not simple division, disregarding the theoretical context of how it fits and supports Hegel's dialectical system in general.

Let us therefore look at the logical structure of Hegel's argument and assess its implications.

1. Hegel starts by pointing out, that there is an existence that is independent (Selbständigkeit), and that though this notion is achieved by reflexion into itself, it is the simple form, and when

[82] Kant 1998, pp. 99-100
[83] Ibid, p. 98
[84] Hegel 1934, pp. 143-4
[85] Theron 2012, p. 133.
[86] Hegel 1934, pp. 138-44.

determining (Bestimmungen) such existence, the determinations themselves denote existences, moments contained in the unity.

2. This unity is identical as much to itself as it is to the manifold in due to which it is determined, that is, the whole is as much identical to itself, as it is to its parts.

3. The parts are the objects that are immediate (unmittelbare), and in a way, the whole can be seen as that which is independent and therefore constitutes the world as being in and for itself, while the parts are the immediate determinations that constitute the givenness or appearance (Schein) of the world.

4. The whole contains moments of "negative" unity and "positive" independence. It is fair to say, I believe, that these aspects of negative and positive is a bit hard to interpret, as Hegel's use of the terms is not clear. However, I believe that the following interpretation is just and uncontroversial: The unity must be understood as a negative counterpart of the manifold/the parts, as it is itself a negation of the plurality inherent in a manifold, while the independence must be granted to both the whole and the parts, as they are identical. However, both being moments of the whole, the immediate independence (the whole as a part) becomes a "substrate", while the immediate existence becomes a "positedness" (Gesetztsein), both which are present at both sides, i.e. the wholes and the parts. The negative unity, on the other hand becomes to the manifold, the parts, an *external* relation.

The second part of Hegel's argument begins by stressing the dialectical nature of what has been the result of the first part. Here we began by assessing the independence of the whole, and we came to acknowledge this independence of the parts too, but equally the relation must contain the sub-ladenness (Aufgehobensein) of these determinations, since both sides are independent but also conditioning each other, which involves dependence.

In the end of Hegel's argument, the distinction collapses into, or is transformed into, the relation of force and its expression. Seen as a first reading, this seemed to me strikingly arbitrary. But if it is read in the light of the inspiration from Goethe, it makes sense, a sense that might have appeared obvious to Hegel after reading Goethe's works: What transforms the dependent part into an autonomous whole, is the force of nature that creates evolution, the will for autonomy and freedom.

The central heritage from Kant's antinomy can, however, be interpreted as being merely an issue, that is not exclusively about space or extensionality, but perhaps alternatively about geometry and the mereology

of *mass terms*. If one were to change the word space with other mass terms phrases, like water, sand, air, or light, we would run into the exact same problem. As long as we remain with the mass term usage, a decomposition of such a whole with extremely vague boundaries, seems to resolve in a kind of multiplication of itself.

Peter Simons has suggested,[87] that the principle of unrestricted composition could in fact be used on masses, in order to create mereological wholes: If it is true that any two objects compose a whole, we might argue, that any section or portion of a mass, forms a whole when considered together, in which case, deploying mereological decomposition, this whole might be decomposed into sections or portions of mass. Hence, when we are concerned with the mereology of masses, we might consider unrestricted composition as a structural limit, as to what could be included into a whole-part analysis.

2.3.2 Husserl

I will begin my comments on Husserl's theory of wholes and parts, with a historical note. If you take a step back and view the landscape over Husserl's works and their development, it is, as is also generally acknowledged, a highly complex matter. The most important works on parts and whole, published in Husserl's own lifetime, is the third (and to some extend fourth) investigation of the *Logische Untersuchungen* from 1901 and the *Vorlesungen zur Phänomenologie des inneren Zeitbewußtseins* held in 1904/5 and published by Martin Heidegger in 1928.

It is often stated that Husserl was the founding father of phenomenology, and that his main inspiration was from Stumpf and Brentano.[88] But as indicated above, I think it justified that there is a tradition from Kant, Goethe and Hegel that is partly disregarded by this view. Though it is not my task here to argue in favor of Kant or Goethe to have been the true fathers of phenomenology, it *does* make a difference in exactly how to read Husserl.

Husserl was indeed inspired by analytical philosophy, and his arguments against psychologism in the *Logical Investigations* that echoes Frege, with whom he had extensive correspondence, makes it obvious that he distanced himself from the dialectical tradition of Hegel and Schopenhauer, and instead turned

[87] Simons 1987, pp. 153-68.
[88] Hill and Haddock 2000 are an example of a tradition that sees Husserl mainly inspired from the analytical-mathematical tradition. It is well known that Husserl was heavily inspired by Brentano and Frege, but Claire Ortiz Hill has convincingly argued that many mathematicians like Cantor, Hilbert and Weierstrass had a substantial influence on his thinking, too, see Hill and Haddock 2000, pp. 137-98 .

towards the logical-analytical and positivist movements that was indeed popular around the turn of the century, as well as particularly the methodology of Descartes.

When it comes to mereology, it is particularly the third and to some extent fourth Logical Investigation that have had the main focus, since it fits the analytical tradition in the twentieth century. His later works were, at the time, read with more skepticism by the analytical tradition, and while the phenomenological movement were growing up through the twentieth century, the analytical tradition, including the formal ontologists, would retain its focus on the Logical Investigations.

In the *Logische Untersuchungen,* Husserl proposes a theory of wholes and parts, where we have "real" parts, as well as emergent moments, that is, "unreal" parts that integrate the whole. Husserl's point is then, that one can operate with different kinds of wholes, for instance moments that depend on their parts, but also parts that depend on the moments. This idea is often regarded with philosophers like Peter Simons, Barry Smith and Kevin Mulligan as an Aristotelean interpretation of Husserl,[89] justly I think, for the *Logische Untersuchungen* is to a large extent the centerpiece of the early Aristotelean period, sometimes known as the early Husserl.

What is more interesting in this regard, is that Husserl uses the notion of dependence to introduce the notion of strict and weak foundation. The nature and implications of this is extensively discussed in the works of Peter Simons and Kit Fine. A moment is founded on its parts and, since it works as an integrator, sometimes the parts are also dependent, or even founded on the moment. This is clear when he talks about so-called 'pregnant' concepts of a whole, a whole that to some degree constitutes a unity, and that I therefore, following Peter Simons among others, call "integrated wholes." Husserl writes

Faβt man alles in dieser Allgemeinheit, dann könnte man den prägnanten Begriff des Ganzen in beachtenswerter Weise mittels des Begriffes der Fundierung definieren, wie folgt:

Unter einem Ganzen verstehen wir einem Inbegriff von Inhalten, welche durch eine einheitliche Fundierung, und zwar ohne Sukkurs weiterer Inhalte umspannt werden. Die Inhalte eines solchen Inbegriffs nennen wir Teile. Die Rede von der Einheitlichkeit der Fundierung soll besagen, daβ jeder Inhalt mit jedem, sei es direkt oder indirekt, durch Fundierung zusammenhängt. [90]

Husserl then goes on to consider a process or operation that seem in some ways similar to our idea of Decomposition. First, he writes:

[89] See Smith 1982.
[90] Husserl 1993, bd ll/1, lll §21, pp. 275-6.

Die Zerstückung eines unselbständigen Moments bedingt eine Zerstückung des konkreten Ganzen, indem die sich ausschließenden Stücke, ohne selbst in ein Fundierungsverhältnis zueinander zu treten, neue Momente an sich ziehen, durch die sie nun einzeln zu Stücken des Ganzen suppliert werden.[91]

And then he explicitly turns towards temporal objects like the ones we found were considered by Goethe and Hegel, and he continues:

Zerstücken wir die Dauer eines konkreten Verlaufs, so haben wir ihn selbst zerstückt: den Abschnitten der Zeit entsprechen Abschnitte der Bewegung ,…, Dasselbe gilt im Falle der Ruhe; auch sie hat ihre Abschnitte, die als Stücke im Sinne unserer Bestimmung gelten müssen, da die Ruhe während einer Teildauer und diejenige während irgendeiner anderen Teildauer in keiner Hinsicht in evidentem Fundierungverhältnis stehen. [92]

The point is therefore, that when a whole is fragmented, i.e. decomposed, the independent moments would also be fragmented and transferred to the individual parts. He then turns to Kant's continuum as infinite divisibility, and, as I understand him, indirectly criticizes Hegel's solution, because, as pointed out above, if the whole is fragmented, then the integrating moments must be fragmented with it and placed in the individual pieces. Therefore, Husserl's solution is to say, that this is a particular kind of wholes, called extensive wholes where pieces can be called extensive parts. This idea is more like a 'piece-of' than a 'part-of'. Husserl writes

Wenn ein Ganzes eine derartige Zerstückung zuläßt, daß die Stücke ihrem Wesen nach von derselben niedersten Gattung sind, als welche durch das ungeteilte Ganze bestimmt wird, so nennen wir es ein ***extensives Ganzes****, seine Stücke* ***extensive Teile****. Hierher gehört beispielsweise die Teilung einer Ausdehnung in Ausdehnungen, spezieller einer Raumstrecke in Raumstrecken, einer Zeitstrecke in Zeitstrecken u. dgl.*[93]

Though Husserl follows Kant here more than Hegel, the solution Husserl proposes does, from my point of view, not really present a key argument against Hegel's point of view, it simply differs. However, Hegel's idea that it is a conceptual fallacy to dispense with the whole, when we consider the parts, seems at best muddled with Husserl. It looks like he does not know which position to take.

However, he to some extent follows the idea from Goethe and Hegel that the founding of the parts in the whole, makes a difference to the nature or at least the phenomenological character of the parts. And this becomes clearer when we turn towards the phenomenology of temporal objects.

[91] Husserl 1993, bd ll/1, lll §25, pp. 288-9.
[92] *Ibid*, p. 289.
[93] *Ibid,* §17, p. 267.

Heidegger informs us in the editor's introduction of the *Vorlesungen zur Phänomenologie des inneren Zeitbevußtseins*, that though the lectures were published in 1928, they were originally given in 1904-5, not long after the publication of the *Logische Untersuchungen*. Heidegger writes:

Während der zweite Band der "Logische Untersuchungen" (1901) die Interpretation der "höheren" Akte der Erkenntnis zum Thema hatte, sollten in dieser Vorlesung die "zu unterst liegenden intellektiven Akte: Wahrnehmung, Phantasie, Bildbewußtsein, Erinnerung, Zeitanschauung" untersucht werden. [94]

Heidegger's introduction suggests implicitly that these lectures should be read in connection with the second book of the *Logische Untersuchungen*, and the quote of Husserl, suggesting that these lectures on inner time-consciousness are supposed to analyze the acts of consciousness that underlie the higher acts of consciousness are already treated in the beforementioned work. In this context, this reminds of the composition/decomposition inversibility, for Husserl's focus in the third logical investigation is mainly a compositional one, examining the nature and integration of the whole, discussing moments as emerging and integrating parts, that create a dependency between different kinds of parts, ending up in different kinds of wholes.

I suggest that Husserl's focus in the *Vorlesungen*, as Heidegger also reports, is more decompositional, that is, it focuses on the nature of parts. It is perhaps because of the focus on parts and the perception of temporal objects, that the analysis here reminds much more of Goethe's Urphänomen and Hegel's negative and positive dialectics of parthood.

Husserl even talks of an original impression, or "urimpression", but this concept is used differently from that of Goethe's Urphänomen. Husserl uses the example of a melody: It is revealed by the succession of individual tones, each forming urimpressions that change our consciousness. We hear every original tone (urimpression) in a melody, given by a presence in the now. It is simply there, now, at this moment. And the only way we can hear a *melody* is to experience the presences of a series of tones in their temporal succession. But there also seems to be an anticipation of what to come, a *protention*, and a connectedness to the tones that were before, a *retention*.

The anticipation of the protention is based on an idea of the melody, a unity, that creates an original understanding, an "Urempfindung", that resembles, I suspect, what Gadamer later calls prejudice or "Vorurteile" in his *Wahrheit und Methode*.[95] So dependence between the parts, the tones (urimpression) and the idea of the melody (Urempfindung) is mediated by a protension that is in the present, that is, *in*

[94] Husserl 1980, p. 367.
[95] Gadamer 2010, pp. 270-90.

the part. For it is the actual understanding of the whole that provides the protension with its prehension of what comes next, and thereby also the possible correction of what comes next, if this does not fit the Urempfindung. It will then change in order to fit the new.

We can think of it as a filmstrip, containing several pictures, that are placed and replaced before our eyes in a succession. The images are the parts, the movie is the whole, and at any point in time where we are watching the movie, we see each picture as a temporal part or stage, that involves protension of what comes next and a retension of what was before embodied in our understanding of the present.

When we look at retension, it becomes even clearer that these qualities are related to the parthood of the urimpression. Husserl writes

Die Doppelheit in der Intentionalität der Retention gibt uns einen Fingerzeig zur Lösung der Schwierigkeit, wie es möglich ist, von einer Einheit des letzten konstituierenden Bewußtseinsflusses zu wissen. Eine Schwierigkeit liegt hier ohne Zweifel vor: ist ein geschlossener (zu einem dauernden Vorgang oder Objekt gehöriger) Fluß abgelaufen, so kann ich doch auf ihn zurückblicken, er bildet, wie es scheint, in der Erinnerung eine Einheit. Also konstituiert sich offenbar auch der Bewußtseinsfluß im Bewußtsein als Einheit. In ihm konstituiert sich z.B. die Einheit eine Tondauer, er selbst aber als Einheit des Tondauerbewußtseins konstituiert sich wieder. Und müssen wir dann nicht weiter auch sagen, diese Einheit konstituiere sich in ganz analoger Weise und sei ebensogut eine konstituierte Zeitreihe, man müsse also doch von Zeitlichem Jetzt, Vorhin und Nachher sprechen? [96]

From a stream of consciousness, the retentional intentionality is pointing or referring back to memory, in which we can identify a section of the stream of consciousness as a whole (Einheit) that are enduring, or perduring in the case of temporal objects, through a certain timespan (dauern).

It is crucial to Husserl to stress that the retention and protention are intentionalities of the particular temporal objects, that are individualized as moments in time by the urimpressions. This means, that the retentions and protentions are not external relations to an "Umwelt", but properties that point or refer to a whole of which they are a part.

Compared to our intuition pumps at the beginning, neither Goethe, Hegel or Husserl have a direct view of whole and parts that can be directly implemented into a decompostional mereology. However, they all point in slightly different ways towards an intuition of how it is possible to provide meaning to the statement that the whole is present in the parts.

From Goethe we inherit the notion of the whole being present in the parts phenomenologically. The parts almost reveal the urphenomen. It is however somewhat vague, in what sense the urphenomen is

[96] Husserl 1980, pp. 433-4.

comparable to an integrating part, like a moment, or if it is the whole of which our perceptions are also themselves parts. And furthermore, the animalistic side of Goethe might seem a bit mystical in today's world, and therefore the will that strives for autonomy would either have to be considered a metaphor or as a semi-religious pantheist position. However, the idea that parts are naturally developing an independency of their wholes, and that wholes and parts, at least in phenomenology must be considered historically, is a point that might be worth noticing.

Hegel suggest a dialectical presence between a whole and its parts. While it is a negative relation that is contrasting the one and the many, Hegel attempts on the one hand to restrict Kant's infinite divisibility of lines, by arguing that part-whole relation is not divisibility at all, as well as Plato's one-many problem, he also maintains Goethe's historical entanglement. A whole also contains its history of becoming as an essential feature of what it is. Though I have much sympathy for this view, we must from a decompositional view insist, that a whole that involves its history of becoming is another whole than one that does not. And this is so much more important, since it in chapter 1 was pointed out how important it is, not to confuse decomposition with destruction and composition with creation and becoming.

Husserl is far from clear on this matter. On the one hand he seems to retain influences from Goethe and Hegel. On the other hand, he is very insistent on attempting a formal ontological approach. This makes him very formal in the *Logische Untersuchungen*, and though he writes about moments and dependence and foundations, the implications of having the whole present in the parts is seemingly only sometimes there. For dependency is not presence, and neither is foundation as such. And perhaps this is why he sometimes embraces an idea of fragmentation as an operation that takes us from whole to parts.

He does however in his more strictly phenomenological parts, become more attentive to the idea that parts include elements that point, connect, or refer to the whole. And this resonates with his ideas of signs as *Ausdrücke* and *Anzeichen*, that is, objects that either confer meaning or point towards another object. In other words, we might say that it is the consideration on Husserl's work, that implicitly points us in the direction of Semiosis.

2.3 Semiosis and Dimensionalization

The relation between Husserl's retention and protention of temporal objects, looks like a strange kind of "indexical semiosis" of parthood, to borrow a term from C.S. Peirce, where there is a content that is given in a way that points towards or represents another object.

From the comments on parthood from Goethe, Hegel, and Husserl above, it seems to be a common assumption, that at least some parts have a feature or property in common, a feature that we also associate with indexical signs. An indexical sign is, however, a placeholder for something else: it refers to something that it is not. But with the parthood relation, the representamen is immanent in the object represented.

Parts seem to be both similar and different relating to this difference of parthood. If x is a part of something, this being-a-part seems to be referring back to a whole that is different than itself, but to which it has bound its identity. But it is obviously not an independent object, and nor would we expect the referentiality to be accidental, though a notion of 'accidental parts' cannot be ruled out in advance. But the claim that structuralists like Saussure famously make, that the relation between the signified (signifiant) and the signifier (Signifié) is arbitrary,[97] would appear controversial in our setting, given that a part would be expected to influence the identity of the whole, and that the part would, most certainly obtain an essential part of its identity from the whole: When we understand something as a part of a whole, the notion, or 'prejudice' as Gadamer would call it, determines what kind of object we are in fact looking at.

Ontologists might argue that this is a fallacy: That an object is a part of something does still make it simply the truth maker of a predication of this object. A stone is a stone, whether it is lying on the beach accidentally, is placed in an oven for heating the food, or is found at an exhibition as a part of an artwork. In these three cases it is placed in different contexts, forming relations that make predications like "The stone is part of the whole Y", either true or false. But it would not involve a change of the identity of the stone. Instead, the wholes of which the same parts would be found, can be said to overlap.

Though I shall use some effort to show that some such an argument would be misguided, I have indeed some sympathies with the argument. And I shall refrain from arguing with Leibniz's law, that all predications will be related to the identity of the stone. First, I have treated these issues at length elsewhere, but what is more important, arguing in this way would entirely sidestep the issue. For what is at stake here is not primarily the general logical principles of identity, though they are certainly playing their part in the background, but the case study of what characterizes the nature and being of a group of objects, 'parts', be they ontological or phenomenological.

The reply would instead be, to draw attention to the premises of the investigation. If the stone is an individual, that is, it is epistemically self-reliant or independent as discussed above, the question if the identity of it would change when it is part of a whole would change, would obviously in part relay on the

[97] de Saussure 2011.

ontology of the whole. So, we would ask: What is the whole like? Is it an integrated object, that is a whole which is understood or perceived as a Gestalt, a unity. Then it must have emerging integrating parts?

This way of approaching the question is certainly interesting, but it is also, as I wrote above, misguided. For it is essentially a compostitional approach: We are essentially not asking about the parts, but about the whole.

So, if it is an integrated whole, we might be justified in following the Goethe-Hegel-Husserl trail and place a mark of the whole on the objects that we so confidently call parts. This 'mark' looks like a semiosis, that the objects we call parts are given to us in a special way that points to the whole.

I think that we by now have made the idea intelligible, that some proper parts are not individuals, but dependent on the whole in a way, that their parthood involves some kind of being representation of wholes, that seem to be immanent in the object. And that from a decompositional point of view, this makes sense, particularly if we consider mereological decompositions of integrated individuals, that do not involve a disintegration of the whole in question.

We may therefore distinguish between the content of the part on the one hand, and the way the part is given to us, at the other. Such a distinction bears some resemblance with Ferdinand de Saussure's ideas of a sign. In de Saussure's *Course on General Linguistics*, there is a famous distinction between Signifié, and Signifiant, the signifier and the signified. This classical concept relates an apparent object like a phoneme with its content or meaning. To de Saussure, what is signified is typically a concept, as the main objective with his semiology, is an investigation into the nature of language.

A point made in the "Course", is that the coupling of the signifier with the signified is arbitrary, but also that it differentiates, or perhaps even demarcates, both the signifier as well as a concept signified. It is not the point here, that mereology should be subsumed under linguistics, but arguably some kind of semiosis is taking place, the moment we conceptualize an object as a part of a whole. For it seems troublesome to claim, that the whole is *represented* by the part, or that the whole in some sense or other should be *present in* or *embodied in* the part. As to the former, this is clearly not the whole-part relation, but rather a conception of a sign that clearly distinguishes itself from the whole-part relation, since representation does not seem to capture part-whole relations per se. In many situations it would be unfair to think of the part of the representation of the whole.

An example could be a book: Page 250 would rarely be considered a symbolic representation of the whole book, though it is certainly a part. On the other hand, it would hardly make sense to claim that this is page 250, but that there is no book that it would be a page of. Of course, we could argue that 'Page 250'

may be a proper name that is arbitrarily assigned to the object, or that 'Page 250' has a particular poetic meaning. But in most cases, we would expect that there is a page 249 and perhaps a page 251, that together form individual parts of the book.

If we consider the coherence and semiosis of the individual text on the page to the text in the rest of the book, the point emerges even more clearly. For suppose that the text on the page describes, say a woman that hits a man with a frying pan. This scene might be funny if the text in the book that relates to the scene makes it a comedy style, and perhaps the reader is thinking "this man thought so much of himself, and now just watch what happens to him", or it may be a relief if the man is a villain that is finally caught before he can achive his overall evil goal, or it might be considered an example of old-fashioned sexist literature if the reader is led to think "why is it always the woman that uses the frying pan…" The individual text-part is understood in terms of the remembered or supposed con-text, or what Gadamer has called the *prejudice*, that is the expectation of the whole that contextualizes the part.

Indeed, Peirce has suggested notions of semiosis that is not a symbolic representation, and therefore opens to semiotic relations that are not necessarily between sign and content, or language and object. Indexical signs are examples of such semiosis, as they are relations between phenomena, where one might indicate the existence of the other. An example could be the relation between an illness and the symptoms of the illness. Sometimes particular illnesses cannot be directly observed, or only with difficulty, and in such cases alternative measures are developed to indicate the proper diagnostics. Following this line of thinking, we can only make sense of an analysis of the blood sample, if we understand the composition of the blood as a symptom of a particular illness.

As to this point, we believe in an open question whether symptoms are supposed to be proper parts of diseases and illnesses or not, but in any case, it seems to be this kind of semiosis we are after when we want to define parthood from a perspective of mereological decomposition. What we are trying to capture by arguing in favor of a proposed semiosis, is rather the idea derived from Hegel. When we talk about a part having a part-whole relation to a particular whole, the very nature or identity of the part seems to be dependent on our understanding of the nature of the whole, in such a way that we understand what the part is not only in terms of one whole that it belongs to, but also exactly how it belongs to that particular whole. We need to be alert, that this semiosis is supposed to serve another purpose as well: it is supposed to form a kind of mereological glue, that represents in some way or other, not the whole as such, but the integrating properties of the whole. And this is to be understood in such a way that when you have a collection that we can justly call "*all and only the parts"*, you do not only have a plurality of individuals, but you have an integrated whole that is in the literal sense a unity.

However, if we take the notion of semiosis seriously enough to try to explain it within the scope of mereological decomposition, we might begin by saying, that for any whole B, there is a set of objects A_1, …, A_φ, where each has the semiotic property of belonging to a mereological decomposition of B. But this only follows, if the mereological decomposition of B in question, is one of decomposing B into all and only the parts, taken in this "simple" sense.

We are now back with our intuition pump. Suppose therefore that the relation between wholes and parts presents a mereology of the object in the sense that decomposition, though it admits partiality, in some way must preserve any integration or unification of the decomposed object. When we decompose an object, therefore, we do not *destroy* the whole, but instead we focus more closely on individual areas or aspects of the whole, like zooming in on points of interest with a lens, or perhaps stretching out the unity until it becomes a grid or system of interrelations, keeping the wholeness and unity intact.

When a square is considered in one dimension it becomes a line, but adding the extra dimension stretches out the line into the square to give us a two-dimensional representation. In the same way we might imagine that a unity, which arguably with Leibniz does not have parts[98], is seen under another dimension, the mereological dimension, a system of parts, and mereological decomposition is then in fact the way to draw this dimension, extending a unity into a composite.

In turn, this means that when we observe or consider an individual part, this part is not removed from the whole, but is considered and observed as being a part performing its "participation", and therefore this participation must always be included in any description of an individual part. Therefore, the notion of part must involve a reference to the participation in the whole, and in turn therefore a reference to the particular whole decomposed.

The part would therefore appear to have similar properties to that of signs, as it would refer to something external from itself. We might therefore say that when we consider an object is a part in a strict sense, the decompositional approach leads to an understanding of parts in the strict sense as involving a semiosis which leads back to the dimensionalization made by the decomposition simplicitér, but also to the whole decomposed as well as the specific participation of the part to the whole.

Considerations on these other aspects would lead us in the direction of arguing, that while composition is about how wholes are constituted by parts, mereological decomposition appears to be more like a

[98] Leibniz writes*: I don't really eliminate body, but reduce [revoco] it to what it is. For I show that corporeal mass [massa], which is thought to have something over and above simple substances, is not a substance, but a phenomenon resulting from simple substances, which alone have unity and absolute reality*. (Leibniz 1965, vol. II, pp. 275) English translation from Look 2017.

dimensionalization of the wholes, in the sense of forming an increase in focus from the larger to the smaller areas.

The basic intuition that governs this approach could be suggested to be roughly as follows: Hence, if mereological decomposition can present us with a sort of dimensionalization of the object in question, that we may suggest introducing a special *mereological* dimension.

If we accept that decomposing objects is nothing like cutting the whole into pieces, the alternative interpretation, it must be more like focusing on areas of the whole (that remain intact), to see and detect its sub-areas, the parts, more clearly. But when we do that, the parts are obviously still connected to the whole. When we focus on the parts, we do not remove them or consider them as individual self-subsistent objects but look at them as within the whole in question including part-part and part-whole relations.

Let us symbolize the whole by a triangle. This whole has no parts, as it is so far considered a Hegelian

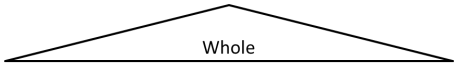

Figure 8. A monadic whole symbolized by a triangle

individual (or Leibnizian monad), which is considered as a unity and in independence from other objects, as itself and for itself. We can now make a dimensionalization of the whole by performing a mereological decomposition. By doing that, it seems, we create an alter ego, another side to it, another sense (Sinn) through which we can form a parts-representation.

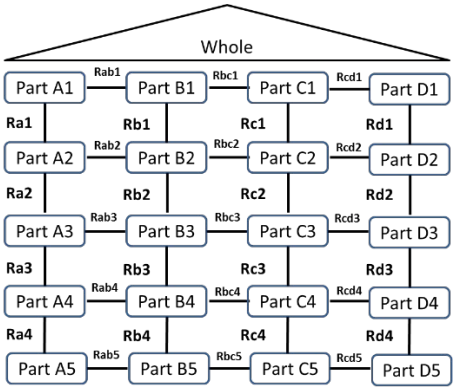

Figure 9. Mereological decomposition symbolized as a grid of parts.

This is symbolized as a grid of parts and includes relations and interactions between the parts. How many parts, and exactly how these are identified, depends on the nature of the whole as well as assumptions of transitivity at least as far as mereology is considered a branch of ontology. We have already touched on the nature of transitivity indirectly, when we considered the Kantian problem of infinite spatial division and further discussion of transitivity will be reserved to the next chapter, because it shall be argued that in order to qualify a discussion of transitivity of parthood in a decompositional mereology, i.e. a mereology based on mereological decomposition, we need to introduce a notion of sortal decomposition as well as to discuss the role of sortals in the simple notion of mereological decomposition, discussed currently.

At present, we must give room to a notion of mereological decomposition, that is not necessarily ontological or metaphysical, but yet preserves the idea that different kinds of wholes might be composed differently. And hence we can now see clearer in what sense a mereological decomposition can be regarded as an explication of relevant assumptions concerning the whole. A simple example could be, if we want to decompose a person into all and only the parts: Whether we are reductionists about the mind or perhaps dualists, would obviously make a difference to if mental events or substances would supposedly result from the decomposition in question.

Consider then three people standing around the old lady's vase that was discussed in the previous chapter. The first one, her daughter in law, considering how large a bouquet of flowers she should buy for the old lady to put in the vase, the second one, her son, reflects on the childhood memories to which he associate the vase, and the third, her grandson, an engineer, trying to detect the crack, and trying to calculate the probability that it would leak, if it was filled up with water. These three people might have different approaches to what would count as, at least essential, parts.

1) The vase as a part of the window decoration, the size, shape and colors of the vase, seen in relation to aesthetical qualities of the room and compared with the variables: the relevant modalities of the intended bouquet of flowers.

2) The vase has a value due to its history, and central here would often be, if the vase would retain its authenticity or not. A way to vividly remember, and perhaps revive, the past, is to repeat experiences from the past, for example by looking at images or objects that have survived since then, and therefore appear to serve as a witness of a now lost age. Such an approach is sometimes highly emotional, and it would appear therefore that there is a particularity or uniqueness about the object, that sometimes seem to be almost visual.

3) The object might be regarded as a lump of clay, that may, or may not, be able to contain water. The structure considered here, need to be nothing else than the relevant spatial and causal properties of the object.

Let us consider the question, whether the lump of clay is part of the vase: In the first case, the aesthetical properties might be retained, if the lump of clay would be replaced with another lump of clay, or perhaps even with an entirely different material, perhaps a lump of bronze. In the second case, the vase is regarded as a unique individual, retaining its particularity from a remembered history, and therefore arguably the vase and the lump of clay would have similar persistence criteria, and we might argue that the lump of clay is a part, perhaps even an essential part, of the vase. The third case is a reductionist approach, and that we therefore would both consider the vase and the lump of clay, since they are identical in the strong sense that there is nothing more to the vase, than to the lump of clay.

On this basis we may suggest, that in the first case we have a case of an intuitionistic non-well founded mereology, we might operate with a sort of irregular parts, like being an artwork in some sense or other is adding a part, in the second case we have a case of constitution, at least in the sense that there are properties that are strongly supervening on the material base, and in the third case we have a case of extensional mereology, where the vase is nothing over or above the clay composing it. And in turn you might argue, why we need all this fuss about mereological decomposition, when we do in fact end up with the same basic kinds of composition.

But this is too swift, however. It is looking at the cases from a compositional perspective, rather than a decompositional one, and if we shift perspective, we may get a different result. As an example, suppose the following line of reasoning:

Case 2 is the extensional one – because of uniqueness. If the parts are unique, the whole must be less integrated. If they are unique, the whole is a sum. To the extent the whole is integrated, the parts loose individuality. The integration is not a part in itself but must "follow" the understanding from whole to parts: The nature of parts is different from a decomposition of an integrated whole: The individuality of the parts is low.

Parthood involves relations and references to the extent it contributes to the integration of the system. The simple reason is, that when we talk about an object that might be a part of a whole, it is different from when we talk about a part of a whole. In the first sense, we talk of the object as independent, i.e. individual. But in the latter sense it has specific relations to other parts due to a special relation of a whole, and it might have parts that are also parts of the whole, and parts that are not.

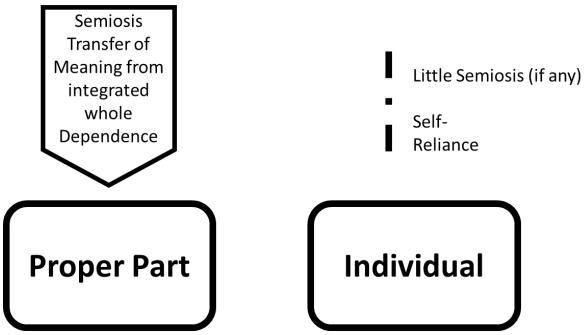

Figure 10. Proper part of integrated whole vs. individual.

As decomposition transfers some of the meaning of the whole onto the individual parts, we can argue that the "thickness" of that semiosis, must be determined by the level of integration of the whole decomposed. It is therefore not possible, that an integrated whole can have proper parts that do not contain semiosis. For it is the semiosis of the parts, that determines their integration in the whole, and therefore are also, to some extent, dependent on the level of integration of the whole.

2.4 Integration and Semiosis.

Extending an integrated whole in a mereological dimension, makes the parts visible. In a sense, that is what a Mereological Decomposition Simplicitèr does. What we have been arguing so far is, that the level of semiosis involved in the parts, may vary depending on the level of integration of the whole. And the level of semiosis may be regarded in contrast to the content of the part. The more unified or integrated the whole is, the more semiosis we may find in its parts compared to the content.

When we want to understand the idea of integration of wholes, we can either consider the level of semiosis involved in the parts, or we can shift to a compositional perspective and consider the emerging parts of the object and their ability to integrate the object.

Especially in the work of Achim Stephan on emergence, different kinds of emergence are distinguished.[99] Stephan argues that discussions of emergence contain a focus that is fundamentally naturalistic: No supernatural explanations are allowed among the so-called 'emergentists'. [100] It is hard to be more specific about what would constitute such a naturalistic explanation, and in concert with the epistemological turn argued in chapter 1, I am reluctant to go into a direct ontological discussion about naturalism vs. constructivism.

[99] See particularly Stephan 1997, 1998, 1999 & 2007.
[100] Stephan 2007, pp 14-15.

It is indeed worth noticing, that the idea of Goethe's 'Wille' understood as an *élan vital* or the idea of Hegel's "*Weltgeist"* as a spiritual pantheism, would not only appear appalling, it would also be considered a mere superstition and thereby irrelevant to an endeavor, the emergentists would characterize as scientific. We must require a natural explanation of the phenomena, that is, an explanation that is intelligible based on a world view of the natural sciences. The approach is therefore more analytic than phenomenological, at least at the outset, compared to Goethe, Hegel and Husserl.

Stephan distinguishes in his work between various kinds of emergence, particularly between Weak Emergentism, Synchronic Emergentism and Diachronic Emergentism. As I understand Stephan he distinguishes between Emergence that is a naturally occurring phenomenon, emergentism which is a group of theories constituting a naturalistic philosophical position on emergence, and an emergentist who is a person who is affiliated with or ascribes to a kind of emergentism.

Weak Emergentism is the idea, that structural properties can emerge from a material basis. It consists of three thesis:

A. Material Monism. Material parts are always primary. Any composition of structures or moments is always on a material basis.

B. Systemic Properties. What emerges from the material basis are systemic properties, i.e. properties belonging to the system, but not belonging to any of the parts.

C. Synchronic Determination. The emergent systemic properties co-vary with the micro-structure, i.e. the ordering and organization of the parts. There can be no change in the systemic properties without a corresponding change in the underlying structure.

Stephan notes that this idea of weak emergentism is compatible with reductionism. In our mereological setting, we might argue, that if a number of individuals form a whole including only Material Monism, it would actually amount to a whole of parts without emergence whatsoever, except perhaps that they are grouped. 'Simple aggregates', 'mereological sums', 'classes' and 'bare pluralities' would satisfy such conditions, and we might then classify them as minimally integrated wholes.

If we add B, however we begin to have some common features. Sets would qualify to the emergence of A and B only, since sets of material objects are not themselves material objects. You could provide arguments that the grouping itself is also an emergent systemic property, and if so, aggregates, sums and classes may be said to belong here to the sets.

When we add C, we obtain wholes where the organization of parts is essential. Therefore, we can operate with structural wholes, like mechanisms, various kinds of systems, fusions and mixture.

The next kind of emergentism is Synchronic Emergentism. This kind of emergentism is stronger than weak emergentism, because it involves emergence of irreducibly systemic properties. In defining irreducibility, Stephan follows Broad and ends up with a proposal for a definition. Stephan writes

A systemic property is irreducible if (a) it is neither micro- nor macroscopically behaviorally analyzable, or if (b) the specific behavior of the system's components, over which the systemic property supervenes, does not follow from the component's behavior in isolation or in other (simpler) constellations.[101]

Two of the main features Stephan emphasizes is unanalysability and impredictability: If we can deduce the properties and behavior of the whole from the microstructure of the parts, the system is reducible. Even though the Stephan/Broad account of irreducibility is partly *ex negativo*, the idea of technically unpredictability, gives an impression of self-animating or self-organizing organisms, whose behavior is not just determined by a mechanical adaption, but is proactively responding to an attempt to manipulate the system, like for example it is the case with a normal functioning immune system. We might add Varela/Maturana-style self-organizing systems to this area.[102]

The third kind of emergentism is called Diachronic Emergentism. This occurs if we add novelty to Synchronic emergentism. Novelty is a bit hard to explain, but with new is definitely meant impredictable emergence of some structure, which has a ring of affiliation to complexity and chaos-theory. Stephan writes

The rise of novel structures is unpredictable in principle, if their formation is governed by laws of deterministic chaos. Likewise, any novel properties that are instantiated by those structures are unpredictable in principle.[103]

I shall treat complex systems more at length in chapter 4. For now, we may turn the idea to involve some kind of qualitative novelty, that is not a variation of the existing. This means for instance an emerging consciousness, or spirit, but in the sense of a completely new system. When a system is reproducing itself, like in Darwinian evolutionary theory where the reproduction is involving mutations and perturbations that make the evolution principally impredictible, because of the complexity (and chaos) that is present. But the newness also connotes independence, as Goethe pointed out.

[101] Stephan 1998, p. 644, and compare Broad 1919 & 1925, Chpt 2, pp. 43-94.
[102] See Maturana & Varela, 1980, 1998.
[103] Stephan 1998, p. 647.

The question is, if this kind of emergence gives rise to a higher integrated object, or whole. I am not sure, and perhaps we might end up in the situation that the two kinds of emergence, leave us with the same kind of integrated objects, organisms.

A possible argument could be, that since complexity rules out causality, or at least predictable causal relations, these kinds of emergence give us wholes with no parts, mereological atoms, monads, or unities. But this might be considered an overinterpretation of the kinds of emergence considered.[104] Still it would now be possible to draw a line from more integrated and less integrated wholes and point to the corresponding levels of semiosis of the parts.

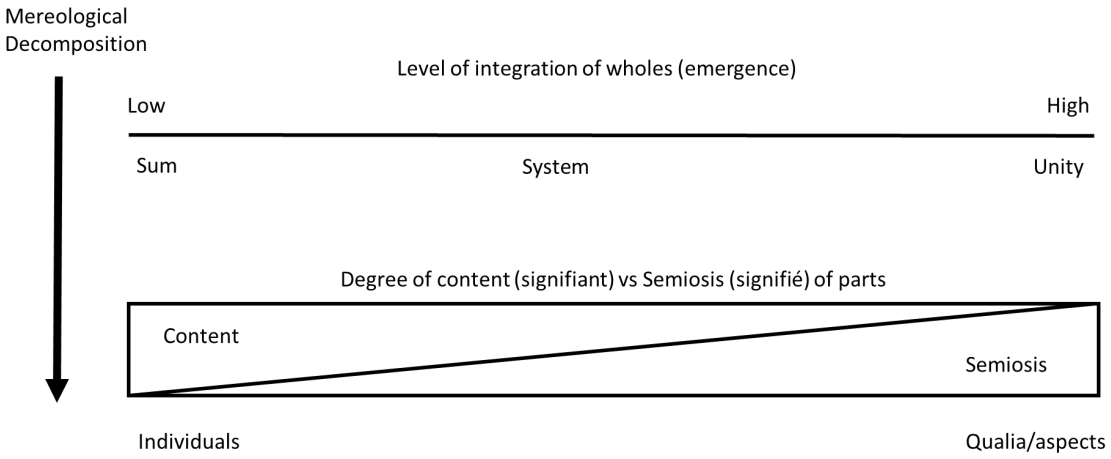

Figure 11. Integration of wholes compared to the semiosis of the parts

The level of semiosis is simply stronger in integrated wholes, than with sums. If you get a sufficiently low level of semiosis, you will not really give much meaning to the parthood, except that the objects are part of a group or a sum. Hence a mereological decomposition simplicitér would give you the parts as they are, because the whole is not much more than that. It is therefore to be developed as an *extreme* or a *limit* of mereological decomposition.

At the other end, we have so much semiosis and so little content, that the parts become indiscernible from the whole itself. A mereological decomposition, would therefore in that case result in mere qualia or properties of the whole, but as a mereological decomposition is a decomposition into *all and only the parts*, there would be a level of integration, where the decomposition would result in only one part, itself.

[104] It might be possible to construe a position of the positions of Goethe, Peirce and Darwin. If we argue that this kind of wholes exist (monads) and perhaps even with our semiosis in the hand, argue that this is where the semiosis of the parts become so weak, that it beginning to refer us to a different object instead of its whole, different in the sense that it is an object with which the part do not overlap, then we actually might be describing a stage, where the, the part has received its independence and have become a sign of another object, instead of a part of the former.

We would then have a case, where the mereological decomposition simplicitér is not adding anything to the analysis. This would therefore be considered as an *extreme* or *limit* in the other end.

To put it more technical: At the mereological extremes, which we also can term the decompositional limits, we operate with either:

A) wholes that are not integrated, called sums, aggregates, or simple pluralities, or

B) wholes that are fully integrated, called monads, unities, or atoms.

In both cases the transition of mereological decomposition simplicitér from the whole to the parts, would be non-informative. As it was explained in chapter 1, in the case of whole that have some integration, the whole and the parts are different representations of the same object, but they are not *identical representations*. The limits therefore state the cases, where the whole and the parts would be in effect the same representations, and therefore tautological.

2.5 Realism about Parts?

If it is granted that the idea of the semiosis of parts may vary from one constitution of wholes to another, and that this can be demonstrated by adopting principles of mereological decomposition, the question remains if we have not moved too far from standard ontological presuppositions to such a view be taken seriously.

Or in other words, if parts are not individuals, then it could be debated if they are an independent natural kind, and if so, if they are more to be considered instrumental as an analytic tool, rather than considered an ontological mode of existence, that few people if any have ever seen or heard of before.

This is perhaps to ask if parts, according to this decompositional approach are really there. Objects that in this sense essentially involve a semiosis as complementary to their content, might seem a counterintuitive inclusion to a view of the natural world.

