COGNITIVE ONTOLOGY

The search for the "furniture of the mind" has acquired added impetus with the rise of new technologies to study the brain and identify its main structures and processes. Philosophers and scientists are increasingly concerned with understanding the ways in which psychological functions relate to brain structures. Meanwhile, the taxonomic practices of cognitive scientists are coming under increased scrutiny, as researchers ask which of them identify the real kinds of cognition and which are mere vestiges of folk psychology. Muhammad Ali Khalidi presents a naturalistic account of "real kinds" to validate some central taxonomic categories in the cognitive domain, including concepts, episodic memory, innateness, domain specificity, and cognitive bias. He argues that cognitive kinds are often individuated relationally, with reference to the environment and etiology of the thinking subject, whereas neural kinds tend to be individuated intrinsically, resulting in crosscutting relationships among cognitive and neural categories.

MUHAMMAD ALI KHALIDI is Presidential Professor of Philosophy at the Graduate Center, City University of New York. His book *Natural Categories and Human Kinds* was published by Cambridge in 2013.

COGNITIVE ONTOLOGY

Taxonomic Practices in the Mind–Brain Sciences

MUHAMMAD ALI KHALIDI
Graduate Center, City University of New York

CAMBRIDGE
UNIVERSITY PRESS

Shaftesbury Road, Cambridge CB2 8EA, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India

103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

We share the University's mission to contribute to society through the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781009223621

DOI: 10.1017/9781009223645

First published 2023
First paperback edition 2024

A catalogue record for this publication is available from the British Library

Library of Congress Cataloging-in-Publication data
NAMES: Khalidi, Muhammad Ali (Professor of philosophy), author.
TITLE: Cognitive ontology : taxonomic practices in the mind–brain sciences / Professor Muhammad Ali Khalidi.
DESCRIPTION: New York, NY : Cambridge University Press, 2022. | Includes bibliographical references and index.
IDENTIFIERS: LCCN 2022025094 | ISBN 9781009223669 (hardback) | ISBN 9781009223645 (ebook)
SUBJECTS: LCSH: Cognitive science. | Cognitive psychology. | Philosophy of mind.
CLASSIFICATION: LCC BF311 .K42 2022 | DDC 153–dc23/eng/20220824
LC record available at https://lccn.loc.gov/2022025094

ISBN 978-1-009-22366-9 Hardback
ISBN 978-1-009-22362-1 Paperback

For Tarif

Contents

Figures

Contributors

JOSHUA MUGG (coauthor, Chapter 7) is an assistant professor at Park University in Kansas City, where he coordinates philosophy, religion, and interdisciplinary studies. He works in the philosophy of psychology, mind, and religion, primarily studying cognitive architecture, belief, and faith.

AMY MACKINNON (coauthor, Chapter 8) is a PhD candidate at Western University studying the philosophy of psychiatry, mind–brain sciences, and disability.

Preface

If a sudden interest in taxonomy is indicative of turmoil in a scientific field, then the cognitive sciences may be in a current state of crisis. Psychologists, neuroscientists, and researchers in related disciplines have recently devoted increasing attention to the ways in which their respective disciplines classify and categorize their objects of study. They are especially interested in the precise manner in which the taxonomic categories of psychology relate, or will relate, to those of neuroscience (e.g. Price & Friston 2005; Poldrack, Halchenko & Hanson 2009; Anderson 2015). This interest in "cognitive ontology" can be traced in part to a range of surprising results emerging from recent neuroimaging research. Despite a widespread expectation that advances in neuroimaging would lead to the discovery of neat match-ups between neural structures and psychological or cognitive functions ("structure-function mapping"), the results of the past few decades have been somewhat mixed when it comes to identifying precise cognitive functions for specific brain regions or networks. This has led many researchers to revisit the question of the relationship between cognitive and neural taxonomy and has led to renewed attention to taxonomic practices more generally.

Broadly speaking, four taxonomic approaches can be discerned among researchers in the cognitive sciences when it comes to structure-function mapping. The first, and perhaps most intuitively plausible position, *localism*, holds that there will eventually be a one-to-one mapping from brain regions or neural networks to cognitive or psychological functions (e.g. Young & Saxe 2009; Saxe 2010). Localism need not be committed to the claim that each cognitive function is performed by a single brain region, since networks of regions may well be implicated in performing any given cognitive function. But it does seem committed to the idea that the very same brain region cannot perform two distinct cognitive functions in different circumstances or on different occasions. In other words, each neural region is "maximally sensitive" or "selective" for a cognitive function.

