SCAFFOLDED MINDS

INTEGRATION AND DISINTEGRATION

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PREFACE AND ACKNOWLEDGMENTS

The impetus for this book arose from observing a number of intriguing changes in the contemporary philosophical landscape. We are witnessing a growing engagement in *empirically-informed philosophy of mind*, which offers fertile interfaces between philosophy and cognitive science, allowing for the application of philosophical resources to the subject matter of scientific inquiries and their calibration in light of empirical findings. Moreover, considerable amount of the philosophical work in this book was propelled by two distinct shifts within empirically-informed philosophy of mind, which invite philosophical engagement with the theoretical commitments of emerging conceptual frameworks and research programs.

The first shift can be described in terms of an intensified study of the *embodied mind.* The theoretical basis of cognitive science no longer exclusively relies on cognitivist approaches that comprehend mental processes as abstract formal processes, or as activation patterns in neural networks that can be adequately described in abstraction from the body and the environment. In contrast, embodied accounts subscribe to the idea that cognition is often best comprehended as the artefact of a dense interaction of neural and non-neural entities and processes. It is explanatorily relevant and exerts a profound influence on cognition in a way that stretches far beyond providing input into a cognitive system it remains closed off from.

The second shift can be described in terms of an intensified study of the *disordered mind*,

expressing an acknowledgment of the convergence of the explanatory concerns of psychiatry and interdisciplinary inquiries into the mind. An empirically-informed reflection about psychopathological phenomena constitutes a valuable resource for testing theories, offering real-life cases instead of hypothetical ones that feature in philosophical thought experiments. Experimental manipulations in controlled environments can be fruitfully combined with studying "naturally" occurring changes in individuals with mental disorders in ecologically valid environments.

Combining these two shifts offers the possibility of complementing contributions and distinctive insights into cognitive processes and the exploration of potential benefits for the understanding and treatment of mental disorders. A more complete understanding of our cognitive lives requires taking into account its dependence upon features of the (non-neural) body and environment and its vulnerability to malfunction. Moreover, if it is true that cognition is "embodied" in a non-trivial sense, then we may anticipate that increased attention to the body will yield epistemological gains for understanding how the mind works and harbor potential implications for the diagnosis and treatment of mental disturbances and disorders.

The overall aim of this book is to help create synergy at the intersection of embodiment and psychopathology. The book will motivate and defend the *Actively Scaffolded Cognition* (ASC) framework, which restructures and repositions embodied approaches to promote a direct interdisciplinary dialogue between philosophy, psychiatry, and cognitive science. It will offer a taxonomy of ways in which cognition is scaffolded onto the body and the environment, and it will demonstrate that ASC can offer useful resources for comprehending prominent features of mental disorders and for providing new ideas for therapeutic measures.

I have enormously benefited from the writings of Tony Chemero, Andy Clark, Shaun Gallagher, Susan Hurley, Dan Hutto, Mark Johnson, Richard Menary, Mark Rowlands, John Sutton, Kim Sterelny, and Mike Wheeler, all of whom have established productive dialogues between the empirical sciences of the mind and philosophical inquiry. I am grateful to Philip Laughlin, senior editor at MIT, and series editors Jennifer Radden and Jeff Poland for support and encouragement from the start, and for putting up with the delayed the completion of this book. The constructive comments of four anonymous reviewers helped me to improve the manuscript. I have greatly benefited from continuous conversations with Remy Debes, Shaun Gallagher, David M. Gray, Thor Grünbaum, Detlef Heck, Dan Hutto, Beate Krickel, Albert Newen, Jennifer Radden,

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1. INTRODUCTION
PHILOSOPHY, PSYCHIATRY, AND COGNITIVE SCIENCE

1.1. Empirically-informed philosophy of mind

The intensified interaction with the empirical sciences has led to numerous transformations in philosophical work. The traditional way of conceiving the task of philosophy is to a large extent tied to the method of conceptual analysis, which is applied to a number of central concepts in various fields of inquiry. For example, some philosophers of mind think that the chief task is to provide a fine-grained, purely a priori analysis of, for example, folk-psychological concepts such as belief and desire. On this view, philosophical analysis is not answerable to empirical facts, and the results of the inquiry are mainly attained on the basis of mapping connections within the

conceptual scheme that constitutes the medium of thinking. Mapping the relevant relations may include designing particular thought experiments, which shed light on the tacit meaning of concepts under investigation and unearth implicit principles that can help understand conflicting judgments. But overall, this view depicts philosophy as essentially being in the business of descriptive conceptual analysis, aiming, as P.F. Strawson (1992, 7) puts it, to "produce a systematic account of the general conceptual structure of which our daily practice shows us to have a tacit and unconscious mastery."