The first thing to point out is, that we have focused on experience and perception in our examples and analysis, and in this sense, we might go along with the skepticism, that parts in this sense are not real. But if we look more carefully, we might ask if there exist integrated wholes, moments, emergent immaterial parts, qualia, and tropes. Following a decompositional mereology, an assumption on parthood semiosis would rely on a decomposition simpliciter of an integrated whole. Therefore, any arguments in this setting

would have as premise an assumption of integrated wholes. And certainly, in system theory, leading proponents have been questioning the ontology of systems, their own subject matter.

Also, it is suggested that parts are in the same ontological category as signs. Do there exist signs? If one opts for a material reductionist position, arguing that the whole universe might consist of quantum fields, it seems like that we would not have room for such a notion of parts, unless such objects are indeed themselves parts, and that's why they behave so strange. Or if they have parts, in which case they would be, I believe, highly integrated.

The suggestion that mereology might be considered a (geometrical) dimension, might offer some relief, as dimensions do tend to change the view of what is already there. If mereology is a dimension, we cannot see parts properly unless this dimension is properly deployed as a measure in our inertial system. Personally, I view an attempt of formulating mereological composition and decomposition as a geometrical dimension as a highly promising and fruitful, but it would be a work in itself, a work that would require this pioneering work to be done first.

What I am arguing here, is simply that parts are not individual self-reliant beings. They are parts, being in their respective wholes and deriving their identity from them. You could say that this analysis and conceptual development is based on an instrumental and epistemological logic, and you would be correct. But it is, however, open to an ontological interpretation.

Chapter 3. Sortal Decomposition

In this chapter the claim is defended that mereological decomposition can be regarded as being essentially governed by sortal predicates. In addition, it is argued that this gives rise to two different kinds of mereological decomposition: First, a notion of a *Sortal Decompostion*, that is, an idea of a kind of mereological decomposition, that is governed by *second order* sortal predicates is introduced. This novel notion is contrasted to *Mereological Decomposition Simplicitér*, and it is attempted to illuminate some of the advantages that might be obtained by applying such ideas of two kinds of decomposition. Particular attention is placed on the transitivity of parthood. As both Mereological Decomposition Simplicitér as well as Sortal Decomposition can be argued to be non-transitive, the potential of a notion of "weak" or *domain restricted* transitivity are discussed.

3.1 Sortal Predicates and Mereological Decomposition

The theory of mereological decomposition simplicitér as it has been developed so far, restricts both the involved notions of composition and decomposition. Parthood is restricted as well, as it is understood as a belonging to a mereological decomposition, that in turn is regarded as an explication of an understanding of a whole. Hence, it is to be distinguished from the intuitions of a mere common sense or vernacular notion of parthood, not because these would be irrelevant, but because such a commonsense understanding is not necessarily coherent with the implications of a logical development of a decompositional mereology. On the other hand, it can be justly argued that any philosophy or logic of wholes and parts must, to some extent, origin in some vernacular use of the terms, or other.[105]

[105] Rose and Schaffer 2017 have argued that common sense intuitions on composition constitutes particularly teleological beliefs, but that these beliefs are not to be taken very seriously, as (as I understand them) the view does not rely on systematic methodological studies and is not more relevant to mereology than folk science is to sciences like, say, physics. What in my view complicates this issue is the introspective and "armchair" character of many mereological discussions and arguments: Despite the fact that they are often somewhat rigid in language use and develop through systematic reasoning, we are often faced with an insecurity about the role of our initial vernacular concepts and interpretations. I have argued elsewhere that this also goes for other fields of philosophical scrutiny, like dualist metaphysics and emotion theory (Hertel-Storm 2021, pp. 5-11). It is worth noticing that for example Husserl's notion of intentionality (Husserl 1993, vol ll/1, pp. 364-455) is supposed to facilitate objecthood in experience, and therefore is of central importance to any practical mereological analysis we may perform. In *Sein und Zeit*, Martin Heidegger famously points out (Heidegger 1993, pp. 55-59),

A sortal predicate is a predicate that sorts objects of different types. The term comes from formal semantics and can be formulated as that there are several domains of entities (more than one) which can be characterized using predicates appropriate to each domain. Henceforth, the predicates sort the entities into types corresponding to the various domains.[106] This is similar to what is proposed with mereological decomposition, particularly as parthood in chapter two was argued to contain some kind of semiosis, and therefore arguable be sorted into a domain of a particular typology. For with decomposition, we single out a particular type of objects, those who satisfy the predicate "… is a part of Y." If mereological decomposition is governed by a sortal predicate, the predicate itself must be the very parthood designator, "… is a part of Y". The reason is, that if we fundamentally distinguish between *all and only the parts* of an object, sorted out from all the objects that are *not* part of the object in question it must be, that sortal predicates are involved: For this is what sortal predicates do: They sort objects into categories or classes.

Let us illustrate this with an example. Think of a person. This person is perhaps a friend, and we think of her in a particular situation. She has many parts. Body parts like hands, feet, head, arms, legs, hair. Perhaps she has mental parts like emotions or thoughts, or perhaps even personality traits. All these parts can be placed in a particular domain, that we call "all and only the parts" because they satisfy the predicate "… is a part of Y (our friend)." Is her personal history also a part of her? What about the clothes she is wearing?

That would depend on how exactly we understand our friend. We can argue that her clothing is part of her personality, but her personal history is not. Or vice versa. So far, mereological decomposition is conceptualized as an explication of our understanding of her as a whole, through a mereological dimensionalization, involving a semiosis and requiring a notion of all and only the parts that are sufficient to compose the whole in question.

Though a mereological decomposition simplicitér can be seen as an operation that involves explication and a dimensionalization of the object decomposed, it is not purely descriptive. For it also seems to work

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that when we encounter an object, we understand this object in relation to the way we are *concerned* (Sorge) about it. We always experience something *as* something. Transferring this point onto our intuitions of wholes and parts, composition, and decomposition, the sortal characteristic of decomposition is in fact expressing this point. Where a notion of mereological decomposition simplicitér that only involves one first order predicate, namely that 'x is a part of Y' would amount to a notion of disinterestedness that is often, following Kant (Kant 2009), claimed to be a necessary precondition for aesthetic judgement (see e.g. Collinson 1992, pp. 134-144). On a parallel line of reasoning, we might argue, that an example of an interpretation of what disinterestedness amounts to, could be to compare with, what Heidegger in his later works calls "Gelassenheit" (see Heidegger 2015) which roughly translates into "leave-it-be". It is therefore likely, that our vernacular concepts do have a more significant influence on our inquiry than we tend to think, no matter how systematic we attempt it to be.

[106] The formulations are partly borrowed from Florio 2023, that makes that distinction to argue in favor of reconsidering a non-typed language semantics.

as a function that performs epistemic operations on objects, while adding semiosis to the parts. The level of integration of the whole is through the mereological decomposition expressed as a semiosis of the parts.

Remember the example from chapter 1 of a table with four legs, a plate and some nagels as parts. In one sense each of these parts are a part of the table, but they play particular roles in the composition of the whole. The table need to be assembled in a certain way to contain a particular structure that can facilitate a particular function (we can sit around the table; we can have things lying on it ect.) The structure is an intermediate part, gestalt or moment that is emergent and is integrating the parts into one table. From a decompositional perspective the semiosis can be regarded as a kind of assembly instructions of the parts' role and belongingness to the structured whole.

The sortal function of mereological decomposition must involve a fundamental ascription of the sortal predicate of parthood to whatever is thought to belong to the outcome. Otherwise, the mereological decomposition simplicitér could not result in *all and only the parts*. Like in set theory, there may both be inclusion and exclusion criteria involved to do that. And these must depend on the sortal predicate, "… is a part of Y", as well as on the nature of the Y explicated in the process.

Going deeper into the sortal aspect of decomposition, we are faced with various questions. Can we add further sortal concepts in addition to the "part"-predicate? And if so, are we making our mereological decomposition more obscure? As we can consider the individual wholes as a belonging to a *kind* of being, we are able to consider *kinds* of parts due to the kind of *participation*, in turn determined by the parthood relation which is again in turn determined by the semiosis of these parts in composing the whole. For example, we can talk about functional parts, aesthetical parts, essential parts, integrative parts, topological parts, physical parts, mental parts, that all may be discerned by application of various sortal predicates.

Let us return to the example of the friend from before. This person is a human being, a whole that has particular characteristics and biological makeup. This is some fundamental properties that are expressed by sortal predicates that jointly would sort the whole into beings, or parts, of particular kinds. When a decomposition is made into *all and only the parts,* these parts are provided a semiosis that they belong to a decomposition of this whole, the person. If we cannot provide a semiosis to something found *in* the person as belonging to such a mereological decomposition, it is not a part of the whole in question. If the person perhaps accidentally has swallowed a fly, this fly might be found inside the person, but it is not a part of the person.

The semiosis therefore suggests that there is a parthood relation of this particular part to this particular whole, a relation that might develop over time. Also, we can coin this development, by making a distinction between the parthood relation and the participation. The development of the parthood relation might be expressed in various kinds of participation. When the person eats, the food is dissolved into nutrients, among other things, and these nutrients might be a part of the system in a certain way, perhaps it is a vitamin. But vitamins might participate differently at various times or stages because they are situated differently in the organism.

Another example of this could be a project manager in an organization. The parthood relation might be the same: she is the project manager of this project, and as such she is a part of the project. However, her tasks in the project (her participation) might vary considerably as the project progresses, say, in the case that the project is organized into stages and therefore the tasks change with progress and time, also if the surroundings of the project change, they cause adjustments in the way it is organised.

It is important to distinguish clearly between the sortal character of wholes on the one hand, and of the sortal character of parts on the other: When we apply a sortal predicate to a whole, we thereby suggest that this whole is of a particular *kind* and/or perhaps belongs to a certain set or class. If this is a first order predicate, it is therefore performing a fundamental categorization. If it is a second-order predicate, it is ascribing a membership to a subclass within the category stated by the first order sortal predicate. In that sense we can say that this new sortal decomposition must be subordinated to a mereological decomposition simplicitér, simply because it operates with second order sortal predicates, while the latter operates with first-order predicates.

When we are ascribing a first order sortal predicate to a *part*, this sortal predicate is always the same, because it is categorizing the object in question as exactly that – a part. Therefore, the sortal predicate '… is a part of Y', is the stand-alone sortal predicate that in a sense "prompts" a mereological decomposition. For simply applying the predicate "… is a part of Y" to a whole Y, would simply end in nonsense: Either we would have to say that Y is a part of Y. True or not, it does not say much. Instead, we need to apply the predicate "… is a part of Y" in a way that reads "Y has parts" or something might be a part of Y. If we then put in x on the empty slot in the proposition, we might obtain a reading like "there is something, we call x or the xs (in the plural), that is part of Y".

Given the connotations from our analysis of the inversibility of mereological decomposition and composition, we might even suggest a stronger interpretation: "There is an x or some xs that jointly compose Y". What 'x' denotes, depends therefore on Y and the meaning of 'x is a part of Y'. In a

decompositional mereology, the sortal predicate 'x is a part of Y' is therefore *necessarily always a first order predicate*, for it states the fundamental nature of the xs. We might afterwards apply other sortal predicates of second or higher orders, in order to further clarify and qualify its nature and kind. But if x is a part, it is not possible to consider it in isolation from the whole, before a simple decomposition is performed, and thereby an ascription of x's being a part of Y. We can therefore regard the concepts of 'Part' or 'Parthood' as sortal concepts that allow us to denote all and only the elements that satisfy the predicate of "x is a part of Y". 'Parthood' designates the property which allows the objects we identify as parts, to be included in this class or belong to this domain.

Suppose though that we feed this predicate as a prompt or command in a machine that is supposed to sort out all and only the parts of an object Y. The machine would not know even where to begin, since what we have entered is strictly speaking only the conditions of the semiosis of the parts, allowing them to be recognized as exactly that, parts. But we also need a prompt of how to differentiate between various proper parts as well as the parts and the whole. And simply to point to the composition of the whole is not always an option, for sometimes we encounter an object as a whole, a gestalt, and the parts are only later something arrived at through an analysis, a decomposition.

Furthermore, admitting the sortal nature of parthood in this way also suggests, that if we accept that we need additional sortal predicates in our analysis, it would be useful to add them as second-order sortal predicates or higher. In a sense, the first-order predicate simply states that this is a mereological decomposition. The second order predication is very often designating subsets or classes of first order decomposition simplicitèr. For example, it could designate a type of parts. If we take the decomposition of a tree as an example, we could have a class of parts that are branches and another class of parts that are leaves.

Are we therefore deploying such sortals into our analysis, it would be useful to refer to it as particular kind of decomposition, let us call it "Sortal decomposition", that builds on second-order predicates or higher. A sortal decomposition is often a central part of a mereological decomposition, because it is the way we distinguish the kinds of parts we are interested in. What distinguishes our notion of Sortal decomposition from our theory of classes or sets, is the underlying notion of a mereological decomposition simpliciter as dimensionalization and the semiosis of parts and must always be presupposed on a more fundamental level.

In a more formal characterization, we might add a definition, which enable us to distinguish between the two kinds of decomposition:

Iff a decomposition of Y is sufficient to form a mereological composition of Y, then it is a mereological decomposition simplicitér. For it is a defining characteristic of the mereological decomposition simplicitèr, that it satisfies the criterion of inversibility.

Sortal Decomposition, on the other hand, does not. To see this, revisit the tree example above: we might identify a subclass of parts as leaves, but the leaves are not sufficient to compose a tree.

To sum up, we can operate with two different kinds of mereological decomposition.

Mereological Decomposition Simplicitér – a decomposition into all and only the parts, and

Sortal Decomposition – a decomposition into a kind of parts

In the latter sortal decomposition at least one extra second-order sortal is added to the generic sortal 'parts of Y', which allows us to encounter a certain *kind* of parts. The result of a sortal decomposition which form in turn *some part or other of* the mereological decomposition simplicitér, in the technical sense that this subset is either a proper part of or identical to, the mereological decomposition simplicitér.

3.2 Where to begin: Prompting Mereological Decomposition

The sortal predicate involved in a mereological decomposition simplicitér is fixed as parthood *per se*. It is in this sense, that the first-order predicate determines the fundamental operation. A question arises, as to how exactly this first-order sortal predicate can initiate and determine the operation of a mereological decomposition simplicitér? For, as hinted to above, to do that, it must be applied to the whole in question. But if the sortal predicate is simply designating parts, it is hard to see how this is applied to the whole. And if it can be applied to the parts beforehand, we don't need it, except perhaps as a designator.

It might be worth noticing, that the question can be argued to have *general* epistemological connotations. The sortal predicate cannot do it alone, for though some might hold, say, that a "real" system is ultimately composed by electricity or particles of some sort. For if the supposed parts are not decomposed from the whole, we cannot claim, within a decompositional framework, that the electricity or particles compose anything in the first place.

Therefore, we might look after alternative options that may present themselves: Putting this question in a way that is loyal to the epistemiological turn made earlier, we might begin to consider merely on what epistemic grounds we might perform an operation like that, with or without sortal concepts. I shall suggest below that a disjunctive answer might be appropriate. We have different strategies to make

partitions of objects, that is, to discern sections of interest when we encounter objects in the world. I shall below provide some examples and suggest that various combinations between such strategies might provide a convincing suggestion to how we in praxis might begin to form mereological decompositions of objects.

Consider then, the following five possibilities: We might have prior knowledge of the composition of the whole in question, we could imagine the possibility that the object or whole suddenly changes in a way that requires analysis of its functioning as an object. Perhaps we can also identify associations to other objects, that would make us attentive to some parts or sections in contrast to others. Or it could be that we are ourselves part of the object, a situation where we, on that ground, can distinguish between us and them among the parts, because of our point of view. We might also experience a variety in the consistency, regularity or other qualia that pertains more to some regions or surface area of the whole, than others. Let us look at these five options in more detail.'

1) We might have an idea about the composition of the object beforehand.

Imagine that we have obtained knowledge from a source, that can lead us to make a mental model of the composition or functioning of the object. It could be that we have learned something about the whole from some source, be that another person, an expert, a parent, or a teacher. or a book, internet search, database, or other information search facilities. It is also a possibility, that we could have learned it ourselves from our interaction with the object.

This solution makes sense. If composition can be seen as the mereological study of the *whole*, and, as I have earlier argued, that decomposition can be regarded as an explication of the whole into all and only the parts, such an idea might sound convincing. It might also be consistent with what is argued in the hermeneutic tradition of the hermeneutic circle, that the expectation of the whole determines the interpretation of the part.[107] We often find cases where we begin with the encounter of a whole, a situation, a system, and where we thereby attempt to decompose it into parts, if there is a particular class of parts we are interested in, or we are perhaps looking for individual parts that might be responsible for a systemic feature or effect.

[107] This notion is particularly held by Friedrich Schleiermacher and Wilhelm Dilthey. See Schleiermacher 1977 and Dilthey 1990.

2) We might consider the possibility of an intentional mereological dimensionalizing by a change in phenomenological stance.

We find a partial explanation of this in Martin Heidegger's distinction between ready-to-hand *(zuhanden)* and present-at-hand *(vorhanden)* in *Sein und Zeit.*[108] In our everyday interaction with the world, Heidegger argues, we often intuit the objects around us as tools for our purposes.[109] But if the objects resist us, for instance if an object is broken or fails to perform an expected task, we intuit it differently as a systemic structure. Imposing our own terminology on Heidegger's point, we can say that we sometimes add a mereological dimension or measure of the objects, in which we look for parts and their interactions. We could also argue that this is a technical approach to the objects, that makes certain features stand out more clearly, as Heidegger himself emphasizes in his lecture *Die Frage nach der Technik*.[110] The point is, therefore that we might experience objects related to our interests, and that such a variation may make us discover various aspects at different times. This may again lead to a partitioning of the object, due to these differences.

3) We might consider overlap or associations of sections with other parts

Suppose we encounter two or more wholes, where some persons or objects participate in more than one. Like an organization, where some employees are working in two different departments, or a broom and a mob, that can be mounted on the same handle. Also, it can be a feature of the object that can be associated with the feature of another object, like a pedicel of a pear and the pedicel of an apple. Identifying a section or a feature in contrast to other features seems to be indeed close to the idea of parts as a sortal predication. However, one might argue, that this would be a process that has to be repeated a great many times, for a decomposition to end up in all and only the parts. This matter is complicated by the fact, that in any strict sense, any mereology built on mereological decomposition, cannot have overlapping parts. But this shall be discussed in more detail in relation to the transitivity of parthood, below.

4) We might identify ourselves as a part or a whole related to the object.

It seems reasonable to argue, that in the case that I identify something as a part of me, I would instinctively be able to distinguish other parts as well. If I look at my arm as a part of me, I could contrast it to other

[108] Heidegger 1993, pp. 102-110.
[109] Heidegger's German word is *Entwurf*, which is an ambiguous term in Heidegger's use, where it means something like outline something by throwing out into the world, see Heidegger 1993, §53, pp.260-7.
[110] Heidegger 1985, pp. 9-40.

parts that are not me, but also not my arm: My legs and my head for example. And furthermore, if I consider myself part of a group, I might also identify others as being part of the same group.

5) Variations in the qualities and integrations of the whole.

If we look at an object and see that some sections or perceptible areas of it are different than other such areas. Perhaps some areas of it appear to posit a certain color hue, perhaps some sections appear more "fluffy" than the rest, some of it is might be regularly replaced, or smelling different. Such experiences make some areas or sections stand out in a way that allow us to identify and differentiate between them as parts, namely the parts that are different in some respect or other. In larger objects, like organizations this might lead to informal categorizations like, the interns, the night shift, the consultants, or the core staff. Such denominations might even be independent of formal categorizations.

There might be potential options or possibilities that go beyond these five suggestions, but I think that they jointly make up a somewhat clear picture of an idea, of how we may initiate a mereological decomposition, in a situation where we cannot simply apply the parthood predicate to some particular whole.

In some sense, we might say that this kind of cognition of differences and patterns might be the source of generating a conception that might eventually lay the ground of a semantics of parthood. And it might in fact be based on this conception, founded on an *experience* of patterns, that we might argue for or against of any theory. Either because we require that the theory must be able to conform to, and explain, our commonsense notions, or because we think it must at least be coherent with, or perhaps even able to explain, how we experience patterns in the world. [111]

Here is an example of how the application of these five "prompts" might work in praxis. Suppose we look at an apple. We might have prior knowledge of the composition of it, so we already know that there is a stalk and behind the skin there is flesh and a core with pips. This would be drawing on a preliminary knowledge of the composition of the apple. We could also look at it and imagine ourselves taking a bite, importing an estimate from experience about how much fruit we might bite of at a time. In this way, the apple can be sectioned into bites of a particular size. We could also point out its similarities to the redness of strawberries, automatically making us identify and exclude the not sufficiently red color on some

[111] Keith Devlin (2003) has for one stressed mathematics as a science of patterns, and it is with a somewhat similar idea that this idea of "partition" is founded, though, the ideas presented here might be justly said to be of a more constructivist nature. The idea that mereologies must conform to common sense, is exactly the idea objected to in Rose and Schaffer 2017. The idea of theories being consistent with experience is in philosophy of science called *Saving Appearances* or in a slightly different version, *Saving the phenomena*. See Barfield 1988 and Duhem 1969.

sections of the surface and the stalk. If we were ourselves a pip inside the core of the apple, or we imagined that we were, we might also distinguish between the complement and ourselves as parts of the apple. We might also observe that areas of the apple are more "yellowish" than other areas, which enable us to differentiate between sections, identifying them as parts of the whole apple.

3.3 Two Kinds of Mereological Decomposition

Let us look at the difference between the two kinds of decomposition a little more closely, adding some formality to the descriptions. Let us call the mereological decomposition simplicitér for "MDS decomposition", and Sortal decomposition for "SD decomposition." To sum up, any sortal predicate governing a SD decomposition, must presuppose the predicate of the mereological decomposition simplicitér. This can be illustrated by considering the scope of the predicates in a sortal decomposition:

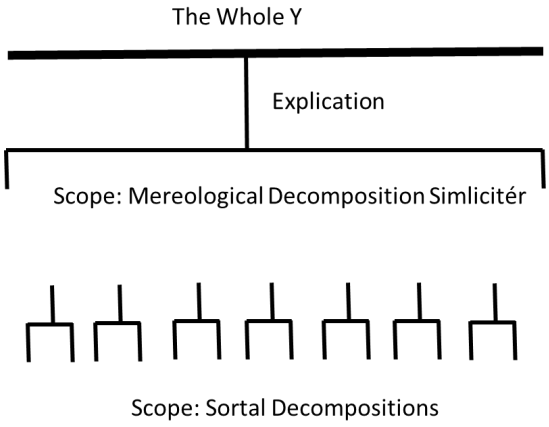

Figure 12. Sortal decompositions as limited cases of Mereological Decompostion Simplicitér

The SD decomposition can be regarded as a limited (or restricted) case of the MDS decomposition. A decomposition *Simplicitér* is also a sortal predicate decomposition, where the sortal predicate in question is a cognate of "...is a part of Y".

Conceiving the result of sortal decomposition as a subset of the result of the corresponding MDS decomposition in this way, would explain why considerations on the MDS decomposition may be useful in considering the nature of parthood as such, while considerations on SD decomposition is useful when the focus is more on segments and classes (kinds) of parts.

Parts resulting of a MDS decomposition are immediate because they are directly sorted into all and only the parts. Introducing a distinction between immediate and intermediate parts, must be supposed to be

a matter of interrelations between parts. Some of the parts of a MDS decomposition might be further decomposed, but it would then be *another* decomposition, i.e. a decomposition of another whole and the semiosis would change, and hence it would be a different part.

This leads to what might seem a paradoxical consequence: First, since an object changes its identity when it becomes a part, it is from this perspective not possible for two wholes to share the same part. For the semiosis generated by the MDS decomposition would be transferring the nature of the whole into the identity of the parts.

Second, it does in fact seem possible for some person or object, to participate in two or more wholes. Consider a building composed of three blocks. A room that is part of one of the blocks would also be part of the whole building.[112] From a decompositional perspective, we must first ask what the room is supposedly a part of, that is, do we think of it as belonging to *all and only the parts* of the building or the block? For suppose I own the entire building and are renting out the rooms. There are perhaps 6 rooms in each block, which makes 18 rooms in the building. If something makes it impossible to rent out the room in question, it would likely be a more significant challenge for me if I think of the room as part of the block (it is about 16,5% of the turnover) than if I think of the room as part of the building (it is about 5,5% of the turnover). In the second case it is perhaps to be considered as insignificant in relation to the whole. We may also think of the room as part of a section of the building: It is the one room (out of 18 rooms of the whole building) that is placed in the first block in such a way that it has a special distinguishing characteristic, say a view over the sea, perhaps. In this case the room has a semiosis as part of the whole building but does also belong to one or more SD decompositions that allow us to specify the location or role as part of the whole.

For parts must be unique since they are attributes for a particular whole at a particular time. If one object changes its semiosis, it might be the same object with a different semiosis, but it is certainly not the same part. If we think of the room as a part of the block, ignoring the building, the room has another semiosis: This room is placed in this block. The block becomes the whole and the remainder of the building becomes (external) context. In this case, we could make an MDS decomposition of the building into the three blocks and a MDS decomposition of the first block that includes the six rooms.

The rooms would not be part of the whole building, because the MDS decomposition cannot be transitive. So, if you tear down a wall and join two rooms into one, the composition of the block would change, but not of the building. But if you see the rooms as parts of the building, then it of course would.

[112] I owe this example to a comment by Achim Stephan.

The trouble only arises when we confuse parts with individuals, and sort parts *as if* they did not contain the semiosis we have identified as the essence of parthood.

Turning to the SD decomposition: We *could* have a SD decomposition, which is further decomposable. But that further decomposition would again be an SD decomposition governed by a different second-order sortal predicate, which again could form an "original" SD decomposition using that particular "new" sortal predicate. Inasmuch as parts belong to *two* SD decompositions they may belong to the same whole: Both sets of parts of the SD decompositions must be subsets of the set of the parts of a governing MDS decomposition.

For this to work out, we need to show, formally, that an MDS decomposition cannot coincide with a SD decomposition. Based on the three assumptions below, an argument can be made to obtain that end:

1. A decomposition of Y is a MDS decomposition, only if the resulting entities are sufficient to compose Y.
2. A decomposition of Y is a SD decomposition, only if the resulting entities are all governed by a common second order sortal predicate.
3. A decomposition of Y is a proper-SD decomposition, only if the resulting entities are all governed by a sortal predicate and the resulting entities require supplementation in order to compose Y.

A SD decomposition of Y coincides with a MDS decomposition of Y, only if the resulting parts of the SD decomposition, are sufficient to compose Y. In that case, the decomposition is not a proper-sortal decomposition of Y.

For the MDS decomposition to coincide with the SD decomposition, without being identical to it, we need to argue that there can be more than one MDS decomposition. But if the result is to be *all and only the parts*, it is hard to see that possibility. But we might want to recur to a Fregean solution, where we can have several modes of givenness (Sinn) to the same reference (Bedeutung) as it was discussed in chapter 1. In that case, the second order predicate would either be a distributive or perhaps dissective predicate to apply to all the parts, or alternatively a predicate that applies to the whole like a systemic property. [113]

In both cases, the problem is, that the second-order predicate in this case does not *sort* anything. This might be because Y is either a mereological atom, or a 'bare plurality' of a special kind of objects, that all fall under the scope of the second order sortal predicate, which is previously distinguished as limits of

[113] The idea of dissective and expansive predicates etc., can be traced back to Leonard and Goodman 1940, and is further developed in Goodman 1966, pp. 53-56.

application. Again, we need to be alert not to ignore the parts vs. individuals distinction that lies underneath all these logical considerations.

The objection could be made, that in the case where a SD decomposition satisfies the requirements of a MDS decomposition, the second-order SD predication is extensionally redundant, and therefore we are in fact engaged in a MDS decomposition. They are in this case indiscernible, and therefore identical.

But, to put it more bluntly, the sortal predicates applied would still not *sort* anything, and therefore be tautological. Therefore, for any mereological decomposition that is *not tautological*, the SD decomposition cannot be identical, that is, be inter-substitutional with, a MDS decomposition.

No object is a proper part of itself, and any object is an improper part of itself. The distinction give rise to the conception of "…some part or other": x is some part or other of y, only if x is a proper part of y or x and y are identical. If the MDS-predicate is taken to mean '... is some part or other of Y', it would clearly be dissective, since the decomposed object Y would be some part or other of itself, given the reflexivity of identity, and of all the proper parts resulting from the MDS decomposition one could also apply the MDS-predicate. Furthermore, this interpretation of the MDS-predicate would allow for decompositions of atoms, though no proper parts could be produced in such cases.

If the MDS-predicate is instead interpreted as '...is a proper part of Y', we exclude identity from the predicate, and hence it is not dissective, given the assumption that nothing is a proper part of itself. Instead, it becomes a distributive predicate of the objects resulting from MDS decomposition of Y. Since it cannot be attributed to Y itself, it would be reasonable to assume that it is in fact *generated* by our MDS decomposition of Y.

In chapter two it was argued that the semiosis governing the parts, can be understood as an image or understanding of the whole that is transmitted through mereological decomposition to the parts. This enables different kinds of parts to be identified, as related to the degree of integration of the whole. In chapter two, the considered wholes were generally considered to be homogeneous, but obviously this does not have to be that way. Actually, we can quite often experience wholes, where some areas are more integrated into the whole than others. Biological organisms seem to change some parts regularly, while others remain steadier, in a machine the oil, water and fuel might constantly change place or change, disappear, or enter, in a pen the ink is more vaporous than the plastic or metal pieces.

This leads us to naturally identify sections, or classes of parts (or perhaps even intermediate parts) that can be described by second order sortal predicates, that is, sortal decompositions. Perhaps it can even be

argued that this is a fifth possibility of initiating a mereological decomposition: Non-homogeneity. However, it is certainly the source of discriminating kinds of parts of a whole.

I shall below consider a famous example from William James' considerations of the nature of a (empirical) self. James writes

In its widest possible sense, however, a man's Self is the sum total of all that he can call his, not only his body and his psychic powers, but his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and horses, and yacht and bank-account. All these things give him the same emotions.[114]

Consider for a moment an interpretation of this passage of James, that may fit with our notion of mereological decomposition simplicitèr: The "total sum of all he can call his" we can argue correspond to a mereological decomposition of the Self in the "widest possible sense". Furthermore, the feelings they arouse, the 'Self-feelings',[115] we can claim to be partially founded on the semiosis of the parts, that they are parts of *me*.

Think for example of a situation, where a person comes to you, and tells you that you have beautiful hands. The pleasurable feeling of pride and love would essentially connect to the fact that it is *your* hands, which is exactly what the semiosis tells you.

Even though we are at a high risk to overinterpret James into our own conceptualization, it does in fact make sense to claim, that the fundamental idea is at least similar.

James then divides the self into constituents, Self-feelings and prompted actions like Self-seeking or Self-preservation. He then further allocates the constituents into classes that they then supposedly constitute:

(a) The Material Self;

(b) The Social Self;

(c) The Spiritual Self; and

(d) The Pure Ego.[116]

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[114] James 1950, vol. 1, chapt. X, p. 291.
[115] Ibid, p. 292.
[116] Ibid, p. 292. James is sometimes a little baffling with his inconsistent language use. For example, he introduces this categorization of the four kind constituents of Self, by pointing out that these constituents are the constituents of the *history* of the self, a point that is later on not emphasized in his analysis. And a few lines later he is also arguing that he is operating with *two* classes, though he is actually listing four. These two classes might refer to the distinction between "me" and "mine", which in more contemporary works have become a central distinction in the formation of the idea of 'psychological ownership'. Psychological ownership is briefly discussed in chapter 5 in relation to the phenomenology of "having parts". Though the mentioning of the two classes of constituents of the history of the self in this place in James 1950 might be

Under a certain interpretation, this can be thought of as a SD Decomposition, because it could be seen as a categorization of different *kinds* of parts within a MDS decomposition of the Self. We might even make a case, that the "sorting out" of the Sortal decomposition might be due to a heterogeneity of the "overall" Self.

3.4 A Question of Transitivity

While MDS decompositions do not say much, except for what philosophically characterizes the notion of parthood, SD decompositions can be seen as a heuristics from which much more elaborate descriptions can be made. For when we are considering classes of parts, we can also add further necessary or contingent properties of these types of parts. Hence, aesthetical and topological concepts like symmetry, location, temporality, might arise from descriptions based on a particular SD decomposition.

Though there might be argued for or against transitivity of composition, decomposition as well as proper or improper parthood, the extensionalist claim that parthood is transitive, seems highly intuitively plausible. If a girl is part of a family, and the family is part of a community, then the girl is obviously part of the community. And if my arm is a part of me, and my finger is a part of my arm, then my finger is obviously a part of me.

Only few mereologists have argued against transitivity in mereology, but from a decompositional perspective it is a bit more complicated. From this perspective we could both ask if mereological decomposition is transitive, if sortal decomposition is transitive, or if parthood is transitive. I am going to argue, that neither of them can be transitive. Though one perhaps can make an argument that SD decomposition can be transitive in some cases. However, I shall suggest that parts of sortal decompositions might sometimes "jump" from one MDS decomposition to another, which may widen the explanatory power of decompositional mereology as such.

So, let us begin by considering the strong transitivity of mereological decomposition more formally. Suppose the following suggestion of a criterion of transitivity. Let MDS:φ stand for a mereological decomposition simplicitér of some whole φ. We can then define a proposed transitivity as

A. *(Strong) Transitivity of MDS:* $(z \in MDS{:}\, x)\&(x \in MDS{:}\, Y) \rightarrow (z \in MDS{:}\, Y)$

considered a source to reveal a deep Jamesian insight, it appears to me more likely that it is more straightforwardly an error or perhaps even sloppy language on James' part.

(If any z belongs to a MDS of an x, and if any x belongs to a MDS of Y, then z belongs to the MDS of Y.) This criterion is labelled as "strong" because it proposedly applies to all kinds of objects, and it would correspond to an extensional version of the transitivity of parthood.

The reason why, mereological decomposition simplicitér is *not* transitive in this way, is simply that it results in *all and only the parts*. Therefore, no further parts can be allowed: Either the xs are *all and only the parts*, or they are not. A MDS decomposition of a MDS decomposition, is not possible: For we would have to argue, that the parts of a mereological decomposition of Y could be further decomposed to parts, that would then also be parts of Y. But in that case, the first mereological decomposition would not have resulted in *all and only* the parts, in which case it would not have been a mereological decomposition simplicitér after all.

On a similar vein, we can construct an argument that, since *SD* decomposition results in a particular class of parts, that is, a grouping of parts of a particular kind, narrowed down as a subset of a MDS decomposition, a SD decomposition of a SD decomposition, would result in exactly the same parts, if it were conducted under the same second order sortal. The second SD decomposition would be a tautology, unless it would involve a third order sortal and hence form a subclass or a subset of the SD decomposition deploying a higher level sortal. This is also why classes are typically not transitive, though they may allow for transitive relations within the scope of the class denominators or perhaps even different functional "domains".[117] Since it is natural for us to think in transitive parthood relations, it might be difficult to accept the idea of non-transitivity. One of the philosophers who have discussed this matter in most detail is Johanna Seibt, who has pointed out, that the governing intuitions of such mereologies, make perfect sense. [118]

Following her line of thinking, we might add another intuition pump: we can argue, that if a person is a soldier, he is also part of an army. And if his finger is part of him, then according to an extensionalist reading of transitivity, his finger is part of the army. But suppose for some reason or other, that this person got his finger amputated, but stayed in the army, the army could hardly be argued to have become decimated on that account. Hence, the soldier's finger was not part of the army in the first place.[119]

[117] Cruse 1979, also referred to in Seibt 2017, p. 575.
[118] Seibt's aim is to develop a process mereology, as I understand it, a mereological model of how vernacular objects from the commonsense world of experience, might arise from, or at least be grounded in, a process metaphysics. For her discussions of transitivity, see particularly Seibt 2001, 2004, 2015 and 2017.
[119] This example is inspired by an example used in Seibt 2017, p. 572, and attributed to Rescher 1955, p. 10. The original example goes like this: *A Platoon is part of a company. A company is part of a battalion. A platoon is part of the battalion*. I have attempted to reformulate it in order to show the conflict to our commonsense intuitions more clearly.

Like the extension list's compositional mereology may get into trouble, if they allow for too much transitivity, decompositional mereology may have a problem if it allows for none: For there is certainly transitive parthood cases as the person-arm-finger case.

Still, MDS decomposition being an intensional "top-down" mereological conception is not transitive. With this insight, we might suggest a "weaker" transitivity of *parthood* and not decomposition. This idea of weak transitivity is a kind of conditional or "local" domain specific transitivity, of a kind that has previously been suggested. But in the context of decompositional mereology, we can argue for it in a slightly new way. Therefore, my argument for it will contain some formal versions of the key principles.[120]

First, we need to invoke the notion of SD decomposition. SD decomposition does not conform to the inversibility criterion, nor is it transitive. Furthermore, we need to distinguish between one SD decomposition from the other. If one SD decomposition is governed by a particular sortal predicate like "hands", it must be carefully distinguished from another SD decomposition governed by another sortal predicate like "feet". Therefore, we cannot just talk about transitivity of SD decompositions *per se*, we must always talk about SD decomposition over a particular sortal predicate. SD decomposition is non-transitive, because as SD decomposition it involves a qualification of being an *all and only the specific kind of parts of an object*, and the parts of these parts would either not be of the same specific kind or not a decomposition of the same object.

And as argued above, it is a defining characteristic of SD decomposition, that it is not inverse to composition. Let us write it the following way: $x \in \frac{SD}{P} : Y$, which reads: x belongs to a Sortal Decomposition of Y, over a Sortal Predicate P. We can then write the non-inversibility roughly as follows:

8. *Non-inversibility of SD decomposition:*

$$\neg((xs \in \frac{SD}{P} : Y) \rightarrow (xs\ Comp\ Y)$$

(It is not the case, that if the xs belong to a SD decomposition of Y, the xs compose Y)

As SD decomposition couples to the notion of composition, in that region result of as SD decomposition would be a subset of a MDS decomposition of the same whole. Therefore, a SD decomposition cannot be sensibly carried out without recurring to the MDS decomposition, as the latter depicts the notion of parts that is essential to the former.

[120] Seibt 2017, p. 575 provides an overview of local transitivity solutions within non-transitivity parthood relations.

It may be objected, that if Y can be SD decomposed into the xs, then the xs are sufficient to compose Y. We may actually make up cases where this is actually true, like if we consider tautologies, like making a SD decomposition into unmarried men from a group of bachelors. Hence, it may be argued, we cannot infer it as a constituting criterion of SD decomposition, as it is most commonly not a decomposition into *all and only the parts*, and therefore is not as such inverse to mereological composition in the way mentioned above.

But this presupposes an overlap of cases of MDS decomposition and SD decomposition, in the strong sense where SD decomposition is thought to be the same as the MDS decomposition. Though we have argued above that this is not feasible, we might add at this point, that the distinction between the two kinds of decomposition, is made for the purpose of having a certain decomposition of only *some* of the parts, while the MDS decomposition results in *all and only* the parts. The SD decomposition therefore would presuppose a MDS decomposition that is "larger": we might introduce a supplementation principle to distinguish them:

9. *Supplementation of SD Decomposition:*

$$\forall P \forall z \exists x \left(\left(z \in \frac{SD}{P} : Y \right) \rightarrow \left((x \in MDS : Y) \& \neg \left(x \epsilon \frac{SD}{P} : Y \right) \right) \right)$$

(For all P, for all z, there exists a P: If z belongs to a SD decomposition of Y over P, there is at least one x that belongs to an MDS decomposition of Y, but not to the SD decomposition of Y, over P).

If we accept a supplementation principle, like the one above we are better equipped to argue against inversibility, and in this way better able to capture the notion of sortal decomposition formally.

To further characterize the relation between sortal decomposition and mereological decomposition simplicitér, we can in addition introduce a relation of subordination. The second order sortal concept of SD decomposition, is one that is selecting *some of the* parts of the object in question, which means that it presupposes and cannot violate the MDS decomposition that constitute a part of its foundation.

10. *Relation of subordination:*

$$\big((x \in SD : Y) \rightarrow (x \in MDS : Y) \big) \& \, (\neg (x \in MDS : Y) \rightarrow \neg (x \in SD : Y))$$

(If x belongs to a SD decomposition of Y, then x must also belong to an MDS decomposition of Y and if x does not belong to an MDS decomposition of Y, then it does not belong to an SD decomposition of Y either.)

This relation of subordination is central to understanding sortal decomposition. Furthermore, it allows us to formulate the week criterion of transitivity of parthood we are looking for.

Granted the intuitions stated above, we might be able to formulate, when exactly parthood is transitive and when it is not. The reason is, that MDS decomposition can now be regarded as a grounding framework for allowing multiple additional SD decompositions, to group various parts into overlapping categories.

A first suggestion to propose a weak transitivity of parthood, might be something like this:

11: *Weak transitivity of parthood (A):*

$$(\left(x \in \frac{SD}{\delta}: Y\right) \& \left(z \in \frac{SD}{\delta}: X\right) \&\left((x\&z) \in MDS: Y\right)) \rightarrow ((x \ll Y)\&(z \ll x) \rightarrow (z \ll Y))$$

(If x belongs to a SD decomposition of Y over some sortal predicate or other, and z belongs to a SD decomposition of x over some sortal predicate or other, and both the x and z belong to a MDS decomposition of Y, then parthood is transitive: if x is a proper part of Y and z is a proper part of x, then z is a proper part of Y.)

We may call this a kind of *weak* transitivity, as it is necessary to state that z is a proper part of Y (as z belongs to a mereological decomposition of Y) beforehand, and therefore circularity threatens. But the point is, that though neither SD decomposition nor MDS decomposition is transitive, a combination might facilitate a weak transitivity of parthood.

In that sense, MDS decomposition works as a background measure or precondition for operating with sortal decompositions, which makes perfect sense if you consider MDS as a dimensionalization of wholes.

However, in the definition above, we seem to open to the transitivity of the SD decomposition. For if x belongs to a SD decomposition of Y, and z belongs to a SD decomposition of x, can we not say that if there is a v belonging to a SD decomposition of z, then it must belong to the MDS decomposition of Y? But if we think of the army-soldier-finger example, this is clearly not the case. The whole idea of restricting the parthood relation is to avoid such cases, even if it is both true, that the soldier is part of the army and that the finger is part of the soldier.

If we allow for the transitivity of parthood, it seems to me, we either have to allow for a "trans-mds-decomposition-sortal-transitivity", or we have to really specify the cases in which such transitivity can be allowed.