Another view, *globalism*, claims that the entire brain, or at any rate, large swathes of the cortex, are implicated in carrying out any given cognitive function (e.g. Crick & Koch 1990; Suppes, Han, Epelboim et al. 1999). These functions are executed by the brain as a whole, and what distinguishes them from one another are such properties as levels of activation. A third view, *revisionism*, has gained prominence recently. It claims that our current cognitive categories need to be revised before they can be directly associated with neural categories. Our existing cognitive taxonomy is simply not suitable for mapping onto neural taxonomy and must be modified before a mapping can be effected (e.g. Price & Friston 2005; Poldrack, Halchenko, & Hanson 2009). Finally, the fourth position, *contextualism*, holds that different brain regions perform different functions depending on context (e.g. McIntosh 2004; Anderson 2010; Lindquist, Wager, Kobel, et al. 2012; Klein 2012). According to one incarnation of this view, it is the *neural* context that determines which function any particular brain region performs. That is, the cognitive function of a region depends on the other regions with which it is coactive, and this relies, in turn, on the nature of the neural pathways that connect regions, their patterns of connectivity (e.g. feed-forward, feedback), the type of coupling that obtains between them, and the temporal dimensions of that coupling. It also depends on such factors as neuromodulation by genetic and chemical means (Anderson 2015). But there is also another version of contextualism, which assigns different cognitive functions to a brain structure depending not (just) on the neural context, but also on the broader *environmental* context, as well as on the *developmental context* and on *causal history* (cf. Pöyhönen 2015; Hutto Peeters, & Segundo-Ortin 2017). This book argues that this variant of contextualism has been unjustly neglected and deserves greater attention. One of its guiding hypotheses is that certain cognitive constructs lend themselves to contextual (or environmental) and etiological individuation, thereby obstructing a one-to-one structure-to-function mapping.

The contextualist position entails that there can be a many-to-many relationship between structure and function (Khalidi 2017; 2020). It is not merely the case that the very same cognitive functions can be subserved by different neural structures or mechanisms (multiple realization), but the very same neural structures can also subserve different functions depending on context (multifunctionality). This will result in a crosscutting relationship between taxonomic categories that track neural structure and those that track cognitive function. This should not be such a surprising result, since crosscutting structure-function taxonomies are also in evidence in other areas of science, particularly the biological sciences. It is

not difficult to find cases in other scientific domains in which there exists a many-to-many mapping between structure and function (cf. Weiskopf 2011; Stinson 2016). The function of flight is performed by different types of structure in different animals, such as bat wings and dragonfly wings. Thus, flight is multiply realized in structures as diverse as mammalian forelimbs and insect exoskeletons. At the same time, the mammalian forelimb performs a different locomotive function in different species, namely flying in bats, walking in cats, and swimming in dolphins (cf. Ereshefsky 2012). However, one of my central claims in this book goes further than this, since I will argue that there can be a many-to-many mapping not just from *structure* to function, but from types of neural state to types of cognitive state in general. This obtains even when one takes into account nonstructural aspects of neural phenomena, including such phenomena as chemical neuromodulation of brain regions.

What is the evidence for a many-to-many mapping between mind and brain, or between cognitive and neural categories? Despite skepticism among some philosophers (Kim 1992; Shapiro 2004; Polger 2009), I would argue that multiple realization, or a *many-to-one* brain–mind mapping, is well attested in cognitive science (e.g. Aizawa & Gillett 2009; Aizawa 2017). Moreover, a *one-to-many* neural-to-cognitive mapping is also a serious possibility. One striking finding from the last decade or two of research in neuroscience, particularly neuroimaging studies, is the extent to which particular brain regions are implicated in a range of seemingly very distinct psychological processes. The idea of neural pluripotency or "neural reuse" has been defended on the basis of a growing body of empirical evidence (Anderson 2015). To take just one example, the amygdala is involved in processing fear and other negative emotions, but also perception of odor intensity, sexually arousing stimuli, trust from faces, biological motion, and sharp contours (cf. Nathan & Del Pinal 2016). Some researchers would continue to insist that the apparent multifunctionality of brain regions stems from an insufficiently fine-grained individuation of these regions and that closer inspection will reveal that it is not the very same brain region implicated in diverse cognitive functions (e.g. Scholz, Triantafyllou, Whitfield-Gabrieli, et al. 2009). But others are at least open to the possibility that brain regions are indeed multifunctional depending on context. Drawing on a number of case studies, this book will ascertain the extent to which many-to-many mappings exist across the cognitive sciences, and will investigate whether this is due (at least in part) to the contextual individuation of cognitive functions, particularly when it comes to the broader environmental–etiological context. One of the principal themes of the book is that cognitive