In the contemporary philosophical landscape, such a view of the tasks and methods of philosophical inquiry is becoming much less common, and major scientific fields of inquiry are now complemented by subdivisions of philosophy that specialize in investigating a range of questions pertinent to the subject matter. The success of cognitive science has surely been a motivating factor for philosophers to take into account new findings and to adjust their theories, topics, and approaches. Philosophers investigating the mind now commonly draw on findings in the sciences of the mind, reaching conclusions based on empirically-informed reflection instead of a priori methods. Accompanying this reorientation in philosophical theory construction, it is now relatively customary to comprehend armchair "data" as defeasible and to deploy a "wide" reflective equilibrium methodology (e.g., Horgan and Graham 1994). This does not necessarily require a complete break with traditional methods of armchair analysis, but it definitively involves a decisive impulse toward "naturalization," reducing the "cognitive wiggle room" by recourse to empirical research (Weinberg 2017). Without this empirical input, especially in areas in the philosophy of mind, the view is that armchair approaches risk "losing contact with the very phenomena they seek to illuminate" (Kornblith 2017, 159).

These roughly delineated modifications in philosophical thinking have contributed to the emergence of a dynamically evolving specialized field, which encompasses a number of productive interfaces between philosophy and the cognitive sciences. Of course, philosophy may not seem to be manifestly present in the everyday practice of cognitive science. Nonetheless, empirically-informed philosophy of mind naturally fits into an interdisciplinary field with a multitude of methodological approaches that has, since its beginnings, regarded philosophy as one of its participating disciplines. Some argue that due to the nature and subject matter of cognitive science, there is "no impassable gulf between those cognitive scientists who are philosophers and

those who belong in the other disciplines, and there is no sharp line between the issues proper to the respective areas" (van Gelder 1998b, 134; Grush 2002).[1]

However, although there are no sharp divisions, philosophers have a particular role to play, and the nature of their work, for instance, evaluating the virtues of competing theories and determining their underlying commitments, is distinct, neither clearly conceptual nor empirical (Thomasson 2014). While sorting out the details of this type of philosophical work is beyond the aims of this book, we may say that it engages empirical material, clarifies concepts, interprets tested and untested hypotheses, and forms new hypotheses, some of which can be tested. The approach lends itself to addressing themes that do not (yet) lend themselves to a transformation into scientifically tractable questions and that have not (yet) reached a level of maturation at which they could be confirmed or refuted (Van Gelder 1998b).[2] In this sense cognitive science is as Daniel C. Dennett puts it, "a land of plenty for philosophers," because numerous of its questions "are still ill thought out, prematurely precipitated into forms that deserve critical reevaluation. If philosophy is, as my bumper sticker slogan has it, what you're doing until you figure out just what questions to ask, then there is a lot of philosophy to be done by cognitive scientists these days" (Dennett 2009, 232).

Moreover, this approach exhibits three important characteristics, which are of central importance for the aims of this book. First, such empirically-informed philosophy avoids the pitfalls of (cognitive) "scientism" (philosophers generate questions but should leave the answers to "proper" cognitive scientists) and "isolationism" (cognitive science has nothing to offer to philosophical analyses of conceptual schemes) (for a discussion, see e.g., Davies 2005; Ludwig 2015). Second, it is an *interactive* specialized subdivision, in the sense that its investigations create an interface that allows combining the application of philosophical resources to the subject matter of scientific inquiries with the calibration of the philosophical approaches in light of empirical findings and scientific accounts. Third, it is *naturalistic* in the sense that philosophical investigations are understood as continuous with empirical work in relevant fields. Unlike

[1] As van Gelder (1998b, 134) rightly notes, in many cases "it would be wrong to think of the philosopher of cognitive science as a person always quite distinct and separate from the psychologist, linguist, computer scientist, etc., and as engaged in completely different and independent tasks."

[2] As an example of how philosophical ideas directly motivate scientific investigations in psychology, Dennett's work on intentional action generated fruitful research on children's judgments about false beliefs (Dennett 2009; Thagard 2009).

traditional approaches, empirically-informed philosophy of mind holds that metaphysics should be informed by and continuous with science.