To take the latter first, we might offer an alternative version of the transitivity. For it might be the case, that neither of these objects involved in the tripartite structure of the transitivity, is the object of which the MDS decomposition is grounded, and it might also be the case that some of the parts qualify to belong to more than one SD decomposition. In such cases the formulation could go like this:

12: *Weak transitivity of parthood (B)*

$$(\left(x\&z \in \frac{SD}{\delta} : w\right)\&\left(z \in \frac{SD}{\delta} : x\right)\&(x\&z\&w \in MDS : Y)) \rightarrow ((x \ll w)\&(z \ll x) \rightarrow (z \ll w))$$

(If x and z belong to a SD decomposition of w over some sortal predicate or other, and z belongs to a SD decomposition of x over some sortal predicate or other, and both x, w and z belong to a MDS decomposition of Y, then, if x is a proper part of w and z is a proper part of x, then z is a proper part of w.)

This is fundamentally to argue that X→W & Z→W, then Z→W, which is a simple elimination of the conjunction conforming to natural deduction. It amounts to say, that if z is part of w, then z is part of w, and whether x, z and w belong to a MDS decomposition of Y seem utterly redundant.

To obtain weak transitivity, we need to always formulate a subset or a subclass as the scope of a higher order sortal predicate, as compared to a lower order sortal predicate. The simplest way to do that in a formal notation, seems to be, to set up the decompositions as a function of each other. I shall attempt to formulate parthood transitivity accordingly. Let the sortal predicates governing the sortal decomposition be ordered (second order, third order… etc. so they always designate a subset of the scope of one in a higher order. Then we may obtain

13: *Weak transitivity of parthood (c):*

$$\forall F\left(\forall P\left(\forall w\forall z\forall x\left(zs \in \frac{SD}{P} : x\right)\&\left(ws \in \frac{SD}{F} : z\right)\&(w\&z\&x\gamma \in MDS : Y)\right)\right)$$

$$\rightarrow ((z \ll x)\&(w \ll z) \rightarrow (w \ll x))$$

(For all second-order predicates P and third-order predicates F, for which it is true that, for all w, z and x, if the zs belong to a SD decomposition of x over P, and the ws belong to a SD decomposition of z

over F, and also all belong to a MDS decomposition of Y, then it is true that if z is part of x and w is part of z, then w is part of x.)

This formulation follows the fundamental logical structure of transitive sets, where subsets of subsets are characterized by inclusion criteria. The criteria are substituted with sortal predicates, but the fundamental ideas are similar. Hence, we have obtained conditions under which transitivity may be formulated. These conditions seem however, to be relatively independent of the first order sortal "…is a part of…".

"Relatively" since it is a second order sortal that governs SD decomposition, it presupposes the first order sortal that governs the MDS decomposition. However, since the MDS decomposition is not transitive, the question is, if it necessarily presupposes the same MDS decomposition, or just that a MDS decomposition is there?

For despite the subordination, we could imagine a perhaps weird situation, we might call a "jump of SD-parts": Despite the subordination, we might think of a situation where parts of a SD decomposition can shift from one MDS decomposition to another, hence "jump".

As above, I shall use an intuition pump to illustrate the idea. Imagine a woman who works as a senior supervisor in a medium sized company. In her spare time, she has just started playing tennis, joining a beginner team in a local tennis club. In this case, we can argue, that this woman is both a part of the company and a part of the tennis club, that is, she belongs to a MDS decomposition of both the company and the tennis club.

This is a totally ordinary case. However, it is important to note, that based on a decompositional approach to mereology, it is the individual whole that generates the parthood relation in the form of a semiosis. Technically therefore, wholes cannot *share parts* in such a mereology. However, the same person can be a part of various wholes, but not the same *part*. For being a part includes the semiosis generated by the parthood relation to the individual whole, generated by the MDS decomposition, and in that sense, all parts must be unique, though context dependent.

But we might have a SD decomposition, that is, a classification of parts that transcend the boundaries of the individual MDS decompositions. This can happen if there are one or more objects belonging to a SD decomposition subordinated to a MDS decomposition, that are identical to one or more objects belonging to a SD decomposition subordinated to another MDS decomposition. Because in such cases, due to the principles of indiscernibility and universal substitution of identicals, the woman being self-identical, can be part of both the company and the tennis club, though not the same *part*.

The second order sortal predicates, may exactly capture and structure parts on the basis various kinds of properties except parthood, which in turn allow for references to parts that can be substituted with other parts, of other decompositions.

3.5 What is Mereological Decomposition? Revisiting the Question

I shall now try to sum up our findings in the first three chapters in a way that hopefully provides an overview, that may serve as a conceptual base of the following chapters. The governing idea of Mereological Decomposition is first and foremost that it can be seen as a complementation, not a replacement of other mereologies. However, it is also an exercise into a top-down logic, that in many ways is different from bottom-up logics. Therefore, it is not an epistemological innocent module that mereologists may use at will, or not. For the use commits to a particular understanding of parts and wholes, composition, and decomposition that one can choose to buy into or not. For those who choose to do so, the use opens to many concepts and tools that may make a mereological analysis much more rigorous, but it also involves a commitment to a restriction of composition and compositional concepts that removes them somewhat from vernacular usage.

The fundamental idea is that mereological decomposition is inverse to mereological composition. That is, together they form an implicational logic, where the two concepts restrict each other. Where compositional logic is one of emergence and summation, decompositional logic is one of dimensionalization and explication. Like we find it with induction where there is always something unaccounted for and deduction that is always limited to what is already there.

Mereological decomposition is not a division or a disintegration, because that would destroy the context in which the parts are designated. The whole is there when we conceive the parts, as a semiosis that points back at the whole from which we came.

Though it may be intuitively compelling to some, this idea of semiosis has indeed major consequences: For it means that this operator that we have invented, is not purely descriptive, but instead creates a particular interpretation on the objects we call parts and wholes. Parts are always uniquely parts of a particular whole, but some objects or persons might be parts of various wholes. They are by no means the same part, however.

Mereological decomposition therefore directly include the context dependence in the context of parthood. The ideas of simple decomposition, mereological decomposition simplicitér or MDS

decomposition, that are all different names for the same, create the semiosis of the parts by transferring meaning in a mereological dimensionalization process, an explication of what is already there. In addition, we might add a more vernacular notion of Sortal, or SD decomposition, by which we can apply sortal predicates to specify other characteristics of the parts, than just their parthood.

The parts themselves are restricted in their own parthood, a restriction that originates from the explication of the restriction of the MDS decomposition. There is no transitivity of decompositions and no overlap of parts. We might formulate attempts of weak transitivity, that is, domain specific transitivity, of parthood, but it is indeed very restricted.

Sometimes some objects that participate in one whole, "jump" from being part of one thing to being parts of another. For parthood, it might turn out, is perhaps more something we *do* or is related to the context we are in. We can participate, by playing or performing a part in a particular whole. And we can change between being some kind of part, and another. In the same or another context.

All this is invisible to the eyes of the compositional approaches, for this approach asks mainly about the whole, assuming the parts, individuals. Mereological decomposition asks about the parts, assuming the whole. This is perhaps the reason why parts from this point of view, do not stand out as individuals, but as unique semiotic entities, adding its parts of the explication of the whole.

Chapter 4. Viewing from the Outside

What does it mean to say, that we have an "objective" approach to a system? Or that we view it from the "outside"? These questions are used to open the subject of how to use mereological decomposition in order to develop a phenomenology of systems. As the principles of mereological decomposition have now been developed to an extent, where we are able to investigate it's uses, it's application to the phenomenology of systems seem like an advantageous place to begin for two reasons: First, we have observed that the application of mereological decomposition is most useful when it comes to systems. Second, we have made a turn towards experience rather than ontology, which might facilitate a phenomenological approach.

4.1 Introduction to a Decompositional Mereophenomenology of Systems

The notion of a system is founded on two assumptions. The perhaps most indispensable is, that it is a whole of parts. Closely entangled into this idea, is another assumption, that these parts are related to each other in such a way, that they interdependently constitute an overall structure.[121] Such a structure constitutes a property that enables a specification of a system as being both *one* individual system and being of a certain *kind*. It is worthwhile emphasizing two points in this regard:

The first is about ontological innocence: It is not implied that systems actually exist. Some of the most famous philosophers of systems theory have been skeptical of this seemingly straightforward idea of the ontology of systems, that is, systems are 'real' in any significant metaphysical sense, and it is generally agreed, I believe, that systems theory does not involve any necessary ontological commitment.[122] It can

[121] This is rather uncontroversial. In the Merriam-Webster dictionary for example, a system is defined as: *a regularly interacting or interdependent group of items forming a unified whole.*

[122] Examples cover Max Weber's ideas of ideal types (Idealtypus) to understand social phenomena which rational understanding is to become a more thought-image (Gedankenbild), see Weber 1904, Niklas Luhmann's approach to the ontology of systems, see Luhmann 1984, pp. 242-85, that though many-faceted seems to me to be of an overall constructivist nature. Finally, perhaps Mario Bunge can be taken as an example, see Bunge 1979 & 2000. Bunge has more clearly rejected the reality of systems, though it might be discussed to what extent his theories fall under the concept of systems theory (I personally would argue that they do).

be seem simply as systems thinking.[123] This might be a reason for hesitating to couple mereology and systems theory, as much mereology is supposedly linked to formal ontology, despite the efforts of many extensionalists to show the ontological innocence of their mereological systems.[124]

The second point is, that systems have proper parts: The assumed plurality of parts seems to propose a notion of wholes of *proper* parts, that on the one hand satisfy weak supplementation as a criterion of proper parthood, and on the other hand place systemic wholes within the limits of mereological decomposition. A mereological atom and a *simple sum* of individuals does not qualify for a notion of "systemic whole". This is in full agreement with the limits argued for mereological decomposition in chapter 2, and therefore such a notion of systems fall almost exactly within the scope of application of mereological decomposition.

This is an encouragement to further investigate whether or not mereological decomposition is well suited as a formal or quasi-formal tool to enhance the understanding and analysis of parts of systems, and if a decompositional mereology can be developed in order to understand and analyze the overall mereological structure of systems.

Applying the logic of mereological decomposition to the phenomenology of systems, a central issue would be to look for semiosis of parts that are supposedly derived from the level of integration of the whole. This is a decompositional counterpart to the ideas of mereological composition of integrative moments or systemic properties of wholes, that is thought to emerge from, or supervene on, proper parts of the whole.

In this chapter the implications of mereological decomposition and semiosis of parts of systems are explored further by making a phenomenological turn. The motivation for such an approach, is not to be found solely in the epistemological turn that was made already in chapter one. The reason is rather, that there is a lot of speculation currently within phenomenology-oriented science of cognitive and social systems, that have revisited questions of wholes and parts, but where mereological tools have been neglected or deemed insufficient.

A phenomenological approach to systems must focus on the overall conditions of the experience of systems of individual subjects. This chapter will begin with a discussion of the idea, that there is a

[123] 'Systems Thinking' has sometimes been used as a meta-concept covering various kinds of systems theory, including approaches of scholars like Bertallanffy and Weber. The collection of texts in Emery 1981 is an illustrative example of that tradition.
[124] The ontological innocence of wholes is an essential component of unrestricted composition as discussed in chapter 1 and is famously argued in Lewis 1991 and Sider 2001.

phenomenological difference to the experience of a system, if the experiencer is to find herself inside or outside the experienced system.

Adding a mereological dimension to this, we can reasonably suppose an overall tripartite structure: The outside/inside experience of a system must be founded in a positioning of the experiencer in relation to the system in question:

> 1. The experiencer is external to the system. The system is therefore viewed from the "outside".
>
> 2. The experiencer is identical to the system. The parts of the system are therefore also parts of the experiencer.
>
> 3. The experiencer is a proper part of the system and belongs therefore to a mereological decomposition simplicitér of the systemic whole. The system is accordingly viewed from the "inside".

However, such a mereological positioning raises as many questions as it solves: What do the views of being "inside" and "outside" a system really mean? What is the viewpoint of having a part, that is, if the subject is herself the very system in question? Are there no other options to be considered as well: As individual wholes, we could have knowledge of other independent wholes, with which we share *some* parts? Or we could ourselves be parts of *several* wholes, that are not necessarily hierarchically embedded in each other?

Furthermore, whatever answers we might come up with to such questions, may in turn lead to even more considerations on questions like, does this necessitate different phenomenologies? Can we say something about the parts by experiencing the whole? Can we say something about the whole from the experiencing of one or more parts? And more tricky but highly relevant: Can we predict something of the conception of potential experience or phenomenology of the whole, from the experience of one and more parts? And vice versa, can we say something of the conception of the potential experience or phenomenality of some or all of the parts, from the experience of the whole?

These questions form the ground of the discussions in the remaining three chapters, though not all of them, will be addressed at length. There will in this chapter be a focus on the inside/outside distinction, with particular focus on the "outside", the next, chapter five, will consider cases where the perceived objects are parts of the experiencer and finally, chapter six, will focus on social systems where the experiencer is perceiving herself as a part of a system.

It will be assumed along the way that the "inside"/"outside" can be interpreted as a mereological distinction that involves a phenomenological difference. It might be argued that this is hardly any more than "collateral damage", in the sense that it arguably follows from our experience. Different positions of the viewer form different perspectives. If I move myself observing a cup, my perception of it will change.

But what is argued here is, that there is a *principal* difference between the *way* we experience parts of systems, as well as perhaps the systems themselves, and what is defended here is, that this difference is a phenomenological one that can be described by applying mereological decomposition as a phenomenological tool. And this is too non-trivial a matter to simply be taken for granted. The discussion also distinguishes itself from much of the internalism (vs externalism) debate on systems, that from time-to-time surfaces in the literature. The internalism debate is often a matter of, if a system should be described in terms of its own structure or if it should merely be described by its interactions with its surroundings[125].

Phenomenological differences of the perspectives of being inside or outside a system, would only be marginally relevant to the internalism debate, if at all. The internalist discussion seems to be mainly on dynamics of systems, particularly whether systems continuously adapt to the environment or if they develop according to internal laws, genes, DNA-strings or similar. We might argue pro or contra a phenomenological distinction jointly with a stand in favor of internalism or externalism, and all combinations could be argued to be equally coherent. This chapter will therefore begin by considering some of the main rival positions. First Wittgentein's revolt against private experiences, then follows a discussion of Kierkegaard's idea, that the distinction is merely a matter of cold reason on the one hand and existential attitudes or emotions on the other, and third that there is no phenomenological difference between an inside or outside view.

Mereological decomposition and semiosis of parts will be considered, first in relation to a particular case study, that of jigsaw puzzlesolving, where we exactly find strategies relating to wholes and parts that are characteristic of an outside-in approach. This will finally lead us into another underlying theme of biological and cognitive systems, namely the discussion of complexity and structure of complex systems.

[125] Internalism and externalism debates come in many flavors in various sections of the philosophical landscape, particularly in epistemology. What is briefly argued here, is that the distinction of if a system and the emergence of a systemic whole can or should be considered with a focus on internal or external factors as we find it in or Bertalanffy 1968 or Luhmann 1984 is not translatable into a phenomenological difference of experiencing the system. The moment the issues of complexity, behaviors or interactions is resumed, these kinds of internalist vs. externalist debates also resumes relevance.

It will be suggested that the Internal/External distinction can be regarded as involving mereo-phenomenological characteristics that look roughly as follows:

We can conceive ourselves as being outside the system, if we consider the whole as an object in its totality, that is, of which we make a mereological decomposition, in order to examine the nature and interaction of its parts. In this case, the level of epistemic complexity will increase as we conduct the decomposition, though it may not be to a level where we will argue that the system is a complex system.

Alternatively, we can consider ourselves as being inside the system, when we experience an object as having a semiosis that indicates its belonging to a decomposition that we as spectator also identify with, that is, that we also experience ourselves as belonging to. In other words, we seem to understand the object as having a semiosis that led us to regard it as belonging to a mereological decomposition that we in some way take for granted. Therefore, the mereological decomposition simplicitèr becomes something like a hermeneutical context or horizon, belonging to the experience of an object in question, and that is either constructed or adjusted during our experiential encounters with the object. In turn this might make us revise our own affiliation to the system, that is, what exactly our own place is in the mereological decomposition simpliciter, which is often done by invoking reasoning based on sortal decompositions of various sorts. Here the complexity increases as to the number of sortal decompositions we might invoke.

In the end we might argue, that being inside a system is to experience it through the semiosis of its alleged parts, while being outside of a system is to see it as an integrated object, which we can mereologically decompose. And it is suggested that the complexity of such systems can be construed either from the inside, as an invocation of multiple sortal decompositions, or from the outside as an increasing multitude of interactions and decompositions of parts of decompositions.

4.2 Inside and Outside Perspectives

What exactly constitutes the perceived phenomenological difference of experiencing a system from the inside compared to the outside? There are numerous examples of experiences suggesting that there *is* in fact such a difference, originating in both organizations, societies and in science. Hence, it might be worthwhile to look a little closer at a few examples to narrow in on the nature of the phenomena we are considering. I have chosen 4 examples that can serve as an intuition pump to get started more philosophical discussion.

1) An open office landscape: If you stand from the *outside*, you see many important people moving papers around and sitting by their computers. If you view it from the *inside*, you are part of a group of people, that makes important analysis to aid the infrastructure in community, that is, you are helping other people to perform certain actions that accumulate value within a situated and organized systemic whole.

2) A situation of sexual arousal: If we stand from the *outside*, say as a cognitive psychologist, we might adopt an evolutionary perspective, arguing that people perform in accordance with certain biological ends, say, they are sexually attracted to each other because they want to ensure the production and survival of the offspring of the species. If you compare this to a view of the person that is aroused, i.e. being *inside* the situational context, she will likely report a very different experience of the person that is the object of her arousal: He has a deep voice, he smells good, he has a sexy body, he has beautiful eyes etc. Most importantly, in the situation she is not attentive to the survival of the species, but more to the satisfaction of her felt desires in the situation at hand.

3) An orchestra playing a piece of music: There is a major difference in how the audience experiences a piece of music, and how it is experienced by the musicians. The musicians are playing and coordinating with each other all the time, they must remember agreements that they agreed to during rehearsals, they are perhaps focusing on particularly challenging passages related to their own instrument, they hear their own contribution distinctly among the many instruments and melodies in the piece they play. And they know the music very very well, having rehearsed it a lot of times both alone and together with the others in the orchestra. The audience, or the spectators, have an outside perspective. They experience it very differently from the musicians. Though they naturally experience the concert differently from each other, the musical piece is often something that is perceived with a distance, both aesthetically and spatially. Some of them may hear the piece for the first time, while for others it might associate to previous listens in their past.

4) A football game: You stand with all the other fans on the tribune at the stadium when your team scores the winning goal in the most important game in the season. When you all participate in a giant roar, an emotion shared by all the fans being there. In a sense you are *inside* the large group of people, that share this emotion simultaneously. It would feel differently, if you were standing alone in front of the television, watching the game, and screaming alone when your team scores. And that would be the case, even though

you would be aware that there would be other fans on the stadium and in many other homes, expressing their excitement in the same way that you do.[126]

All the examples provide everyday situations, where an apparent situational context is radically changing the experience. The experience of what you are, see and do, is altered by a context in a sense, that your expectation of the whole determines what you see. The next step would be to take two influential philosophical discussions of being inside vs outside, to narrow down on the essential phenomenological difference. First Wittgenstein's arguments against this difference is constituted in turn by a distinction between the "private" and the "public", and secondly Kierkegaard's idea that the distinction is rather founded on a distinction between "cold rationality" vs an existential "relating-to". I shall not suggest that we simply accept either of the two philosopher's points of view, but as is often the case, in both cases there are lessons to be learnt.

4.2.1 A Remark on Wittgenstein's Privacy Argument

It is a central theme in Ludwig Wittgenstein's classic work *Philosophische Untersuchungen,* published in 1953 to attempt an explanation of the difference between the phenomenological characteristics of perception of the inner and the outer of systems. A famous example is the experience of pain. When we experience pain from the "outside" we often observe pain behavior, like crying. As such it can be regarded as public behavior. This is contrasted to the private experience "being in pain" or that we "feel the pain". Wittgenstein writes

"Wie wäre es, wenn die Menschen ihre Schmerzen nicht äußerten (nicht stöhnten, das Gesicht nicht verzögen, etc.)? Dann könnte man einem Kind nicht den Gebrauch des Wortes "Zahnschmerzen" beibringen." – Nun, nehmen wir an, das Kind sei ein Genie und erfinde selbst einen Namen für die Empfindung! – Aber nun könnte es sich freilich mit diesem Wort nicht verständlich machen. – Also versteht es den Namen, kann aber seine Bedeutung niemand erklären? – Aber was heißt es denn, daß er 'seinen Schmerz benannt hat'? – Wie hat er das gemacht: den Schmerz benennen?! Und, was immer er getan hat, was hat es für einen Zweck? – Wenn man sagt "Er hat der Empfindung einen Namen gegeben," so vergißt man, daß schon viel in der Sprache vorbereitet sein muß, damit das bloße Benennen einen Sinn hat. Und wenn wir davon reden, daß einer dem Schmerz einen Namen gibt, so ist die Grammatik des Wortes "Schmerz" hier das Vorbereitete; sie zeigt den Posten an, an den das neue Wort gestellt wird.[127]

[126] This example is often used as a key example of shared emotions. It will be further discussed in chapter 6. See particularly Thonhauser and Wetzels 2019 for an in-depth discussion of the example.
[127] Wittgenstein 1984, *Philosophische Untersuchungen* sec. 257, p. 361.

It is important to notice with Wittgenstein, both that, not being part of the phenomenological tradition, he does not use a phenomenological vocabulary, and secondly that one of his main points is to reject that the idea of inner and outer can be founded on the distinction of the private vs. the public sphere. He does not reject the distinction between inner and outer altogether, however, but identifies it instead as a matter of grammar. Your perspective depends on which language-game you are a part of. The idea can be illustrated with a story, adapted from my own childhood:

Peter is five years old and at a family party. The adults are mainly talking and eating, and Peter is therefore bored. He finds a ball and goes outside, where he shoots the ball up against a door in a wall. Peter invents a game for himself. He needs to hit the frame of the door every time he shoots the ball. If he hits the right or the left side, he gets five points. If he hits the arch he gets ten points, and if he misses the frame, it is game over.

After a while Linda, who is of the same age as Peter, comes towards him and asks what he is doing. She only sees a boy that randomly shoots a ball against the door, and perhaps she wonders what might be the fun in that. But when Peter explains the rules, she suddenly understands why this is more fun than talking with the adults, and asks if they can play it together. They play for some time, and perhaps they refine the rules, for example, some play the game with the rule that hitting the corners of the frame gives fifteen points.

In order to be part of the game, that is, inside the language game, one needs to know the grammar, i.e. the rules to follow. That might also change the perspective of the game, as was exemplified with Linda's looking at Peter's "just shooting a ball against a door" and then later wanting to be part of the game, that is, something made a different sense to Linda than before. Wittgenstein's point is also, however, that this is not a case of something *private* made *public*. Instead, it is rather a change of the understanding of the grammar/rules of the games, that makes it possible for someone to be *inside*, or in some sense, 'part-of', the game.

This difference of perspectives can still be regarded as a phenomenological one, for there is a significant difference between the pain-behavior like crying seen from an outside perspective and the pain experience that is experienced. As I read Wittgenstein, the pain experience and the pain behavior are supplementary, and the meaning of the term "pain" depends on the grammar developed in the individual language game, where it, in a very significant sense, *plays a role*. [128]

[128] The German term used by Wittgenstein is *Sprachspiel*, which can both be translated as "language-game" but also as "language-play", see Wittgenstein 1984, *Philosophische Untersuchungen* sec. 23-31, pp. 250-256. But while the players are

There have been published much substantial criticism of Wittgenstein's position, and in this context, it is important to emphasize that the argument from the semantics of concepts to point out a criticism of the idea of purely private phenomena, perhaps is overemphasizing the role of language in experience. And though this discussion has taken many roads in analytic philosophy, it is worth pointing out that many critics could argue that Wittgenstein is overemphasizing the role of language: One cannot argue from the way that language obtains its meaning, to imply something about the (non-linguistic) subject matters it is sometimes applied to, like phenomenal experience. [129]

Being somewhat sympathetic to such arguments, I do on the other hand also think that the problem Wittgenstein faces, is even more sophisticated than that. For example, it might be argued also to involve questions as, whether language shapes experience or experience shapes language, if language is a transparent tool of communication or should rather be seen as a discourse containing various kinds of underlying structures, power-relations, and narratives, that make it an ever-evolving complex system or perhaps a constructivist universe. And we might even raise the question of, to what extent inner states can be accessed or "read" through observations of behavior. But what Wittgenstein *does* manage to show is, I think, that the concepts of private and public experiences cannot account for the inner and outer experiences of a language game. Hence, with Wittgenstein we might accept, that the phenomenological difference of experiencing a system from the inside and outside, is not a matter of if the experiences are "essentially private" or "essentially public".

We may recant the discussion of experiencing a system from the inside vs the outside, as being a distinction between the objective and the subjective, at least in the sense that terms or descriptions of experiences that are more psychological or "private," compared to those that are more physical or "public". A further advantage is that we may avoid an ontological perspective of dualism, though the accompanying distinction between introspection and sense-perception might seem tempting.

This is essentially a deep point on the philosophical-phenomenological contemplation on the nature of both phenomenology as such, as well as the nature of systems, it is also significant in relation to the role of mereological decomposition in a possible development of a future mereophenomenology. For whether one would agree with Wittgenstein's insistence on the role of language in the epistemology of

necessarily part of a play, the gamers are not necessarily part of a game. Hence it makes sense to say that we can "play a game". In Wittgenstein's sense it means both, and it is therefore relatively unproblematic to include people in a language game.

[129] Kripke 1982 famously pointed out, that this may lead to a semantic skepticism all together. See also McGinn 1984 for discussion.

inner states compared to outer behaviors, I believe that his argument that this cannot be fully conceived in terms of an underlying distinction between the public and the private, is indeed convincing. It is therefore reasonable to attempt to look for other ways to explain the distinction.

4.2.2 Rationality and Existence: A Kierkegaardian solution

In Markus Gabriel's book *Der Mensch als Tier,* [130] an epistemological argument is made following the ethical thought of Alice Crary,[131] that to understand humans' relation to nature, and thereby what they themselves *are* as natural beings, cannot be achieved "from the outside" of the situational context of humans. Therefore, any human ethics must be an ethics of epistemological underdetermination,[132] simply because we are not able to perceive our situation in an unemotional and 'cold' rational way.

This reminds of Kierkegaard's idea, that there are two kinds of truth. In works like *Either-Or* or *Sickness unto Death,* Kierkegaard points to what we might call the distinction between relationship and relating-to. In the beginning of *Sickness unto Death*, Kierkegaard writes

A human being is spirit. But what is spirit? Spirit is the self. But what is the self? The self is a relation that relates itself to itself or is the relation's relating itself to itself in the relation; the self is not the relation but is the relation's relating itself to itself. A human being is a synthesis of the infinite and the finite, of the temporal and the eternal, of freedom and necessity, in short, a synthesis. A synthesis is a relation between two. Considered in this way, a human being is still not a self.

In the relation between two, the relation is the third as a negative unity, and the two relate to the relation and in the relation to the relation; thus under the qualification of the psychical [Soul] the relation between the psychical [Soul] and the physical [Body] is a relation. If, however, the relation relates itself to itself, this relation is the positive third, and this is the self. [133]

Though this passage might appear a little cryptic to a reader unfamiliar with Kierkegaard's style, it does in fact capture the essential spirit of Kierkegaard, I believe. Behind the words lies the idea that a relation between objects is a whole that can be rationally analyzed, but that a relating-to is an active and perhaps engaged attitude that you need to unfold, in order to become yourself. Exactly because subjectivity is

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130 Gabriel 2022.
131 Crary 2016.
132 Gabriel's favored term is "Nichtwissen", see Gabriel 2022, p. 283-93.
133 Kierkegaard, 2023, p. 351. What in the quote is translated as "relation" is the Danish "Forhold" which could also be translated as relationship. The term "relating itself to itself" could perhaps more accurately be read as "relating-itself-to-itself" to point out the active mode that Kierkegaard implicitly emphasizes. Furthermore, what is by Hong translated as the psychical and the physical is "sjel" and "legeme" respectively, which could be more adequate translated as soul and body, at least for the purposes here. I have therefore added these terms in the quote in brackets. What Kierkegaard originally writes is this: *Mennesket er Aand. Men hvad er Aand? Aand er selvet. Men hvad er Selvet? Selvet er et Forhold, der forholder sig til sig selv, eller er det i Forholdet, at Forholdet forholder sig til sig selv; Selvet er ikke Forholdet, men at Forholdet forholder sig til sig selv. Mennesket er en Synthese af Uendelighed og Endelighed, af det Timelige og det Evige, af Frihed og Nødvendighed, kort en Synthese. En Synthese er et forhold mellem To. Således betragtet er mennesket endnu intet Selv. I Forholdet mellem To er Forholdet det Tredie som negativ Eenhed, og de To forholde sig til Forholdet, og i Forholdet til Forholdet; saaledes er under Bestemmelsen Sjel Forholdet imellem Sjel og Legeme et Forhold. Forholder derimod Forholdet sig til sig selv, saa er dette Forhold det positive Tredje, og dette er Selvet.* Kierkegaard 1994b, p. 73.

involved as something actively engaged in something, reason seem to fall short of constituting that one may arrive at oneself.[134]

Kierkegaard's point is to some extent, that where objective truths are accessible by reason in all its generality, subjective truths are situated in the individual life situation. Objective truths do not necessarily make a difference to us, they are not necessarily important. Subjective truths are often important to us, but they lack generality. But what is the point, we may ask with Kierkegaard, to investigate something true, if it is not important to us? And drawing a line to contemporary attitude theory of emotions and values, we might argue the point that feelings, emotions, and values are constituting the situatedness in the lifeworld, rather than "cold" reason.

Crary is using this situatedness to make the point, that not only the natural or animalistic self but also the particular *humane* parts of humans, i.e. the parts that make people human beings, are not always value free and rational. [135]

Instead, with Kierkegaard we might stress the difference between the relation on the one hand and relating-to on the other. (Living) beings are relations, or syntheses of relations between mind and body and they have something both timely and eternal in them. This could be the construct of rational models in psychology, biology, or theology. But they are not *human* beings until this relation relates-it-to-itself. Because only *then* do they become themselves.

Still, it is a little hard to see, why we cannot be emotional about something that we are not inside of. Of course, this is a larger philosophical and aesthetical sophisticated question, but I propose the following abbreviation in the form of two counterexamples to the idea that we are emotional about something we have an internal perspective to and rational about something we have an external perspective to:

A. One can in fact be emotional about things that we are external to. A classic example could be the experience of aesthetical qualities in, for example, an artwork. When we experience an artwork that "moves us", we have an emotional relation to the artwork. Note, that this emotional relation is not to our relation to the artwork. In the terminology of Kierkegaard, this is not a case of relating-to a *relation*

[134] It is often claimed that this is the whole point of one of Kierkegaard's other landmark works, the novel *either-or*, see Kierkegaard 2023, pp. 37-83 for the essential readings and Kierkegaard 1994a for the original text. This interpretation of Kierkegaard can be further simplified into a matter of rational vs. existential truth, see for example the classic exposition in Copleston 1963, pp. 341-7, and though this may appear oversimplified to some, *Either-Or* can be seen as an entire case study leading up to exactly this point.
[135] Crary 2016, p.2.

between the spectator and the artwork. Our emotions are more directly intuiting or directed at the artwork.

B. One can in fact be rational about things we are in close relation to. Take the simple example of driving a car or playing in a band. In both cases we are certainly observing the driving and the playing from the inside. We might even admit to Kierkegaard's idea of that what we are "inside" is the relation and we have a clear idea of self in relation to our self in that relation, because we are relating-us-to the relation, and still, we might be rational in a significant sense. Most obviously we need to adjust our behavior to unforeseen input along the way, adjusting the tempo, the direction etc. which can be modelled both as a means-end rationality, but also as involving statistical predictions and fundamental arithmetical and geometrical calculations.

It is important to stress, that Gabriel and Crary also focus on the epistemic difference between being inside and outside a situational context, as something that concerns the "immediately given" in consciousness, to paraphrase a wording often used in the beginning of modern phenomenology, for example with Bergson and Husserl.[136] As such it seems to be a deep phenomenological claim, that involves that the epistemic difference in being inside and outside of a system, is rooted in or produced by a phenomenological or experiential[137] difference between being experiencing a system from the inside and the outside.

With Hegelian systems philosophers like Luhmann, identity is made of a, as I read Luhmann, cognitive distinction between the system I am in and a differentiation to the context, which is not part of the system, which I then term "surrounding world" or "Umwelt"[138]. While Luhmann would agree, that we always know systems first from the inside, this is more to be interpreted in the style of naturalists like Maturana and Varela: First we experience, and then, for that experience to make sense, we make differentiations and distinctions between ourselves and the world. To Luhmann, this is an ongoing negotiation with the surroundings due to the behavior of the system.

As I read Gabriel and Crary, they point out that being inside a system makes a fundamental qualitative difference to that system, because we always experience from somewhere, and perhaps following philosophers like Thomas Nagel, the *view from nowhere* does not make sense.[139]

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[136] Bergson 2001, Husserl 1993a pp. 48-56.
[137] Maturana & Varela 1980, see particularly Maturana's introduction pp. xix-xxi.
[138] see e.g. Luhmann 1984, pp. 242-85.
[139] Nagel 1986. One of Thomas Nagel's central points in Nagel 1986 is that there is an essential tension between the subjective (being in the world) and the objective (being outside the world), and that they cannot be resolved completely. In Nagel 2012 his main arguments are directed more specifically against materialist-reductivists' positions on consciousness.

How far Gabriel and Crary are willing to follow Nagel, and how much they belong in the Luhmann tradition, is to me unclear. And, following Hegel, it is a common theme with both Crary, Gabriel and Luhmann, that the identity of a system is based on the differentiation to the surrounding world. We distinguish what is included in the system from that which is not. Boundaries are made in contrast to the surrounding world that is always more complex than the system, and according to Luhmann, this is what makes the inside and outside of a (social) system: Inside and outside means inside and outside of the boundaries.

A question that is often left unnoticed however, is how this might warrant a phenomenological difference. If inside and outside of a system is simply a matter of how an object is placed in relation to a boundary, it is hard to see a reason for maintaining any reason for a necessary phenomenological distinction. The common answer lies in the very nature of the system and its boundaries: The system has highly interrelated parts that make up functioning processes or structures, that might be affected from the outside, that is, if it is an open system.

But Luhmann's approach does not warrant for the stipulated phenomenological differences. As I read Crary and Gabriel this is also the fundamental intuition governing their point of view. But following the idea of boundaries, we should not expect to have room for an external view, which is essentially Nagel's and Crary's point. There is no god's eye view, everything is seen from a perspective. But this does not change the fact, that there is a phenomenological difference in the above examples, whether the observer is part of the system observed. It is not the proposition that in order to have an external view, one needs to be part of no system at all.

4.2.3 The Objective

One of the main differences between being inside and outside a system is the manner of description. If Luhmann and Wittgenstein were right, there would not be any particular differences in the experience of purpose that we find in particularly example 1, 2 and 3 above. When we see the office workspace from the outside, we focus on behaviors, and the coordination and perhaps optimization of those. But the staff has levels of meanings involved that is completely invisible to the "outsider". And furthermore, these 'objective' reasons might not be recognizable to the immediate experiences of the "insiders".

When compared to Nagel 1986 it appears to me that he emphasizes the first-persons perspective. Where Nagel 1986 can be interpreted to form a position that is comparable with both Luhmann as well as Maturana and Varela's neo-biological naturalism, Nagel 2012 clearly distances itself from such views. However, as I read Nagel 2012 it is not a directly phenomenological work, at least it does not fall within the standard phenomenological positions, despite its engagement and focus into subjectivity.

This is an example of what Daniel Dennett has called "competence without comprehension". It is very often the case, Dennett argues, that systems follow rules that it's members are not alert to, but which are preconditions for, that the system can function properly. Dennett writes

Competence without comprehension is as ubiquitous in human life as in animals, bacteria, and elevators, but we tend to overlook this possibility and assign appreciation of the rationales of successful human action to the clever actors involved. This is not surprising. After all, we tend to attribute more understanding to wolves and birds and honey bees than we can support with evidence: the use of the intentional stance to interpret behavior across all species carries with it a tacit presupposition of rationality, and whose rationality can it be if not the behavers'? The very idea of free-floating rationales is a strange inversion of reasoning…[140]

Dennett observes, that such free-floating rationales are more than common and he gives numerous examples. Particularly he uses as example a discussion of H.P. Grice's pragmatic maxims speech acts.[141] We need to abide to the maxims in order to engage in successful communication, even if we know them or not. Free floating rationales can be seen therefore as products of analytical reflection, including mathematical thinking, on the system, that may serve as tools in order for us to better handle or operate it. And it is not a matter of truth, if the case is, that such rationales are also found in the minds of the participants of the system, like Platonic forms. The use is, as I understand Dennett, purely pragmatic.

In that sense, we can work with a hierarchy like this:

2nd order free floating rationales (the use of the free-floating rationales are…) of

1st order free floating rationales (the system works in the following way) of

Systems (what the participants want to do or not)

No matter how many orders of free-floating rationales we are working with, we can argue that this kind of analysis might constitute a kind of external view. However, we must always remember, that the inertial system from which we speak, itself is or is part of, a system. Even in the case, that the systemic whole is to be conceived ontologically innocent. The external view must be constituted by the implicit assumption of the spectator or analyst, that he, or she, is mereologically distinct from the object.

However, it is important to draw attention to the fact, that the phenomenology of particularly Jean-Paul Sartre, has been a discussion of such ideas. In Sartre's *Being and Nothingness*, for example, it is pointed out that such an external object is still nonetheless an intentional object: It is perceived from a certain

[140] Dennett 2017, pp. 287-8.
[141] See Grice 1975 for the original exposition of the maxims.

perspective, the perceiver's perspective and it is placed in a world at a certain distance from him or her, related to other objects in the world.[142]

This means that the object is still a *phenomenon*, depending on the perceiving subject, placed in the same world. It leads back to Husserl's ideas of the transcendental subject, that is the universal condition for something to be given in consciousness, and the empirical subject, that is the location of the subject as an intentional object in the world, created by a distinction between what is 'me' and what is the 'other'.[143]

Sartre points out that the look on the other, the object in front of me can create a destruction, even of my *self*. The object is then purely objective and not part of my world, despite the fact that it is given to me as an intentional object. Note, that this is still a phenomenal quality and so is it, when Sartre afterwards points to, that I, myself and my world can indeed become an object for the other. This is like seeing yourself from an external point of view, from the *outside*.[144]

Even though it is with Sartre possible to view oneself through the eyes of another, this does not dispense with the fact that what we are working with is a phenomenal quality. It is my imagining how I, myself, would appear to the other. And in that sense, we have reached a possible solution to the question of how to obtain phenomenological objectivity.

Consider the question: What does it mean to say that we can have an objective approach to a system? A phenomenological answer would be exactly that the system appears as an object, a whole of parts, that, though it is given as an intentional object to a subject, an I, is identified as an independent individual by a focus, that has destroyed the phenomenological context, inclusive the self of the phenomenal I of the spectator, the perceiver.

Based on the discussion of Wittgenstein and Kierkegaard above, we seem to begin to form a perhaps relatively vague idea of, how the experience of being inside and outside a system may phenomenologically defer. So far, we have simply talked about systems and their parts or participants, without really emphasizing the ideas of mereological decomposition.

Let us therefore now turn to the question of, how an understanding of being inside and outside of a system might be developed in the light of an approach of mereological decomposition.

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[142] Sartre 2003, pp. 279-80.
[143] Husserl 1993a, for the transcendental subject, see pp. 91-93. For the empirical subject, see pp. 10-12.
[144] Sartre 2003, pp. 54-69 & pp. 279-288.

Mereologically, being *inside* the system obviously means to be a part of the system, while being outside the system means to be mereologically disjoint from the system. But what exactly does it mean to be disjoint from a system?

Suppose a social system, like a family of four; A mother and a father and two children. The family lives in a house, and one day they receive a guest, perhaps a social worker, that are coming to talk to the parents relating to some problems the children are experiencing at school. But is she *inside* the family? The experience of the house certainly often makes a difference, but if you ask most family members, they would indeed argue that she does not perceive the family from an inside perspective in the same way, the family members do, even if she sits or stands in the places that the family members normally do.

The difference is more that the family members conceive themselves as *parts* of the family, while none of the five, be it the family or the social worker, conceives that. The social worker will therefore see the family from the outside, either from a view from nowhere (if that is possible at all) or from an external in the sense of one system contemplating another system. A suggestion could be, that this takes place in accordance with a Gadamer style hermeneutic process, where the perceived system resists or challenges the prejudice of the subject of the hermeneutical process, and therefore creates a step towards a fusion of the two horizons of meaning.[145]

Therefore, we could stipulate that being a part of the family, is a conception that can influence the experience, because from a viewpoint of mereological decomposition, this relation is not merely formal but sometimes "thick with meaning." First, we can say that there is a decomposition simplicitèr that involves that the part involves a reference to the whole, and second, we can set up sortal decompositions in order to specify criteria, conditions and conceptualizations pertaining to the parthood relation.

For example, we can say that there is a sortal decomposition into family members, that is, all the human beings that belong to the mereological decomposition. In this case, there are four members. And the social worker is not one of them. She is a guest, a visitor. She represents an organization, in this case a municipality, and therefore she has another semiosis than the family members. She understands the family from the outside, based on her prejudice or prior knowledge of the family as a whole. This is her foundation for making the decomposition, which forms her expectation for the meeting. On the other hand, the individual participants in the family have an idea of the municipality, and perhaps also a prejudice of employees in the social service department. This is based on meaning derived from their

[145] Gadamer 2010, pp. 270-311.

understanding of the whole, transferred to the part through their understanding of the mereological decomposition simplicitér of the whole, they identify her with.

If we argue from a phenomenological point of view, viewing the system from the inside requires that the inertial system in question is a *part* of the system in question. And consequently, *being* a part or not, as well as *having* a part or not can affect the phenomenological experience *of* as well as *in* the system.