phenomena are often individuated with reference to environmental and etiological factors, but neural phenomena are usually not so individuated. Even when they are, the pertinent "external" factors do not always coincide with those relevant to the cognitive phenomena. That is why there can be a many-to-many mapping between cognitive and neural categories. This is not just a claim about the causal relationship between mind and environment but an individuative claim about the taxonomic categories that pick out real kinds in the cognitive domain.

The search for cognitive kinds has occupied many philosophers of cognitive science, especially those who have looked closely at particular case studies in the cognitive domain. There would appear to be two countervailing impulses among contemporary naturalist philosophers. The first is the tendency on the part of some philosophers to admit more or less any items into our cognitive ontology that are countenanced by our best scientific theories, thereby inviting the accusation that they are too permissive and are over-populating our cognitive ontologies. This kind of "rainforest realism" (Ladyman & Ross 2007) is sometimes even thought not to be a brand of realism at all, since allowing in too many items can be seen to undermine the idea that there is a select or elite group of ontological entities that make up the world (including the mental world). The other tendency among naturalist philosophers is to subject empirical work to detailed and meticulous scrutiny and to conclude that the psychological or cognitive constructs in question are not, despite appearances, natural kinds, thus inviting the rebuttal that they are being too restrictive.[1] How should we adjudicate this apparent tension among cognitive ontologists? There is clearly no substitute for looking at each case and judging it on its merits – and there is obviously no inconsistency in considering some cognitive categories to correspond to natural kinds and others not. For most of the case studies that I will be discussing, I will conclude that there are

[1] Both tendencies can be illustrated by the titles of publications by empirically minded and naturalist researchers who view the cognitive sciences through the lens of natural kinds. For the restrictive tendency, consider: "Is *thinker* a natural kind?" (Churchland 1982); "Consciousness is not a natural kind" (van Brakel 1995); "Psychiatric disorders are not natural kinds" (Zachar 2000); "Concepts are not a natural kind" (Machery 2005); "Memory is not a natural kind" (Michaelian 2011); "Pain is not a natural kind" (Corns 2012); "Addiction is not a natural kind" (Pober 2013); "Is emotion a natural kind?" (Griffiths 2004). Meanwhile, the permissive tendency can be discerned from the following titles: "The natural kind status of emotion" (Charland 2002); "Delusion as a natural kind" (Samuels 2009a); "Why don't concepts constitute a natural kind?" (Samuels & Ferreira 2010); "Depression and suicide are natural kinds" (Tsou 2013); "Addiction-as-kind hypothesis" (Ylikoski & Pöyhönen 2015); "Innateness as a natural cognitive kind" (Khalidi 2016a); "Autism as a psychiatric kind" (Weiskopf 2017a).

good grounds for considering them to be natural kinds. However, there are a few caveats that come along with this conclusion. First, scientific theories are defeasible, so the final verdict on any scientific category awaits the end of inquiry and our current conclusions are inevitably just tentative. Still, wholesale revision of concepts is rare in the history of science (which may be why the infamous categories of *phlogiston* and *caloric* recur so frequently in philosophical discussions of these matters), so we should not expect our current cognitive categories to be summarily swept aside and replaced in their entirety. Second, even though I will argue for a positive verdict for most of the categories to be discussed, I will also occasionally point to other categories in the vicinity (e.g. some superordinate or subordinate categories) that do not seem to correspond to natural kinds. Thus, most of the focal cases I discuss will be vindicated, but some of their close relatives will not. Third, even when it comes to the focal cases, I will sometimes argue for splitting rather than lumping, making the case that what is often taken to be a single natural kind is likely to be two or more different kinds. Moreover, in some of these cases, I will also argue that the split kinds do not belong to an overarching kind that comprises all and only those kinds. Hence, this amounts to a revisionary approach to our taxonomic practices and requires us to make some adjustments to our cognitive ontology. Finally, one reason why my conclusion tends to be less revisionary than that of some other philosophers, who have cast doubt on the existence of some central items in our mental ontology (e.g. *concept*, *emotion*, *pain*), is that I am operating with a more expansive notion of natural (or real) kind. As I will explain in the first chapter, the conception of natural kind that I am deploying (and have argued for elsewhere) is a nonessentialist one that relaxes some of the conditions that other philosophers have put on natural kinds. Others (including some cognitive scientists) who have tackled this question have been relying on what I consider to be an unduly restrictive or reductionist notion of kinds.