1.2. Philosophy *in* cognitive science

Another way to help clarify the approach of this book is to explore how it corresponds (and fails to correspond) to extant distinctions in the literature. To distinguish empirically-informed philosophy of mind from other philosophical work, some differentiate between philosophy *of* cognitive science and philosophy *in* cognitive science (e.g., Brook 2009). Empirically-informed philosophy of mind is a way of doing philosophy *in* cognitive science, for instance by offering integrative interpretations of tested hypotheses into larger frameworks, generating new hypotheses, and providing fine-grained conceptual clarifications. Philosophical work of this kind can be seen as philosophy *in* cognitive science, since it constitutes a part of the practice of cognitive science, whether or not it is performed by researchers trained in philosophical methods. In contrast, philosophy *of* cognitive science can be pursued in a number of ways. For instance, it can be pursued by using the tools of philosophy of science, working out how general problems in the epistemology and metaphysics of scientific inquiry manifest themselves in cognitive science (Bechtel 2009; Bechtel and Herschbach 2010). Systematic considerations on the nature of explanation, confirmation, validity, the relation between theory and data, reduction, etc. in the special case of cognitive science are indispensable for securing scientific progress, especially in light of the different fundamental methodological and conceptual commitments of various disciplines comprising cognitive science (Samuels, Margolis, and Stich 2012).[3]

While the type of empirically-informed philosophy of mind that this book engages in can largely be understood as philosophy *in* cognitive science, it also involves significant amounts of reflection that may be more characteristic of philosophy *of* cognitive science. For example, investigating whether cognitive models fit behavioral data, or whether certain correlations perhaps reflect causal or constitutive relations, involves deliberation about the types of explanations that

[3] Alternatively, philosophy *of* cognitive science can also be pursued by using the tools of ethical and socio-political philosophy, addressing for instance the effects of scientific knowledge about the mind and reflecting on its place in the context of liberal democracies.

one takes to be suitable for cognitive processes. Moreover, offering a theoretical framework that aims to integrate various positions with emerging empirical findings involves reflection on the extent to which a single, unified view is possible, especially in light of the considerable complexity of mind and behavior.

1.3. Two shifts

Having briefly delineated the nature of the empirically-informed philosophy of mind that this book employs, it is important to note that the overall project is propelled by major theoretical reorientations in the field. This is the type of situation in which philosophical work is especially called upon to advance research by engaging often ambiguous theoretical commitments of emerging conceptual frameworks and research programs. This book brings together what can be seen as two shifts in the empirically-informed study of the mind.

1.3.1. The embodied mind

The first shift is in the theoretical basis of cognitive science toward the *embodied mind*. Some maintain that we are witnessing a paradigm shift toward *embodied cognition* (EC), undermining the central idea of *cognitivism*, according to which "cognitive mental processes are operations defined on syntactically structured mental representations that are much like sentences" (Fodor 2000, 3–4). Of course, one may point out that somewhat similar shifts have occurred previously, for instance during the 1980s, when emphasis progressively shifted from abstract formal descriptions of cognitive processes to connectionist approaches based on neural models of cognitive architecture and neural-based computation (Bermúdez 2014, 59–82).[4] However, while this shift has certainly introduced significant theoretical modifications, it left certain fundamental commitments untouched. One of them is a basic understanding of the mind that underlies cognitivism's methodological approach. While the organism's body and sensorimotor systems deliver sensory input and enable behavioral output, they do not shape cognitive processing in any

[4] For instance, Marr's (1982) influential investigation of the visual system focused on explicating in information-processing terms the algorithms by which an information-processing task is solved.

interesting and epistemologically significant way. This means that whether mental processes are best seen as abstract formal processes, or as activation patterns in neural networks, the shared commitment is that they unfold inside brains and can be adequately explained in abstraction from the body and the environment.

In contrast, EC aims to provide an approach that accentuates the function of the body and the environment in cognition. EC accounts converge on some version of the general view that cognition is the product of the dynamic interaction of neural and non-neural processes. Without there being an essential gap between cognition, body, and environmental features, the idea is that numerous aspects of an agent's cognition profoundly depend upon features of that agent's non-neural body and environment. Before going further, it is worth pausing to specify the sense in which "dependence" is understood.