I would agree to, that concerning many objects, it is not adequate to speak of their intrinsic subjectivity. I don't believe, say, that shoes or chairs or other similar medium-sized objects have a mind of their own, even though that like Hume, when I think hard as a philosopher in my philosophy laboratory, I am not able to rule out the possibility. However, it is not the purpose of this investigation, to decide on that matter. Instead, I shall limit myself to the point that in social settings some objects that are believed to have consciousness, like persons *experience* themselves and others as,

1. *being* parts of larger wholes such as cultures, groups, organizations and societies, and

2. *having* physical parts such as body parts, organs and subsystems (like the digestion system, immune system etc.) as well as mental parts like personality traits, cognitive and sensory abilities, imagination etc.

Mereophenomenology could then be suggested to be the study of, how this parthood relation appears *prima facie*, and how the assumption and experience of being or having a part affects the surrounding world, not to decide with or against Luhmann, but more to explicate the mereological assumptions that need to be asserted there.

4.3 The Jigsaw Puzzle: Mereological Decomposition and Transmissions of Meaning

If one wants to explain wholes and parts of systems from an outside perspective, an archetypical example is surely the jigsaw puzzle. When someone is doing a jigsaw puzzle, she is typically not considering herself a part of it or it a part of her. [146]

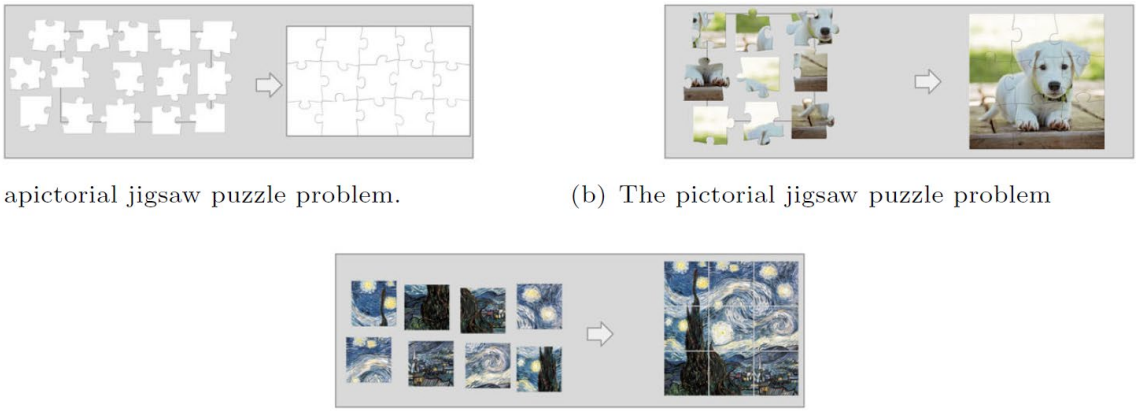
Instead, the player solving a jigsaw puzzle is experiencing interacting with an external object. But there is a clear relation between the whole and the parts, one is tempted to say, that is the whole point of doing it. So let us look closer at this case, as a first understanding about how we may understand decomposition and semiosis from an external, or outside, perspective.

[146] Like playing a game, the gamers are often not part of the game in the sense players are part of a play. Therefore, in this section, jigsaw puzzle solvers will be referred to as "players".

Jigsaw puzzle solving may be regarded as an archetypal account of problem solving. The type of problem that has to be solved, is to arrange several pieces into a way that they fit into an overall gestalt. In a recent survey on Jigsaw puzzle solving techniques, Markaki et al 2022 formulate it like this:

In a puzzle the pieces must be arranged in a logical way to obtain the correct solution. Thus, the main goal of a two-dimensional puzzle is to put together a number of particular pieces into a combined and well-fitting arrangement without any gaps between the adjacent pieces[147]

On average, we think of jigsaw puzzle as a cardboard box with a picture printed on the top of the lid, and a specified number of pieces inside. The idea is, then, to remake the picture from the lid, by putting the pieces together in the *right* way. In other words, it is about to recreate a predetermined form, order or structure, that resembles the image on the lid. But if we see this as problem solving in the way specified in the quote above, we can distinguish, as does Markaki et al, between two kinds of 2D jigsaw puzzles, pictorial and apictorial ones. [148] Apictorial jigsaw puzzles are blank puzzles, that can often be solved by examining the shapes and possible fits of the pieces. Pictorial jigsaw puzzles come in two forms, some with square pieces and some with fits.



(a) The apictorial jigsaw puzzle problem.

(b) The pictorial jigsaw puzzle problem

(c) The square piece jigsaw puzzle problem

Figure 13. Three kinds of jigsaw puzzle solving. [149]

[147] Markaki et al 2022. The definition is follows Freeman et al 1964 and is generally accepted. For our purposes of providing an example of mereological decomposition principles, it appears perfectly suitable. However, it is perhaps worth noticing, that these principles would also be applied to puzzle solving that is not restricted in this way. For instance, we could have a puzzle solving that operates with empty spaces, as would be the case if the whole was a song or tune and the pieces tones that should be placed to form an arrangement of it.

[148] Much of the research in the cognitive aspects of jigsaw puzzle solving has focused on developing strategies for puzzle solving, sometimes identified as algorithms. With the invocation of the age of machine learning, where strategies of problem solving can more easily be tested, more and more of the scientific vocabulary has been borrowed from computer science.

[149] Markaki et al 2022, Fig. 2.

The player, be that a machine or a person, begins with a prompt. A prompt is the piece of information or instruction that sets the process of the puzzle solving in motion, with the aim to generate a particular response. The player then follows one or more strategies, that is, algorithms, to solve the problem and achieve the goal. An algorithm is an ordered series of instructions, and in the case of an apictorial jigsaw puzzle, it often consists of iterations of the following three steps:

a) *Classifying the pieces*
b) *Rotating and matching them*
c) *Evaluating correct fits*[150]

It may be argued that the process is more complicated than it seems at a glance. Depending on how many pieces we work with, the complexity increases exponentially depending on whether the jigsaw has, say, 10, 100 or 1000 pieces. The strategy is then one of first creating pairs, then triblets, then quartets and then composing larger and larger pieces until the reassembly is complete. There are some supplementary strategies that can be applied to reduce complexity in these processes, particularly making boundary lines (like assembling the outer rim first, because the pieces there have a discernible form) or "istmus'es", that in turn create "pockets" that can then be solved individually, thereby reducing complexity.[151]

The square piece jigsaw puzzle is on the contrary a jigsaw puzzle where this strategy is not usable, since all the pieces have the same form. Instead, the sole focus is to recreate an initial image. Together the two kinds of puzzle solving agendas, present themselves as complementary in more standard pictorial jigsaw puzzle solving.

This complementarity is known to anyone who ever tried to solve a pictorial jigsaw puzzle with, say, 100 pieces or more. When you get stuck using one strategy, you try another. The pictorial approach uses therefore strategies like the algorithm for automated color-based image reassembly proposed by Tsamora and Pitas:[152]

a) *Finding neighboring image fragments*
b) *Finding matching boundary segments of neighboring image fragments*
c) *Image fragments boundary alignment*
d) *Image reassembly*

[150] Freeman et al 1964.
[151] See Markaki et al 2022, sect. 2.
[152] See Markaki et al 2022, sect. 3.3.1, as well as Tsamora and Pitas 2009.

It is important, not only to notice, but to emphasize, that both kinds of strategies, the pictorial algorithm and the apictorial algorithm, are proposed in a way that approaches computational models, that is, developing problem solving approaches that can be performed by a computer. And as Markaki et al 2022 points out, that the use of such models goes far beyond a simple understanding of how to make Jigsaw puzzles. It also has applications into various kind of restoration of artefacts in for example archeology, as well as developing techniques of deep learning and image recognition.

If we consider an average cardboard pictorial jigsaw puzzle with 1000 pieces, bought in the local bookstore, we should be able to solve the jigsaw using either of the proposed algorithms. That is, it is possible to solve the puzzle without looking at the picture at the top of the box. Following this line of thought, referring to the picture that is printed on the lid, seem to be an aid, not a necessity. And furthermore, many would say that looking at the picture you are about to reassemble makes it more fun.

But what exactly is the role of the picture on the top of the box? We can stipulate, based on our knowledge of mereological decomposition, that the pieces contain a semiosis, at least at the moment we are able to identify them as being a sortal decomposition of a whole that contains the same image. It is reasonable to assume, that seeing the image on the top of the box containing the pieces, becomes part of the "prompt" that gets us started with the puzzle solving process, together with the knowledge that there is a thousand pieces, that the form of the picture is supposed to end up having the same shape as the picture on the box, that there is not supposed to be any space within the overall shape, that is to be left empty, and that there is not any piece in the box that does not belong somewhere in the puzzle.

This could be a formulation of an informal prompt of solving a jigsaw puzzle on a Sunday afternoon on the family kitchen table. But it is important to know, that the prompt could have been different, in fact it sometimes is:

First, you can *choose* whether you want to use the image as a guide to how to combine and where to place the various pieces of specific form and color. Whether or not you choose the guide, you will of course eventually get the same result, as you still know that all the pieces are shaped in a way that all the pieces interlock and make up a picture, if and only if they are combined and ordered in a specific way.

Second, it should be noted that a lot of product development has recently been made within the industry producing jigsaw puzzles. You can buy 3D puzzles, with which you build 3D objects like an assembly kit. Sometimes the pieces in such puzzles are marked with numbers to make it easier.

Also, there is made so-called "Wasgij" puzzles. This is usually a normal cardboard pictorial jigsaw, but where the image on the box does not correspond to the image to be reassembled by the jigsaw puzzle solving process. Instead, the printed image on the box often gives hints to what the image is going to be, once it is reassembled. And often there is printed a question like "What has happened just before?" Or "What is it that they see?" to go along with the image. I have provided a picture of an example below in Fig. 14.

Figure 14. Example of a Wasgij puzzle from Jumbo [153]

In these cases, the prompt is different, and different strategies may be applied. Still, the wasgij puzzle provides a context, a source of an imagined whole to guide the process of puzzle solving. The player would know to what end the problem solving is currently.

One of the central issues here is to regulate the puzzle solving process, in a way that regulates the complexity involved. It needs to be an appropriate challenge. If the complexity is too high the player is likely to give it up, because of lack of progress. If the complexity is too low, on the other hand, the player does not experience enough of a challenge. That is why adults would rarely like to do 36 pieces puzzles: It is too easy.

Summing up on this part of Jigsaw puzzle solving, it would be fair to say that the role of decomposing the mental picture the player may have of the whole in question, its decomposition and the semiosis that may go with that, is an aid at best, and that the jigsaw puzzle can be reassembled without such holistic phenomenological means. A compositional approach is therefore sufficient, with its algorithms and

[153] Image from https://wasgij.com/de/ accessed on May 20, 2023.

prompts, to solve a puzzle without extra remedies, like say, deliberations and reflection. Like when playing chess, the algorithm beats the conscious mind. Or so it may seem.

But attention might be drawn to another aspect of more descriptive praxis. First, the algorithm approach does not necessarily have to presuppose the idea if the image itself is a part of the picture. Suppose the jigsaw puzzle displayed below in figure 15.

Figure 15 Example of a classic "Falcon" Jigsaw puzzle from Jumbo [154]

Staying, however, with the classical puzzle, as the one in the picture above, one of the amusing elements of doing jigsaw puzzles, is to see how the image emerges slowly as you place the pieces in the right place. And from a mental image of the whole that either you save in your imagination, or that is seen or remembered from the lid of the cardboard box, it is satisfactory when the last piece is put in its place: Nothing is missing – everything looks like it should. Dopamine is awarded in the brain, and we can sit back and relax – that was fun.

The jigsaw puzzle seems to provide an example where we can experience the whole and all the parts simultaneously, in the same way we do when we consider a particular word together with the letters that makes it up. But from being a vague image in our minds, it is gradually realized through our reconstruction.

[154] Image from https://www.jumbo.eu/en/products/falcon-the-lighthouse-keepers-cottage-1000-pieces/, accessed May 21, 2023

4.3.1 Jigsaw-semiosis

It seems obvious, that a mereological decomposition is still taking place when we make a puzzle solving, even though it may not be essential to the puzzle solving process from a computational perspective. But what exactly is this mereological decomposition that supposedly is going on in the background?

Let us begin by pointing out, that if we would argue that all and only the parts of the jigsaw puzzle would be the 1000 pieces, we would be confusing sortal decomposition into nice parts (non-overlapping parts) with a mereological decomposition simplicitér. For having all the pieces is not enough. You have to have them combined and ordered in order to reproduce the image or picture from the lid, which makes the intended structure a part of the jigsaw puzzle, and it is exactly recognizing the individual piece in its supposed contexts, that is an essential component of the fun of making a jigsaw puzzle.

Is the image of the boat, the lighthouse, and the bench not part of the jigsaw puzzle? It might be argued that it is not necessary that a jigsaw puzzle has a picture as part that depends on a "seeing- in", that is, the idea that we encounter an object behind the mere perceptions or stimuli. It is enough to be alert that a certain combination of surface colors and shapes of the pieces will result in somewhat harmonic whole, without having the more mysterious "pictures" or "images" as proper parts.[155]

This argument strikes as being even more powerful, if we accept that considering something as a part, includes relations and references to the whole of which it is a part. It is, for example, this relation that would determine the correct place of the particular piece in the puzzle. These relations and references to the whole, are obvious to anyone who has ever done a jigsaw puzzle. Therefore, we do not need the seeing-in aspect of invoking a picture into a jigsaw puzzle, even though we might accept its presence in the mind of the person doing it.

We may try to counter this argument, by arguing that this is not the actual situation that happens when people do a jigsaw. The image that the players are trying to reassemble, will often appear to many players as an essential integrating property: it is *this* very image that they are trying to "build".

Arguably, it is exactly when one recognizes parts of the image or picture of the whole, as a context of the individual pieces, that we encounter the decompositional semiosis embodied in an individual piece: The piece in itself is often just a brick with colors on it. But together with the knowledge of how the whole should be like, the brick derives meaning from the whole, a meaning that changes as we gain on our task

[155] See Wollheim 1987 and 2003 for discussion and defense of 'seeing-in,' but compare Ingarden 1962. I have made a brief encyclopedic introduction to the subject matter of Art and Mereology in Storm-Henningsen 2017.

to "reassemble" the whole. The 'meaning' or what the 'role' it is supposed to fill out, changes as we know more and more, that is, when we have made more and more of the puzzle. Sometimes, it can even feel like that an individual piece visually changes as we consider its possible roles as parts in various areas of the jigsaw (see the examples below).

This suggests that the semiosis is perhaps more fluent than it was laid out to be in chapter two. The suggestion opens to a further complexity, that has to do with the relationship of the perspective of the system. On the one hand, if the jigsaw was made repeatedly, some development of the experience of the semiosis while doing the puzzle, would fade after repeatedly doing the puzzle over and over again. On the other hand, some of the same things will repeat itself, like if solving the puzzle displayed in figure 15 and exclaiming: "this piece looked like it should be *there*, a part of the boat, but really it should be *here,* it's a part of a colored cloud in the sky."

Though such phenomenological changes during a jigsaw puzzlesolving are taken from own experiences and conversations with friends, similar effects are well described in studies of perception, and I shall briefly mention a few examples. To choose some examples, based on our development of mereological decomposition in chapters 1-3, we might distinguish between possible experiences of a "local" and a "global" change in the semiosis of parts.

A local change would be the case mentioned above, where the part is reinterpreted, based on an evaluation of its relation to the whole. In the jigsaw puzzle solving case, related to figure 15, it does not change our understanding of the whole, the pieces, the image to build, but only the relation of a particular proper part or parts in the composition of the whole, that is, how it belongs to a mereological decomposition of the whole which in turn can be seen as an explication of the object decomposed.

A global change, would be the change emphasized in the hermeneutic circle, as mentioned with Gadamer above, where our conception of the whole, and thereby also its mereological decomposition simplicitér changes. This change would be expected to have repercussions through the whole system, but perhaps oddly enough, it does not have to affect our sortal decompositions much. For even though we change our understanding of all the parts and of the whole it composes, this does not mean that the conceptual ordering of the parts in sections and classes might change. For the same parts might still fall under the same inclusion criteria as they did before the change. To understand how such changes might come about phenomenologically, it would be useful to visit an example within the vast literature in psychology on perceptual illusions. Let us take one on color experience.

The argument is that as one is doing a puzzle, the opinion often changes of a piece concerning what pictorial object it may belong to and that this might change the phenomenological appearance of the pieces during the experience or imagination of the various contexts. The overall idea is illustrated in the chess board shadow illusion, shown in figure 16 below. In the chess board shadow illusion, also sometimes called the checkerboard shadow illusion, are two spaces on a board marked as A and B, placed in two different contexts, that makes them appear to have different color. But should you move one field to the other, they have exactly the same color, even though it does not seem that way.

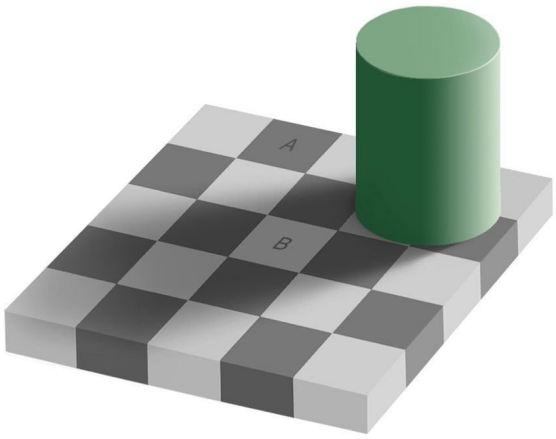


Figure 16. The Chessboard Shadow Illusion [156]

The illusion is naturally set up to do an impression, but it shows the argued jigsaw puzzle effect very well. The moment we move one jigsaw piece to another place, another context, it looks slightly different.

It might be objected, that it is a mistake to generalize from mere optical illusions to, more generally epistemological mechanisms and principles. For tricking the eye in relation to optical parameters is one thing, arguing for a top-down holist epistemology is something else. But the purpose of this example is only to point to a tentative example of a mechanism, that may function in accordance with the mereological principles we have described, not to argue that optics can be a model for all kinds of perception.

In the context of jigsaw puzzle solving, the experienced changes must be expected to be relatively small. But we can also present an argument in favor of the likelihood that they *are there*. I believe that such small

[156] Image from https://allthatsinteresting.com/checker-shadow-illusion. This version of the light/shadow illusion stems originally from Adelson 1993. The basic discovery of the contrast illusions dates back to T.N. Cornsweets work, see Cornsweet 1970.

changes in the belief system are sometimes what is looked for, and perhaps also the source of the much wanted dopamine release in the brain.

In a recent review, Tulver et al. published a review on the research on the phenomenon of *insight*, that they argue is not exclusively a phenomenon that occurs in relation to problem solving, but is found to have a much wider application, covering both therapy, meditation, psychedelic experiences, and delusions.

What is meant by "insight", is the feeling of a sudden understanding, a revelation after struggling with a problem. Tulver et al. write:

A key feature of insight problem-solving, which is present in most theories of insight, is that a change in the initial problem representation is required for the solver to be able to see the problem "in a new light",…,. This change or "restructuring" can occur as the reorganization of prior information, often after being unsuccessful when attempting to solve the problem using more conventional knowledge structures,…,. In some cases, the restructuring may take the form of novel connections being created between previously unrelated concepts,…,. The mental restructuring can also be elicited by relaxing unconstructive constraints or switching attention to crucial elements of the problem ,…,. These processes usually occur spontaneously without any external cues by rearranging already existing knowledge structures (i.e., fact-free learning ,…,) However, it is also possible for restructuring to be elicited by acquiring some new information or experiencing a novel event that fits the problem-solver's goal. An example of this view is the theory of opportunistic assimilation whereby the solution is triggered by a stimulus in the environment which is then assimilated into the prior memory representation of the problem.[157]

Insight, under such an interpretation, can likely serve as a feeling of reward for the player, and it would change some understanding, though it would not necessarily have to amount to conception of a global change of the system.

It is worth noticing that if an object has a parthood-semiosis, it is a part. When we solve a Jigsaw Puzzle, we see it as a whole, not considering the eventual systems the cardboard box with the pieces in, and the picture on top of the lid, could be part of. We have in Sartre's words destroyed the context. It appears therefore in a "closed" form and we feel we have a distance towards it. It does not mean that we cannot do anything with it, or to it. It just means that it appears distinct from us, the player, spectator, the mind's I, "Dasein" or whatever we choose to call the phenomenological subject it is given to.

If the jigsaw puzzle has had a semiosis, we would argue that it would itself be a part of something else, like a situation, an economy, the things in my teenage-daughter's room, or other kinds of systems that

[157] Tulver et al., 2023, p. 5. orig. ref. omitted.

might contain jigsaw puzzles. The focus here is, simply how we perceive the whole of the system as well as the parts with their semiosis, from the outside.

4.4 Complex Systems

As Jigsaw puzzles have a relatively simple structure, there is often emerging complexity as the jigsaw puzzle solving commences, which is something that we often attempt to handle by deploying various strategies. However, complexity might also be a feature that can occur in the system, but even so, detectable from an outside view. An obvious example is in complex natural systems like biological organisms, but the emergent complexity has famously been reproduced in computational models.

In what remains of the chapter, we shall first look at some of the methodological concerns relating to complex systems, then consider some of Steven Wolfram's claims to have produced complexity in closed computational models and consider the potential role of mereological decomposition in relation to developing and handling complexity in systems. Many systems appear "closed" in the sense, that they do not interact much with the surrounding world, while others obviously do. Alternatively, some systems allow for some interaction, like Jigsaw Puzzles. We might be tempted to say, that the Jigsaw Puzzle only consists of pieces, but that would be a mistake as shown above.

Often, we operate with "complex systems", where the prediction of behavior and delineation of what is inside and outside is not so (relatively) simple. Complex systems are often biological systems, cognitive systems, meteorological systems that contain many qualitatively different kinds of parts. But the key issue is that the systems contain principally unpredictable interactions between their parts. Many scientists would argue that this has to do with the interactions with the contexts or surroundings. If the interaction of the system with its context or surroundings is itself complex or many-faceted, there is a higher degree that the system itself contains complexity.

These troubles have been emphasized by philosophers like William Wimsatt, William Bechtel and Robert Richardson as well as Achim Stephan, among others.[158] But they are also found, or at least hinted at, in various sciences, for example meteorology and human nutrition. And in the sciences they might have severe implications, as in Guillemot 2010 where it is suggested to replace a top-down epistemology with a new so-called "bottom-up" epistemology. This is at the price of accepting a weaker evidence base or

[158] Wimsatt 1985, Bechtel & Richardson 2010, Stephan 1998, pp. chapter 18, & 2007, pp. 232-46. But as discussed below, also Bertalanffy 1972 was involved with such concerns.

level of justification than could otherwise be provided by a top-down epistemology, and similarly in human nutrition where it has been argued that we should dispense with intervention trials in favor of more emphasis on epidemiological observation based (non-intervention) studies[159].

In many cases of complex systems, though we initially have a clear idea about the nature and identity of the system and how to delineate it from its surroundings, there seems to be an intermediate level where the interaction between the various parts and levels of organization, seems to be so many-faceted that it is both in principle and praxis impossible to predict any specific behavior of individual parts within the system, at least with any certainty.

One focus of this debate on methodological issues connected to complex systems, are related to "sensitive causation" or "synergy".[160] At the core lies a problem of causality in relation to complex systems. The problem has many faces, but the main idea is, that a proper understanding of cause-effect relationships in complex systems seems to be difficult to capture and perhaps impossible to predict.

The many faces originate in part from the many different types of complex systems that have been studied, thereby attaching various methodologies, models and theories to the discussions, that have made the problem appear in a very diverse manner. Initially, the most famous discussion was found with chaos theory,[161] but the debate has by now grown into other scientific domains, like biochemistry, evolutionary biology, psychology, cognitive science, organization theory and meteorology, to mention a few.[162]

In biochemistry in general, healthcare sciences like nutrition in particular, synergy has been a celebrated conception in order to understand the context-based effects of various nutrients or active substances. But, as it turns out, synergy might also cause methodological concerns, as is clearly formulated in a 2004 paper by Kris-Etherton et al.:

The effects of bioactive compounds may arise in several ways that may not be identified easily by currently suggested approaches. A false negative result may arise because of the possible dependence of health effects on the simultaneous interaction of multiple components or physiological and cellular effects. The effect of bioactive compound intakes may not be the result of a single bioactive compound, but may arise from synergy between compounds. In this case, studies of individual

[159] See especially David Jacobs and associate's work on Food Synergy: Jacobs et al 2009, Jacobs & Tapsell 2007, & Jacobs & Steffen 2003.
[160] See Corning 2003, Stephan 2007, pp. 232-238.
[161] See Gleick 1998 for a history and overview of theories.
[162] Smith and Jenks 2006, Auyang 1998 and Bar-Yam 1997 provide introductions to complex systems theory that cover most of the fields mentioned, except organization theory and meteorology, but see Stacey 2003 and Guillemot 2010.

compounds would prevent this synergy, mitigate the effect, and possibly prevent identification of the compounds. The health effect would be seen only with consumption of the complete diet or possibly with individual foods.[163]

The issue raised by Kris-Etherton is, that if we talk about effect measures in studies of complex systems that are focused on normal functioning, and not pathological issues, it seems to be a problem that the synergic complexity concerning physiological effects of dietary components, might be distorted due to exactly those synergic interactions.

It is from a similar reasoning but this time in meteorology, that Hélène Guillemot in 2010 proposes a bottom-up epistemology to replace the so-called top-down epistemology. While top-down epistemology is proposed to have a testable theory that is then evaluated through observations and experiments, the bottom-up epistemology consists in hypotheses, which are constantly developed through mathematical models and simulations, contrasted with observations that then refine the models, which in turn change the significance of the observations. And the point is, that this bottom-up dialectical model, is supposed to be detached to a certain degree from the theories corresponding to the models in question.

The procedure can be decomposed into three steps, with in which intervene no less than three different models. The first step consists of carrying out a measurement campaign within a zone that is monitored by observation stations. Then—this is the second step—a mesoscale model, also called "cloudresolving model" (with grid cells measuring a few kilometers) is used to simulate weather evolution in this zone during the time period under consideration: mesoscale specialists enter into their models parameters measured at the beginning of this period, and define limit conditions, so that the simulated climate resembles the climate observed during the campaign. In this way, the mesoscale model is validated by observations in a detailed fashion. Finally, climate modelers test the studied parametrization in a simplified, one dimensional version of the model. This so-called "column" model consists of a single horizontal grid cell with all of the vertical layers superimposed; It contains all of the "physics part" of a GCM but no dynamics, so, it is far less difficult to use. This one-dimensional model is provided in input with the external climate data from the mesoscale model, then it runs and its simulation is compared to that produced by the mesoscale model, which permits modelers to validate its parametrization, and eventually, to ameliorate it…[164]

Guillemot's point, of making an ongoing process of computer models that are continuously corrected by observations, we get a much better understanding of how the system evolves. However, the dialectics of this model, that in some ways resembles a hermeneutical iterative model of some sort, may deliver and continuously improve and rectify the understanding of the system, but then on the other hand, it does

[163] Kris-Etherton 2004, p. 526.
[164] Guillemot 2010, p. 247.

not ensure prediction and consequently we do not obtain evidence for, or justification of, any theories. Here, the focus is on the models and the rectification of models, rather than justification.

It might be suggested that bottom-up epistemology solves the issue and seems to be an epistemology that works well with the increasingly popular tradition of computer modeling within complex systems. And that to some extent, it does suggest a qualitative measure of working with complex systems, but since it is exactly the prediction issue that is a central problem in, say, the Kris-Etherton synergy quote above, it can be hard to see if it really solves the problem. From a critical perspective you might argue that this is simply giving-in to the troubles that arouse. Therefore, since the notion of complex systems would appear to have severe implications to the methodological and philosophical foundations of these sciences, there have correspondingly been developed several attempts to make more unified discussions and theories of these philosophical issues.

Arguably, we may have gained explanatory power concerning how systems work and we may be able to say something about various system's different stages of organization at different times. But the price is, that the question of exactly what it means that something is a part of a complex system as well as the question of determining which elements do in fact participate in the constitution of the system, have become somewhat difficult to answer. Hence, the more nonlinear interaction and complexity we add to the description of complex systems, the more difficulty we have in understanding the part-whole relation of such systems.

An essential defining property of a complex system often involves substitution and re-organization of its parts, perhaps even in a sense that is sometimes said to challenge the main ideas of standard (linear) mechanics.[165] This has sometimes been taken to mean, that different kinds of parts in various organizations could constitute the same wholes, which had led to an invocation of various notions of emergence and supervenience, some of which to some appear just as mysterious as the problems they are trying to solve.[166]

The idea that the parts might be inter-substitutional, and perhaps even replaced continuously may be said to add problems with the systems boundaries in space and time. The reason is, that the claim that the whole is to be identified in terms of the sum of its constituent parts becomes hard to defend when it comes to complex systems, as it may be hard to identify exactly which kind of objects would qualify as

[165] See Bar-Yam 1997 for a fine introduction to the nonlinearity of complex systems.
[166] See Stephan 2007 as well as the selection of readings in Bedau and Humphreys 2008.

constituent parts, particularly when those are supposed to be material proper parts. The whole of such systems appears often much more stable than the configurations of parts that make them up.

4.4.1 Wolfram's automata

At least since Prigogine and Stengers 2017, a central issue of complex systems has been this proposed unpredictability. Issues of the emergence of both mechanism and randomness have been considered to create solutions of how to construct an epistemology of an empirical naturalist approach to such complex systems.

But the emergence of complexity does not only take place in open systems, that also involve sensitive causation. Stephen Wolfram did one of the most influential demonstrations of the emergence of randomness in closed systems.[167] Wolfram did simulations that show how we can produce complex structures in mathematical programming models from simple mathematical algorithms, or automata, complex in the sense of irreducibility and unpredictability. He argued that such basic automata might be the basis of more complex appearances in various sciences, including the creation of space, time, particles and even Einstein's theories of relativity, the laws of quantum mechanics, and entropy.

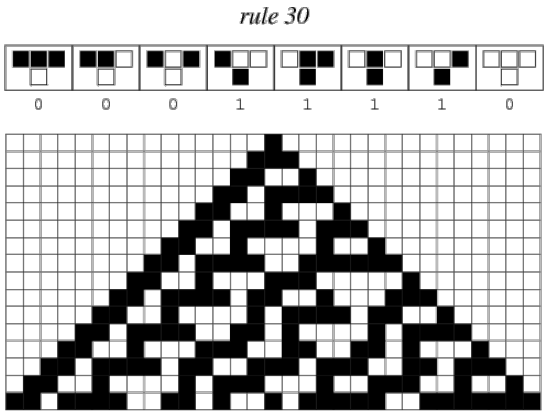
The idea is simple: On a computer we simulate a grid with a large number of cells in which colored dots can appear. Then a series of small programming rules, called automata, are run as small binary programs. The automata are simple conditionals or prompts, prescribing what happens if a cell contains, say, a colored dot, or not. The point was to discover what images might or might not result on the grid, to imitate how nature perhaps is able to create complexity from the simple. Often, in Wolfram's simulations, several automata were combined to form a rule, to optimize variation.

Because it is taking place on a particular grid, and because the processes are limited to the unfolding of algorithmic simple automata, the situation at the outset appeared to be much like our strategies for jigsaw puzzle solving above. Often, nothing interesting happens, but sometimes interesting patterns appear after some time. An example could be rule 30 (containing 8 automata) which Wolfram himself has used as an example of randomness creation (1983, 2002).

So, we have ordered the grid, so that we start on the top line in the middle, and that we descend vertically for every step in time following the rule of the particular automata that we are deploying. In this case,

[167] Wolfram 2002. This work was long underway and already more than 15 years before some of the first publications where made as to the creation of randomness in mathematical simulations using automata, see Wolfram 1983, 1985.

whether or not a cell should be colored, depends on the cover of itself and its two neighbors in the previous step. The automata rule 30 reads:



…and after 250 steps it looks like this:

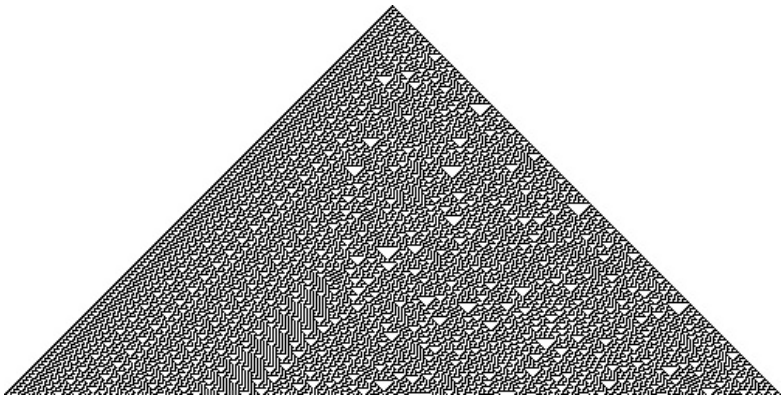


Figure 17. Wolfram's Rule 30 [168]

Wolfram argues, that even if our complex system behavior is governed by certain simple principles compiled by automata, we will not be able to predict the behavior of such systems, unless they build on automata that are simpler than ours. The point is an epistemological one, that the principles that govern us as an inertial system that is explaining another system, must always be more complex than the system we are attempting to predict.[169]

It is one of Wolfram's central points that the irreducibility of whatever structures the automata-rules, makes it hard, or sometimes impossible, to predict this emergent complex systemic structure in an automaton-created process, especially if you go beyond the mere appearance. Instead, we have to select

[168] Wolfram 1983.
[169] Wolfram draws here on Kurt Gödel's famous incompleteness theorem, see Gödel 1931.

a range of simulations, and let them unfold their complexity, to see what kind of structure they would result in. [170]

There are a lot of meta-mathematical assumptions in Wolfram's explanation of his simulations that may appear unwarranted, and they have indeed been much debated. Particularly, it is far from clear if cognition follows rules that may be described in automata-based rules, and it appears as a concept of mind that has been considered and rejected in connection with developments in artificial intelligence research in the 1980'es, based on linguistical and semantical issues relating to language. [171]

Another issue is that one is perhaps not necessarily assured about the boundaries of the temporal or the spatial framework. Does the simulation have to run for a few minutes, a couple of years, a millennium? To this we must add the intrinsic randomness or indeterminacy that builds up inside the system as it unfolds. And secondly, you could have many automatons that would create similar structures, in which case it would be hard to decide which automaton would be the proper model for the structure of the natural process we are looking for.

An objection may be raised, I believe, concerning exactly what principle of composition is at stake in such simulations in general, and particularly if this notion of composition is one that needs extra-epistemic or ontological assumptions that go beyond the mathematical framework of the simulations. The argument basically rests on the objection that these kinds of simulations really create patterns, but that they are rather something that is created in our perception of them. You could say that there is a sort of *epistemic displacement* at stake. Let us spell the argument out in more detail, as it seems to be concerned particularly with the notion of composition.

Suppose then that we deploy a simple three-step automata-rule simulation, forming colored dots on a grid in black-and-white, in such a way that the structure, after some time, very much resembles the crystal structure of a snowflake. We then return to a classical issue in information theory and computation, which is about, in what way these dots display anything but simply a plurality or aggregation of dots. In comparison, when we look at a computer screen, we might read some text and though we 'know' that

[170] Wolfram's rule 30 has been shown to meet more rigorous standards of complexity, like the Devaney and Knudsen definition of chaotic behavior, that rests on prediction of non-determinism and sensitivity to initial conditions, see Cattaneo et al, 2000.
[171] Devlin 1997 provides a compelling summation of the arguments based on speech-act theory against the idea of cognition as fundamentally automata-based. But see Dennett 2017 and Dawkins 1976 for a version of a theory of *memes* to work in a similar way, that may escape the speech-act based arguments.

there is no real text on the screen, but only colored dots. [172] When we see it as a text, it is because we in some way identify some gestalt structures, of which we could identify the individual lines and colors as parts. Adopting a phenomenological approach, we immediately see that there is a text on the screen. Hence, at least a part of our principle of composition is that what we see is a part of a text.

The complexity that Wolfram argues, and many with him, can therefore not make sense unless we see the emerging pattern in the light of the whole, as for example displayed at the bottom of figure 17. As I understand Wolfram's position, this is exactly one of his central points and corresponds somewhat to the trend in physics that identifies at least part of chaos theory as an epistemology rather that an ontology.[173] But even in this case, it does not refute the fact that it is possible to show how elementary processes in principle can produce structures at a higher ontological or epistemological levels, and thereby creating a randomness which in turn facilitates unpredictability.

An unexplicated connotation of composition could be, when you look at the dots on the grid, that you are always already looking for something to occur in the hope that these evolving images are going to display something "interesting", i.e. will form an image of something we can recognize. Now, the realist approach would be bluntly to argue that we see the structures because they are there.

Compared to all the efforts mathematicians have done in order to reduce complex system structures and emergence to simple features of mathematical programming, this solution would appear strikingly naïve. But even if we did accept it, we would be facing another issue: This would be a reversal of the chaos theoretical idea of entropy, since composition would unite many parts into one structure, and hence, the whole would be significantly less complex than the aggregation of the parts. Simply because the whole is one, and the parts are many.

A way to avoid this, could be to argue that since a whole involves all the parts and as well as an emerging structure, it would be more complex than the parts. But in that case, this seeming principle of composition, would not be a principle of composition at all, but instead a story of creation of an independent structure next to all the other things. And this seeming ambiguity, may be the source of the troubles concerning entropy indicated above.

Whether the whole is identical to all the parts, or it involves an emergent or supervening structure, a principle of composition would have to account for that the elements can be considered as parts of a

[172] …and that's if you are lucky, because the optical colors dots may arguably be reduced to rays of different wavelength meeting the eye. This type of arguments can be found further discussed with eliminitavists like Peter van Inwagen and Trenton Merricks, see particularly van Inwagen 1990 and Merricks 2003.
[173] See Gleick 1998 for a standard reading of Chaos theory belonging to this tradition.

whole, which in any case would be a transition from something more complex to something more simple, but also that the simple and the complex, the unity and the aggregate of parts, must co-exist simultaneously. Though this point will be argued further below, invoking arguments that do not rely on chaos-theory, it is important to stress that this understanding of composition seems to be supported by complexity theory.

It seems to be a tendency to have a "light foot" on the shifting perspectives in mathematical programming of complexity, first from automata governing dots on a grid, something that is supposedly there in the model and followed by a recognition of complex structures as we look at the model. Because we really don't literally *see* the automata or the grid. Instead, we know it is there because we have a knowledge of how the model is constructed. We *see* the dots, and then we *recognize* the supposedly more complex structure by associating it with forms and structures already familiar to us. This latter process is strikingly like what we discussed as "seeing-in" above.

From a decompositional perspective, we would first ask the question of what the nature of the whole is of which these processes and automata are supposedly parts. And if we go back to rule 30 as it was deployed in the grid 250 times, the question arises if the whole in question is the last line 250, or the entire triangular structure that you see on the image. If the former is the case, rule 30 itself is definitely not a part of the whole in question, but part of the principles of its creation. If the latter is the case, we need to discuss both endurant and perduring parts. Rule 30 can consequently be seen as a relation between parts perhaps even a part of parts, which might entail that the rule 30 itself can be argued to belong to a mereological decomposition of the whole in question, which in turn also invokes the discussion from chapter 3 on weak transitivity.

4.5 Decomposition as an Increase of Complexity

Based on the discussion of complexity above, decomposition seems to allow for the emergence of complexity. With the jigsaw puzzle, we observed that the more pieces there are, the more complex becomes the algorithms that could solve them. Therefore, several different strategies are often used by the players to solve it. Similarly, here, the more parts or sortal decompositions we create, the more potential interaction can there be. This gives rise to more sensitive causal relations, which in turn increase the unpredictability both in theory and praxis.

However, mereological decomposition might be an aid. If we have a better idea of what counts as part of a particular system and what does not, together with what categories or sub-groupings of parts we can

work with, we would tend to decrease complexity in the system, in much the same way as when we develop strategies for puzzle solving. Back in 1952 Ludwig von Bertalanffy already pointed to this idea in his effort to found a General Systems Theory. Bertalanffy wrote:

The properties and modes of action of higher levels are not explicable by the summation of the properties and modes of action of their components taken in isolation. If, however, we know the ensemble of the components and the relations existing between them, then the higher levels are derivable from the components. [174]

In a later paper on the history of systems science published just before his death, von Bertalanffy looks back on this quote: Though it expresses Aristotle's notion of a whole being more than the sum of its parts, this is a particular source of trouble, von Bertalanffy argues, as "linear" science is not equipped to deal with internal relations of parts of complex systems. Therefore, according to von Bertalanffy, a central tenet of his program of General Systems Theory should be a logico-mathematical field of understanding systems as wholes. [175]

Still, Bertalanffy's point seems to pose a fine summary to the use of mereological decomposition, when we attempt to understand systems in general, complex systems in particular, in an objective fashion. In doing so, we are often faced with sets of properties that seem to be in opposition to each other, but it is exactly the virtue of systems thinking, that it might combine very different kinds of parts in a joint analysis of a particular common appearance or understanding of an end, functionality, or mechanism.

If we look at some of the attempts that have been created to list the essential properties of complex systems, we often would run into a list that would look something like this:[176]

1. Complex systems are composites.
2. Complex systems evolve and change with time.
3. The interaction with and within complex systems is rich, meaning that by that it is non-linear.
4. Complex systems are, perhaps with a few exceptions, open systems that work under conditions of non-equilibrium.
5. Complex systems are self-organizing systems.
6. Complex systems involve emergent properties, and thereby they often have several levels.
7. "each element of the system is ignorant of the behavior of the system as a whole: it responds only to information that is available locally." [177]

[174] Bertalanffy 1952, 1968.
[175] Bertalanffy 1972. His does not give a direct reference to Aristotle, but it is probably to the *Metaphysics* 1041b11-25.
[176] The definition/ list of properties is amended and adopted from Smith and Jenks 2006, page 13, Cilliers 1998, page 325, and in part Stacey 2003, page 243.
[177] Smith and Jenks (2006), p. 13.

8. A complex system is demarcated from its environment, by mainly three factors:
    a. Its history.
    b. Its developmental potential.
    c. An applied identity principle.

Consider for a moment, that these basic characteristics are sorted into a system group and a complexity group, proposing two different kinds of governing intuitions. We would probably then obtain something like this:

Systemic Properties:

1. Complex systems are composites.

6. Complex systems involve emergent properties, and thereby they often have several levels.

8a. A complex system is demarcated from its environment by its history.

8c. A complex system is partly demarcated from its environment, by an applied identity principle.