Chapter 1 will set out the broad metaphysical picture that will guide the inquiry. I derive the naturalist notion of kinds that I am using from the nineteenth-century discussion of classification and kinds initiated by Whewell, Mill, and Venn, rather than the more recent essentialist view of natural kinds put forward by Kripke and Putnam. I go on to defend a "simple causal theory" of cognitive kinds (Craver 2009), which conceives of them as "nodes in causal networks" (Khalidi 2013; 2018) in the cognitive domain. In addition, I argue against the layer-cake picture of scientific domains associated with Oppenheim and Putnam (1958) and put forward some reasons to resist reductionism when it comes to

cognitive categories, based on different bases for individuating cognitive and neural categories. Finally, I respond to some concerns that the resulting ontological picture is not a realist one, on the grounds that it countenances the existence of cognitive kinds that are mind-dependent and self-reflexive.

In Chapter 2, I take up one of the most basic putative cognitive kinds, *concept*, arguing that it should be considered a real kind based on our current state of knowledge, contrary to what some philosophers have urged (e.g. Machery 2009). After surveying a body of empirical work on concepts in both cognitive neuroscience and cognitive psychology, I try to show that this work is pitched at two or three different levels of explanation. Much of the recent work on concepts using neuroimaging techniques should not be expected to reveal the neural correlates of concepts. That is partly because the research has different explananda and is investigating different causal processes. Meanwhile, other work on concepts in cognitive science reveals psychological structures (prototypes) associated mainly with automatic processing rather than deliberative reasoning. By contrast, concepts proper can be understood as functional kinds, which are individuated partly etiologically and partly with reference to the thinker's discriminatory and inferential abilities. I argue that many research programs in cognitive science individuate concepts in this way, combining diachronic and synchronic factors, though this does not seem to have been widely noticed by philosophers or psychologists. The resulting account of concepts is closely related to the "wide functionalist" theories first proposed by Harman (1982) and Block (1986), and is pitched at what Marr (1982) would call the "computational level," rather than the "algorithimic" or "implementational" levels.

Chapter 3 is about the category of *innateness*, which is a feature often associated with a range of cognitive phenomena, including concepts, cognitive capacities, behavioral dispositions, and mental states. Arguing against a number of recent critiques of the notion (e.g. Griffiths 2002; Mameli & Bateson 2006), I try to show that innateness can be identified with a cluster of properties that are causally interrelated in various ways and will propose a tentative causal model of the kind. In individuating innateness, it is important to distinguish proximal from distal causation. Some of the causal properties associated with innateness are involved in individuating innate cognitive capacities synchronically, while others are etiological in nature, responsible for making those capacities innate in the first place. This complex causal network is robust enough to warrant considering innateness to be a real kind as used in contemporary cognitive

science. (This chapter is closely based on previously published work [Khalidi 2016a].)

Chapter 4 considers a related cognitive construct, *domain specificity*, which is invoked in a number of different research programs in cognitive science, to indicate cognitive capacities that are limited in certain ways. Specifically, the idea is that some cognitive capacities are restricted in their application to a certain domain, whereas others range freely beyond that domain. The challenge arises in saying what constitutes the domain of a capacity, especially since areas of knowledge do not come antecedently compartmentalized. Building on the work of some cognitive scientists, I argue that the best way to understand the proper domain of a cognitive capacity is by invoking evolutionary considerations. This means that domain-specific capacities are individuated etiologically (at least in part), based on their evolutionary history. They are also identified on the basis of their synchronic causal powers, what they can and cannot do, since domain-specific cognitive capacities cannot range beyond their proper domains (whereas domain-general ones can). Given this cluster of causal features, I argue that there is a prima facie case to be made for considering domain specificity to be a cognitive kind, one that may include various types of cognitive capacity, such as alarm calls in vervet monkeys and face recognition in humans.