First of all, while logical dependence obtains between propositions, we are in this context concerned with *ontological dependence*, which describes a variety of relationships between entities or beings. Still, the sentence "cognition ontologically depends on the body" can be comprehended in several ways. Understood in a strict sense of ontological dependence, cognition could not exist if the body did not exist or did not supply its machinery with oxygen. Existential dependence in this strict sense is a relatively trivial relation that has little explanatory power in our context. Much more relevant for the purposes of this book is a different sense of dependence that we could call *nature dependence*. In this relation of dependence, cognition depends on the body not merely for its existence, but for its nature or character. Saying that X (cognition) depends on Y (the body or environment) is in this sense roughly equivalent to saying that X is generally shaped by the specifics of Y or that aspects of X reflect aspects of Y. This relationship is important from an explanatory standpoint: when the nature or character of X is dependent on Y in this sense, then the characteristics of Y cannot be ignored in the explanation of X.

EC is best seen as a conceptual umbrella for a number of relatively un-unified research endeavors that have nevertheless influenced theory and practice in cognitive science. EC comprises labels like *embodied*, *embedded*, *extended*, and *enacted* cognition, which all endorse *epistemological inseparability*, thus the view that the organism's body and sensorimotor systems actively participate in the execution of cognition, such that we cannot provide a full understanding of cognitive processes by studying exclusively what is occurring inside the head of the cognizer.

1.3.2. The disordered mind

The second shift is toward more sustained study of the *disordered mind*. The vulnerability of our minds to division and self-alienation has long captivated philosophers, but the intense and puzzling perceptional, cognitive, emotional, and behavioral characteristics in mental disorders are now receiving a more prominent emphasis. Within the last three decades the new interdisciplinary field of the philosophy of psychiatry and cognitive psychopathology has begun to develop and flourish (Fulford 2000; Fulford et al. 2003).[5] Inspired by both Anglo-American analytic and continental philosophical traditions, philosophers, psychologists, and psychiatrists working in this area are striving to attain a more profound understanding of both psychiatric conditions and mental healthcare. Within the philosophy of psychiatry, we may distinguish between overlapping areas of special interest (Graham and Stephens 1994; Murphy 2008), employing the distinction between philosophy *in* and *of* psychopathology. The latter includes fields of inquiry dealing with the way in which general problems in the philosophy of science related to explanation and classification manifest themselves in psychiatry as a special science. It also includes systematic reflections on how ethical considerations about rationality and self-determination apply to mental disorders. The former is progressively recognized to complement philosophy *in* cognitive science. For instance, philosophical reflections on questions surrounding personal identity have profited from analyses of mental disorders (Wilkes 1988; Humphrey and Dennett 1989).

Compatibly with this second shift, there is an increasing acknowledgment of the remarkable convergence of the concerns and approaches of cognitive science, psychiatry, and philosophical inquiries into the mind (see Cratsley and Samuels 2013). Psychiatrists have become increasingly attentive to the explanatory potential of cognitive science, perhaps assisted by the perceived lack of progress in the neurobiology and genetics of mental disorders (Broome and Bortolotti 2009; Kendler 2008; Kendler et al. 2011), while cognitive scientists have gradually turned to exploring features of psychopathology, hoping to shed light on puzzling phenomena and to gain deeper insight into "normal" functioning. The view is that aspects of conditions classified as mental disorders can—not entirely unlike manipulations in experimental settings—provide

[5] The study of cognitive psychopathology is now increasingly taking on a role that resembles that of brain lesion studies in cognitive psychology.

opportunities to discern the nature of the mechanisms that underlie normal cognitive functioning. The study of the disordered mind thus supplements philosophy *in* cognitive science with empirically-informed theorizing about psychopathological phenomena, which constitute valuable resources. Case studies from psychopathology offer important data, which support or challenge theories. In fact, the uniqueness of psychopathological aspects resembles actual instances of the sorts of imaginary conditions that appear in thought experiments, without raising concerns about plausibility.

1.4. A productive intersection

While these two shifts in the empirically-informed study of the mind may not be equally important and prevalent, they can complement each other in a number of ways.[6] Importantly, the intersection offers the possibility of distinctive insight. For instance, psychopathology offers a rich source of insight about the organizational, structural, and functional features of cognition and provides evidence relevant to the assessment of hypotheses. Experimental manipulations in controlled environments deployed to unearth these structures can be fruitfully combined with studying "naturally" occurring changes in individuals with mental disorders in ecologically valid environments. Models of cognition can be evaluated by exploring the extent to which they are able to explain cognitive performance in individuals with mental disorders and to offer viable explanations of the nature of the impairment. The study of psychopathology allows for observing arrangements of functional continuation and disruption in cognitive capacities, which enable inferences about the organization of normal functioning.