Complexity Properties

2. Complex systems evolve and changes with time.

3. The interaction with and within complex systems is rich and thereby non-linear.

4. Complex systems are, perhaps with a few exceptions, open systems that work under conditions of non-equilibrium.

5. Complex systems are self-organizing systems.

7. "each element of the system is ignorant of the behavior of the system as a whole: it responds only to information that is available locally"[178]

8b. A complex system is defined by (demarcated from the environment by) its history and its developmental potential.

Sorted this way, it is relatively obvious, that the entries listed as complexity properties, are much more dynamical and intangible perhaps, than the entries listed under systemic properties. In my sorting of the list I admit to have been disregarding, that some of these properties listed as complexity properties, might arguably be listed as systems properties. Theories of complexity have developed in various ways under various names, like "open systems", "cybernetics", "chaotic systems" etc.

Some could argue that the second property that systems evolve and change with time, is a systems property that has nothing especially to do with complexity. On the other hand, the idea that complex

[178] *Ibid.*

systems evolve, in the sense that they qualitatively develop according to a potential in a certain timespan, is exactly one of these things that is essential to complex systems. And as Wolfram has shown, we sometimes do not need much more to create complexity in the Prigogine and Stengers sense. What is *does* suggest is that there is an intrinsic opposition between complex systems' systemic properties and complexity properties. It is nothing more than a suggestion, so far, but it is relatively intuitive that the so-called systemic properties are more intimately connected to classic mereology than the complexity properties. It is important to comment somewhat on these various properties, both to argue this dichotomic feature, but also to show how this basic problem can be depicted as a problem of mereology.

Mereological decomposition asks about the nature of such systems from the integrated whole and then dimensionalize downwards. This does not exclude complexity, but it might aid compositional approaches of complexity as an emergent property, to delineate the context and to develop strategies that can reduce the complexity of the problem solving at hand. Decomposition can be developed into an aid of classifying parts and reducing complexity. But it seems relatively weak in doing something about complexity, compositional approaches do this better. The reason is probably, that mereological decomposition is designed to examine parts and parthood and not wholes. We might even suggest that the weak application might be due to the inversibility to composition. As such we might have higher expectations when we are in situations where we are working from an internal perspective.

It would seem that mereological decomposition would, *ceteris paribus*, increase complexity in the models of analysis, simply because it is a move from the one towards the many. And inversely, composition, as much as it involves integration, would, *ceteris paribus*, decrease complexity in our model. And furthermore, emergence and sortal decompositions might be used to develop tools to handle intermediate balances of "some level of complexity", following the notion of "some level of integration" that are essential characteristics of most systems.

5. Parts of Persons

And Milinda began by asking, "How is your Reverence known, and what, Sir, is your name?"

"I am known as Nâgasena, and it is by this name that my brethren in the faith adress me. But although parents, O king, give such a name as Nâgasena ,…, yet this, Sire, ,…, is only a generally understood term, a designation in common use. For there is no permanent individuality (no soul) involved in the matter."

Then Milinda called upon the Yonakas and the brethren to witness: "This Nâgasena says there is no permanent individuality (no soul) implied in his name. Is it now even possible to approve him in that?"

And turning to Nâgasena he said: "If, most reverend Nâgasena, there be no permanent individuality (no soul) involved in the matter, who is it, pray, who gives to you members of the Order your robes and food and lodging and necessaries for the sick?" ,…,

"Now what is that Nâgasena? Do you mean to say that the hair is Nâgasena?"

"I don't say that, great king"

"Or the hairs on the body perhaps?"

"Certainly not"

Or is it the nails, the teeth, the skin, the flesh, the nerves, the bones, the marrow, the kidneys, the heart, the liver, the abdomen, the spleen, the lungs, the larger intestines, the stomach, the fæces, the bile, the phlegm, the pus, the blood, the sweat, the fat, the tears, the serum, the saliva, the mucus, the oil that lubricates the joints, the urine, or the brain, or all of these, that is Nâgasena?"

And to each of these he answered no.

Is it the outward form then that is Nâgasena, or the sensations, or the ideas, or the confections (the constituent elements of character, Samkhârâ), or the consciousness, that is Nâgasena?"

And to each of these he answered no.

The Questions of King Milinda, book ll, chpt. 1 (translated by T.W. Rhys Davids) [179]

In this chapter, focus will be on the notion of the experience of having parts, that is, parts of a systemic whole that is the persons themselves. The difference between persons and other systems like machines, computers or jigsaw puzzles, is, that persons involve an I, that is, a subject that can make the judgement that "I am this system" or "This system is me." It is not the case that human beings are always correct in this respect. It is likely that we have parts, that we do not know that we have, and sometimes we even believe that we have parts, that we really do not.

[179] Müller 1996, part l, pp. 40-42.

In a similar vein, it is not implied that persons in the sense of living, conscious and reflective human beings, are the only beings, who experience parts of themselves in a certain way. In fact, it is likely that many animals and other living beings have similar experiences. In this chapter we shall focus on persons as living, conscious human beings, to develop a theory of the phenomenological experience of having parts, based on our previous findings.

Even though the treatment is restricted to this very particular and unique domain, further additional delimitations are required. For there have been extensive discussions on the nature of human self-perception and consciousness in various sciences for many decades, and even which kinds of parts we might consider, could involve a history of ideas in philosophy and science since antiquity.

But as the investigation is to be an investigation into the phenomenological experience of having or possessing parts, two themes in the contemporary discussion come particularly to mind. Both are posed directly or indirectly in the quote from the *Milindapanha* above: There is the question, if a person contains a self, and what that is supposed to mean exactly that a part of *me* or the whole of me, is my *self*. Furthermore, there is also the related question of mind and body, particularly how experiences might be embodied and what it feels like to have a body at all.

I shall therefore limit the discussion to these two issues. As we move along, I shall follow the distinction between the minimal self, that is the mind's I, the narrative self that is essentially historiographical, and add the concept of an ideal self, which is a purposive teleological idea of a striving self towards one or more ends. Contrasted to this, we find the classical ideas of mind and body as well as extensions of these (extended cognition, extended minds, extended bodies, extended emotions, or affectivity) and I will attempt to show, that even though mereological decomposition works very differently when we compare narrative selves to embodied and extended cognitions. However, I am also attempting to show that there are numerous possibilities of reconciliation that might lead to new ways of breaking new ground in psychology and cognitive science.

5.1. King Milinda's question

Am I a part of myself alongside other parts like impressions, arms, legs, hair, thoughts, and feelings? Or am I all that taken together? This is one of the questions the Greek King Milinda,[180] asks the Buddhist

[180] Milinda is translated from Pali to refer to the Indo-Greek King Menander (also called Menander the Saviour) that reigned in the northwestern parts of the Indian subcontinent probably between 160-130bc. See Kubica 2023, pp. 129-163. Even though the story it set at that time, the text is estimated to be written around 100 ad.

sage Nagasena . If we think that there is a soul, a perceiving subject that constitutes the I, then we could argue that our body parts appear to be *attached* to us, like branches on the stem of a tree. In this way, it gets a strange external ring to it: The parts may be parts of *my self,* but not part of the I. This seems to indicate that I am a proper part of myself. That there is more to myself than me.

On the other hand, this does in fact correspond to my experience of myself. Sometimes. For sometimes I look at my hand, knowing it is my hand and I look at myself in the mirror, thinking that my nose is too big, my lips are too wide or that my eyebrows are too thin. These are all parts of me, that I can look at. Similarly, I can consider certain emotional reactions, or thoughts about others that I have had, and I may like or dislike these thoughts and reactions, as well as the fact that I have had them.

We can therefore make phenomenological sense to the claim that the I is not the same as my self, and perhaps there is also a distinction to the notion of "me", if this is understood as identity attribution, in the sense of what or who I am, like in a formulation like "being an x: that is *me*".

If we, as Nagasena does, give up on the I, as he does in the dialogue quoted above, then we encounter another problem.[181] For, as King Milinda points out, we would have no integration of the whole, that is, no subject to ascribe properties or responsibilities to. Nagasena answers, by using the image of a chariot. It is not the wheels or the pole or the goat, but all these things taken together that is the chariot: The whole is the mere sum of its parts, or so it seems.

Seen from a perspective of a mereological decomposition, we could add to Nagasena's answer, that if you consider all the parts as individuals, you would never be able to make up a notion of a chariot or a person for that sake. Not because the parts considered as individuals are not there, not because they are not relevant, but because the notion of parthood itself escapes you. You think of the parts without the whole. In order to understand how the parts make up a person or a chariot, you need to include the semiosis created by the transfer of meaning from the whole to the parts, effectuated by a mereological decomposition in question. Though this would make Nagasena's answer stronger, it still does not quite answer King Milinda's question, I think. The reason is twofold:

A. Mereological Decomposition is just a method. It is therefore not guaranteed that it is able to solve all deeper philosophical issues on its own, though it might be an aid. Like most other methodologies, it is more like a particular kind of optics, that can make you see particular features more clearly, or notice

[181] *Ibid*, pp. 43-44.

things that may otherwise be left unnoticed. In this case, the question remains, what kind of part or integrated whole that is sufficient to serve as constituting a person.

B. I believe that Nagasena makes an unwarranted move in his answer to King Milinda. For King Milinda begins the conversation asking questions, that make Nagasena in effect saying "I do not have a soul (permanent individuality)", whereafter the king asks into what exactly then, Nagasena refers to when he says 'I'.[182] When Nagasena then makes the argument of the chariot and says

",…, Your Majesty has rightly grasped the meaning of 'Chariot'. And just even so it is on account of all those things you questioned me about the thirty-two kinds of organic matter in a human body, and the five constituent elements of being – that I come under the generally understood term, the designation of common use, of "Nâgasena." [183]

he implicitly argues that you can make an argument from an outside third-person experience of phenomena and transfer the analysis by analogy to phenomena experienced from the inside. Whether his claim turns out to be true or false eventually, this argument stands as a fallacy, unwarranted and unjustified.

We cannot, therefore, even when armed with mereological decomposition and the tools of analysis provided by such an approach, make mereological and phenomenological investigations of objects that are disjoint from us, and expect that we can transfer the results directly to the phenomenological experiences of our inside experiences of systems in which we participate.

When we consider inside first-person experiences, we might still distinguish between the experience of being the system, the' I', or 'me' or 'self', of the system, or being part of a larger system where perhaps we rather use terms like 'we' and 'us'. The latter will be reserved to chapter 6, at least to the extent that it becomes the overall theme. What concerns us here, is merely the former.

5.2 Mind, Body, and Self

In as much as we consider ourselves as some sort of system, we per extension also consider ourselves as wholes of parts. In this sense, it is possible to conceive of a mereological decomposition of us as persons. This means, that we would have a notion of who or what we are as a whole, and therefore also an understanding of the parts that *we* have or believe that we have. Such parts should involve some kind of semiosis, to the extent that we consider ourselves as an integrated whole.

[182] *Ibid* p. 40.
[183] Müller 1996, p. 44.

The semiosis of parthood would suggest that the parts would be *our* parts, the inside approach, that they *present themselves* to us, epistemically or phenomenologically. In as much as we experience the semiosis of our own parts belonging to ourselves, we must expect that this experience will direct us towards an understanding of ourselves as a whole. For what we then experience is a partial explication of ourselves through a mereological decomposition.

We might distinguish between body and mind, that is, argue that we have mind-parts and body-parts. On that reading, we might regard the human organism as a highly complex system and even the functioning, behavior and constitution of microbiological parts like cells, are themselves an area where we have a limited understanding and knowledge, at least so far.

Whether or not one acknowledges the Cartesian origin of mind and body dualism, we might be caught in that particular framework, simply due to what we believe is common sense.[184] If we are asked to provide examples of parts of persons, the first examples most of us would think of, would be body parts, that we use to maneuver in the world on a daily basis. Arms, legs, hands, feet, head, eyes, ears, nose are likely the first that come to mind. We sense them and we sense *with* them.

In addition, we could argue that we have more abstract parts. Some say persons also have *systems* as parts, like the immune system, the hormone system, the cognitive system, the digestion system. Such parts appear to be much more elusive, because, though they are perhaps just as physical as arms and legs, they are not *material* in the way we normally conceive an arm to be.

Complementary to the body parts of a person, we might consider the mind and mind-parts. The ontological status of the mind versus the body, or the mental versus the material have been discussed extensively in the history of philosophy, converging into Descartes' formulation of the mind-body problem in his *meditations on first philosophy*. Though this work is from 1641 the debate has not slowed down since, but has re-occurred in various forms, most often as favored solutions to this problem and criticisms thereof, like idealism, materialism, dual aspect theory, and more recently theories of supervenience, emergence, and embodied cognition. The purpose of these discussions is a common goal to reconcile the mind and the body after Descartes' separation of them into a dualist conception.[185]

[184] I have elsewhere discussed such cartesian common-sense concepts relation to philosophy of emotion. See Hertel-Storm 2021, pp. 5-13.
[185] Descartes famously distinguishes between *Res Cogitans* (the thinking thing) and *Res Extensa* (the extended thing), see esp. the beginning of the 5th meditation (63-66), but also the 2nd and the 6th meditation contributes to the distinction. Descartes 1993, pp. 63-70, 88-90, 93-105.

So, a simple Cartesian distinction is not so straight forward, as it might appear, whether one is an ontological dualist, or not. It is not simply reductive materialism on the one side, compared to some kind of mind-spirit on the other. And neither was this Descartes' position in the meditations. Descartes' idea of Res Extensa was *spatial* objects set up against cognition. Literally Res Cogitans means "the thinking thing." This is important to emphasize, even for the readers who might be well aware of this already. For it allows us to discuss a potential semiosis involved in both *Res Extensa* and *Res Cogitans*, without having to concern ourselves with, if we are involved in category mistakes of an ontological nature.

5.2.1 The Illusiveness of the Self: The *I*, the *Mine* and *the Self*

Given that we accept that a person can experience the semiosis from his or her parts, we might proceed by asking how exactly this might take place. If we presuppose the whole conceptual apparatus of mereological decomposition, we know the many assumptions that are made before one can actually think of oneself, in terms like "I have parts" or "I am an individual". But it might be, that some of these are to be considered as more implications of such a claim, that preconditions of it.

When we discuss persons and parts in this chapter, we do so from the stipulation of persons as individuals, that can be MDS decomposed into parts. This process would thereby explicate the nature of the person as an individual. In the case, that we are unsure of who we are, that is, are reconsidering our identity, it is a common strategy we will try to experiment with the reach of our control in relation to our Self-agency. What I can manipulate and control, is within my will and power. What is beyond my control, is alien…it is not controlled by me. This is why children attempt to experiment with games.

In developmental psychology, much research has been made into what exactly the child becomes self-aware. In order to understand itself, it need to identify some phenomena as "mine" or "within me", while identifying other phenomena as "the other" or "something else than me". An example could be, when a baby suck on its toe, and not only get a specific taste and feeling sensation relating particularly to the intentional activity of sucking on something, but also a strange feeling that seems somewhat more distant, that might later be identified as a "tickling" in the toe.[186]

When children look in a mirror and recognize themselves, they see themselves from an outside perspective that aids their differentiation between themselves and their surroundings. They observe

[186] see Zahavi et al 2004 for collection of essays that provide fine discussions of the development of self-consciousness in children, particularly Phillipe Rochat's chapter of the development of self-objectification through for example mirroring (pp. 1-20). See also Keromnes 2019 for discussion and background on mirroring as a way to Self-awareness.

something different from their 'I', and from their immediate experience of their Self. We are back with King Milinda's question of what it is, that this or that person is, be it not an "I." When we talk about the "I", we can refer to what Sartre called the transcendental subject of experience, following Husserl's notion and what I believe approximates what Descartes called *res cogitans*.[187]

This can be contrasted with a 'Self'. The 'self' is about identity, and it concerns the way a person may reflexively ascribe essential properties to, what she is and how she may understand herself. The self is a measure of my extension into the world. "How big am I? What opportunities the world has to offer can I exploit and do I miss out on something?" as Hartmut Rosa for one would put it. [188]

Such ideas follow from concepts of the "self", as constituted by psychological ownership, an idea that originates in William James expression of such a notion briefly mentioned in chapter three.[189] According to James, the self is synonymous with ownership, which means that our house, the car, the lawnmower, the dining table and the apple tree in the garden are all parts of the Self. The claim is, that we feel ownership of our body, exactly because we can manipulate and control it, as well as predict its behavior. This also implies, that we tend to include whatever we can physically control and manipulate as either parts of our body, or as something that is ours, that is, belongs to me.[190]

The question is of course, if that also means, that it strictly speaking belongs to a MDS decomposition of the self? For it seems to be a concept of self, that is particularly wide: James' point is, as earlier noted, that the content of this self – what we own – is provoking a particular emotional response. If somebody takes it for their own, we become angry and accuse this person of stealing, that is, taking something of mine away from me. However, not everything that I own, seems to have that property. If I cut my hair, I don't care if somebody else takes it. I might also own a tree, and if somebody takes a leaf among the many on the tree, I might not care, perhaps I would not even notice the absence. Furthermore, I might own things that I want others to take away, like if I have an infected tooth that I want the dentist to remove. Therefore, the case can be made, that it is not the ownership alone that constitutes such an emotional response, and that therefore James' concept needs narrowing down.

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187 Sartre 2003, pp. 97-99, (see also Zahavi 2005, p 115-132), Husserl 1993a.
188 Rosa 2005, pp. 279-293.
189 James 1950, vol. 1, chapt. X, p. 291. See also Khan et al. 2022 for a contemporary phenomenological discussion.
190 The question is not whether we actually are in control of our behavior. Just the feeling that we are is enough. In Hohwy et al. 2004 it is argued that the experience of control is better explained on a neurological basis, than on a phenomenological one. Concerning the demarcation between the I and the self from their surroundings (the other), we need not go into this discussion.

On the other hand, there seems to be a point in arguing, that the idea that we surround ourselves with certain things instead of others, to create a place that we feel is ours, is certainly an important one, that I believe is a part of James' view. But I think that Achim Stephan's idea of affective scaffolding is a better tool for describing this , and it will consequently be considered below as an example of emotional extension.

5.2.2 The Minimal Self and the Narrative Self

Obviously, there are things that we feel we own, that we do obviously not confuse of being part of our self in the same sense that our bodies are. To clarify this issue somewhat, Shaun Gallagher has introduced the notion of *The Minimal Self*.[191] The minimal self, as I understand Gallagher, is equivalent with the "I", the phenomenological subject. This is contrasted with the Narrative Self, that Gallagher sums up as

A more or less coherent self (or self-image) that is constituted with a past and a future in the various stories that we and others tell about ourselves.[192]

Gallagher delimits his overall notion of Self to include a sense of "self-agency" as well as "self-ownership". Self-agency is exactly the idea that I can do things, while self-ownership is the idea of something being mine: It is my body, my thought, my idea, my feeling, my impression etc. This idea of a "Narrative Self" corresponds somewhat to what Antonio Damasio has called the "Autobiographical Self".[193]

The Narrative Self is therefore a Self-understanding governed by storytelling, either made by yourself about yourself, or made by others about you. Damasio writes:

Extended consciousness still hinges on the same core "you", but that "you" is now connected to the lived past and anticipated future that are part of your autobiographical record. Rather than just accessing the fact that you have pain, you can also survey the facts concerning where the pain is (the elbow), what caused it (tennis), when you last had it before (three years ago, or was it four?), who has also had it recently (Aunt Maggie), the doctor she went to (Dr. May, or was it Dr. Nichols?), the fact that you will not be able to play

[191] Gallagher 2000, se also e.g. Khan et al 2022, pp. 447-450 for a recent updated discussion. Gallagher also sometimes refers to the minimal self as "minimal self-awareness".
[192] Gallagher 2000, p.15.
[193] The ideas of Narrative Self come in many forms and flavors, see Dennett and Ricoeur for those most important to Gallagher. See Damasio 2000, pp. 195-233 (and compare with the sections on "core consciousness" pp.82-130) for an excellent discussion of the main features.

with Jack tomorrow. The range of knowledge that extended consciousness now allows you to access encompasses a large panorama. The self from which that large landscape is viewed is a robust concept in the true sense of the word. It is an autobiographical self.[194]

The narrative self involves issues in ascribing parts to persons, in a new way. The basic issue is the narrativity, that we, based on the quotes from Gallagher and Damasio, clearly are supposed to take seriously. For if we think of a person as an animal, a thing with life and consciousness, a res cogitans, we might perform a MDS decomposition of the person and from there consider mental-parts, physical parts, systemic parts, processual parts, biological parts etc.

Considering narratives, on the other hand, we are talking about the *story* and the *fabula*, levels of narrators and characters, genres and discourses among other things.[195] And since these are connected in narrative structures that integrate the parts somewhat, we can imagine that we might find semiosis of a very different kind than the cases considered so far. Furthermore, luring in the background, we might have the problem of reconciliation: How do we reconcile the mind-body parts with a notion of narrative self.

On the other hand, the narrations seem to indeed be central to our understanding of our own actions, as well as when explaining them away. The Narrative Self is therefore all encompassing, but it is also erroneous. A point that perhaps needs more attention from the philosophers, is the phenomenon, well described in the psychological literature, that we quite often tell ourselves stories to justify whatever action or feature we dislike about ourselves. In turn this might create a self-image of a person we would like to be, a self that from time to another comes into conflict with the repressed self, a subconscious self that nonetheless affects us, our feelings, and our behavior.

Therefore, I would like to introduce the notion of an *ideal self*, a teleological idea of the Self we want to be, or rather, is on our way into becoming something in the future. This is to be distinguished from the part of the narrative self, that we might call the *historical self*. The historical self relates to memory, as history relates to sources. In Dings and Newen (2023) the narrative self is convincingly used to explain why episodic memory is shaped by scenario construction and how this depends on the notion of a narrative self, and it reminds of Hayden White's classic argument that the historical narrative determines the relevance of the sources and data chosen to support it.[196]

[194] Damasio 2000, p. 196. Damasio also refers to this as a kind of extended Consciousness, but in order to avoid confusion with the extended mind and the lived body, which is below discussed as extension, I shall stick with the notion of Narrative Self.
[195] I follow here more or less the terminology used in Bal 2017.
[196] Dings and Newen 2023, White 2014, see Garrett 2018, pp. 87-104 for discussion of historical narratives.

The ideal self on the contrary, is the part of the narrative self, that orientates towards the future. We have a feeling of what happens due to the purpose, or the resulting state of affairs, and we feel that we are in the process of becoming something, which makes our actions make sense. Sometimes a narrative overlaps between the historical and the ideal self, but often they are separated. For the historical self is always at the end of things, attempting to make sense of the past as leading up to the present, to whom I am now. And the ideal self looks ahead, it is the starting point of what it comes to be in the future.

The narrative self does also bridge between the past and the present. When you say things like "I think that I am a homosexual", "My company is soon so big, that we can have several full-time employees", "I am doing my best to be a good father to the kids", "I can feel that I have a master songwriter in me", "most of the time I am an excellent teacher" or "I am going to be the best soccer player in the world", then we are really comparing ourselves up against ideals that we strive towards, consciously and subconsciously, and at the same time referring to past experiences.

When we are considering the whole of which we are to make a mereological decomposition, it is not clear at all, what exactly we are talking about. It could be a minimal self, a narrative self, be that historical or ideal or both.

But at the outset we can consider ourselves as individuals, simply due to method: We attempt to understand what individual whole we are working with, by explicating it through a decompositional analysis. And at the outset we can choose the self as an individual whole, expecting relevant SD decompositions to be the minimal self, the historical and the ideal self.

We might foresee an issue with the SD decomposition related distinctions in narratology. For there are for example distinctions between the stories that are told or narrated, and the way they are narrated, something that is not easily fitting into a standard ontology-inspired philosophy of mind. In her classic introduction *Narratology*, Mieke Bal offers an account of such distinctions of narratives. She writes

A **narrative text** *is a text in which an agent or subject conveys to an addressee ("tells" the reader, viewer, or listener) a story in a medium, such as language, imagery, sound, buildings, or a combination thereof. A* **story** *is the content of that text and produces a particular manifestation, inflection, and "colouring" of a fabula. A* **fabula** *is a series of logically and chronologically related events, that are caused or experienced by actors. These three definitions together constitute the theory this book elaborates. These key concepts imply other ones. Take the last one, the fabula, for example. Its definition contains the elements "event" and "actor." An* **event** *is*

the transition from one state to another state. ***Actors*** *are agents that perform actions. They are not necessarily human. To* ***act*** *is defined here as to cause or to experience an event.*[197]

Mind-parts and body parts are now supplemented with stories, fabulas, events, actors, and acts.

Figure 18. Self and other

Looking from the perspective of the narrative self, it is worth noticing that the minimal self is a proper part of the narrative self. Though far from all would agree, I think it follows from Gallagher's idea. However, this is seen from an outside perspective. If Gallagher is looking at you, and pointing to your Self, the mind's I seen as a minimal condition for Selfhood, seem to be the lesser sphere "embodied" in the larger sphere of the narrative. But this gives us a problem on our hands, for the I, the subject, the res cogitans is the perceiving subject of a person. And when we ask into parts of persons, it is from this person's inside perspective of how the parts of the person are experienced.

The narrative self can therefore be regarded as the minimal self's understanding of itself. But when we use ideas of narration, we must, as I have shown in the quote above be alert to the fact that we might make narratives that are not ours, not even in the decompositional sense of it being in my mind. For as we have seen, being in my mind does not entail that it is part of my mind.

This can be elaborated with an example. Let us consider a thought. If I am thinking the thought, it is of course my thought, but it is not necessarily a thought *about* me. We could in fact easily imagine a situation where what I am thinking about has a different status from how I am thinking about it. So, let us treat the thought as a narrative: We can then distinguish between the form, the story, and the content, the

[197] Bal 2017, p. 5 (*italics orign.*).

fabula. And where the story might be interrupted and fragmented, the content, or fabula, would likely be more integrated and well structured.

Suppose now, I am retelling the tale of *Little Red Riding Hood*. I may tell it in a certain way, emphasizing parts that I like, and perhaps leaving out some very scary passages. I would therefore say that it is indeed my story(-telling) for that is something I made, and I feel that I own this version. But the tale itself, the fabula, is not mine. It is a story my father told me as a child, and I am furthermore aware that it is indeed a fairytale rooted in folklore. But it could be, that the content of the narrative I was telling, in some way was my story, that it expressed something about my self, like, say, everyday stories like one of a time when the storyteller got lost in a city, and asked a stranger for the way home.

So we can have narratives that are mine, either because the *story* is mine in some way (involves a semiosis), and where the fabula might or might not be mine, or, by the same token, we can argue that the *narration* of the self, can be a story that I made about my self, considering my self as a fabula or content. However, this does also imply that I can have thoughts, my thoughts, because it is narrated as a story by me and in my version, but that it contains content or fabulas, that is not mine. So, though my thoughts are part of me, their content might not be.

Though this might appear odd, it is really not. For we can think about things that are not us, but instead content that we in some way or other carry in our mind and narrations, that is, we seem to carry it in our self. For hence, it is not us. We might therefore make an analytical distinction into narratives that seem to be "ours" because the story(-telling) involves a semiosis that implies that it belongs to a mereological decomposition of the self, and narratives that we "carry" in the sense that it is ours but still yet inside us.

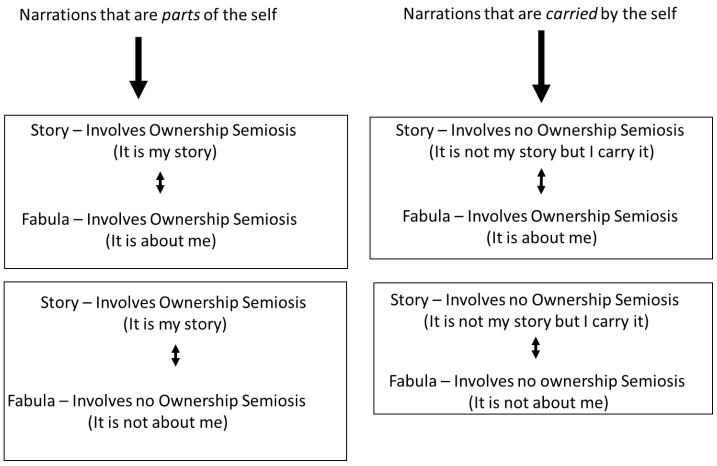

Figure 19. Kinds of narratives of the self

It is obvious that we might have thoughts that are parts of the mind or accounts of the Self that are not narratives in a sense, that the narratological distinction can be applied in such a way. We might argue that we can make sense to an idea of thoughts in the mind that are not in any literal sense *parts* of the mind, a distinction presented in figure 19, might therefore be instrumental to considerations of how to apply mereological decomposition to parts of the self, even if one should disagree about some of the details. For consider the discussion in aesthetics about whether the picture is part of the painting, also briefly touched upon in chapter 4 related to the "seeing-in" discussion. We might argue with this model, that the painter owns the painting, as it is she who created it, in the same way a narrator may own the narrative when created. But if you reproduce the *Mona Lisa* one might still argue that the picture is one of Leonardo da Vinci while this token-reproduction is a creation of the painter who made this particular reproduction. We can therefore argue that the picture (motif, fabula) has a different semiosis than the painting (canvas, paint, story) in such a way that the picture is not part of the painting but is instead in some way *carried on* by it. This would depend on the semiosis involved, and not so much on the narratological assumptions. We shall later take this issue up again, when we below consider extensions of the self, as this can have a major impact on how to understand ideas as of extended minds, bodies or emotions. Or so I shall argue.

If we return to the question of the person as a Self or a system, and we ask how the whole person experiences its parts, this question cannot be about how some proper parts appear to the person, itself being another proper part. For then we are not asking about the experience of the person's *own* parts, but instead of its experience of external parts that it owns. We need therefore to go back to the question of the experience of the body and the mind, to further illuminate the distinction of minimal and narrative self.

5.3 Body and mind

When I interact with the world, my parts are often perceived as almost pure semiosis. Let us take up Damasio's playing tennis as example: When I play tennis, it is a stretch to say, as Merleau-Ponty would, that my racket would become an extension of my arm. For when I hit the ball, I do that in a coordinated effort using my whole body, of which it is true that the racket is experienced as almost absorbed. It is *I*, who hit the ball, not my arm. My arm is then almost reduced to a motion, a location or section of my act. As Heidegger observed, it is only when I attend to the arm out of a special interest, that I to some extent objectivize it. It is still my arm, not any arm, and therefore the semiosis is still there. But I might focus

on other aspects, like aesthetics (perhaps I should shave the hairs), functioning (is it strong enough to make the smash or should I train it), health (is this pain a beginning tennis-elbow).

The case is an interesting one, because it feels like, that when I play tennis, I sometimes do not make a mereological decomposition at all. I play tennis, I ride the bike, I read the book, I drink coffee. Not my parts. You can argue that one is always using his or her parts to play and ride and read and drink, but the question is, if that would not be a fallacy of confusing the inside perspective with the outside. For looking at an object from the outside, one would have a tendency of focusing on the parts that do the job and that therefore are discernible from other parts. But when I focus on the task at hand, I have a tendency of considering my whole self as a subject.

This reminds of what Mihaly Csikszentmihalyi has labelled "flow". Csikszentmihalyi writes:

My mind isn't wandering. I am not thinking of anything else. I am totally involved in what I am doing. My body feels good. I don't seem to hear anything. The world seems to be cut off from me. I am less aware of myself and my problems. My concentration is like breathing. I never think of it. When I start, I really do shut out the world. I am really quite oblivious to my surroundings after I really get going. I am so involved in what I am doing. I don't see myself as separate from what I am doing. [198]

There have been a lot of discussions about if "flow" is a proper state of mind, if it is correctly described and defined in the studies made of it, if there are different forms of flow etc. The same thing has been discussed with similar "mystical experience" concepts like Peter Senge's and Carl Otto Scharmer's "Presencing" which is a sort of meditative "Letting come" and Hartmut Rosa's ideas of "Resonance".[199]

Common to the insight governing flow and similar notions, is the idea of the absorption into being present in the moment and the activity you are doing. In this sense, such ideas may have a lot to tell us about perceiving the self as part of something else, but that discussion is in the main, reserved to the next chapter. What is interesting here is, that it seems to support an experiential side of the non-transitivity of MDS decomposition. For if I am in "flow", however one chooses to think about it, you might find yourself as a part of something bigger, or in contact with the world surrounding you, but you do not usually think like this: "It is actually funny, I am part of this world, so my arm must also be part of this world, since it is indeed part of me."

[198] Csikszentmihalyi et al. 1988, p. 195 cited in Moneta, 2021 and Liu and Volpato 2023. See also Abuhamdeh 2020 for discussion.
[199] See Senge et al. 2005 and Scharmer 2009 for the development of the concept of Presencing. Hartmut Rosa developed his notion of resonance in Rosa 2020.

Note what exactly is the argument here: It is not, that when I am a part of something bigger than my self, that I cannot conceive my own parts. Instead, it is, that it is possible, and in fact common, to do that: We often think that something is wrong, when we think that only some parts of us take part in a particular event. For example, if you have sex with someone, and you feel that it is only your body that is involved in the act. Or, say, if you have cramps or tics in muscles in your leg, and you feel that you cannot control its behavior.

The point is, therefore, that we do *not necessarily* think of our self as an individual, mereologically decomposed into parts. And perhaps even, that it is not certain that a mereological approach would be our primary state of being-in-the-world.

5.3.1 Sorting into the physical and the mental

The first thing that happens when we decompose ourselves into parts, is that the parts of us obtain a semiosis through the transferred meaning from the whole to the parts. That is, we can distinguish the whole from the parts by saying, that the parts are *my* parts but the whole is *me*. This can be translated into a more technical description, where we say that my parts belong to a MDS decomposition of my Self, while the whole is identical to the Self being decomposed. Therefore, the parts have a semiosis, while the whole does not. This constitutes in turn the application of the first order sortal, "x is a part of me."

The idea of the parts of me being my parts, seems often trivial and uninteresting to us in relation to about any practical circumstance we can think of. Instead, we are more interested in a limited range of parts, designated, and classified through SD decompositions. And when it comes to persons, there are classically two types of parts that are being considered, but whose relation and integration as well as sometimes their very existence is being debated: Body-parts and Mind-parts.[200]

From a mereological perspective, the relation between mind and body seems to have three possible configurations at the outset: First, the mind and body can be proper parts of the same whole or person. Second, the mind can be a proper part of the body, and third, the body can be a proper part of the mind. At a glance, it is tempting to attribute ontological positions to these mereological options. We might

[200] The question of whether the mind and the body is decomposable into mind-parts and body-parts, is to a certain extent a matter of transitivity, which is dealt with in chapter three. Though the matter of the general transitivity of parthood is a rather complicated one within a decompositional mereology, the answer to this particular question is relatively simple: Iff the mind-parts and body-parts belong to the same MDS decomposition of the person, as do the mind and body, then there can be sortal decompositions of the mind and the body, respectively.

attribute the first configuration to cartesian dualism, the second to physical reductionism and the third to idealism or subjectivism. But this would be much too swift. For to say, for example, that the mind is a proper part of the body, does not necessarily imply that the mind is reducible to the body. And similarly, to say that the body is part of the mind, does not as such reduce the body to mere experiences, since other options might be available.

If mind and body are both proper parts of the same person, they belong to the same MDS decomposition, but can be discerned by SD decomposition. That amounts to say, that both the body and the mind have a semiosis, but that there is a person, which is not only body nor mind, and which does not have such a semiosis: 'I' am not 'mine,' and the moment I speak of the self as literally my-self, I distinguish myself from what is not, I thereby apply a semiosis to it.

If mind is supposed to be a proper part of the body, the mind must be supposed to belong to a MDS decomposition of a body-person, a person being in the main a body. The ontological implications rely of course on what exactly is meant with a notion of "body." If we consider the question, for instance, if it is a precondition of physical objects, that they have only physical parts, in the sense that they are composed of material parts? If we conduct a mereological decomposition of any physical object, we would usually find that there is lots of non-material parts that is needed to constitute mere "physical objects." Examples cover parts like interactions, hierarchical relations, changes etc. Even if we go to the level of elementary particles, it could with the outset of modern physics be discussed exactly how "material" they are. Hence, to say that the mind is part of the body could be to attribute the mind to some kind of configuration of the nonmaterial parts of physical objects like the body.

The third option is where the body is supposedly a proper part of the mind. As I believe that I have so far already made it clear, what constitutes this line of thinking: The answer also in this case depends on what is supposed to be the "mind." If the mind is in part physical or relies on emergent bodily processes, or is constituted by them, it could be argued that the mind relies so heavily on these processes that these processes are in fact a part of the mind. In turn, this mind as a whole could be argued to comprise emergent properties, that make us discern between the more, say, cognitive, and the more physiological, which would bring to mind Spinoza's metaphysics of substance or a neutral monism.[201]

[201] Spinoza's approach, which is, as I read him, a multi-aspect approach, have inspired many philosophers and scientists up through history. I still believe that the best way into his ideas is to study the Ethics, see Spinoza 1985, but several works have been published as to his psychological significance, see particularly Damasio 2003 and Yovel 1999. Neutral monism is a much-discussed topic. See the overview in the Stanford Encyclopedia of Philosophy, Stubenberg et al. 2023.

We could also argue that the mind reaches out externally, that its constitution relies on interaction with the surrounding world, for instance that it is constructed through social interaction with other people, and that this interaction therefore also constitutes a kind of proper part of the mind. Of course, one could argue, this might be open to idealism and therefore not entirely ontologically innocent. If the body is nothing more than a kind of experience present in the mind, and since the mind is constituted also by impressions or experiences that are not in this sense "bodily", the body is being reduced to a special kind of experience, being a proper part of the mind.[202]

Though the key point here is not ontological but a phenomenological analysis of the experience of a person of having a part, ontological issues of what it means to be a person seem always to be able to play a role in our experience of having parts. But the point of this discussion, is to show that the role of the ontological assumptions of persons, can be twisted around in our mereological analysis. To the extent that the mereological analysis, as much as it is decompositional, can serve as an explication of the assumptions of the nature of the whole, making a phenomenological analysis of our experience of having parts, may on the other hand make a significant contribution to the psychological understanding of the Self.

5.3.2 The body as an organ: The duality of embodied experience

However, there is a phenomenological duality or "doubleness" at play, that complicates a straightforward phenomenological approach to the experience of having parts. This problem has been recognized and discussed particularly in philosophy relating to the mind-body problem and has to some extent been inherited by cognitive science, particularly in discussions of the interplay between mind and body, likely theories of embodied cognition or body phenomenology.

When I consider my arm is a part of me, on the one side the arm is something I can experience. I can feel it, I can see it I can smell it and I can hear interactions that I make with it. This phenomenological doubleness that you can use the body to experience something else, but also you can experience the body itself. This appears to create an ontological distinction between the lived body as you can experience only from a first-person perspective, and the physical body that you can experience from a third person perspective as well as (at least to some extent) from a first person perspective.

[202] Arguably, one finds positions like this with for example Leibniz's monadology, Berkeley's non-materialism and Husserl's conception of *hylé* in his transcendental period. See Strickland 2014 & Leibniz 1965, Berkeley 1996, Husserl 1993a, pp. 201-5.

It is possible to regard the body as a container of the mind: The mind holds the controls and makes the body behave in certain ways. This view is referred to by philosophers as "the ghost in the machine" view, and is sometimes, unjustly I think, attributed to Descartes. What is of central importance in considering this view, is that the body often appears to be itself sentient. As we mentioned above, sometimes the person appears as one, the I, that plays tennis, rides bikes etc. On the other hand, it is like we sometimes are able to withdraw to the minimal self, and look on the other parts, as parts of the person that is complementary to me, that is, the minimal self. So here is the problem: Sometimes I am the whole self, and sometimes I am inside my body, looking at it objectively, in a somewhat alienated way.

Depending on the situation I can look at my body as part of the minimal self and as a part of the narrative self, and in various situations both claims seem plausible. The question is, of course, how to explain that phenomena, that the experience of the body varies in this "mereophenomenological" way. We find some interesting suggestions from Sartre and Merleau-Ponty. In *Being and Nothingness*, Sartre makes an argument, that in cognitive psychology would amount to that the focus of attention on the task at hand, makes you destroy the context, the body, the tools used etc. to focus exclusively on the task at hand. Alternatively, in *Phenomenology of Perception*, Merleau-Ponty argues that experience can be seen as a phenomenological field, that includes the lived body, that grows and diminishes depending on the task at hand and the resources available. If the body is not able to perceive a particular object clearly, the minimal self might decide to expand itself by attaching tools and instruments, like glasses, a stick or instruments that then become part of the phenomenal field, that is, the lived body.[203] The lived body, is of course not to be understood as physiology in a naturalistic world, but instead as an ambiguous mind-body subject of experience.

Both solutions, though only mentioned here in an over-simplified form, seem to be usable to analyze particular situations of experience, separately or jointly. From a decompositional point of view, we might add a further feature, that is hinted at above, and that might clarify matters a bit. For it is clear that when we are in what Csikszentmihalyi calls 'flow', there seems to be involved an experience of a *unified*, controlled and harmonic self, that we implicitly understand as me. It could be the case that the MDS decomposition is involved, for I have some parts that work together. And it is me that does whatever I am doing, playing the game, travelling, eating. But since I am not experiencing any distinctions between kinds of parts (I am simply one being), perhaps what is the case is, that there is no SD decomposition performed?

[203] Sartre 2003 and Merleau-Ponty 1998.

Still, we can attribute predicates to my Self, that does not seem to end up in making a decomposition. For example, I (self) am playing tennis (predication) while paying attention to the various movements of my body (involves a MDS decomposition and perhaps also a SD decomposition). The trick is, that I can in fact apply the predicate (x is playing tennis) to myself, without making a mereological decomposition. And this simple fact, points to, what we perhaps already were aware of, that we can apply non-mereological predicates to a subject, and that it does not have to involve a mereological decomposition. It is only, when a non-mereological predicate is added as a higher-order predicate to an MDS decomposition, that a SD decomposition occurs. And the application of any predicate, does in linguistic terms create a dominant epistemological focus, that has a tendency to focus on some parts more than others, some properties of the parts more than other properties, or neglect the mereological dimension all together.

5.3.4 Heterogeneity: More or less Semiosis and Integration

It is mentioned in chapter 4, that wholes are not always homogeneous. Sometimes we have heterogeneous wholes, that is, wholes that are differentially integrated. By "differentially integrated", I mean that some parts are integrated to a higher degree than others. Let us follow the mereological terms and call homogeneous wholes for "mixtures". [204] Mixtures are in this sense where we find a spatial equal distribution of two or more parts within a certain domain.