In Chapter 5, I discuss the kind *episodic memory*, which has recently garnered a great deal of attention from philosophers. In light of current empirical work, it has become increasingly challenging to accept an influential and intuitively plausible philosophical account of memory, namely the causal theory (Martin & Deutscher 1966). It is unlikely that each episodic memory can be associated with a trace or "engram" that can be shown to be linked by an uninterrupted causal chain to an episode in the thinker's past. Some philosophers and psychologists have responded by effectively abandoning the category of episodic memory and assimilating memory to imagination or hypothetical thinking (e.g. Suddendorf & Corballis 1997; Michaelian 2016; De Brigard 2014). But I will argue that there is still room for a distinct cognitive kind, *episodic memory*, a cognitive capacity whose function it is to generate representational states that are connected to past episodes in the experience of the thinker, bearing traces of these episodes that are individuated not at the neural level but at the "computational level" (Marr 1982).

Chapter 6 considers an unusual cognitive category, which pertains to a kind of *process* rather than a kind of entity, state, or capacity, namely what I call *language-thought processes*. The kind of process in question is often

discussed in the cognitive science literature under the headings of "linguistic relativity" and "linguistic determinism." I claim that these labels aim to identify a distinctive type of cognitive process, all of whose instances share something important in common, namely a fundamental or deep-seated influence of language on thought. However, by looking at some paradigmatic cases, I argue that there is nothing to distinguish this type of process from a broader cognitive phenomenon, namely concept acquisition or conceptual change. Moreover, I also argue that within this broader category, there are two distinct kinds of process that are usually lumped together that do not seem to have anything significant in common. There is an important difference between those processes that involve simultaneous recruitment of linguistic capacities and those that do not. I argue that these two types of process may constitute distinct cognitive kinds within the broader cognitive kind of *concept acquisition* or *conceptual change*.

Chapter 7 discusses the categories of *cognitive heuristic* and *cognitive bias*. These categories have come to define a burgeoning research program in cognitive science (the "heuristics and biases" program) and are widely considered to be universal features of human thought. On closer inspection, both categories are found to be too heterogeneous to identify real cognitive kinds, though some of their sub categories may be such. In particular, the chapter examines the construct *myside heuristic* (closely related to the phenomenon often known as "confirmation bias"). This is found to be a better candidate for cognitive kindhood, since it seems to pertain to a specific feature of human cognitive architecture. Moreover, the myside heuristic, which (roughly speaking) attaches more weight to one's own opinions than to contrary opinions, can be rational in certain contexts. Thus, distinguishing the heuristic from a corresponding bias can only be done against the background of a cognitive task or problem. This constitutes yet another instance of contextual or environmental individuation of a cognitive construct. Again, this kind of contextualism does not preclude it being a real cognitive kind, but it does make it unlikely that it will correspond to a neural kind.

Chapter 8 tackles a psychiatric kind that does not pertain to cognitive science narrowly conceived, though it is strongly rooted in cognition. It concerns body dysmorphic disorder (BDD), a psychiatric disorder that has been classified in the most recent edition of the standard *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) as one of the obsessive compulsive–related disorders (OCRDs). This condition involves persistent and intrusive thoughts about a perceived bodily flaw that is not observable or appears slight to others, it leads to repetitive behaviors, and it tends to

result in significant distress or functional impairment. The chapter argues that the disorder seems to have an important cognitive component involving certain deficits in visual processing, in interpreting the mental states of others, and in assessing evidence for and against one's beliefs. A causal model of BDD is proposed that aims to show how its main features fit together. Based on this causal model, there are strong grounds for considering it a distinct psychiatric kind. The causal model also strongly suggests that it should not be categorized with the OCRDs. This model suggests a revision of the standard psychiatric taxonomy based on an analysis of the underlying causes of the disorder as opposed to its superficial symptoms.