Consider, for instance, empathy, globally defined as the ability to understand and respond to others' mental states. Impairments in the capacity for empathy constitute a crucial dimension of a number of disorders. Studies on autism spectrum disorder (ASD), borderline personality disorder, and schizophrenia demonstrate that empathy is a mechanism that can be differentially impaired without, for instance, other damages in short- or long-term memory, showing that they function independently of each other. Once identified, such *single dissociation* can be used in epistemically constructive ways. For example, the existence of this single dissociation can lend

[6] For some examples, see Fuchs and Schlimme (2009); Drayson (2009); Maiese (2016).

initial support to the suggestion that empathy is not a unitary concept, but rather a multidimensional construct involving two distinct abilities: an emotional component and a cognitive component. In both ASD and borderline personality disorder, affective and cognitive empathy can be differentially impaired, such that a deficit in cognitive empathy is accompanied by a preserved emotional empathy (Smith 2009; Harari et al. 2010).

However, studies on alcoholism, controlled for psychiatric comorbidities, find the opposite pattern: impaired emotional empathy is accompanied by preserved cognitive empathy (Maurage et al. 2011). Taken together, the findings show a *double dissociation*, supporting the idea that emotional and cognitive empathy are two distinct abilities, likely reflecting two different underlying mechanisms. The now differentiated intact and impaired functions help generate a taxonomy of functional subsystems and offer information about the functional organization of the human mind, though without showing how these subsystems interact. The bottom line is that the experimental investigation of pathological dissociations opens new stimulating ways for the scientific investigation of cognition.

EC also offers to the philosophical study of the mind and psychopathology some of the aspects that traditional cognitive science lacks with respect to crucial aspects of mental disorders. It has been argued that traditional cognitive science neglects the role of emotions, the body, and phenomenal consciousness. Take, for instance, three characteristic features of depression: motor retardation (e.g., slowed movements and speech, altered bodily awareness), emotional disturbances (e.g., low mood), and altered phenomenal quality (e.g., the sense of being captured in an unchangeable state), which are often portrayed in clinical and autobiographical descriptions (Ratcliffe 2008; Radden and Varga 2013). Of course, it is not the case that approaches drawing on the theoretical framework of traditional cognitive science deny that these disturbances are characteristic. The point is that they regard them as secondary to, and to a large extent caused by, cognitive biases in depression. While this approach provides a potential target for cognitive intervention, it comes at a relatively steep price. It is unable to account for the rich phenomenology of the experience and fails to suitably explain why pathologically altered states in depression are experienced as absolutely resistant to change and detached from the mental lives of others. This is where approaches that draw on EC could offer significant contributions to understanding mental disorders, analyzing them not merely as "brain dysfunctions" but as disturbances of an immersed embodied interaction with the environment, mediated by the brain.

1.5. Scaffolded Minds and Actively Scaffolded Cognition

The book can be described as combining two epistemological assumptions that arise from these two shifts. The first assumption is connected to the embodied nature of human minds, while the second assumption is connected to their fragile nature. This leads to the *epistemological conjecture* that while many psychological mechanisms are puzzling and unknown, we cannot provide a full understanding of cognition without studying (a) how cognition depends upon aspects of the non-neural body and environment, and (b) how it is vulnerable to malfunction. The combination of these two assumptions leads to a fertile intersection with noteworthy epistemic potentials for philosophical research and clinical practice.

In light of the potential synergies and complementing contributions these two shifts offer, this book will investigate how they can be brought to work together and to explore potential benefits for the understanding and treatment of mental disorders. For this aim, the book will offer a theoretical framework, *Actively Scaffolded Cognition* (ASC), which integrates a number of embodied approaches. The term "scaffolding" is beneficial for the aims of this book, as it offers a suitable amount of conceptual flexibility required for the task. The notion of cognitive scaffolding, originally advanced by Lev Vygotsky and further developed by Kim Sterelny and others, became influential in developmental psychology, broadly designating support structures that enable a child to complete cognitive tasks that she could not accomplish on her own. But while scaffoldings are in this tradition often seen as temporary outside aids that are eventually removed once the child is able to perform the task independently, the way it is used in this book captures that they often become more or less permanent reinforcements of our cognitive machinery. In this way, the term will offer flexibility on several levels, which will help taxonomize forms of scaffolding and outline a view that is able to understand various embodied approaches as continuous with the idea of "cognitive niche construction" (e.g., Sterelny 2010).