In contrast, we could imagine an organization or other kind of social system, where some members are considered as the core, while others are considered more like peripheral. We could also imagine a liquid, like a soup, where some of the ingredients are more integrated than others. Perhaps pieces of meat or vegetables are present in the soup and do not seem so well integrated in the soup as the tomatoes, water, cream, spices etc. And along the same line of thinking we could think of the mind's I as highly integrated into the person, while other parts, be those parts of mind or body, are less well integrated. For instance, many will argue that the appendix is less integrated in the organism than the vital organs like heart, kidney and liver.

This problem is more complicated than it might seem because the concept of integration is ambiguous. In the cases of the organization and the person's organs, integration is thought to be about how vital the object is to the persistence and development of the whole. It is a highly naturalist biological way of

[204] See Sharvy 1983 and Simons 1987, pp. 218-221 for discussion. It is not argued that mixtures are homogeneous in any absolute sense, just that "true" mixtures are relatively fine-grained.

thinking in mechanisms, and it understands the notion of integration in the terms of Aristotle's conceptions of essence and accidents. This is a common way of thinking in biology, and it has been exported into social science, philosophy, and identity theory, to make exactly the distinction between the mind (or the mind's I) and the body.

We might consider making the same distinction between essence and accidence relating to soup, by distinguishing the elements of the dish by distinguishing between the soup and the filling. Many of us have probably heard in childhood our parents or grandparents saying, that we should eat more of the soup and less of the filling or vice versa. Seen from this Aristotelean perspective, the filling is not an essential part of the soup since we could remove the filling and the soup would still be a soup. But we could not alternatively remove the liquid, and leave the filling, that would not be a soup but only soup-filling.

This is because there is seemingly no dependence relation between the soup and the filling, at least not in the same way as it exists between body and mind, and the organization and its members. Instead, in the case of the soup, integration has more to do with an intuition of what sticks out visually. You can visually distinguish between the soup and the filling, and if you wanted to add integration to the soup you would put the soup and the filling together in a blender, in order to create integration: the soup would change it's texture, but the filling and the soup would be indistinguishable. Integration here therefore means making the soups as a heterogeneous whole more homogeneous.

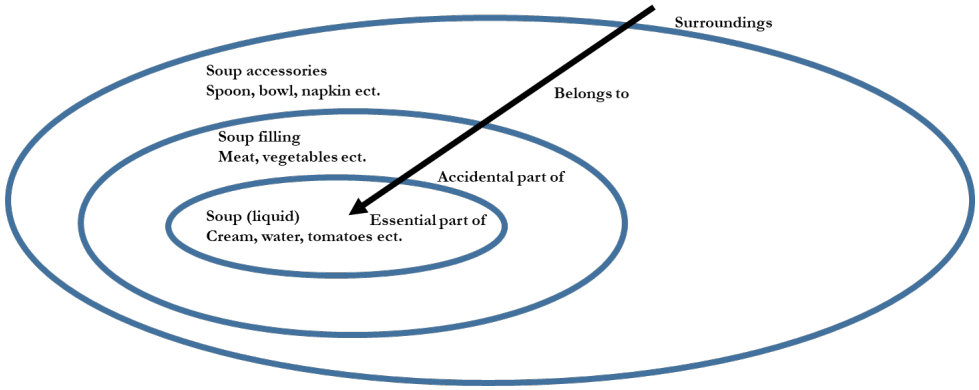

Figure 20. Semiosis determined by essential and accidental parts of a soup based on level of integration

It is important to note, that this understanding of integration and terms of heterogeneity and homogeneity could as well be applied to mind and body as well as to organizations. As it builds on the notion of a homogeneous mixture of parts, we are approaching a mereology of mass terms in which it is hard to pinpoint any nice parts in David Lewis' sense. From this perspective, nice parts that are not improper

parts would serve as indicators of heterogeneity. Note also, that the level of semiosis is determined by the distance from the center, point in the direction of the arrow, that is, towards the pole of identity.

This model of heterogeneity does fundamentally distinguish between what is more or less a part of the whole. But though the structure of the model might turn out similar, the interpretation of what it means, can vary with the first order predicates applied to the whole. Do we distinguish between parts in terms of integration, what we can or cannot control, what we trust, what is necessary or contingent or in terms of what our future goals are, to take some examples, can fully change our interpretation.

I shall discuss these examples a little further below but start by pointing out that the overall structure seems to remain the same. The purpose is to determine what is in the minimal self, the narrative self and what is owned, but not the self, and in the end, what the surroundings are, that are not the self, but the other.

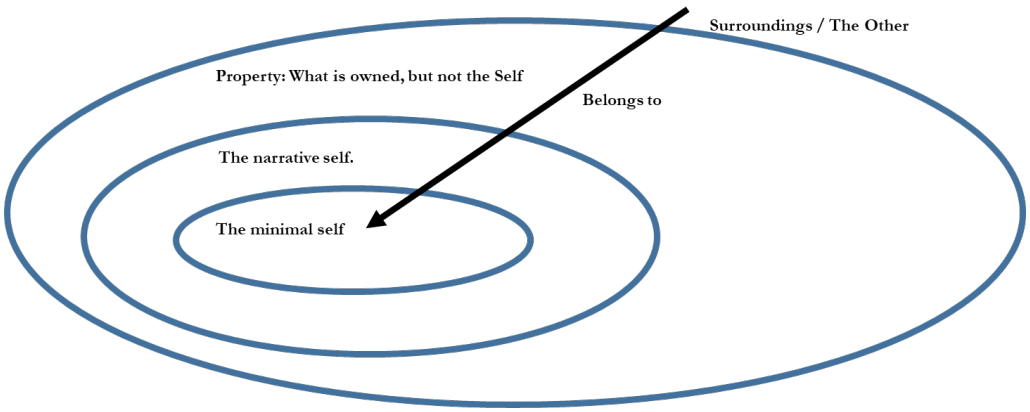

Figure 21. The minimal self, the narrative self and property of the self

In this case the semiosis of how much a part of something is of the self, can arguably co-evolve with psychological ownership: The more you own something, the more it is part of you. You own your body more than your car, the car more than your children, your children more than your friends etc. Various attempts have been made to define the experience of psychological ownership and some of them will be used to illustrate the issues of persons experience of their own parts below, as it is not intended here to take sides in the psychological ownership discussion.

This also means, that some parts might change place according to the various interpretations of the different versions of the model. For example, the body might be in the minimal self in some versions of the model, while in the narrative self in others. Your glasses, walking stick, car or pocketknife might also be in what is owned, but not the self in some versions, while they might belong to the narrative self in

others. If we take *control*, as is used as a case example to prompt our analysis above, we might come up with a model like the one displayed in figure 22 below:

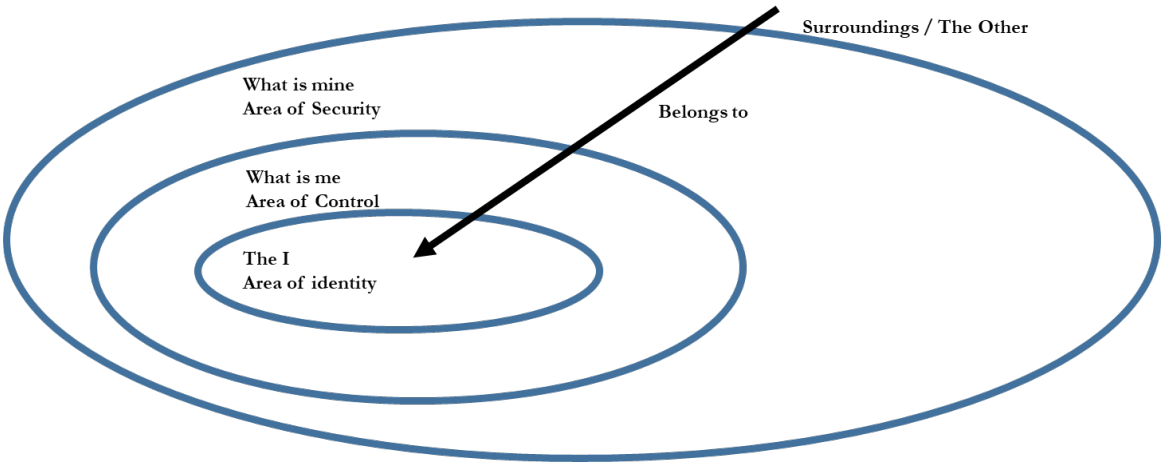

Figure 22. Areas of identity, control and security

Here we could have a model where the I is the identity pole, that is, the decision making thing that exercises control. What is *me* – perhaps my mind and my body – is defined by being within an area of unlimited control, a feeling of self-control, perhaps also understood as a source of ethical behavior and responsibility. What is *mine* is then the area of security – other people, societal events – and we attempt to obtain security from them through making friendship commitments, control (as much as possible), guidelines and legislations, with which some level of safety can be established, often at the cost of the freedom of the I.

Another approach is to focus instead on the notion of trust, of which there is indeed a lot to be said.

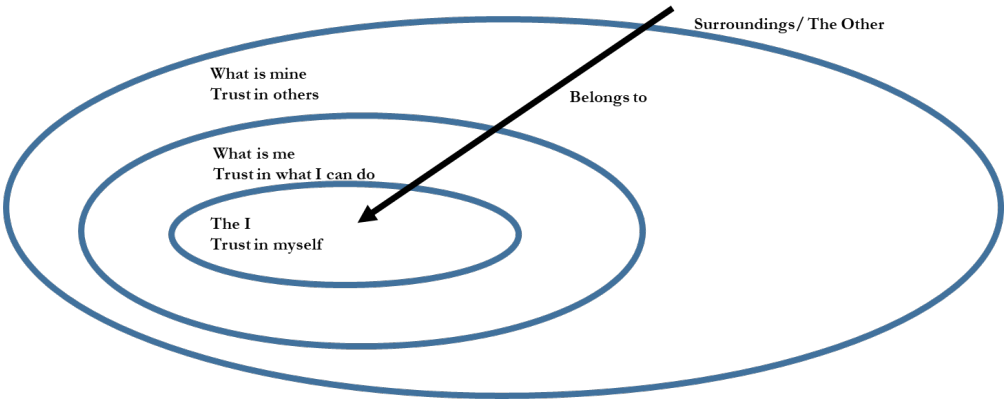

Figure 23. Trust in myself, in me and in others

The Danish philosopher Knud Eiler Løgstrup is famous for his slogan, that we *enter the world with trust.*[205] We must learn not to trust people. But a common psychological issue is also trust in myself, and trust in what I can do, and that what I want to do is the right thing to do, etc. And some might argue, that trust in others seems to be a more dangerous enterprise, than trust in myself, though some persons would not think so. But following Løgstrup, if I trust someone, there seems to be a demand for this person to honor the trust shown to him or her. Therefore, relations are built that way, and it is in such relations that we must look for the foundation of ethics.

These models, I trust, might give a hint towards how such a model might be constructed. Different kinds of parts might be isolated and allocated in terms of various SD decompositions, and because the MDS decomposition might have to conform to several predicates ascribed to the whole.

The application of mereological decomposition indicates that there are different conceptions of wholes at play here, wholes as homogeneous mixtures and wholes as heterogeneous systems of which some of the parts seem to play a more important role than others. In the background however, we remember that the original proposition of any kind of application of mereological decomposition was that integration of the whole is reflected in this semiosis of the individual parts, expressing to what extent we are able to conceive the parts through a MDS decomposition.

If we are therefore logically able to conceive the mind and the body as two disconnected things, the whole person who they supposedly compose seems to be disintegrated. And the ontological problem, made famous by René Descartes, is then to account for the interaction between these two spheres of being. To understand what a person is from a perspective of mereological decomposition, we therefore need to understand different types of parts, predicates, and SD decompositions, in order to pinpoint what kind of semiosis is required.

5.4 Extensions

We have already seen that how much mind and body may be said to extend into the world, might vary from one situation to the next. Ideas of extending the self to a larger or smaller degree, may naturally be expected to have implications for the idea of, what exactly parthood is supposed to be and how to decide if an object is a part of me, an extension of me, a scaffold, something I own, something I sometimes

[205] See Løgstrup 2008, chpt l, pp. 17-39.

own, or something other. Major issues in philosophy of mind in the last 20 years, have exactly been the topic of extensions, following the works of Merleau-Ponty on the phenomenology of the body and by Clark & Chalmers on extended mind and cognition. Following our path of body and mind, we shall here discuss ideas of body extension, extended cognition, and extended emotion.

Before we get into that, a few observations relating to a particular phenomenon that has to do with extensions is appropriate. It is a phenomenon, that I, in lack of a better phrase have chosen to label "acts of *engraving*." When we extend ourselves into what is normally the surrounding, we are, as Clark and Chalmers famously point out, often using persons or objects as scaffolds for our cognitive processes. As Heidegger phrases it, we throw (Entwurf) ideas out from ourselves. But they do not necessarily become things like material objects. Instead, we can be said to engrave the surroundings with our extensional "detour", and this creates or carries something of our self, into the surroundings. As such, this notion must be distinguished from the similar notion of inscription used for instance by Roland Barthes among others.[206] While the notion of inscription is often involved in a semiotic discussion of how we put a meaning into a sign or symbol, often by interpreting it, the idea of engraving is at the outset more pragmatic: We affect the world in a certain way, by extending our own subjectivity into it, so that we can scaffold our memory into living and reliving aspects of our own subjectivity. This does not mean, that others would recognize the meaning in the same way as the engraver, for she would have to imagine the same whole in order to create a similar semiosis from the same decomposition. However, this does also not imply, that the engraver has an epistemological primacy in the sense, that she must be supposed to understand the engravings more correctly. It is often the case that health professionals or psychologists can interpret our engravings differently than we do, and yet get a better or more comprehensive understanding of the engraver's narrative self, than the engraver does herself.

Let us again take the example of the picture and the painting. I am perhaps painting a picture, on a blank canvas. With my emotions and cognitions as well as lived body, I can say that the creative process I am making is a cognition of wanting to make an image that expresses an emotion. So, I use parts of my body to paint an image in a special way. It is an image that symbolizes my love for nature's harmony, say, and I paint it in a certain way. In this sense I engrave some of my emotions, because when I later look at the painting, I recognize the love that I felt when I made it. Because it is an engraving of my emotions, I experience the painting (story) and the picture (fabula) as both "containing" my emotions, and because it is *my* emotions, I experience the painting (narrative) as deeply personal: Both the story and the fabula

[206] Barthes 2009.

have a strong semiosis of being mine. Therefore, it is also easy for me to consider the picture as a whole that consists of both the painting and the picture: Together they become a particular artwork, by which I have engraved an emotional state into the world, because I can relive the feeling when I look at the picture. It becomes an extension of my emotional memory.

5.4.1 Extensions 1: The Ideal Self and the extended body

When we consider the notion of the Self, we might extend it into the world, that is, in a phenomenological sense enlarging it. We do that often by integrating it into our lifeworld. We adopt new parts into our area's ownership and attempt to gradually integrate it further from there. We experience it as being more and more acquainted with the thing, how it can be controlled, what it can be trusted to do or perform, etc. Sometimes this is due to optimization of the functionality of the self. If I buy a new bed, I can sleep better at night, which can make my mood better. If I get a new winter coat, I am not freezing so much when I am outside in the winter. Many everyday examples seem to follow from this pattern. I can make dinner faster if I own a kitchen machine/ food processor. I can get faster to work in my car.

There is a development in motivation psychology, that might lead us to suggest another idea of the Self in relation to the extensions of the embodied self, and that is what we might call "the ideal self." The ideal self is directly coupled, as mentioned above, to my imagery of what I may become or what I *want* to become. This gives me a feeling of purpose, that in turn creates a self-identity, that is, a particular notion of the self. This makes me sometimes prioritize what I want to adopt into the sphere of my self. Sometimes it makes me feel a *need* or a *wish* for something that I want to include, and sometimes, though I do not really like it, I include it out of a rational deliberation of value. Before taking this idea further, an example might be useful as an intuition pump, a statement of a 12y old boy I have made up as an example:

After watching an online interview with Christiano Ronaldo, the soccer-player, I decide that I want to become something like him (ideal). I want to become a soccer player (notion of Self) and eventually I want to become just as good as him (ideal Self). I sign up for soccer-training, buy a football (with Ronaldo printed on it) to train at home, I get a CR7 T-shirt, football shoes of the right brand. My coach tells me that I need more physical strength, so I begin to go to the fitness center four times a week, in order to train my muscles and overall condition.

Many parents of boys in the age of 12, would know this enthusiastic wish of their kids, to become a famous sports idol. It often makes the person value and re-value things, both emotionally and rationally. Perhaps I don't like training in the fitness center, but I need doing it if I am to achieve my goal. The

football with the Ronaldo print is becoming something highly valued because it is becoming a part of my identity. And I am building my body to make it more fit to aid me in obtaining my goal: *The ideal self*.

In this case, the bodily and material extensions of the self, of course changes the way you design your surroundings, the clothes you wear and other areas of ownership of things that are not strictly bodily, but it does however often affect or integrate in the body. The boy will gradually build a body that is more like a "football-player-body", he will be good at running and kicking, and perhaps not so good at dancing. Or, he will eventually have to give up his ideal self.

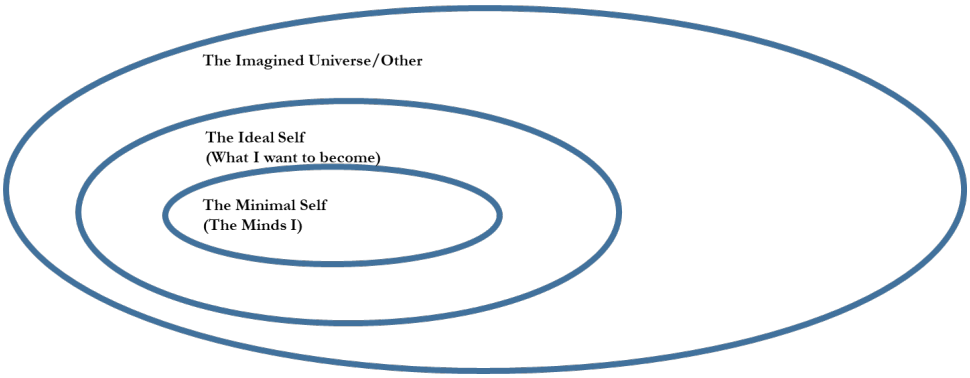

Figure 24. The ideal self

This idea of the ideal self is fundamentally Aristotelean in its teleology, as it is a kind of final cause that creates the sense of the processes, we are engaged in. This means, that the ideal self makes it easier to consider and review parts of processes, because it involves a future goal and purpose, which creates a sense-making in the Aristotelean sense.[207] This makes the identity of the self a much more fluent matter. The question "Am I an x?" depends not only on the parts you have, but also on the understanding of this ideal self, a future whole and its MDS decomposition, of which some parts are likely to occur or some desired sortal decompositions would be possible.

It is worth noticing, that such a desire therefore occasionally would transform the semiosis into a value. If the whole is desired, that is, if we are attracted to a particular ideal self, it would be easy to imagine that some of the parts belonging to a decomposition of such a whole, would appear to be highly attractive, a value derived from the whole, that is, through the MDS decomposition. This is not to say that the semiosis in any literal sense is transformed into a value. It is more likely that such a value of parts is derived through the MDS decomposition alongside the semiosis.

[207] Aristotle *Physics* 199a9-19.

It may be suggested that the relation presupposed between persons and their bodies is false, or at least ill conceived: Perhaps the body is not part of a person, but the person is a proper part of the body? Though this proposal may seem extravagant to some, there might be some reasons to support it. First, we shall set aside the dualist position, where the 'person' is supposed to be equivalent with the mind and the thereof following personality, and that this person therefore resides ontologically as some kind of 'hardwired' cognitive system in the body. If this was what we meant, it would fundamentally be a material reductionism and the distinction between person and body would ultimately be a strife over our definition of terms only.

But we might understand the proposal as follows: there might be parts of the body that, if altered or removed, would radically change the functioning of the body, but without changing the person with respect to personality or recognition. That means, that we would on an overall perspective be able to recognize the same person in the body, despite also recognizing that the body has changed. A simple example could be when a finger is amputated due to an accident, but we might also take more everyday occurrences, as ageing and growing up. Though some bodily changes obviously have an impact on the overall personality, a lot of bodily changes does not. In this case, the body would not as such contain a semiosis, since there is the main subject of mereological decomposition simplicitér which generates the semiosis, but instead the personality or person would have a semiosis of belonging to the body.

Seen in this way, the shift between bodies as parts of persons and persons as parts of bodies is less innocent. But one thing is the ontological underpinnings, but another thing is understanding of what we mean when we talk about a person. If a person is supposed to be part of the body, we would rather talk about 'personality' than 'person', simply because we would have a hard time exactly pointing out what we mean, without falling back into a reductionism. This is, as far as I can see, because of two things: first, if the person or personality has a semiosis of being a proper part of a larger whole, our intuition would tell us that we are then moving beyond the individual and into the social.

5.4.2 Extensions 2: Distributed cognition and the extended mind

A major discussion in cognitive science and philosophy of mind has been on whether the mind can be extended "beyond the skull", or more precisely, interpersonally or physically extended into the world. The simple approach is to simply individuate minds and/or cognitive processes according to the particular body, brain, brain and connected central nervous system, or similar. This is what in some

discussions is called the "intracranialist" position, though a more nuanced label might be an intrapersonal approach.[208] Such an approach, however, is as at the outset an ontological discussion, though it has major implications for the phenomenology and psychology of cognition. The whole discussion as it originates in Clark and Chalmers famous 1998 paper, seems to be founded on an outside view, though extended cognition does not entail it, the opposing position of intrapersonal individuation does.[209]

What is particularly interesting, is that their position of the extension of the mind and of distributed cognition, seems to conflict with the logic of mereological decomposition so far. For even in the case, where we adapt a first-person living body of embodiment of cognition, we can easily set up a situation of extended cognition. A famous example could be the Clark-Chalmers example called "Otto's handbook":

Otto suffers from Alzheimer's disease, and like many Alzheimer's patients, he relies on information in the environment to help structure his life. Otto carries a notebook around with him everywhere he goes. When he learns new information, he writes it down. When he needs some old information, he looks it up. For Otto, his notebook plays the role usually played by a biological memory.[210]

The example is as simple as it is indeed compelling. Let us begin with stating an equally simple version of the problem it poses in regard to mereological decomposition: There is a mereological decomposition of Otto, that includes his mind and his body, his mind-parts and his body-parts. Since Otto's notebook is *owned* by Otto, but is not a *part* of Otto, as he cannot control and manipulate the notebook in the same way, he can manipulate and control his body, as he perceives it as an external thing in his surroundings.[211] The claim must therefore amount to, that there is an object, the cognitive process at hand, that is both a part of a MDS decomposition of Otto and part of a MDS decomposition of the notebook. But since parts of a MDS decomposition are unique, this cannot be the case.

An easy solution might be to argue something like a phenomenological version of the intrapersonal claim, saying that the cognition in Otto affects his behavior to modify the notebook (he writes in it). Then, at a later time, the modified state of the notebook causes Otto to use it to aid his cognitive state (he reads in it, and now he remembers). But this solution would not take into account the functionalist point made

[208] See for example Davies and Michaelian 2016.
[209] Clark and Chalmers 1998. Here they define this kind of internalism as accepting the "boundaries of skin and skull." This makes perfect sense within an ontological framework, but it does presuppose a notion of physiological body that is far from the idea of the phenomenological lived body.
[210] Clark and Chalmers 1998, p. 12, quoted in Davies and Michaelian 2016, p. 308.
[211] An argument could be made, that Merleau-Ponty could include the notebook as a part of Otto's body, and I would agree to the fact, that it is indeed unclear if he would. But for the sake of argument, let us suppose that the notebook is not part of Otto's lived body, as we could easily find other alternatives like laptops and partners in conversation, who would definitely not be parts of Otto, but would complicate the problem statement unnecessarily.

by Clark and Chalmers, that the whole process could as well be imagined as a purely cognitive process in the brain. And in order to strengthen the argument further, the hermeneutical point could be made, that only Otto is capable of understanding and interpreting the text in the notebook in order to boot his memory in exactly this way: It is Otto's cognitive process, even when it is sent in a loop in the surroundings. Therefore, it is certainly to be individuated as one process, in the same way that a team jointly performs a common task, or a strategy can be implemented by a whole organization.

Note, that what is claimed is not transitivity. It is not the case that the whole cognitive process is part of the notebook and of Otto. Instead, parts of it take place in the notebook and parts of it in Otto. The mereological case might therefore be, that there seem to be a part of Otto and a part of the notebook that jointly form a whole, that is not Otto, nor the notebook. We have some kind of a temporal matrix: The cognitive process can be seen as a perduring whole, that can be decomposed into parts. Let us suppose that Otto and the notebook are endurant entities (which it is not certain that they are).[212] We then have a situation of apparent overlap:

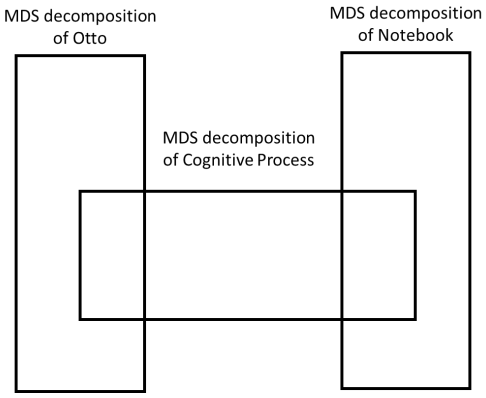

Figure 25. Overlap of distributed cognition between agents

We can say that Otto is not part of the cognitive process, because the parts of the cognitive process do not compose Otto. Similarly, the writings in the notebook do not compose the notebook. But by the same token, we could also argue, that neither the cognition taking place in Otto nor the writing in the notebook, compose the cognitive process. This process, therefore, seems to have gained an odd kind of independence.

[212] An enduring entity is one that is wholly present during the timespan of its existence. A perduring entity is a temporally distributed object, where different parts appear at different times. It is often agreed that things like tables and notebooks are enduring entities, while processes are perduring through time.

In turn, this raises the question, under what condition the cognitive process can be said to belong to Otto at all. We are working under the assumption, that both Otto, the notebook and the process are an integrated whole to a degree sufficient to designate them as a system. The question is now, what kind of semiosis may be produced during the various decompositions. It might be, that the text in the notebook can be identified under a sortal decomposition that would lead the reader back to Otto. Like if the text said, "one o'clock – dentist", it would only make sense as a part of Otto's lifeworld.

Conversely, we could also think of a situation where somebody else, perhaps unknown, has written something like an algorithm in the notebook, say a recipe: "In a bowl, crack one egg, add 5 spoons of sugar, two teaspoons of vanilla. Whisk together with 1 liter of buttermilk". This recipe can be read, understood, and followed by anyone, and the question arising when you read a text like that would more be, if you like Danish cold buttermilksoup, than who wrote it. Otto might have written it himself, and then later use the recipe, having no idea that he wrote it himself, unless he could discern the handwriting. But if we wrote it on a tablet in the Kitchen, we could easily imagine a situation where he would not have a clue. In fact, it is common in some families that there are some recipies that are treated as sacred, family secrets handed over from parent to their sons and daughters, while others are shared freely without any sense of ownership involved. So, the cognitive process may begin with the book, and then later be continued in Otto's mind and behavior.

We can therefore think of various cognitive processes, that based on this mereophenomenological approach, can be attributed to various kinds of agents or functionality. Some cognitive processes might be attributed to Otto, some to the notebook, and some to the idea of an independent development process. This leads us to two possible answers to the problem above. We might argue that there can be cases of mixed semiosis, that is, that some kinds of distributed cognition might be said to belong to more than one agent. In such case we can in fact have cases where we experience an overlap of parts. The counter argument against this could be, that we are confusing the object that is participating with the participation itself, in much the same way argued in chapter 3.

Another solution might be to consider a belongingness that is less strict than parthood, and not one of ownership. I have labelled it "carrying" but it could perhaps also be labelled a "padeye-relation", after the naval use of that term: A padeye is a ring that holds a line in place on, say, a sailboat. It leads the rope and attaches it to a particular place on a boat, without fixating it. Following that line of thinking, think about the game tug-of-war, where two rows of people try to pull the same rope in opposite directions.

They are all carrying the rope, but the rope is not belonging to any of them. In a sense, we can argue that it reminds somewhat of an idea of bodily scaffolding.

We can then consider a book. Sometimes we can think of the writings in it as belonging to the entity. "This is my copy of the King James bible, for instance" It is a particular book, design, markings on the pages made by my grandfather, the two pages in the middle that continuously threaten to fall out. But we could also imagine that we think of the book in the sense like "The poem is written in that book" Here we think of the poem as something other than the book. It is merely supporting the writing-down-of-the-poem. Some books are pieces of art in their own right, while some are merely an aid to writing down and communicating the text. And similarly, some texts are works of art in themselves, the composition, the rhythm, the imagery, the wording, while other texts are simply supporting the transfer of information.

A 'padeye principle' therefore could argue, that some whole might support or carry content, without them being part of the whole in question. If this solution is accepted, the issue would be to investigate in each case of distributed cognition, if there is an overall semiosis, or several partial semioses, which would make it possible to individuate the process accordingly.

5.4.3 Extensions 3: Extended emotionality and Scaffolded Affectivity

As in apparent contrast to cognition, emotionality seems to be not easily placed between mind and body, and sometimes they seem not easily individuated as well. Certainly, sometimes somebody does something that makes you angry, and when you find out that it was all a misunderstanding, the anger gradually wears off. The anger seems then possible to individuate, because you can point to a particular situation that effectuates it, and another situation that ends it.

In classical emotion theory, distinctions are made between feeling theories and cognitive theories, sometimes also known as propositional attitude theories. Feeling theories, as we find them with William James, Antonio Damasio and Jesse Prinz, argue that some kind of bodily feeling is essential to emotions.[213] Cognitive theories as we find them with Richard Lazarus, Robert Solomon, and Ronald de Sousa, would argue that some kind of belief-value system is involved in emotions, that is, it involves some kind of evaluation.[214]

[213] James 1950, vol. 2, pp. 442-485, Damasio 1994, Prinz 2006.
[214] Lazarus 1982 (in discussion with Zajonc 1980), Solomon 1977, de Sousa 1987.

It would be easy to attempt to simply identify the two as aspects of emotions, but the problem is, that feelings and attitudes so understood, would have very different duration and development. As Solomon once observed, you can be angry with a person for many years in the sense of maintaining an attitude towards her, but you don't feel that anger all the time. Secondly, it is commonly believed to be indicated with the Schachter-Singer experiment, that our understanding of the situational context of your emotion is sometimes essential to your emotional response.[215]

Emotions seems to be contagious, as we often adopt emotional responses from the surroundings. This has also led to investigations into affective scaffolding, which is about how decisively to use the environment in order to maintain or induce certain emotional, or affective, states. Though scaffolding usually does not work through contagion, it is a way to regulate and prompt affective states, including for example, emotions, moods, and feelings. In Coninx and Stephan 2021 it is coined like this

Scaffolding is the use or structuring of environmental entities (the scaffold) to enable, support, enhance, or regulate a certain activity, skill, or capacity (the scaffolded). Scaffolding relations may involve a heterogeneous class of environmental entities that are causally related to the agent in various complex manners. [216]

Relating to our exploration into the parts of persons, we might argue that emotionality might conceptually set us free from the proposed mind-body duality. For we might consider emotions as parts of persons that might transgress the boundaries of mind and body, even in these phenomenological fluent forms we have so far considered. For it can be argued, that it does not make sense to talk about embodied feelings. Instead, we talk simply of feelings. And it is relatively uncontroversial to argue in a similar vein, that emotions involve cognition. Instead, we talk simply of emotions.

When considering a case of extended, situated, and scaffolded affective states, implicitly places extra emphasis on the question of when such an affective state is *mine*. Granted that affective states can be treated as parts of a narrative, since they then are parts of a supposed narrative self, the decompositional answer would be, that we must look for a semiosis that we can experience as a belonging to a mereological decompositon simplicitér of the narrative self. For we might have senses of expressions like "this is what I feel" or "this emotion has completely taken me over", that in some sense or other suggests that I can have affective states that are not part of me, but that I carry in me. As an example, think of an actor, that may relive emotional states of the fictive characters they are imitating, by empathically identifying them and their situation, even though they would say that this emotional state is felt, it is induced in the actors

[215] Schachter & Singer 1962.
[216] Coninx and Stephan 2021, p. 43.

in a way that makes them feel and express the emotion. And we might argue that it is even possible to engrave such affective states into a situational context, perhaps thereby making up a scaffold for others who need emotional support.

Coninx and Stephan 2021 make the important observation, almost in passing that

…mineness denotes how close a scaffold is to who we believe ourselves to be. [217]

We might also point to, that they are, most of them, intentional states. But not all of them. We find states of depression and anxiety, which are, like Kierkegaard's "Angst", not *about* anything. They do not have an intentional object. These kinds of affective states are, therefore, not easily individuated. But we can say that for all the affective states that *do* have an intentional object, the *emotional* state is one that makes us evaluate the objects in a particular way. This is also the case when we reflect on our own self, I review beliefs of what I have become, how I function, what I own. This is often connected to an accompanying emotional state, compared to particular values and norms.

It is important to remember, that the beliefs one has about the self, are continually biased. For we often explain away actions and motivations that are unsettling, in favor of a reasoning that conforms to accepted values and norms. But as many psychologists have pointed out, norms, values and needs often conflict, which complicates our inner mental life. This does not affect that our emotions are a central part in setting up a value system, and that a change in such values generates an emotional response. As Ronald de Sousa once said, emotions are a perception of the axiological level of reality.[218] This makes therefore some parts and owned property more valuable than others. And we can therefore use the semiosis of the parts of persons to indicate what overall value system is at stake. We can also make a sortal decomposition of the emotions in order to hint to what is important to the person, in the end hinting at the ideal self and the most important purposes in life.

5.5 My Parts

When most people consider themselves, it is obvious to them that they have parts. From our considerations it is indicated that it is not always that way. We might in fact extend our minimal self to the whole person, a phenomenon that we often observe, when we think back at times when we were in "flow." When we think about parts of persons, we often make a primary distinction between mind-parts

[217] *Ibid,* p. 61.
[218] de Sousa 1987, p. 332.

and body-parts. Following cartesian dualists, we might argue that the mind is something exclusively given to introspection, the inside perspective, while the body comes from a perception of the other. Already in chapter 4 we questioned, with Kierkegaard and Wittgenstein, this distinction, and here we have further developed this critique. For the idea of the Self can be considered as a narrative, in which case we are considering a somewhat consistent idea of who we are, creating a personal identity, but the story is often heterogeneous and fragmented. It is what the story is about, the fabula, that seems to be somewhat consistent, and sometimes it is not even that. I might sometimes think that I am a lion, metaphorically speaking of course, and at other times that I am more like a mouse.

The question is, then, if both the fabula and the story are part of the person. On a similar vein: granted that the text, the story, is part of the book, is the fabula also? From a view of mereological decomposition, such ideas are all about what exactly the idea of a person is in the first place. When we ask, "What is a Person?", and "Who am I?" we can to some extent infer a question of mereological decomposition, like "If I explicate my self through a MDS decomposition, what counts then as parts of me, and what does not?" Answering this question, we have learned to look for semiosis, and the question about the narrative self, for example, then translates into: Can both the story and the fabula in the narrative, be considered with a semiosis of belonging to my self. Is it something that is me or that I own? And perhaps you find out that the story is yours, but the fabula is not. In that case we might have discovered that it is not all that is inside me, that *is* me. I can tell a story to my kids, and though the story itself, or the version of the telling of the story, is mine, the fabula, the tale that is told, is not necessarily so. But it could be.

In our interaction of the world, we also extend our body, our cognition, and our emotion into the world. This further adds to the unclarity of the extension of the narrative self, but it also suggests, like in the case of the minimal self, that the added parts, or extensions, might account for the communication and interaction of the person with the external world. On a sentient and affective level, we engrave our self into the world, by creating an extension of our body, cognition, and emotions. This continuation is, however, not a replication, but can more be seen as a scaffolding of our own self. We see and remember ourselves by re-experiencing ourselves and supporting and mitigating elements that are not. In turn, this opens for the possibility of acquainting ourselves with parts of the world, that are not, and perhaps never will be, parts of us. But by engraving into the exterior world, we are tracing ourselves in the other, making it possible for us to virtually detect our boundaries from the inside.

Chapter 6. Persons as Parts

Insbesondere tut sie hinsichtlich der objectiven Welt der Realitäten (wie auch jeder der mannigfaltigen idealen objektiven Welten, die Felder rein apriorischer Wissenschaft sind) nichts anderes – das kann nicht oft genug eingeschärft werden – als den Sinn auslegen den diese Welt für uns alle vor jedem Philosophieren hat und offenbar nur aus unserer Erfahrung hat, ein Sinn, der philosophisch enthüllt, aber nie geändert werden kann und der nur aus Wesensnotwendigkeit, und nicht aus unserer Schwäche, in jeder aktuellen Erfahrung Horizonte mit sich führt, die der prinzipiellen Klärung bedürfen.

Edmund Husserl: *Cartesianische Meditationen*, (the end of the fifth meditation) [219]

It is a feature of the civilized human being, that we are essentially part of groups, organizations and societies. We are submitted to laws, rules, norms, strategies and values. In the modern world we might add a lot of digital communication, multimedia interactions and online platforms, that is regarded with various degrees of accountability. We are used to talk about firms, organizations, companies, municipalities, countries as well as Facebook, LinkedIn, TikTok, and other platforms, as if they exist like concrete objects like apples, tables and persons do, and if they were phenomenologically given to us in the exact same way.

However, such wholes are not phenomenologically given in the same way. Let us take the example of a firm. You cannot literally *see* a firm. Perhaps you have seen the buildings, the employees, the annual reports, the products or the directors of the firm. But the firm itself? What is that really? Even though we might have an issue, understanding what it is, we have often no problem in knowing when we are inside a company, adjusting our behavior accordingly. Like Nagasena would answer King Milinda in the opening of chapter 5, that the firm is really just all these things, Milinda's counterargument, that then there is no such person, needs to be taken seriously. In most western countries, firms are legal persons. They can be held accountable and responsible for their "actions." But this also suggests, that persons can be parts of systems as well as being a whole of parts.

[219] Husserl 1992, *Cartesianische Meditationen*, p. 154-5.

So far, our investigation has been focused on the notion of mereological decomposition and parthood of systems, seen as a semiosis of parthood that is constituted by the knowledge or prejudices of the whole. The decomposition is regarded as an explication and dimensionalization of the whole in question and it places upon the part a semiosis that implies a belongingness to the whole, but in particular individual ways depending on the nature of the, at least assumed, whole.

We shall now turn towards the mereophenomenology of such social systems, in order to use mereological decomposition to give an account of how these are related to our experience and behavior. Fortunately, there has been done much work in this field already, and in this chapter, we shall therefore orientate ourselves somewhat towards theories within the field of *organizational behavior*, in order to investigate if our notion of mereological decomposition might complement explanations and discussion of this field of research. Though systems theory has sometimes been in focus, including some discussions on wholes and parts, formal mereology as such is rarely considered in this field, if at all. It is therefore to be expected, that a decompositional mereology might offer new perspectives and explanations to this area of investigation.[220]

Our way into the discussion of the phenomenological experience of being a part, begins with the individuals. What does it mean that we are more than one, and what constitutes the impression of "just" being among some people. Then we will investigate the group level, to make a similar transition, to the experience of being a part of an organization. And finally, this will be compared and contrasted to the experience of participating in even more abstract wholes, like countries, global communities or the universe.

In the end, it will be discussed if multiple participations are possible, and if so, what constitutes a mereological decomposition simplicitér of such multiple partitions. The notion of understanding the human as a free and independent individual in a society will be discussed, with special attention to the question, if it is possible to individually *choose* to be a part or not, in this modern world of structured wholes.

6.1 The Self Among the Others

A central question that confronts any philosopher who wishes to understand what it means for a person to partake in something larger than himself, like a community, is first to consider what it means *not* to be

[220] See Hatch 1997 and Stacey 2003 for approaches that is relatively complex-systems oriented. See McKenna 2020 for a common psychological approach to the individual-group-organization approach.

a part of any such a social system, but *merely being present among others*. For just being "merely present" among others, is that not to say, that you together form a group or a pair, you and the other? But on the other hand, does it not also make sense to argue, that a person *can* be among people that he does not identify with, he just stands in front of them, perhaps looking and being looked back upon: I am here, and you are there, nothing more. For the denial of this, would amount to the claim, that all people I would ever meet, would form a part of a group that I also participate in. With or without my consent to do so. And no person I meet could ever be another.

We might begin to approach a solution to this question by pointing out, that this problem relies on a seeming confusion between two kinds of composition. For if we argue in favor of an extensional mereological unrestricted composition, it follows that any two or more objects form a whole. However, the structure of such a whole might be arbitrary, and would have no ontological bearing on neither the world, nor the parts.

Using a decompositionally restricted notion of composition, we would argue that this notion of the associated whole would be expressed by the semiosis of the parts, something that can indeed be phenomenologically given in experience. If the mere sum of the parts equals the whole, the decomposition is merely instrumental to adding a formal categorization but does not add anything to the understanding or experience of neither the parts, nor the whole. Uncontroversially, the group is a social construction in the sense, that the parts acknowledge their participation in the social system.

This also means, that it is the experience of the semiosis that governs your participation, that would be decisive about whether you feel as a part of whatever social unit or object. Consequently, one might argue, it is a person's ignoring or discarding this semiosis that may free them from the norms, commitments, and responsibilities of the participation in the group.

A question that then comes to mind, when we talk about persons as parts, is a why: If a person *engages* into becoming a part of a social system, why would he do that? Why not just continue to consider yourself an individual? This has been a major topic in the history of political philosophy and should perhaps be taken more seriously in the public debates of our modern societies. Why would we have a society instead of none? In turn, this raises the question of what it means both theoretically and practically to be in a group, community, society, state, or nation. For it seems to involve both gains and losses. In the contract theories of Hobbes, Locke and Rousseau, there is an overall agreement, that a person accepting a social contract to become part of a state or community, is trading freedom for either safety, possibilities and

recognition or a combination of these.[221] The focus here will be on the experience of participation of persons, while the political implications are left aside as much as possible.