Finally, Chapter 9 is an epilogue that brings together some of the main themes that run through the previous chapters. The principal themes that I recap are the etiological–environmental individuation of cognitive kinds, the advantages of a real-kind approach to cognitive ontology, and the purview of cognitive neuroscience. On the first score, I distinguish the variety of externalism defended in this book from the familiar varieties in the philosophical literature. On the second, I show how taxonomic practices in cognitive science can benefit from reflecting on the overarching ontological categories in the cognitive domain and on greater clarity in distinguishing relationships among different kinds of kinds (e.g. subordinate and superordinate kinds). On the third point, I argue that the scientific discipline of cognitive neuroscience, which aims to build bridges between neural and cognitive taxonomies, need not revolve around the search for neural correlates of cognitive kinds. After all, a scientific discipline like ecological genetics does not seek genetic correlates of ecological constructs.

This account of cognitive ontology cannot (obviously) hope to be comprehensive. But by choosing a number of central or representative entities for investigation, I aim to establish a number of conclusions about real kinds in the cognitive domain. First, when approached using a notion of kinds that is naturalistic and sensitive to the character of the special sciences, the cognitive domain can be seen to be populated by real kinds, which can be revealed by scientific investigation. Second, many of the items posited in our current scientific taxonomies are likely to correspond to real kinds in the cognitive domain, and wholesale revisions to our ontology are not likely. Third, notwithstanding the previous claim, some of the cognitive entities discussed in the book, and in particular, some of the ways in which some cognitive entities are classified (within superordinate categories, or into subordinate categories) are likely not to be consecrated or borne out by future scientific theorizing. Fourth, the relationship between our cognitive and neural taxonomies is complicated by the fact

that etiological and relational individuation in cognitive science may lead to widespread mismatches between cognitive and neural categories, due to different individuative practices in the respective sciences. Finally, it is possible to be a realist about cognitive ontology while at the same time admitting that there may be crosscutting classificatory practices within the cognitive domain, yielding crosscutting taxonomies that track orthogonal causal processes.

* * * * *

This book might not have seen the light of day without an Insight Grant from the Social Sciences and Humanities Research Council of Canada, for the project "Taxonomic Practices in the Mind-Brain Sciences." I am grateful to this research grant in no small part for encouraging me to collaborate with others in ways that I would certainly not have been able to do without it. Collaborative work is rare in philosophy not just because resources are scarce, but because of a traditional disciplinary ethos of solitary contemplation. Notwithstanding this prevalent attitude, having the funding to help support research assistance is one way to encourage collaboration between established and emerging scholars. Thanks to this grant, I had the resources to support two junior researchers while working on this book, Dylan Ludwig and Amy MacKinnon (both of whose contributions I will detail below).

My largest debt is to my two coauthors on Chapters 7 and 8, Joshua Mugg and Amy MacKinnon, respectively, who very kindly agreed to contribute their research and writing to a monograph that is largely the work of someone else. Over a decade ago, Josh joined the graduate program at York as a very enterprising MA student who was eager to work on foundational questions in metaphysics. He went on to pursue a thesis topic that combined metaphysics and cognitive science, under my supervision, on the theoretical underpinnings of dual-process (or dual-system) theory in the philosophy of psychology. While he was finishing his dissertation, we collaborated on a commentary for the journal *Behavioral and Brain Sciences* on a target article proposing a new cognitive heuristic (Cimpian & Salomon 2014). This led to further collaboration on the topic of cognitive heuristics and biases, resulting in an article, "Self-Reflexive Cognitive Bias," which was published in the *European Journal for the Philosophy of Science* (Mugg & Khalidi 2021). When it came time to write a chapter on cognitive heuristics and biases, I very naturally reached out to him (now an assistant professor at Park University) for possible collaboration, and was delighted when he agreed. My association with Amy was very fortuitous.

I first met her while she was an MA student at Western when I attended two conferences there. After a couple of engaging conversations about the philosophy of psychiatry, which was a budding interest of mine, we agreed to stay in touch. When she briefly joined the PhD program in Critical Disability Studies at York University, we renewed our conversations about the philosophy of psychiatry. She soon decided to return to philosophy and to Western to pursue a PhD in philosophy, but in the meantime, she agreed to work as a research assistant on this book project, helping me investigate a number of different topics, notably, episodic memory. But our main work together has been on the psychiatric condition of body dysmorphic disorder, about which we read and discussed dozens of research articles. Her knowledge of psychiatry and the philosophy of psychiatry, as well as her firsthand experience working with patients with mental health conditions, was invaluable in helping me think through the issues, both theoretical and practical, so I was delighted when she agreed to be a coauthor on Chapter 8.