This conceptual flexibility will assist in integrating accounts that subscribe to the principle of epistemological inseparability and that propel the study of mental disorders. ASC will offer a taxonomy of active scaffoldings, comprising two forms of *intra-somatic* scaffolding (simple and complex) and a specific form of *extra-somatic* scaffolding. The taxonomy is largely guided by pragmatic considerations linked to the explanation of common symptoms in mental disorders.

1.6. The structure of the book

Consistent with the principles of empirically-informed philosophy of mind, this book aims to complete a dual task of *mapping* and *application/calibration*. Consequently, it naturally falls into two parts. The first part (mapping) makes a distinctive theoretical contribution, while the second part (application/calibration) shows how fine-grained philosophical distinctions can be applied to and calibrated by empirical research in psychopathology. This type of dual task not only naturally arises at the intersection of cognitive science, philosophy, and psychopathology, but contributions of this kind are crucial for an interdisciplinary field like cognitive science, as they help address issues that traverse multiple areas of inquiry and link diverse approaches to understanding the mind.

The first task (Part I, Chapters Two to Five) is to engage the theoretical commitments of EC and offer a platform for further investigation. This is an important step given that EC is not a unified area of research, and the various research projects usually subsumed under the EC label lack homogeneity and established definitions of central concepts (see e.g. Wilson 2002). One major goal is to draw the contours of ASC. For this, Chapter Two will explore two main theses that traditional cognitivism embraces but EC rejects. This chapter will provide an overview, which will gloss over details of particular positions to draw broad contours that only become noticeable at a particular level of abstraction. It will describe the cognitivist paradigm in terms of the commitments of three partially competing approaches (classicism, connectionism, and mixed architecture), which share a commitment to particular internal procedures that process information from the environment to perform actions. While these approaches also exhibit differences when it comes to questions about representations and cognitive architecture, they share a commitment to the two principles of the *separability thesis*, which define the "disembodied" picture that EC opposes. In addition, the chapter will discuss clinical cognitivism, which applies principles of cognitivism to a clinical and therapeutic context. While cognitivism is a relatively unified interdisciplinary approach that aims to comprehend the causal processes that execute computational operations on representational structures, EC lacks the characteristics of a well-defined and unified theoretical approach. At least at this stage of its development, EC offers valuable corrections to the cognitivist approach to cognitive science, but it should probably not

(yet) be seen as offering a full alternative to cognitivism.

On such background, Chapter Three will disentangle differing positions in current debates, and introduce a number of fine-grained distinctions. The chapter will illustrate how the notion of *actively scaffolded cognition* (ASC) can be used to construct a framework that integrates a medley of positions that support at least one of the two claims of inseparability. The chapter will steer clear of some of the debates about the extent to which mind and world are intertwined and focus instead on offering a preliminary idea of what it means for cognition to be *scaffolded* onto the environment and sensorimotor processes. To exclude trivial forms of dependence, the notions of *nature-dependence* and *active scaffolding* will be introduced, while additional details of ASC and its commitments will be further specified in chapters Four and Five.

The flexibility of the concept of scaffolding will at this stage help to tailor a taxonomy of forms of scaffolding, which is guided by pragmatic considerations with regard to common symptoms in mental disorders and will therefore neither offer a comprehensive ontology nor focus on a particular cognitive domain or function. With the aim to provide distinctions that could be productively applied to the context of psychopathology, the chapter will distinguish between two forms of *intra-somatic* scaffolding (simple and complex) and a specific form of *extra-somatic* scaffolding (inter-somatic), which is a distinct kind of socially scaffolded cognition. Intra- and extra-somatic scaffolding are thus the classes of the genus ASC.