Let us then begin with the question of, if it is indeed possible to regard oneself an individual among others, that is, as a person among other persons that is not part of any community. For it is relatively obvious that participating in a social system changes people's behavior, but it is not so obvious that it is always for the better.[222] Remaining for a moment with the classics of political philosophy, Rousseau for one points out, that the very gaze of another person raises the *amour-propre*, the pride and vanity among humans, that we only find when a human is corrupted by society[223]. If Rousseau is right the very entering-into-a-society makes a change to a person that also includes the immediate experience and behavior. And certainly, later motivation psychologists like Abraham Maslow and David McClelland would agree that the need of socialization and affiliation is so fundamental, that other needs or behaviors would only be expressed if this "affiliation need" is indeed to some extent to become satisfied.[224] This does not imply, though, that it is the socialization itself that causes the existence of some need, perhaps leading pride and vanity in a sense we find with Rousseau. Indeed, with Maslow's account it does not.

Following the line of thinking of mereological decomposition, we may argue, that in the case of being in the presence of the *other*, the other is seen from the outside, that is, seen as an individual or as a part of a system, that I, myself, are disjoint from. Hence, I can understand them as individuals driven by internal factors and logics, or as having properties or being parts of a particular system. An objection to this idea of the other, could be made along the following lines: If we think a system big enough, there will always be one of which I can conceive myself as a part and the other as well. For instance, we are all part of this world, that is, the earth and its inhabitants, or perhaps even this universe. Hence, there is no person as to which one can be completely alienated, for in that case, as Rousseau implies, you would not even be aware of his existence.

We can even stretch this further, by making even more hypothetical cases or even fictitious statements: We could imagine a system X that we are all a part of, for instance, that we are all created by god. As an

[221] See particularly Smith 2012, pp. 140-213 for an exposition, comparison and discussion of these three classics in "contract-theory".
[222] Aronson's introduction to social psychology provides a fine overview of the main negative and positive aspects of socialization, see Aronson 2011.
[223] See Rousseau 1994, note particularly this quote (p.40): ***Amour-propre*** *and* ***amour de soi-même*** *must not be confused; two passions very different in nature and in their effects.* ***Amour de soi-même*** *is a natural sentiment which prompts every animal to watch over its own conservation, and which, directed in man by reason and modified by pity, produces humanity and virtue. Amour-propre is only a relative, artificial sentiment, born in society, prompting every individual to attach more importance to himself than to anyone else and inspiring all the injuries men do to themselves and to others; it is the true source of honour. (emphasis orign.).*
[224] See Maslow 1986 and McClelland 1986.

important factor is, concerning the experience of parthood, that we *feel* an alignment, more than we actually have one. And in this case, as we are all created by God and serve his overall purpose, any stranger would be part of the same system. Let us compare to another idea, that for some might be closer to their everyday experience: we could argue that we are all family related if we go far enough back in the evolution of generations. But this does not imply, I take it, that it should be taken to imply, that we should greet all strangers as relatives. So, therefore the semiosis of *this* parthood relation, might not be as strong as the one of the divine creator. To complicate matters further, we might agree that some holding the belief of the divine creator, may experience a different power of the involved semiosis. Some would argue that we should greet all as the children of God, while others might indeed regard strangers as the "others". And in yet another case, we can be thought as being all very special social animals, a result of biological evolution but with special characteristics, that make me acknowledge the fundamental rights of all human beings, as stated in the human rights declaration, or arguing according to Kantian ethics where all human persons have intrinsic value.[225]

I do not always *choose* to do so. I may choose to regard another person from my city, or my country as a friend, but I can also choose not to do so. It is not *determined* by a set of facts. I can even choose, to give a former friend a "cold shoulder", that is, treat him like everybody else, disregarding whatever common history we have together. Granted, the closer you have been, the more difficult that is. But arguably, it *is* possible to a high enough degree, that any idea of determination by facts is undermined: There might be a default stance though that is determined by cultural parameters of expectations, or perhaps even personality traits, but I would hold that this can be broken: You can decide to view a person in a different way than your initial inclination tells you to.[226]

Hence, the other is the result of a phenomenological stance, a conscious choice to regard the other person as something exterior, that is, an individual or a part of an individual that is distanced from me, in a very important sense. For it is in such a case that I can detach my emotions and consider the other, in much the same way as the jigsaw puzzle solving process in chapter 5. I destroy the surroundings of this other, and if I do it intensely enough, it may involve the destruction of myself and my 'I'. Instead, the other is

[225] Kant 1920 and 2003.

[226] This is also a precondition of the governing norm related to scientific research, that we should strive to free us self from personal interest when we adapt a scientific mindset. This idea is particularly found in Descartes' *On Method* and in Mill's *Logic*, but is also often the very motivation for the design of empirical methods, see Descartes 2001, p. 16, where he writes, that he aims to … *carefully avoid haste and bias, and to include nothing more in my judgments than that which presented itself to my mind so clearly and so distinctly that I had no occasion to place it in doubt.* " It has been pointed out by Tversky and Kahneman that many of our everyday decisions are merely due to "heuristics and biases, see Gilovich 2002, a point in favor, I think, of this cartesian sentiment.

a person that is an individual system or a part of a system. For example, sortal decompositions of interest could be her

- physiological parts, if she is limping on the left leg
- aesthetical parts, she might be a good model for an advertisement
- she is an employee, that can be motivated by the prospect of satisfying affiliation needs
- she is always wearing highly fashionable clothing

Some of these sortals would consider her a part (employee) or potential part (becoming a model), others as an individual (there is something wrong with her leg, she wears particular clothing (could be regarded as affiliation to a culture, though)). In this way, to see persons as individuals, makes sense, because it makes it possible to determine the influences from outside the group or organization. In a decompositional mereology, this feature is taken care of by sortal decomposition, but still, it is often a useful approach, since it is easier to spot important properties, in order to later formulate them as sortal decompositions in a decompositional model. For treating the persons as individuals encourages a classical compositional approach with emergent levels, which have a tendency of missing out on some essential parthood properties: They simply become invisible in the model.

From this view, where the other is viewed as an individual, does not rule out the communication between myself and the other. It even does not rule out empathy. All that is said is, that the individual is completely autonomous, and therefore the source of their own decision-making. But we might assume or stipulate that I can communicate with this person, using a particular language. This means, that I can speak to her, and she can speak back to me, in the same language, and she can do predictable actions based on our conversation, whether we understand each other correctly or not.

6.2 The Group and the "We"

The next level is to begin talking about participation, that is, the semiosis that is involved in an experience of a person's participation of a social system. The first thing to discuss is the idea of collective intentionality, that is, if a group of persons can have collective experiences, in a similar way individual persons can. The next step is then to consider the semiosis we experience of another and my self, *belonging to the same system*. From this is argued that the semiosis might be "thick with meaning", and that the idea of the whole appears like a hermeneutical horizon, detected through the semiosis, and that this semiosis is often, but far from always, experienced as a *value*. This is more clearly observed, when we consider the

idea of "Teams", an idea of structured groups that work toward a common goal. For in that case, we are able to consider various "roles" or "tempers" that the participants may be assigned to.

What then, is the difference between experiencing myself and the other as individuals, and then experiencing us as parts of a we? Dan Zahavi, for one, has defended that collective intentionality or sharing of emotions must presuppose a collective subject, a "we". This is not to presuppose, he argues, the primacy of this we: It is not necessary to claim a view of "community first", that the individual self is essentially a social construction. It could be, he argues, that the we is dependent on the individual subject of experience, the I.[227] The question is, however, exactly what kind of phenomenological difference we are considering. Okay, it is a difference in being a collective vs. an individual subject, but how does a collective subject experience something. In order to see the difficulty, ask yourself if you are really a collective or an individual subject. As a starting point, we can ask what it means to be a part of a collective experience. The claim might be, that the I's who are parts of the collective experience, are an experience generated by a group. Zahavi writes

Even if I cannot be a member of a we unless I identify with the group in question, my identification is only necessary and not sufficient for membership. Why is that? Because a we by necessity involves more than one member. And whether I count as one also depends on whether the others recognize me as such. [228]

What Zahavi is doing here, is to make an argument that may take him from the individual to the group. Clearly, this step is both important and difficult. It is not only about phenomenology and its explanatory power in social psychology, but also about if we can avoid charges against phenomenology of solipsism. Particularly, this has been an issue for Husserl, who in the development of his phenomenology, also finds this move urgent to avoid the uninvited solipsism that threatens his transcendental approach, at least in the first book of the *Ideen*.[229]

[227] Zahavi 2021. As I see it, he is therefore bound to argue a phenomenological difference between the experiences of a we compared to those of an 'I,' which indeed he does.
[228] Zahavi 2021, pp.15-6.
[229] Husserl 1993a There is a vast body of publications discussion the possible solipsistic implications of Phenomenology in general, Husserl's transcendental phenomenology in particular. See Parker 2020 for a relatively recent contribution that considers the argument, that even if we can accept collective intentional experiences, we might only reproduce the problem of solipsism on a group or social level. Husserl have discussed the matter in the *Cartesian Meditations's* 5th meditation, Husserl 1992, *Cartesianische Meditationen*, pp. 91-155. As I understand the contemporary discussion on shared intentionality it appear somewhat divided between the rather radical claim that Husserl makes, that there is a collective generated intentionality that is shared in some way by the members of the group and the more weak claim that is defended by for example Hans Bernard Smid, that argues that the belief that others belief or feel the same as I do, changes my feeling. The decisive question here is, I agree with Parker, if the claim can work as an argument against solipsism or not.

This argument incorporates a premise of "a view from nowhere" epistemology, as discussed in chapter 4, *as well as* a phenomenological argument from experience. The phenomenological argument mainly consists in, that we require membership of a "we", to "participate in" or constitute a collective experience. The "view from nowhere" premise is, that there is a group formed, of which *we* need to identify as a member, also forming a context within which the other members recognize me as a member. Note that this former argument is not about *experiencing*, and, as I read Zahavi, it is not enough that a person *believes* that the other members of the group accept him as a member, they must actually *do* so, which can perhaps be regarded as an ontological premise.

This move raises some *very* hard questions, perhaps even harder than the ones it solves: For suppose the subject of a collective experience is the collective itself. What, then, exactly is it that I, as a member of the group, experience? The same? And in any case, how would I ever decide how my personal experience relates the experience to that of the collective? Does everyone participate in the whole experience, that is, in the sense that the whole experience is distributed among all the members of the group? And if so, is it not the case that the distinction between a collective experience and an individual one, must be accounted for by a change in phenomenological quality (which I think is indeed Zahavi's position)? How do we account for phenomenological difference between the individual and the group experience?

Let us consider an alternative reading: I experience only a part, or perhaps a *version*, of the collective experience generated by the group, in which I am a member. What, then, relates my experience to the experiences of my fellow group members. In that case, we could use Occam's razor and argue that the collective experiences are rather individual beliefs or experiences of someone's fellow group members having experiences. Whether these experiences are to be governed by a pre-established harmony, I can argue that what I experience is unrelated to my group members experiences. If they were all zombies, I would likely maintain the same experiences, as I would if they are not.

Suppose further an even more complicated case, where there is *disagreement* in the group about, if a person is a member or not. Suppose for example, that a meeting has been called among the inhabitants of a small village, in order to arrange the annual summer party: The group that attends the meeting would be somewhat differentiated: some would have lived in the village for many years, some have just moved there, some are family related, some are not, some have a house large enough to host the whole event, while others live in smaller cottages. Imagine, then a case where a newcomer is greeted friendly and politely and indeed feels well received and included. While some of the others of the group readily accept this newcomer as a full member of the group, others do not feel that way. Not because they have to

dislike her, but perhaps they feel that she is just too new to really have "settled in" yet. While *she* would feel as a member of the group, and some of the others may have a corresponding sentiment, some wouldn't. However, she would likely have experiences that she would characterize as "collective", group experiences she would express like "We have decided that…" or "we believe that…", all relying on her experiencing an overall inclusion into the group. But is she really included? Are the experiences really collective? And is it possible to make perhaps a graduation, like that it is possible to be *somewhat* included in the group?

Before we take that line of thinking further, let us consider yet another rather extreme case, that is instructive both because of its extremity, but also because it is actually a modified real-life case from my personal past experience: Suppose a person that is fan of a rock band, say, *Iron Maiden* perhaps. This person is always wearing band symbols and images, when he is moving around in his social context, both at work in a record store and perhaps also at home: tattoos, clothes, poster, design of his social media sites, sharing images and music, playlists on Spotify etc. However, this person does not know any other Iron Maiden fans. Consequently, when he is going to concerts, he would know no-one, and no-one knows him. But still he would have a strong sense of affiliation, and a feeling of shared experiences and emotions. So even though no-one accepts him as a particular person as a member of the group "the iron maiden fans," simply because he has chosen to use and identify with the symbols and perhaps the attitude of the band and/or their fans. There is no "we" except in the individual minds of the fans.

An obvious objection to the conclusion of this example would be, that in the case where the shared emotions are experienced, for example at the concert, all the participants would accept each other in a "we". And that might be so. In that case, it seems to imply a possibility of accepting persons into a we, that is not known, not before, under or after the collective experience. No one is deliberately deciding whether a person is included or excluded in the group. In turn, this may question Zahavi's stipulation of, what exactly is meant by the other member's recognizing a person as a member of a particular group, the *we*.

The application of Mereological decomposition might offer an alternative solution. The problem that many phenomenologists have is, that to escape solipsism they have strongly rejected the idea of phenomena being inside vs. outside.[230] Their line of reasoning often follows the arguments of Wittgenstein against private language-games or Merleau-Ponty's idea of the lived body, all in order to

[230] Wittgenstein 1984 (see also chapter 4), Merleau-Ponty 1998 (see also chapter 5), Leibniz 1965 and Strickland 2014. But see also discussion in Arendt 1978, esp. pp. 23-53.

avoid a distinction between the essentially private and the public. For the danger is, that if we open up to private experiences, everything any person can know is just her own inner experiences and a Leibniz style of monadological solipsism follows. But if we argue in such general terms, the idea of being inside or outside a we, would suffer from the same arguments. For the argument, that the I is to be considered a mereological atom is an independent addition to that argument, independent in the sense that we can argue for or against private and public experiences, with or without the assumption of the I as a monad.

But in chapter five we argued for a mereophenomenological understanding of inside and outside. Being inside means experiencing a system of which one is self a proper part. And one could choose further to add the situation of which one is himself the system. And this makes a phenomenological difference, or so it is argued. For in the latter sense I would experience part of the system I am as *my* parts. And in the former I would perceive the parts in the system as being parts of the same system that I perceive my self as being a part of. That means, I experience me as having a semiosis as belonging to a decomposition of Y, and I perceive another part x, that is disjoint from me, having a semiosis as belonging to the same system Y, as I do.

6.2.1 Minimal Semiosis

I am going to investigate the nature of this inside experience of being parts of systems, and what exactly this means to the phenomenological difference of experience. I shall argue that the hermeneutics of understanding involved in experiences of oneself and other (supposed) parts, are "thick with meaning" that is constituted by many different layers of "horizons" involved. But so far, we can already pinpoint where to start, namely with the constitution of how it is experienced to be a part of a we, or a group. Some of the contextual resources appear in a phenomenological close proximity, while others seem more distant. We cannot expect that the elements of the semiosis are neatly structured. Like it is the case of many structuralist distinctions, as for example de Saussure's distinction between Signifié and Signifiant, it is to be considered an artificial distinction of something that is deeply intertwined. In the same way, it would not be surprising if it turns out, that when a person experiences a semiosis of participation, this may be integrated into the phenomenon where it may be mixed up with many other aspects of the experience and can only be differentiated by analysis.

With inspiration from the ideas of minimal self, we might correspondingly argue in favor of an experience of minimal parthood. For suppose a whole is heterogeneously integrated, then we might have cases where the semiosis of the part is strong and other cases where it is relatively weak. In turn, we can argue that

there we can think of a point where the semiosis participation is so weak, that we are unsure about whether it is there or not. Or perhaps it is "flickering" in the sense that it appears like it is sometimes there and sometimes not, as if there is a "loose connection" in the wire of a lamp. It is crucial to notice, that since the semiosis is provided by a mereological decomposition, this flickering would also involve a sense of doubt as to whether the system is really there, or it really is a system after all.

Let us consider an example to illustrate this point: You are travelling somewhere by train, and in this train, there are wagons which have groupings of four seats placed two and two around a small table. There is not many on the train on this particular day, and with the table where you sit there is just another person sitting on the other side of the table. When the conductor comes to see your tickets, she looks at you both, and you briefly show your tickets, look at each other in an informed way. Afterwards the stranger is looking out the window, and you play with the sense of grouping and belongingness. For you could make sense of a we, a pair of passengers, that could be decomposed into the two of you. You are a group, you think, but then a little later, you think that this makes no sense. "I do not know this person; we never spoke and are not really acquainted" you think. But then a little later, you are getting of the train, so you take your bags, nod to the other passenger and say "Have a nice trip". And the stranger smiles as he looks up, and says "You too". After all, it seems like there was some sense of we, though it was so weak that it was "flickering".

As is discussed in extensional mereologies, we can deploy a principle of unrestricted composition to the world, forming wholes of any number of objects of any kind. However, from a decompositional perspective, making such a composition of myself and the stranger, is not enough to constitute a we, because the whole needs to be integrated to some extent in order for a semiosis to be experienced in myself and the stranger. And if we think of spatio-temporal boundaries, like sitting in the same part of the wagon, going in the same direction, being on the same train or discursive ones like, being addressed together by the conductor, and greeting each other briefly, we increase the integration to an extent where both persons might agree, that we in some way or other could argue that both of us belong to a we.

This is a minimal semiosis, for it is a situation, where there is a differential between the conceived whole and the parts, or members of the we. If this would involve other shared feelings or communication, the integration of the whole would increase, and therefore also the sense of being-a-part. The experience of the I of becoming a part of a we is, though strong, not so easy to articulate. Following so different sociologists as George Herbert Mead and Niklas Luhmann, we can argue that the self is continuously

negotiated with the social context.[231] So the need for becoming a part of the group also makes us conform to norms and standards of the group, following Ash, the conformity might be effectuated on the level of immediate perception.[232]

Following the decompositional approach it makes sense to argue, that a conception of myself as a part is a categorically different experience than to conceive myself as an individual. This does not only show itself in discussions of self-identity, where norms, responsibilities, rights and duties are essential to the acceptance of the group, but it also has to be mirrored in the relation to the other *in the group*.

But how do I understand myself as part of the group? How to I experience this alleged semiosis. We know from Goethe that the semiosis in some abstract way must carry an image of the whole, of which it is a part, particular of the integrating properties. But when I think of my self as an employee or member of a family or group, what is it exactly that I imagine or experience? Let us suggest, in order to create a perhaps preliminary structure for our investigation, a guideline to where to place our philosophical attention.

6.2.2 The Horizon

There is a preliminary understanding of why this has to be done, a hermeneutic horizon that makes us understand what we experience as parts, but also containing norms of how something is to be accomplished. In the case where we experience our own semiosis, this experience obtains a nature similar to what James referred to as "fringes." James writes

If we then consider the ***cognitive function*** *of different states of mind, we may feel assured that the difference between those that are mere 'acquaintance,' and those that are 'knowledges-****about****',..., is reducible almost entirely to the absence or presence of psychic fringes or overtones. Knowledge* ***about*** *a thing is knowledge of its relations. Acquaintance with it is limitation to the bare impression which it makes. Of most of its relations we are only aware in the penumbral nascent way of a 'fringe' of unarticulated affinities about it.*[233]

The point is, that often, we seem to order our impression into series, due to a characteristic feeling of affinity – the impression appears as belonging to something. Christopher Broniak formulated the view with admirable clarity, in a 1996 paper on James's theory of fringes, when he wrote

[231] Mead 2015, pp. 178-200 & Luhmann 1984.
[232] Asch 1956.
[233] James 1950, vol. 1, chpt. 9, pp. 258-9 (*emphasis orign.).*

Fringes are at work in the part-whole structure of spatial perception, in which we relate the present part we sense to a whole that cannot be sensed all at once. They are at work in our awareness of chronological time, connecting the present moment with the "no-longer" and the "not-quite-yet." [234]

It is important to notice, that though this *belongingness* to a background feeling or concept, is not *generally* a strictly mereological relation, though it may sometimes obtain this form. It is mereological, according to James, especially when we consider spatial perception: For example, when we go into a house. We cannot perceive the whole house at the same time, but we can perceive it in bits and pieces, say, one room at a time, being fully aware that this room belongs to the house, which we have a predefined concept of. As I read James, he would be open for the idea, that fringes are in some cases connected to the idea that what we experience is connected to a background concept, as part-to-whole, which comes very close to the idea of semiosis defended here. But also, we may have fringes of temporal succession, association of qualities like taste and color, that is not straightforwardly part-to-whole. Husserl's corresponding idea of a phenomenological horizon is more generally mereological in its application.

Das Einzelne ist – bewußtseinsmäßig – nichts für sich, Wahrnehmung eines Dinges ist seine Wahrnehmung in einem ***Wahrnehmungsfeld****. Und wie das einzelne Ding in der Wahrnehmung nur Sinn hat durch einen offenen Horisont "möglischer Wahrnehmungen," sofern das eigentlich Wahrgenommene auf eine systematische Mannigfaltichkeit möglicher ihm einstimmig zugehöriger wahrnehmungsmäßiger Darstellungen "verweist," so hat das Ding noch einmal einen Horizont: gegenüber dem "Innenhorizont" einen "Außenhorizont," eben als Ding eines* ***Dingfeldes****; und das verweist schließlich auf die ganze "Welt als Wahrnehmungswelt." Das Ding ist eines in der Gesamtgruppe von simultan wirklich wahrgenommenen Dingen, aber diese Gruppe ist für uns bewußtseinsmäßig nicht die Welt, sondern in ihr stellt sich die Welt dar, sie hat als momentanes Wahrnehmungsfeld für uns immer schon den Charakter eines* ***Ausschnittes "von"*** *der Welt, vom Universum der Dinge möglicher Wahrnehmungen. Das ist also die jeweils gegenwärtige Welt; sie ist jeweils für mich sich darstellend durch einen Kern "originaler Präsenz" (womit der kontinuierlich subjektive Charakter des aktuell Wahrgenommenen als solchen bezeichnet ist) sowie durch seine inneren und äußeren Horizontgeltungen.*[235]

Husserl's idea of invoking possible wholes as horizon for things is, I believe, to be read in a way that is roughly equivalent with the mereophenomenological idea advanced here of the ideal self. Furthermore, we might suggest that it is to some extent or other, as well as of the suggestion, that the idea of the whole that is detected in the semiosis of the parts, may be negotiated with the surroundings of an ongoing basis

[234] Broniak 1996, p. 463. It is also worth noticing that this remark on the experience of time, reminds of Husserl's ideas of retension and protension, discussed in chapter 2, Husserl 1980.
[235] Husserl 1992, *Krisis* §46, p. 165 (*emphasis orign.).*

as we may or may not experience changes or surprises in our interaction with the concrete surroundings. As Gadamer emphasizes, the horizon follows phenomena through time:

Ohne Zweifel ist der Begriff und das Phänomen des **Horizonts** *für Husserls phänomenologische Forschung von tragender Bedeutung. Mit diesem Begriffe, den auch wir zu gebrauchen Anlaß haben werden, sucht Husserl offenbar den Übergang aller ausgegrenzten Intentionalität des Meinens in die tragende Kontinuität des Ganzen einzufangen. Ein Horizont ist ja keine starre Grenze, sondern etwas, das mitwandert und zum weiteren Vordringen einlädt. So entspricht der Horizont-Intentionalität, die die Einheit des Erlebnisstromes konstituiert, eine ebenso umfassende Horizont-Intentionalität auf der gegenständlichen Seite. Denn alles als seiend Gegebene ist weltlich gegeben und führt damit den Welthorizont mit sich.*[236]

What is connecting the phenomena, is here clearly the "carrying-over" of the continuity of the whole from phenomena to phenomena. But there seems to be more at stake here. If one pays special attention to Gadamer's point, that the Horizon is not something that is a settled limit or border, but something that moves with you, the subject of interpretation or perception, this indicates a possible interpretation of the hermeneutical horizon, somewhat similar to James Gibson's idea of motion perspective, also known as parallax. For Gibson the motion perspective is a characteristic of a moving subject, and it is used to estimate your own velocity compared to various perceived objects, as well as to estimate various objects in distance from your self, their velocity and direction, together with other "depth cues" like experience of relative size, color, shadows, overlapping interpositions and texture. The idea is here, that the elements of the perspective might be experienced as changing in different ways and with various rhythms and velocity, which might give rise to more complex representations of the semiosis. [237]

So we might look in this particular direction. When I consider my self as part of a whole, I am observant of a semiosis that is generated by a particular idea or perhaps more vaguely a sense, that I can attempt to analyze, in order to get a firmer grip of the various elements in the MDS decomposition that explicate the parts. I can then sort them out in various- SD decomposition, but the novel here is, that I can also place or locate them in terms of an imaginary distance in relation to each other. Let us take a simple image of a visual horizon to illustrate this, before we proceed to the characterization and differentiation of the mereophenomenological-hermeneutic horizon that may follow from this approach.

[236] Gadamer 2010, p. 250 *(emphasis origin).*
[237] Gibson 1950.

Figure 26. Picture from a train in Kazakhstan [238]

Let us attempt to distinguish the levels in the photograph in Figure 26. A) First, we have the window itself. It moves along with us, and we therefore perceive it to be at rest, simply because we are moving in a coordinated fashion, the subject and the window. B) If we look at the road in front and the electric pole, it could be so fast changing, that it can be hard to discern if the velocity is over a certain level. But if we look at the road a little farther away as well as the trees and light poles close to it, these would be more slowly and fluently moving, changing the perspectival angle as we move along. C) Further back are the mountains and the clouds in the sky, that for a while will look like a very slowly moving part of the horizon until the subject turns or moves, in which case they will abruptly disappear. D) Finally, is the line of the horizon itself, one that the subject cannot always see, but almost always feel is there. These number of levels are not universal in number, at least we cannot allow ourselves to stipulate that. There could have been more elements on the picture, like a house, a truck, a lake or something else, that would have made the impression of more levels.

Turning back to the hermeneutic horizon of the semiosis, we might first propose a quick example on how this four-level structure might look like when we are discerning elements in the MDS decomposition into proposed four SD decompositions constituting "levels" based on an experience and distance. [239]

[238] Accessed June 24, 2023: https://commons.wikimedia.org/wiki/File:Borovoje_mountains_northern_Kazakhstan._View_from_the_train_window_1.JPG

[239] Stephan 2012 distinguishes between three kinds of existential feelings, how oneself feels, feeling of the social environment, and the world as such. Stephan argues that such feelings are indeed often a significant background of our affective dynamics. In Jacobs et al 2014 this distinction was used in a study on depression, and it was recognized as a

Suppose as an example a modern nuclear family, mother, father and two kids, a girl and a boy. The first we must do is to consider a subject, from who's perspective the semiosis of participation is experienced. Let us take the Girl. We call her Lisa. The family has everyday rhythms. The parents leave for work at a certain time in the morning, the kids go to school in the morning and come home in the afternoon, do their homework, go to sports, parents come home, make dinner, washing the laundry, watch television, wag the dog, go to bed… and then it starts over the next day. We may argue, that though such everyday routines quickly become habitual and perhaps feel mindless to Lisa from time to time, they are not in any literal semantic or hermeneutical sense, meaningless.

A) At baseline everyone has a sense of their own self as being a part of the family, like in the statement "It is me that is the mother of this family" and this idea of self can be "thick" and complicated. Lisa may actually feel, that she has a different impression of her mother as mother, than she thinks her mother has of herself as mother. Whether this prejudice is a part of the parthood semiosis as such or more a coupling or "plug-in" to the semiosis or mereological decomposition, is hard to say. For the mothers feeling of being a mother, certainly would influence her "motherhood" even in the case it is completely erroneous or misconceived. Everyone's idea of themselves as parts is, at least in as much as it affects their self-understanding, something that on the one hand continually changes, but on the other hand also is normally in slow and continuous motion, like the subject at the train window.

B) Then there is the idea of how the things that happen are happening and who is where (Dad is there, mom is here, Lisa is out and John is in). This is an expression of a close proximity context. And it is very often normative and in the form of narratives: (Dad is just home from work and he is troubled because of his boss, mom is smiling more than usual because she is afraid anyone will find out she is having an affair, John is looking forward to going to a concert with his friends…). Often these narratives are only hinted in fragments, and different members might have different interpretations of what exactly is going on. But relating to this there seems also to be a systemic understanding of the structure in the group. There is a vertical notion of, who has the power and decision competencies (vertical structure) and who is doing what, and when (horizontal structure).[240] This is also identity creating, who are we in the family and what roles do we play.

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important feature of the phenomenology of depression. Though the idea of a semiosis horizon is borrowed from Phenomenology and Hermeneutics and translated into a decompositional setting, the distinction can, I believe, roughly be said to correspond to what is here called the self, the group level, and the universe level.

[240] This expresses a classical idea of vertical (hierarchy) and horizontal (division and specialization of labor) structure of organizations, see McKenna 2012, pp. 478-82 for an overview.

C) Then there is a more overall horizon, that appears to provide extra meaning to this. In work life, this would be an understanding of a "corporate" level, but when we are with the example of a family it is relatively weak. It could be a community of neighbors, a community, other parts of a larger family (grandparents, cousins …etc.). It is a larger context that informs the work of the group, makes it important. It is also here we find overall strategic outlooks.

D) We then operate with a national or global level. This is even further away and can appear very idealistic and little practical. It is a way of categorial thinking, that contains the overall notions of the cultural setting, political agendas and it is also in this area we contain images of famous and fictive personalities, villains, and idols. As a part of that we can also suggest a universal horizon. And we could end up in giving this an extra letter "E." In this case, we are also working with a kind way of categorial thinking, and it contains the fundamental assumptions within universal theological, philosophical and scientific categories. What is the difference between man and animal? Is the universe made up of energy? Different persons may have different approaches to such a notion of "being-in-the-universe." Some are thinking that considerations on this matter are fruitless thinking, and that energy and focus should be on the things within close proximity. "Worry about the things you can change" might be a slogan for this kind of person. The opposite kind of approach is of course the philosophical approach, particularly when some persons adopt a Socratic approach.[241]

We may show these different proposed levels in a figure, before engaging into a further enquiry into what such levels may contain and how they can relate to each other and the subject. It is worth keeping in mind, that the structuring of these levels depends on the application of SD decompositions that could have been different. We could have chosen to emphasize other "depth cues" in order to

[241] Plato let these two sentiments confront each other in the *Georgias* 485a-b, where Callicles says to Socrates : *It is a good thing to engage in philosophy just so far as it is an aid to education, and it is no disgrace for a youth to study it, but when a man who is now growing older still studies philosophy, the situation becomes ridiculous, Socrates, and I feel towards philosophers as I do toward those who lisp and play the child. When I see a little child, for whom it is still proper enough to speak in this way, lisping and playing, I like it and it seems to me pretty and ingenuous and appropriate to the child's age, and when I hear it talking with precision, it seems to me disagreeable and it vexes my ears and appears to me more fitting for a slave, but when one hears grown man lisping or sees him playing the child, it looks ridiculous and unmanly and worthy of beating* (trans. W.D. Woodhead in Plato 1980, p. 268).

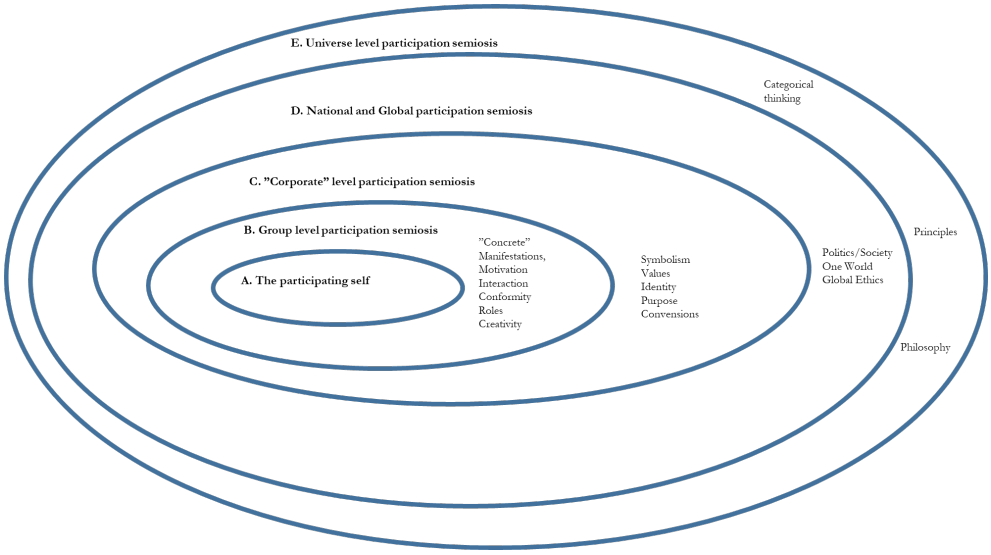

Figure 27. SD decompositions seen as a Levels of Participation Semiosis Horizon

rearrange the levels indicated in Figure 27. Furthermore, we could also consider the possibility to choose a particular fringe, or level and regard it as an individual whole, ignoring its context. But this would not be without problems, which can be seen from the following. First, the MDS decomposition cannot be the sum of SD decompositions, or at least we cannot at present assume that it is. For the MDS decomposition tells us something about the generic parthood relation, and even though it results in all and only the parts of the whole, it is usually not possible to provide a list of parts. This is why the MDS decomposition is not transitive and why, if we change the idea of the whole, all the involved parts would change their identity, which in turn would lead to that the parts involved in the SD decompositions would be different.

6.2.3 Participation and Roles: The Group and the Team

When you join a group, you are therefore accepting the semiosis of mereological decomposition, it becomes a question of modifying one's self-identity: The judgement "I am an F, and therefore part of Y" is not the same claim as "I am an F, and therefore belong to the class of Y." It is possible that when we experience being parts of a community, we construe some cultural behaviors and needs, that would otherwise not have been there. Psychologists such as McClelland and Maslow mentioned above, both argue with Rousseau, that *recognition* is something that is at least in part, socially constructed. As I read Maslow, his position is, that the need for recognition is not apparent before other more basic needs are at least partially covered. McClelland argues that needs in general are culturally sensitive.

Asch 1954 and others have shown, some kinds of conformity also are central to group behavior. This conformity can be both normative and informative, and the idea is that all members must behave in a certain way, and not behave in other ways. Even informative conformity is normative in the sense, that it expresses a norm, that if a member of the group has superior knowledge or experience, the rest of us does well by adopting her lead. This means one of two things:

A. Based on the idea of the whole, relations between the parts are created

B. Based on the relation between the parts, an idea of the whole is created or revised

And following the lead of Mead, we might conjecture that both A and B are negotiated on an ongoing basis, though various groups would have different strategies of how to iterate these chimeras of what could end up becoming bottom-up and top-down solutions.

In some cases, we are perhaps interested in productivity, in others immersion, in others aesthetics. Some groups may emphasize safety, and therefore go for experience and best practice, others for innovation and choose solutions on the basis that have not previously been attempted or deemed possible by the group. Groups therefore often become teleological. They have a purpose, are assigned or formed in order to *do* something and sometimes they almost are treated like persons. Group traits become similar to individual traits, so that one can place test member's personality and fit them into the segments of the groups, that could optimize their participation.

Sometimes distinctions are made between groups and teams. Teams are structured groups where the work is coordinated and delegated in such a way, as to effectuate the group's performance towards a particular goal. Here it is clear, that the notion of the individual participants in the groups are dependent on a mereological decomposition that explicates the purpose of the overall whole, its structure in a very functional and often also very formal way.

R. Meredith Belbin has made one of the most influential functionalist theories of team roles. His idea is that various team members can be assigned tasks fitting to their personality traits.[242]

[242] Consequently, he also made a personality test, based on Jung's parameters and the subsequently developed system by Myers and Briggs, called the Myers-Briggs Type Indicator, or MBTI for short. See for example Myers 1962 & Myers 2016 and compare with Jung 2021.

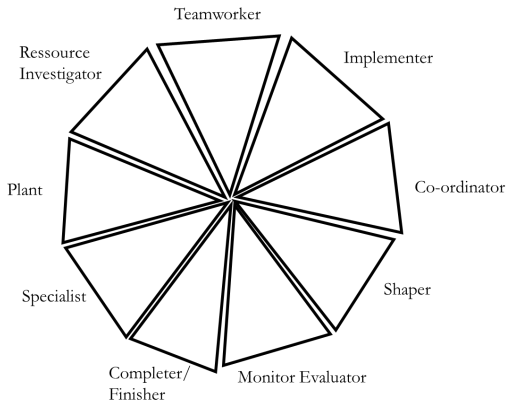

Figure 28. Belbin's Team Roles[243]

Belbin's theory has indeed been contested, as to if testing the employees for personality traits and setting them up in this, can actually be documented to affect productivity. But it is a clear example how one might use a mereological decomposition in order to create a sortal decomposition that leads into nine overall partitions of which one can recruit the right human resources for the individual partition. For the model does not propose that there are exactly nine members of the team. Some people might play more than one role, and in other cases we might experience two or more sharing in performing a particular role.

Being aware of this, it affects my experience of the other parts of the team. For if I expect another to play a particular role, her semiosis will be functional but also coordinated with mine. Therefore, her way of behaving, her attitude towards the work, the manager, the others in the team, will be important to my self, because I can couple it directly with my ability to perform in the team. I become interested in her as a person, not as an individual whole that may or may not have value to her, but as part of a we, a group, a team, that is performing a task and collectively *evaluated on performing the task*, both by *others* and also by *themselves*. For it might be the case that a manager, a teacher, a customer, a user or other stakeholder might grant a reward, that might be important for the individual person's self. You get a particular bonus or salary, a prize, recognition, knowledge, opportunity if you perform well as a group. This may also be why some participants can have a direct interest in helping "teammates", simply because they value to optimize the team's performance. As they experience the team's structure through the semiosis of the team members, experienced through their behavior, they are able to associate their behavior with the more abstract notion of "the work in the team".

[243] Belbin et al., 2022.

Like with organizations, we can consider both structure, culture and processes of groups and teams. [244] For high integrated teams, may exactly differentiate themselves from the rest of the organization they may be considered a part of, in terms of all three factors. For example, they might develop a different collaboration process than what is custom elsewhere in the organization, which might strengthen the group identity and develop values and norms in the team, that proves unique for this group. Some teams therefore might develop a *control culture*, where we often review each other's work, while in other groups a *culture of trust* may develop. Each participant is the best in what she does, and therefore a norm may develop, that I should let my colleagues be and trust that this is the best work someone in this group can perform.

Such beliefs are naturally developed both from the mereological decomposition of the we, and the overall idea of the structure, culture of the team, but then it is continually adjusted to the impressions and experience of the other members both during the team's work as well as "outside" it. Hence, we could argue that we continuously evaluate our impression of the persons as well as their participation. In this sense, we both consider persons as individuals and as participants, in order to evaluate their participation in a whole, of which I am also myself a part. There is much similarity with the experience of the Jigsaw-puzzle solving in chapter five, where the interpretation of the individual pieces changed with our changing picture of the whole, as well as with the changing picture of the parts.

Another classical point made in management psychology that should be mentioned, is the different way of thinking of team roles offered by Edward de Bono.[245] Instead of Belbin's offering an account of team roles, that connects a mereological decomposition of the team with the traits of the individual persons, de Bono offers a model where the team role regarded much like a temper combined with an associated

[244] Based on a Scandinavian tradition within organization theory originating with a Danish textbook by Bakka and Fivelsdal arguing the utility of a structure-culture-process approach to the analysis of organizations, I have together with Erik Staunstrup, Hans Jørgen Skriver and later Niels Vestergaard Olsen, argued that such an approach does also apply to teams, that in this way can be seen as micro-versions of organizations. Bakka and Fivelsdal 2004, Skriver et al 2012, pp. 155-9 and Staunstrup 2021, pp. 210-1.

[245] de Bono is a much underrated profile in our understanding of creative processes. And indeed, he bears a major responsibility for this himself, as being notoriously reluctant to conform to academic standards in his works. Instead, he often writes small books on various topics, often in the style of DYI handbooks. However, I believe his works have much to offer to our understanding of creative processes in groups, and that he could be regarded as a somewhat eccentric philosopher of creativity and innovation, that, like Nietzsche, has much to offer when one gets used to his particular style. Also, his influence on our vernacular thinking is not to be underestimated, which makes his inclusion in this analysis particularly apt. See de Bono 1990 for the thinking hats. de Bono 1972 is to be considered one of his main works, and though it is not covering the thinking hats, it gives a fine overview of his philosophy of creativity. see Dingli 2009 for an overview and academic assessment.

way of thinking, are *assigned*, figuratively by assigning hats to the participants. Just like getting into the part you must play in the team, by making it an act or a roleplay. de Bono writes:

I could have chosen clever Greek names to indicate the type of thinking required by each hat. That would have been impressive and would have pleased some people. But it would be of little practical value, since the names would be difficult to remember ,…, The color of each hat is also related to its function.

White Hat *White is neutral and objective. The white hat is connected with objective facts and figures.*
Red Hat *Red suggests anger (seeing red), rage and emotions. The red hat gives the emotional view.*
Black Hat *Black is gloomy and negative. The black hat covers the negative aspects – why it cannot be done.*
Yellow Hat *Yellow is sunny and positive. The yellow hat is optimistic and covers hope and positive thinking*
Green Hat *Green is grass, vegetation and abundant fertile growth. The green hat indicates creativity and new ideas.*
Blue Hat *Blue is cool, and it is also the color of the sky, which is above everything else. The blue hat is concerned with control and the organization of the thinking process. Also the use of other hats.*

Remembering the function of each hat is easy if you remember the color and the associations. The function of the hat will then follow. You may also think of them as three pairs:
White and red
Black and yellow
Green and blue
In practice the hats are ***always*** *referred to by their color and never by their function. There is good reason for this. If you ask someone to give their emotional reaction to something, you are unlikely to get an honest answer because people think it is wrong to be emotional. But the term* ***red hat*** *is neutral. You can ask someone to "take off the black hat for a moment" more easily than you can ask that person to stop being so negative. ,…, Thinking becomes a game with defined rules rather than a matter of exhortation and condemnation.* [246]

What de Bono hints at, is that the proper conception of team roles perhaps is more emotional, or rather, is a forming of attitudes. This idea couples well with the cognitive theories of emotions, that point to a character of emotions as propositional attitudes. So instead of fitting into a team structure, we rather create the sense of a structured whole, by considering the participation of the proposed parts, amending the idea of the whole gradually as we go along. de Bono's thinking hats is therefore also used for team building. As he points out in his book, roleplay where people are assigned to various hats, increase the understanding of how the individual hats, or tempers, may regard the world.