The taxonomy raises a number of weighty questions about the relationship of dependence that holds between the scaffold and what is scaffolded. Chapters Four and Five will confront questions concerning inseparability in the ontological sense, while also providing further specifications of other aspects of ASC. They will explore two different paths. Chapter Four will draw on recent debates on boundaries of cognition, while Chapter Five will address the issue in light of more general questions on how to delineate the boundaries of mainly biological systems and mechanism. To further specify ASC and its underlying "global" commitments, Chapter Four will position ASC in broader discussions about the boundaries (the "where") of cognition in the philosophy of cognitive science, which is intertwined with the question of ontological inseparability. This is a debate between cognitivism and EC as well as between EC accounts, and numerous philosophers maintain that discussion would greatly benefit from providing a "mark of the cognitive" that picks out all and exclusively cognitive processes. The chapter will first engage two accounts that discriminate cognitive processing from mere information processing (Rowlands 2009; Adams and

Garrison 2013). This is followed by an investigation of the more general, *fine-grained vs. coarse-grained debate* about the question of the correct grain-level that should be deployed to examine cognitive processes. Roughly put, the debate revolves around the question: should the boundary of the cognitive be fixed by examining the fine-grained functional details of cognition, or should the focus be on larger cognitive ensembles?

While it has been noted that the debate has reached an impasse characterized by a clashing of intuitions, the chapter will argue that the failure of trained philosophers to elicit converging intuitions about a circumscribed subject might indicate a deeper problem. The chapter will explore underlying sources of the opposing intuitions, argue that "cognition" may be a special kind of prototype concept, and yet oppose eliminating the concept from scientific taxonomy in favor of several less inclusive labels. Rather, there is perhaps an opportunity here to explore the possibility for a kind of *pluralism* that is familiar from mature sciences and that neither implies anti-realism nor impedes scientific progress. The attempt is in part motivated by a suspicion that no single account of cognition is both broad and specific enough to account for the wide variety of cognitive processes. The broad range of interdisciplinary goals pursued in cognitive scientific inquiry and the complex nature of cognition and mind should render us suspicious of the idea that a single, unified framework will eventually explain the entire range of cognitive processes. Importantly, it is possible to embrace pluralism while still holding onto the effort to integrate relatively dissimilar positions into loosely-knit frameworks. Clarity on such matters may help avoid confusions about whether novel approaches complement traditional cognitive science or provide an alternative to it.

Unlike the approaches discussed in Chapter Four, Chapter Five will engage influential accounts of causal and constitutive relevance, aspiring to secure a more neutral base. The chapter will draw on an interventionist account of causal relevance (M) as defended by James Woodward (2003; 2010; 2015). It will add to M further conditions of *stability* and *specificity* to elucidate the particular relationship of *nature dependence* and *active scaffolding* holding between the relata in ASC. The addition of these auxiliary conditions will lead to the *manipulability account of active scaffolding*, or *Active Scaffolding (M)*. While M, thusly enhanced will capture a number of a large number of active scaffolding relationships, others are often characterized by mutual and bidirectional difference-making. This compels considering a metaphysically distinct constitutive relationship, as investigated by the mutual manipulability account (MM) of constitutive relevance (Craver 2007). Recent work on mechanistic explanation (Bechtel 2017; Bechtel 2008; Craver

2007; Machamer et al. 2000) will help rethink relations of dependence that ASC aims to capture and provide *a mutual manipulability account of active scaffolding*, or *Active Scaffolding (MM)*. On a first pass, the chapter will use MM to explicate constitution as a difference-making relation, and it will deploy two of its conditions as a test for ASC. MM offers several advantages. First, it provides an independently motivated basis for specifying ASC, which avoids certain risks that this Chapter Four will identify. Second, it also dovetails with the general pragmatic ambitions of this book, which seeks to explore the possibilities for extending the range of therapeutic interventions. Third, it retains proximity to explanatory practices in the relevant scientific fields and offers considerations on amenability to experimental testing and confirmation. To avert the risk of importing some difficulties linked to the notion of intervention, the slightly revised MM* will be introduced, which relaxes some requirement on interventions.

The second task (Part II, Chapters Six to Eight) is to show that ASC is a productive framework for considerations about a number of characteristic features in mental disorders. The focus will be on problems with altered bodily experience and social cognition deficits, which are characteristic of a wide range of mental disorders, and the task will be to apply and adjust various conceptual and theoretical resources of ASC. Embarking on such a project seems attractive in light of the numerous potential benefits for diagnosis and treatment. First, understanding how scaffolded processes can *disintegrate* at many different junctures and at many different developmental stages, with each combination leading to markedly different downstream consequences, may assist in comprehending heterogeneous behavioral symptomology. Second, in light of the relatively modest efficacy of current treatment options, it is reasonable to explore scaffolding structures that can perhaps eventually be exploited for therapeutic purposes, complementing pharmaceutical and psychological interventions.

Embarking on such an enterprise, Chapter Six will offer an application of the idea that certain concepts and cognitive activities are, in various ways, scaffolded onto the sensorimotor system. More precisely, it will explore *intra-somatic scaffolding* and distinguish two ways to comprehend the scaffolding relationship that are consistent with the epistemological inseparability thesis. The chapter offers support for the ASC framework and analyses of a number of studies to provide a more comprehensive understanding of mechanisms that are involved in the symptomatology of depression, in particular motor retardation. This work is accompanied by

reflections on potential therapeutic implications and considerations about the kind of further research that would be needed for a systematic clinical application.

Chapter Seven will expand the scope of inquiry and address a particular form of *inter-somatic scaffolding*, which not only involves the agent's sensorimotor apparatus, but extends into the environment to include external structures that adaptively guide behavior. In such cases, the vehicles of cognition appear to individuate externally, constituting a neural, bodily, and extra-bodily assembly. The chapter will trace the development of interactive skills that enable behavioral synchrony, which sometimes drives cognitive processes in children and adults. The main focus will be on dysfunctional emotion regulation in depression, which has a genuine cognitive function and serves as the basis of an "extended" regulation of emotional and physiological arousal. Improving our comprehension of synchrony has important implications for theory and practice, and interactional synchrony might be a promising operational construct for studying diagnostic and therapeutic opportunities.

Chapter Eight will focus on pathological alterations in the skills that enable us to smoothly understand each other in various contexts. It will be shown that mindreading skills are supported by an epistemically engineered environment and scaffolded onto the human body and sensorimotor apparatus. But in that case, one might anticipate new avenues for understanding common problems with social cognition in mental disorders. Research in ASD, for instance, has largely disregarded the role of the body and movement and described social cognition impairments exclusively in terms of mindreading deficits. The chapter will aim to incorporate recent empirical work in light of the conceptual distinctions established in Part I, and show how an analysis in terms of scaffoldings offers new perspectives on central features in ASD. Consistent with the epistemological inseparability thesis, the chapter will support the view that an adequate explanation of social cognition in ASD needs to take into account possible sensorimotor impairments and their effect on disintegration in the higher-order functions that they assist.

Overall, the second part of the book aims to establish that shifting attention from mental symptoms to fine-grained sensorimotor aspects and further improving the position proposed in the book can lead to identifying diagnostic subtypes, or even to specific sensorimotor markers for early diagnosis. One great advantage of identifying such markers would be that these lend themselves to non-invasive, objective measurement that is relatively independent of cognitive-linguistic abilities. After summing up what has been achieved in the book, the conclusion will end

by indicating potential contributions to recent discussions on reduction in psychiatry.

In several ways, the book attempts to walk a thin line. It primarily appeals to philosophers, especially those focusing on empirically-informed areas of philosophy of mind and (meta)theoretical issues, but also to mental health professionals interested in current reflection on the theoretical basis of the scientific study of the mind. The relatively pluralistic position might help readers from the latter group explore the discussion without requiring substantial prior commitments, but one could also worry that it results in a less sharp theoretical position than other contributors have adopted. However, the reasons for adopting this position are mainly theoretical. While the ASC framework holds that explanatory purposes require adopting a taxonomy of various forms of active scaffolding, the choice of not endorsing a single, monolithic theoretical framework is supported by considerations about metaphysical disputes about the boundaries of cognition as well as debates on pluralism in other fields. To be clear, ASC is not neutral, as it for instance denies cognitivist assumptions about separability; it is not pluralist in the sense that it grants equal status to the entire range of theoretical approaches. Instead, the overall outlook on cognition is pluralist in the sense of granting cognitivism a place the larger story about cognition, while skeptical of the view that there is a single theoretical framework that is able to adequately deal with the entire range of cognitive processes.

The book also walks a thin line when it comes to the relationship between the ASC framework and the empirical material discussed in the second part of the book. As a note of caution, it should be stressed that there will sometimes be a disconnect between the relative precision of the definition of what counts as manipulability and as an instance of ASC and the empirical material explored in this book. Because the empirical material on this subject is relatively sparse, at least compared to other areas of psychology, clinical psychology, and psychiatry, some compromises are difficult to avoid. In some cases, perhaps somewhat imprudently, active scaffolding will be inferred from complementary but separate studies. Moreover, some of the findings mentioned, especially in the course of the last three chapters, are relevant for the overall goals of the book, but have not been probed by a sufficient amount of bottom-up and top-down interventions.