[246] de Bono 1990, pp. 32-3 (*emphasis orign.).*

Peter Senge has pointed out the idea of systems thinking is central to bridging the "engagement gap" between members of a team or workforce. Systems thinking is in this regard considered as the acceptance of that others are different, and play different parts that I do, and that that is okay. If they perform different parts, it is often encouraged for them to think and work in a special manner, that is different from ours, because they participate as different parts than we do, and therefore contribute in a different way. [247]

6.2.4 Breaking Free: The myths of Creativity and Innovation

It is clear, that we often would encounter situations where some members of a group have another understanding of the decomposed whole than we do. *If* it is furthermore correct, that we often tend to have an emotional attitude towards this whole and its parts, we would often seem to find ourselves on each side of the engagement gap very often. And we often do, but empathic relations to each other as well as conformity relations, combined with some kind of managerial activity, can often integrate the group, in the sense that the participants can and will behave in a way, that makes their individual conceptions of the decomposed whole coherent.

But sometimes, forces are working within or outside-in to change the structure or process of the team. New goals are set for the team, perhaps members are changed, and both processes, structure and culture are bound to change. There is a vast literature on change management and innovation, for since we often value our and others participation of systems, changing the systems would naturally provoke emotional responses, for better or for worse. We may also attempt to create teams that create changes and innovations as an overall purpose, and the question relevant for our investigation, is how such a conception of a system may look like from the participators "inside" view. Margaret Boden has argued in favor of three kinds of creativity. She distinguishes between 1. the "unfamiliar combinations of familiar ideas", 2. the "exploring of conceptual spaces" and finally 3. the "transforming of conceptual spaces". [248]

The first one is based on the idea that one can combine two different ideas, or concepts, in a way that makes new meaning. It is a classic way of seeing creative idea generation that is also supported by people like de Bono. As an example, take a concept like a laptop and combine it with one of a notebook, and what you get is perhaps the concept of a tablet.

[247] Senge et al 1999, pp. 319-34 and Senge 2006.
[248] Boden 2010, pp. 31-35.

The second is one that involves a creative process like the one we find in mathematics and in jigsaw puzzle solving. Here the task is to figure out how potential parts would fit into the whole, what Thomas Kuhn also claimed being a characteristic of normal science.[249] This idea involves strategies that can often be formulated as algorithms of problem solving.

The third one is the case, where a part has to transform our very understanding of the subject matter. Sometimes this is called *transformative learning*, namely learning where one has to unlearn something that we thought we already knew in order to learn the new. [250] This kind of creativity often involves that the identity of the organization and the participants are challenged.

Let us look at these kinds of creativity from a decompositional perspective: The first one, the "unfamiliar combinations of familiar ideas" is something often argued to be a fundamental feature of new solutions. It is something that often happens at the group level, because various participants interact and couple various ideas and association with each other. This is, *ceteris paribus*, strengthened by the approaches of Belbin and de Bono in various ways. However, such novel ideas are often said to meet resistance in other parts of the organization. One explanation for such "resistance against change" or "resistance against learning" that is available to us in our model of participation is, that our identity at as participant would be determined by factors on other levels of our idea of the organization. Ideas that do this may therefore conflict with our values or with our idea of our self as participant.

The second one, the "exploring of conceptual spaces" is more analytic, sometimes even mathematical. Because it is a kind of creativity that is played out within the framework and boundaries of the (experience of the) system, it can be handled as much other labor, unless of course it gives rise to the third, which is the "transforming of conceptual spaces." Whether this third category leads to resistance among other participants, is however, often both a matter of velocity as well as of the overall of the participants willingness to accept change.

A membership of a group appears often as relatively close to us. It has a direct influence on our decisions, motivations, and interactions. We feel that it is highly present to us but that it often changes at a relatively

[249] Kuhn 1996, pp. 35-42.
[250] See Mezirow 1991 for a psychological overview and discussion. This idea is often found in other areas of philosophy and economy. For instance, Schumpeter 1976 have called to attention the idea that innovation involves an idea of creative destruction and Clayton Christensen 2011 have argued that radical innovation, or disruption, involves a destruction of market forces and therefore are unpredictable. Kuhn's 1996 famous idea of scientific revolution involves a destruction of a paradigm, and in Husserl's 1993a transcendental philosophy, the notion of epoché designates knowledge that needs to be "bracketed" in order to see the subject matter, "die Sachen selbst" more clearly, an idea that in innovation psychology led Carl-Otto Scharmer 2009 to introduce the idea of dispensing with previous knowledge, in order to see "with new eyes."

rapid pace. Often, we would say that we can directly see the group, particularly if we are talking about a team, where the purpose and structure appear to be so clear, that it almost appears as a material object. A likely explanation for this is that being in a group or working in a team makes us extend our minds into both other people as well as physical or technological objects.

When we discuss issues with our colleagues, we are also making intersubjective control of our understandings and decisions, and when we build, write, or draw something, we make a testimony in the form of an "engraving" into what we experience as the real world. We can afterwards look at the report, the product, the whiteboard, or the notes to revisit the work later. It has been "thrown into the world", as Heidegger would put it. Though the group purpose and structure originate in a particular explication of a mereological decomposition of a whole, the participation often creates sensory stimulations that assimilate experiences of material objects.

6.3 The Imagery of Organizations

Let us proceed to the next fringe in our model. The group or team of which we participate is often thought of, as part of a larger whole. If this is the case, the mereological decomposition of a group or team is a SD-decomposition, because the MDS decomposition must then be of this larger whole. We might even argue, that we can be part of a larger whole, without being part of a group of a team. Or that the group is a larger whole that I identify with, whatever this might be Iron Maiden fans or the LGBT+ community. In such cases, to be a participant in the group would likely to appear fuzzy and remote, since many of the engravings or group participation are missing. Hence, very often, such remote groups are conceived more on the level of organizations, whether they are formally recognized as such or not.

Understanding a person as a part of an organization would imply that this person is submitted to the hierarchy that in one way or other constitutes the organizational structure. The organizational structure, like we considered the group structure above, is typically divided into a vertical structure and a horizontal structure. As the vertical structure is the distribution of decision competence, i.e. managerial power, the horizontal structure expresses the division and coordination of labor. The structure also serves to identify the organization as one system with many parts, and henceforth it has an integrative function.

Following our idea that the parts become more and more dependent and less and less individuals, and that this semiosis would be to a larger extent outspoken or explicit, to the extent that the whole is integrated, the parts of a deeper organization, i.e. an organization where there is more structure, the parts

would apparently be less individual. But we could imagine the culture or clan style organization, like Mintzberg's *missionary configuration*, that is mainly held together by strong values and ideals but without any clear strategic management or coordination or distribution of labor. Instead, following Mintzberg, we might operate with the heads of ideology, like the priest or an idol, that could serve as guiding the members of this clan into the right mindset and behavior. This could be anything from a music fan club, or group of people joining in specific copies like cars, motorcycles, or electric trains, to a religious community or network and will coordinate various projects and events hither and thither among its members.[251]

For clarity, we might differentiate between two kinds of social groups, one which we call 'organizations' are groups with a structure as defined above, and another is called 'cultures' defined as groups that lack such a structure as a source of integration. Comparing to the classical mereology as discussed in the first three chapters, we could compare cultures with classes, one organization seems to constitute an emergent structure. So, an objection could go, would it not be possible to distinguish parts of an MDS decomposition of a culture and an SD decomposition of an organization, and if so, the whole use of the semiosis of parthood stemming from the idea that mereological decomposition is not a division or disintegration, but for a part at least as much as it concerns social systems.

But it does not. This is a consideration like the one we had, when we thought about one of the fringes in our model in figure 27, as the whole, of which we would then perform a MDS decomposition. We have to remember that it is the MDS decomposition, the Mereological Decomposition Simplicitér, that defines exactly what in the present case is meant by a part, because, as it is a decomposition into all and only the parts, we will be able to discover the exact nature of the parts that are, well, participants in the relevant system. An SD decomposition, does not have the same definitory power, as it only serves to isolate a set of that kind of parts belonging to the system. Therefore, we will be able mereologically to distinguish some kinds of parts from other kinds of parts, but as long as they belong to the same whole, i.e. the same MDS decomposition, they will contain similar semiotic properties that will allow us to ascribe them to the particular whole of which they are supposedly a part.

As much as I worked as an associate professor at a higher education institution, the idea of being an associate professor, is exactly pinpointing out my participation in a particular organization, and when I come home to my wife I am, to the extent that I'm a husband, pinpointing out my participation in another particular organization. But when I'm shopping for food or clothes in the local town, I am not doing it

[251] Mintzberg 1979, pp. 479-80 & 1983, pp. 293-296.

as a representative of an organization but as an individual, and therefore I am "just" Peter, being a proper name that identifies an individual and does not contain a semiosis that relates me to any group or organization of which I might participate.

Therefore, it is the MDS Decomposition, and the MDS Decomposition *only*, that identifies the nature of parts and parthood, particularly raised on the level of integration of the decomposed whole. In an integrated whole, like a culture, we will be able to work with individuals, that might have affiliations, feeling as participants of groups, despite the fact that they don't know any other persons in this group. This is often because such persons subscribe to ideals or beliefs that make them belong to a certain paradigm of values and assumptions, they share with others, or could share with others.

This makes the culture of such a community, one that often seeks to create symbolic manifestations both as online groups, making events, banners, t-shirts, tattoos etc. in order to create such an engraving that makes the community feel "real" to the participants. [252] For the idea of an organization seems often remote and distant in itself.

We might feel that we have experienced a team directly, but an organization, like a company or an association, is something we indeed do feel is real, but it feels more remote than the team or the group of closest colleagues. That is also why, I guess, we would argue that the team is "inside" the organization, and certainly there exists a whole area of organization theory that characterizes an organization in terms of overlapping groups.[253]

The semiosis of the participation on the organizational level, then, appears as intertwined with the group participation semiosis. And it can be hard to distinguish between them, since it is not given that various participants have the same understanding of the organizational whole, as well as of the group. However, it is possible to distinguish them, first and foremost in terms of the experienced closeness, but also, in terms of how it is experienced and affects the participants.

6.3.1 Metaphors and ideal types

The initial idea of an organization is often quite vague. We create an idea of the whole based on the communication we hear about it, somewhat like a puzzle solving process but without a clear idea of a

[252] See Hatch 1997, pp. 217-231 for a theoretical account of the role of symbolisms in such cultures.
[253] See Likert 1961 for a highly influential account.

frame or a whole to be reassembled. Max Weber coined the important idea of ideal types, that is, a normative understanding of the "objective" about how socializations *ought* to be.[254] He distinguishes famously the bureaucracy as an ideal rational mode of organization but points out that this ideal is more of an ideal toward which one may strive. So having an idea of the ideal type, is not to argue that this ideal form is instantiated in various social settings, but rather that having this ideal might change our behavior in a certain way. Hence, we could argue that the ideal is in some way instantiated as a norm in the behavior of the participants. Here is an example:

Suppose a manager has two employees that sit in offices just next to each other. The manager tells them, that she is the person that delegates and coordinates tasks among the two, and that if they want to make any decisions or if they have any questions regarding their work, they should consult her. In praxis the two employees quickly discover that this is easier said than done. For the manager is often inaccessible, being at meetings, out of the house or busy with her own tasks. Therefore, the two employees decide to coordinate the small things about, who goes to lunch when, making sure that the other can answer phone calls when toilet visits are needed, etc. After some time, the manager becomes alert to the heresy, but is actually happy that the employees can think for themselves. But in a state of crisis, if the employees perhaps feel insecure or threatened, it is likely that they will resort to the ideal and make absolutely all decisions through the manager.

So, the idea of the ideal form instantiated as an idealized context of how the group functions, and in turn how the individual behavior at the workplace unfolds. Gareth Morgan has suggested that these ideal forms should rather be seen as metaphors of kinds of organizations, or organizational design, as it is sometimes called in the literature, instead of a structure of delegation, coordination and decision making. Morgan suggests 8 metaphors that I have set up in a model that is similar to the one I used with Belbin's team roles:

[254] Weber 1904.

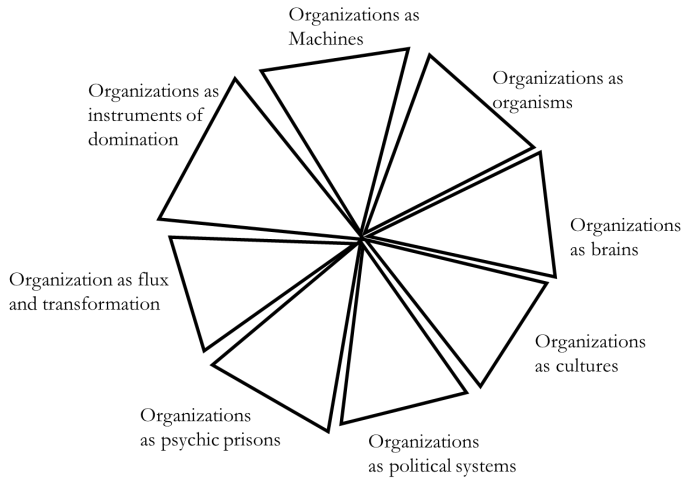

Figure 29. Gareth Morgan's Metaphors of Organization[255]

Morgan's idea incorporates some of Weber's idea of ideal types. For the imagery of the organization that is attached to the metaphor, is not an expression of how it is or what it approximates, but an expression of the cognitive and behavioral pattern that associates with the semiosis created by a mereological decomposition, that is, an expression of the imaginative whole designated by the metaphor. Morgan writes

Different metaphors have a capacity to tap different dimensions of a situation, showing how different qualities can coexist. For example, using some of the images explored in previous chapters we can see that a specific aspect of organizational structure may reflect an attempt to "mechanize" a particular set of activities; it may be a particular manager's defense against anxiety; it may symbolize a key aspect of corporate culture; it may express a mode of "single-loop learning"; it may be a crucial part of a department's power base; it may be an anachronism that prevents the organization from dealing with the demands of the wider environment. All these features can have a simultaneous presence.[256]

The MDS decomposition of a particular whole, and the semiosis we experience of our self, are prone to affect our actions in a certain way, that both test and develop these assumptions, but also communicate them through our behavior to other participants of the group, organization or externally to others that do not conform to the behavior, and thereby do not communicate a similar semiosis.

I shall not go through all Morgan's metaphors, but only consider the two first in contrast with each other. The first metaphor mentioned in Morgan's book, is the organization viewed as a machine. In this case, the organization is governed by mechanics, and it comes close to an understanding of mereology that is often discussed in ontology, that the relation between parts may in the end be expressed as a causal

[255] Morgan 2006.
[256] *Ibid*, p. 339.

relation. As is well known, this does not rule out teleology, especially not on a biological level, but in organization theory it does suggest some version of an assembly-tape style of understanding of the value chain in organizations, where all the parts perform specific operations that are closely coordinated in order to jointly create an overall flow, often deploying "scientific management", developed by Frederick Taylor. Accordingly, the individual employee is regarded as an instrument or tool that performs certain actions, she is considered a resource through ability and competence, and a cost. As a member of this organization, you would therefore typically tend to identify yourself with some kind of operation, that you are specialized in, and you would tend to form a group with others with a similar specialization. They seem to *be like you* in a particular way, namely that they perform the same operations that you do, and therefore have the same problems and issues, e.g. that the manager may evaluate you on the same parameters and standards.[257]

Mintzberg points out, that this influences the configuration (or design) of the organization. Though he does not emphasize the relation between organizational configurations and belief-systems, one of his most famous configurations is exactly called the "machine bureaucracy." The machine bureaucracy is a centralized organization with relatively many staffs and middle managers, compared to the production core. They also have a high level of formalization, which is a part of the centralization.

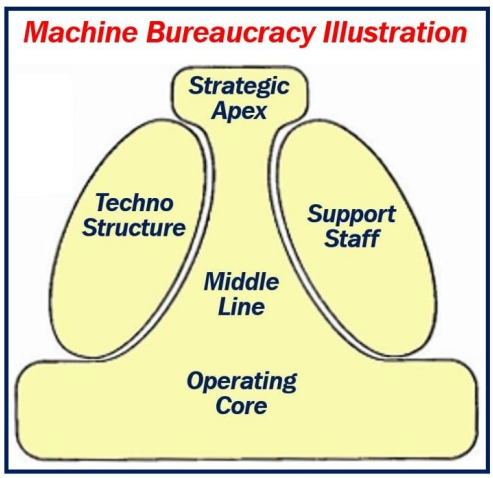

Figure 30. Mintzberg's Machine Bureaucracy[258]

The Machine bureaucracy can be seen as a factory structure. For our purposes, the important learning is, that it seems like that our very idea (semiosis) of the organization we participate in, affects both our idea

[257] Morgan 2006, chpt 2, pp. 11-31. See also Taylor 1911 for his account of Scientific Management.
[258] Mintzberg 1979, chpt 18, pp. 314-47. Illustration is accessed June 25, 2023, from: https://marketbusinessnews.com/financial-glossary/machine-bureaucracy/

of participant roles but also creates values and behavior that seem to affect the overall structure of the organization we are participating in.[259]

A contrasting metaphor that you find in Morgan is that of the organism. The strength of organic organizations is their ability to adapt to changes in the environment, hence "organic" as this again brings to mind the homeostasis of biological systems. The relation between wholes and parts in this kind of system is very different from the mechanical one, since the structure of the whole seems to be persisting through time, emergent on the different parts and on the other half pound is continuously interchanging and replaced. What is the central difference here, is that when it comes to organizations, we cannot directly observe the behavior of the whole, but only the behavior of the parts, or some of the parts, depending on how exactly we define a system and the parts they have.

Furthermore, it should be noted that in organic organizations, the managerial focus is often on developing strategies and ambitions for the future. Consequently, both historical storytelling as well as visualizations of visions for the future is often used to motivate and integrate the employees, in a way that they preserve their self-identity as parts of the organization through the changes made as well as those that lie ahead. This is important, because the best way to describe this in ontological terms is to see the organization as a perduring entity but with enduring parts, namely the employees. And this is despite the observation we made, that in an organism it is often the structure of the whole that appears as an endurant property, while many parts and relation between the parts perdures in no way that seem sometimes almost teleological. But this can be explained by pointing out what makes parts endure, that is, what makes them persist through time as parts, are exactly that they are governed by the same semiosis. The overall conception of the organization as a whole including the interpretive mereological decomposition simplicitér of it, is constituting a stability, perhaps even a static element, in this fluctuating environment that constitute an organic organization.[260]

Morgan writes a little further down on the same page quoted before that:

The metaphor that the scientist uses to study these latent tendencies shapes what he or she sees. The same is true of organizations. Think "structure" and you'll see structure. Think "culture," and you'll see all kinds of cultural dimensions. Think "politics" and

[259] Some of the best description of how belief systems lead to effects in the structuring of organizations is found with Edgar Schein. Schein works under the assumption that cultures build on shared assumptions, that creates espoused values that again makes the culture express itself through artifacts, among which is some overall organizational parameters. Though Schein's theory is not without its issues (what does it mean to share a belief, for example) it forms together with the models of Mintzberg and others a now classic stand against the ideas of contingency-theory proposed notably by Lawrence and Lorsch a.o., arguing in the main that organizational structures are in some sense determined from the surroundings. See Schein 1990, 1980.

[260] Morgan 2006, chpt 3, pp. 33-70

you'll find politics. Think in terms of system patterns and loops, and you'll find a whole range of them. This is the manager's dilemma. We tend to find and realize what we are looking for. This does not mean that there is no real basis to what we find. Rather, it is just that reality has a tendency to reveal itself in accordance with the perspectives through which it is engaged.[261]

Morgan's point here shows very well the problems associated with SD-decomposition, considered in isolation. Either one is tempted toward a reductionism (everything is really x) or some kind of constructivism. But compared to the model of mereological decompostion set up here, this would be oversimplified for two reasons:

First, SD decompositions complement a MDS decomposition. And therefore, the image of a grouping or class of parts would be based on a wider, overall conception of the whole. This conception is tested and developed on an ongoing basis through the interaction and communication with other participants.

Second, the semiosis of the organizational whole is to be regarded as a layer, or a context, of an often much stronger group semiosis. This means that the image of the organization that is MDS decomposed complements that of the group. Furthermore, it might be, that an organizational semiosis, might again be complemented by an even more external layer.

6.4 Of Nations, Global Community, the Universe, and Everything

Even more fuzzy, sometimes hiding in the background as we observed in the picture from the train in Kazakhstan, we have a feeling of belonging to a country, a nation. Apart from being part of a group in the first round, and an organization in the next, I am also part of a country. I, for one, am a Dane, a citizen of Denmark. More concretely, besides being an associate professor at UCL University College, working in the team that teaches and develops their bachelor program of innovation and entrepreneurship, I am also part of a country. This means, that I am submitted to rules, like laws, cultural norms and authorities that my group and organization is also submitted to, granted the assumption that we are all from the same country. We often experience this only when we meet people that make us contrast between us and them. If somebody likes other things than we do, behaves different than we do, speaks different, I become alert to my own distinctive features.[262] Based on this, models can be made as to more clearly make me distinguish our differences, and perhaps even enforce my symbolic mediated affiliation (I can raise a flag, make special Danish dishes, like buttermilksoup). Many of these things,

[261] *Ibid.*
[262] See Eriksen 1995 for an exposition and overview. Eriksen follows Sartre's idea of we'ness in Sartre 2003.

however, take place on an individual or group level, that is, in a closer proximity than the nation that appears relatively far away. I make the buttermilksoup to some friends, I raise the flag at a birthday party. Though it refers to the idea that is implicit of the nation or national "culture" that I am a part of.[263]

Even in these cases, there is often a general consensus, that the overall structure of the society affects and is affected by the culture. If you are living in a democracy or a totalitarian regime, if there is much bureaucracy or little, if the infrastructure is extensively developed, if the digitalization is high or low - all this will affect the culture. But the experience will be mediated, and the corresponding behavior will take place in a closer proximity. Therefore it is fairer to regard such layers of experience as a kind of *categorial* thinking or experience, at least in the sense that it adds an extra understanding of the sortal already deployed at a lower proximity, like examples expressed in the following three statements: "It is not only a company, it is a Danish company", or "It is not only an unfair behavior, it is also illegal", or "Our contribution not only does something good for these 4 refugees, it also shows that we in Denmark think about others than just ourselves.

Does it make sense to add an extra layer of semiosis? For we could argue, that we are also a citizen of the world, that is, a person on a planet, and in turn a part of the known universe. Or perhaps a part of everything? For it seems, that we have created a framework of a framework of a framework. And true enough, but it is important to remember that our purpose to point out the thickness of the semiosis that we might experience in ourselves and others as we are identified as parts of some larger whole.

When we think about ourselves as beings in the world, the first suggestion that may come to mind are some of the global endeavors that the world faces. Sustainability, Artificial intelligence and Gender policy are some of the issues that are raised on a global scale, at least at the moment of writing these words. Many of these issues are indeed important, but when I consider what to do with them, I would again often have to translate the problems into the group or the organization. So, if I want so save the world I would join a community or find some likeminded people to start up a new political party. If I think myself as part of a nation or the globe, I will often be paralyzed with powerlessness, or alternatively I will simply feel these issues as distant categories: If I go to my manager and ask him to make a difference on a global scale, he would likely simply look at me and ask me to go back to working with something more realistic. Note, that he is not denying that we exist in the same world, or that we are persons on the planet. But it is a notion too distant to be operative: Though the horizon follows you, it is too far away to be touched.

[263] Hall 1990, Hofstedte 2010 and Lewis 2006 all offer examples of such theories of intercultural differences and communication.

There are of course exceptions. For instance, where persons have published a book or have suffered an extraordinary circumstance. But still, in order for it to have a more practical or behavior and decision modifying effect, it needs often to be translated into group or organization level, or both. Still, there are some impressions that we might attribute of the more national, global, or universal horizons.

I am here suggesting ideas or concepts with a high level of generality, like principles or categories, that are so general, that they must apply to any participant of the nation, globe or universe. It can be hard to figure out exactly what they are, and therefore, for all practical purposes, must participants of social systems just pretend that they know. But one must be able to look through the semiosis of the group and the organization, as well as myself as an individual, to even formulate the proper questions to, what we might call the "outer rim". Investigating such notions are often what we simply call "philosophy." For it is the consideration of phenomena at its outmost generality that constitute this enterprise, even considerations of, if this is really a proper definition or understanding of philosophy, or not. But it is, however, arguably the way philosophy would appear in a decompositional mereophenomenology, as a consideration of the most general conditions. Applied philosophy, would then be to trace the phenomenological considerations back in the semiosis towards myself: What does that mean to me, here and now.

In the end, that might mean, that this "outer rim" - to use a star wars expression - is the layer of the horizon where one asks questions of what it means to be?, what a universe is?, what infinity is? and perhaps, what does it mean to experience?, and what are parts and wholes?. We might suggest, that if we take a position of the idols of the twilight gods, we can argue that there is a truth, and that it is not up for discussion, but something for scientists to discover. In this case we place the "scientists", whoever they are, "out in the outer rim with the problems lying there." Names like Albert Einstein, Immanuel Kant, and perhaps Plato and Aristotle become idols far removed from the person that experiences the world. I have in fact often met severe resistance, if I would want do discuss with my students the possibility that Einstein was wrong, or that the big bang theory suffers from philosophical problems that are severe. "Who do you think you are?" a student once said to me.

For if you question the "Gods" and the problems they were struggling with, we may ourselves be curious and open towards the questions lying in this "outer rim". And because our attitude towards the categorial questions and beliefs in the horizon far, far away, will likely have effects at closer proximities, we might at the end give rise to the suggestion, that philosophical thinking about metaphysical questions might in fact open possibilities of innovations in groups and organizations. For this openness might, in the same

way as complexity, be transferred as an essential component of the meaning of the whole, be transferred to the experience of horizons at lower levels.

6.5 Being there

The semiosis of being a part of a social system is therefore not a particular good thing. It is not a bad thing either. It is simply there. For being part of a community can lead to group pressure and tyranny, both politically in societies, and on social networks where major concentrations of people interact in ways that was not long ago reserved for smaller groups. Being part of a group may also create support, affiliation, a meaningful identity as well as acknowledgement and recognition. We are social animals, and for most of us, it is therefore not healthy to retract from society and lead a life alone, removed from the world.

The analysis of the semiosis in this chapter, based on selected insights in organizational behavior, suggests, that we might be able to affect how the group affects the individual part. For it is through the participants semiosis that an understanding of the group and organization in the world emerges. Changing therefore the map, diagram or narrative might in fact vary the understanding of the other parts and participants in the system, particularly in the team and therefore help facilitate change and innovation. And in as much as we can be regarded as a plural subject, the same process might be replicated on the organizational level. But this is troublesome, because so many various people and points of view might be addressed. It requires therefore a cultural setting that either allows, or perhaps even supports such innovations.

This can be aided by considering the themes of national structuring, what is also known as political systems. It is argued here, that the fundamental feature of political systems that decides, whether they are a facilitating or inhibiting innovation in organizations, is about the stance taken to issues of the "uttermost generality", a foundational semiosis of participating in the world. If one is to take a stand of "fundamentalist approach", insisting of the truth on foundational beliefs it is having an inhibiting effect on organizations, while insisting on a "philosophical approach" opens up for critique of existing ideas and to the possibility of innovation and change. Most of us will adopt a fundamentalist approach to some issues and a philosophical approach to others, but the balancing of these two forces might decide the formation and continuation of equilibria as well as disruption and development. It can be argued that this strife between these two can be seen as a dialectics on all levels of social systems. And from a decompositional perspective this is the essence of (mereological) socialization.

A last remaining question could be formulated like this: In the analysis above, it is here and there hinted at the point, that since we sometimes deliberately are able to change the idea of the group and the organization, for example when we jump from system to system. Would it not be possible to free ourselves from the idea of these systems at all? And the answer is given, I think in chapter five. For regarding oneself as an individual, and not a part of any social systems, is to consider oneself as an individual. It might be suggested that this kind of individualist approach is what Ralph Waldo Emerson aims at in his essay on *Self-Reliance*. Emerson writes:

Whoso would be a man, must be a nonconformist. He who would gather immortal palms must not be hindered by the name of goodness, but must explore if it be goodness. Nothing is at last sacred but the integrity of your own mind.[264]

Emerson's point is not that we should cut all bonds and live an irresponsible life. On the contrary, he is pointing out that we should not just accept what is good and what to do after pressure from those surrounding us, the other members of the country, the firm, the group. As Markus and Kitayama 1994 formulate it, we have created a "collective fear of the collective", quoting the anthropologist David Plath

Our cultural nightmare is that the individual throb of growth will be sucked dry in slavish social conformity. All life long, our central struggle is to defend the individual from the collective. [265]

But an alternative is simply to let it be. As is implicit in the quote from Emerson and made explicit in his essay on nature, what comes before the socializing, must be nature. We could of course argue, that nature is a cultural concept, but we could make sense to a notion of "natural man," being an individual who is in contact with her own self, destroying the sociality around her. And we might with Emerson argue, that this does not necessarily create a Hobbesian irresponsible and unethical monster. For the whole idea of responsibility and irresponsibility, as well as rights and duties, would only make sense granted a mereological decomposition of a system identifying these relations between parts. For in the end, as well as in the beginning, "natural man" is simply there.

[264] Emerson 1840-44, p. 30.
[265] Plath, 1980, p. 216, quoted in Markus and Kitayama 1994, p. 568.

Summary

The dissertation presents a rethinking of mereological decomposition that can be applied as an underlying logic of the experience of parthood. It opens with a logical analysis of mereological decomposition, which is contrasted with composition and other bottom-up "building-relations." It is then argued that particularly parts of systems contain a distinctive feature of semiosis that allows parthood to be experienced. Historical precursors of this view are examined to corroborate this perspective. The dissertation then continues with considerations of what this means for the phenomenology of the experience of parthood.

To lay the groundwork for a study of parts and the experience of parthood, the argument is made that if composition can be regarded as a formal operation facilitating the study of wholes, then decomposition can be regarded as an inverse operation facilitating the study of parts. The notion of mereological decomposition is then analyzed and developed, and it is argued that it has to result in class of entities labelled all and only the parts. Furthermore, it cannot entail the destruction of the whole because this would be to confuse creation with constitution, and because parthood is often dependent on the particular whole to which it belongs.

Instead, it is argued that mereological decomposition must be regarded as an explication or mereological dimensionalization of the whole. In a significant sense, all and only the parts explicate the meaning of the whole. This has consequences for our understanding of parthood. For it means that the parts, at a minimum, must contain a semiosis, that is, an essential reference to the whole that makes the parts a particular ontological category: They are not individuals in the sense of self-relying entities.

This seems to suggest that there is a sortal function involved in mereological decomposition. And this makes it possible to distinguish between simple mereological decomposition sorting the whole into parts, and decompositions that apply higher order sortal predicates, labeled sortal decompositions or SD decompositions. This accentuates the problem of how to prompt a mereological decomposition, for in order to sort the parts, we need to be able to distinguish the whole and its parts in the first place. A suggestion of how elements in the experiences of the whole might aid this cognitive process is exemplified. This seems to imply that parthood is not transitive. However, it is suggested that the distinction between simple decompositions, also called MDS decompositions for clarity, and SD decompositions gives the possibility of formulating a notion of weak transitivity, that is, transitivity of parts belonging to various SD decompositions within the scope of the same MDS decomposition.

The notion of semiosis gives rise to a further examination of the experience and phenomenology of parthood, or so it is argued. Parthood can be experienced from the outside or from the inside, the latter in either the sense of being a whole that has parts or being a part of a larger whole. First, it is discussed what constitutes an outside view, and it is argued, along with Sartre, that it is constituted by a phenomenological destruction of the context of an object in question. It is then considered how semiosis is experienced when observing a system from such an outside view, and it is argued that the decomposition transfers meaning and complexity unto the parts, but also that our experiences of the parts lead to imaginings of the wholes to which we think they belong. It is then suggested that the derived complexity through mereological decomposition might be controlled by a combination of composition and SD decompositions. In the last two chapters, attention is turned towards persons, particularly parts of persons regarded as a whole, and persons seen as parts of larger wholes.

In the first case, the notion of self is stressed as essential. The notion of a person's self can be divided into the minimal self and a larger self, often called the narrative self. This is related to the distinction between the physical and the mental, and it is argued that concerning the narrative self, the semiosis of the parts of the self is often clearer. It is stipulated on the basis of some examples of flow that the notion of the minimal self may be considered as phenomenologically situated, as its extension might be differently experienced in various situations. Furthermore, a distinction between "part of" and "carrying in" is made, particularly in the light of that not all elements we would locate in the mind, body, or self would be counted as parts of the persons themselves.

In the second case, is first discussed what it means to be with others without forming parts of a whole, and it is argued that a minimal semiosis must be experienced to justly argue that persons understand themselves as parts. It is then argued that an essential feature of the semiosis of being a part is the experience of a horizon that can be analytically divided into levels or fringes of distance, for example into group, organization, society, global, and universal, of which some or all can be present in the parthood experience of a person.

In conclusion, the notions of mereological decomposition and semiosis introduced here appear to be a useful metatheoretical apparatus that may function as an add-on mereological module to governing compositional approaches. This may promise to add understanding, explanatory power, and corroboration to many observations and claims made within the philosophy of psychology, cognitive sciences, and systems thinking.

Zusammenfassung (Summary in German)

Die Dissertation präsentiert eine Neubetrachtung der mereologischen Zerlegung, die als zugrundeliegende Logik der Erfahrung von Teilsein angewendet werden kann. Es beginnt mit einer logischen Analyse der mereloogischen Zerlegung, die mit Komposition und anderen bottom-up "Aufbau-Beziehungen" kontrastiert wird. Es wird dann argumentiert, dass insbesondere Teile von Systemen ein charakteristisches Merkmal der Semiose enthalten, dass das Teilsein erlebbar macht. Historische Vorläufer dieser Ansicht werden untersucht, um diese Perspektive zu bestätigen. Diese Dissertation setzt sich mit Überlegungen darüber fort, was dies für die Phänomenologie der Erfahrung von Teilsein bedeutet.

Um die Grundlage für eine Studie über Teile und die Erfahrung des Teilseins zu legen, wird argumentiert, dass, wenn die Komposition als formale Operation betrachtet werden kann, die die Untersuchung von Ganzen ermöglicht, dann die Zerlegung als formale Operation betrachtet werden kann, die die Untersuchung von Teilen ermöglicht. Der Begriff der mereologischen Zerlegung wird daraufhin analysiert und entwickelt. Und es wird argumentiert, dass er zwangsläufig zu allen und nur den Teilen führen muss. Darüber hinaus darf dies nicht zur Zerstörung des Ganzen führen, da dies Schöpfung und Konstitution verwechseln würde, und weil das Teilsein oft von dem spezifischen Ganzen abhängt, zu dem es gehört.

Stattdessen wird argumentiert, dass die mereologische Zerlegung als Erläuterung oder mereologische Dimensionalisierung des Ganzen betrachtet werden muss. In einem wichtigen Sinne, erklären alle und nur die Teile die Bedeutung des Ganzen. Dies hat Konsequenzen für unser Verständnis von Teilsein. Denn das bedeutet, dass die Teile zumindest eine Semiose enthalten müssen, das heißt, eine wesentliche Beziehung zum Ganzen, die die Teile zu einer bestimmten ontologischen Kategorie macht: Sie sind keine Individuen im Sinne von selbständigen Entitäten.

Dies scheint darauf hinzudeuten, dass eine "sortale Funktion" bei der mereologischen Zerlegung eine Rolle spielt. Und dies ermöglicht es, zwischen einfacher mereologischer Zerlegung, die das Ganze in Teile sortiert, und Zerlegungen zu unterscheiden, die höherstufige "sortale Prädikate" verwendet, die als sortale Zerlegungen oder SD-Zerlegungen bezeichnet werden. Dies verdeutlicht das Problem, wie eine mereologische Zerlegung ausgelöst werden kann, denn um die Teile zu sortieren, müssen wir zunächst in der Lage sein, das Ganze und seine Teile zu unterscheiden. Ein Vorschlag, wie Elemente in den

Erfahrungen des Ganzen diesen kognitiven Prozess unterstützen könnten, wird veranschaulicht. Dies deutet darauf hin, dass das Teilsein nicht transitiv ist. Es wird jedoch vorgeschlagen, dass die Unterscheidung zwischen einfachen Zerlegungen, auch als MDS-Zerlegungen zur Klarheit bezeichnet, und SD-Zerlegungen die Möglichkeit bietet, einen Begriff der "schwachen Transitivität" zu formulieren, das heißt, die Transitivität von Teilen, die verschiedenen SD-Zerlegungen innerhalb des Geltungsbereichs derselben MDS-Zerlegung angehören.

Die Vorstellung von Semiose führt zu einer weiteren Untersuchung der Erfahrung und Phänomenologie des Teilseins, so wird argumentiert. Teilsein kann von außen oder von innen erlebt werden, letzteres entweder im Sinne eines Ganzen, das Teile hat, oder als Teil eines größeren Ganzen. Zunächst wird erörtert, was eine Außenansicht ausmacht, und es wird, zusammen mit Sartre, argumentiert, dass sie durch eine phänomenologische Zerstörung des Kontexts eines betreffenden Objekts konstituiert wird. Dann wird betrachtet, wie Semiose erlebt wird, wenn man ein System aus einer solchen Außenansicht beobachtet, und es wird argumentiert, dass die Zerlegung Bedeutung und Komplexität auf die Teile überträgt, aber auch, dass unsere Erfahrungen der Teile zu Vorstellungen der Ganzen führen, zu denen wir denken, dass sie dazugehören. Es wird dann vorgeschlagen, dass die abgeleitete Komplexität durch mereologische Zerlegung durch eine Kombination aus Komposition und SD-Zerlegungen kontrolliert werden könnte. In den letzten beiden Kapiteln richtet sich die Aufmerksamkeit auf Personen, insbesondere auf Teile von Personen, die als Ganzes betrachtet werden, und auf Personen, die als Teile von größeren Ganzen betrachtet werden.

Im ersten Fall wird die Vorstellung des Selbst als wesentlich hervorgehoben. Die Vorstellung von einem persönlichen Selbst kann in das minimale Selbst und ein größeres Selbst, oft als narratives Selbst bezeichnet, aufgeteilt werden. Dies steht im Zusammenhang mit der Unterscheidung zwischen dem Physischen und dem Geistigen, und es wird argumentiert, dass hinsichtlich des narrativen Selbst die Semiose der Selbstteile oft deutlicher ist. Es wird aufgrund einiger Beispiele von "Flow" festgelegt, dass die Vorstellung des minimalen Selbst als phänomenologisch situiert betrachtet werden kann, da seine Ausdehnung in verschiedenen Situationen unterschiedlich erlebt werden kann. Darüber hinaus wird eine Unterscheidung zwischen "Teil von" und "in sich tragen" vorgenommen, insbesondere vor dem Hintergrund, dass nicht alle Elemente, die wir im Geist, Körper oder Selbst verorten würden, als Teile der Personen selbst gezählt werden können.

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List of Formal Descriptions and Definitions

8. *Non-inversibility of SD decomposition,* $\neg((xs \in \frac{SD}{P}:Y) \rightarrow (xs\ Comp\ Y)$, p. 103

(It is not the case, that if the xs belong to a SD decomposition of Y, the xs compose Y)

9. *Supplementation of SD Decomposition,*

$$\forall P \forall z \exists x(\left(z \in \frac{SD}{P}:Y\right) \rightarrow \left((x \in MDS:Y)\&\neg\left(x\epsilon\frac{SD}{P}:Y\right)\right)$$ p. 104

(For all P, for all z, there exists a P: If z belongs to a SD decomposition of Y over P, there is at least one x that belongs to an MDS decomposition of Y, but not to the SD decomposition of Y, over P)

10. *Relation of subordination,*

$$\left((x \in SD:Y) \rightarrow (x \in MDS:Y)\right)\& \ (\neg(x \in MDS:Y) \rightarrow \neg(x \in SD:Y))$$ p. 104

(If x belongs to a SD decomposition of Y, then x must also belong to an MDS decomposition of Y and if x does not belong to an MDS decomposition of Y, then it does not belong to an SD decomposition of Y either.)

11: *Weak transitivity of parthood (A),*

$$(\left(x \in \frac{SD}{\delta}:Y\right)\&\left(z \in \frac{SD}{\delta}:X\right)\&\left((x\&z) \in MDS:Y\right)) \rightarrow ((x \ll Y)\&(z \ll x) \rightarrow (z \ll Y))$$ p. 105

(If x belongs to a SD decomposition of Y over some sortal predicate or other, and z belongs to a SD decomposition of x over some sortal predicate or other, and both the xs and zs belongs to a MDS decomposition of Y, then parthood is transitive: if x is a proper part of Y and z is a proper part of x, then z is a proper part of Y.)

12: *Weak transitivity of parthood (B)*

$$\left(\left(x\&z \in \frac{SD}{\delta}: w\right)\&\left(z \in \frac{SD}{\delta}: x\right)\&(x\&z\&w \in MDS: Y)\right) \rightarrow ((x \ll w)\&(z \ll x) \rightarrow (z \ll w))$$ p. 106

(If x and z belongs to a SD decomposition of w over some sortal predicate or other, and z belongs to a SD decomposition of x over some sortal predicate or other, and both x, w and z belongs to a MDS decomposition of Y, then, if x is a proper part of w and z is a proper part of x, then z is a proper part of w.)

13: *Weak transitivity of parthood (C),*

$$\forall F\left(\forall P\left(\forall w\forall z\forall x\left(zs \in \frac{SD}{P}: x\right)\&\left(ws \in \frac{SD}{F}: z\right)\&(w\&z\&x\gamma \in MDS: Y)\right)\right)$$

$$\rightarrow ((z \ll x)\&(w \ll z) \rightarrow (w \ll x))$$ p. 106

(For all second-order predicates P and third-order predicates F, for which it is true that, for all w, z and x, if the zs belong to a SD decomposition of x over P, and the ws belong to a SD decomposition of z over F, and also all belong to a MDS decomposition of Y, then it is true that if z is part of x and w is part of z, then w is part of x.)

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