Even though he is not listed as a coauthor on any of the chapters, Dylan Ludwig has left scarcely less of a mark on the book than my two collaborators, and his contribution has been as important. While he was a PhD student working with me at York, I employed Dylan as a research assistant on this project from its very inception, and his help has touched every chapter without exception. His astute analytic skills, his ability to link philosophy and the sciences, and his background in neuroscience all helped shape this book in numerous ways. He was an invaluable conversation partner and sounding board on every chapter. On a more mundane note, he also prepared the bibliography and index for this book, with model efficiency and attention to detail.

Conversations with my colleagues at York University, particularly Kristin Andrews, Jacob Beck, Brian Huss, Kevin Lande, Alice MacLachlan, Robert Myers, and Claudine Verheggen, sometimes on the Toronto streetcar or subway, were more influential on my thinking about these issues than they realize. In some cases, a stray remark or innocent-sounding challenge led me to rethink some of the basic assumptions I was making. They have also organized and participated in a number of stimulating workshops at York over the years, which were very thought-provoking and left a long-lasting impression.

In June 2019, Joshua Mugg and I organized a workshop at York University on "Natural Kinds in Cognitive Science," which was a source of inspiration for writing this book and helped launch me on this project. I am very grateful to all the participants for their enlightening presentations

and many contributions to the discussion sessions: Sara Aronowitz, Dan Burnston, David Colaço, Javier Gomez Lavin, Dan Kelly, Dale Stevens, Jacqueline Sullivan, Stephen Setman, and Maggie Toplak. Lively discussions after each paper and an informal roundtable at the end brought together all participants with members of the audience. The workshop was partially supported by the SSHRC grant mentioned above, as well as by the Department of Philosophy, the office of the Vice President for Research and Innovation, and the office of the Provost. Also at York, I was fortunate to participate for around five years in regular lab meetings of the Cognitive Neuroscience lab, led by Shayna Rosenbaum. The lab's research on episodic memory and spatial navigation helped me better understand how cognitive scientists validate their constructs and how they think about the ontology of the cognitive sciences.

In the midst of writing this book, I was very fortunate to be offered a position at the Graduate Center, City University of New York, which has been an ideal environment for finishing it. The lighter teaching load helped me meet the projected deadline (give or take a couple of weeks) and the intensive engagement with insightful graduate students inspired me in the home stretch. The final stages of writing this book were also contemporaneous with attending (virtual) events at the Graduate Center, notably the Philosophy Department Colloquium and the Cognitive Science Speaker Series. In addition, I have been a keen member of the Experimental Philosophy lab, organized by Jesse Prinz, with an ever-expanding cast of perceptive characters working on various projects at the intersection of philosophy and cognitive science. All these discussions informed the final drafts of these chapters in tangible and intangible ways.

Some of these chapters have appeared or have been presented in earlier forms at various forums. A version of Chapter 3 was published as: Innateness as a natural cognitive kind. *Philosophical Psychology*, *29* (2016), 319–333. I am grateful to the editors of that journal for permission to reprint it here (with significant revisions). An early version of Chapter 3 was presented at the Society for Philosophy of Science in Practice, Toronto, June 2013, and at the European Society for Philosophy and Psychology, Granada, Spain, July 2013. A much earlier version of Chapter 4 was presented at the Cognitive Science Society Conference, Portland, August 2010. Chapter 5 was influenced by a graduate seminar on Memory that I taught at CUNY in the Spring semester of 2020–2021, and the enlightening discussions with the students in that class. A version of Chapter 6 was also presented at the European Society for Philosophy and Psychology, Granada, Spain, July 2013. Finally, versions of Chapter 8 were copresented (with

Amy MacKinnon) at the Canadian Philosophical Association (virtually), June 2021, and the Philosophy of Science Association, Baltimore, November 2021.

Some of the people I have already mentioned have read and commented on parts of the manuscript, including Dylan Ludwig, Amy MacKinnon, and Josh Mugg. Sarah Robins also very kindly read a draft of Chapter 5 and lent me her insights into episodic memory; her writings on the subject have been a real source of inspiration for me. Brett Reynolds generously offered to read Chapter 6 and lend his expertise in linguistics, for which I am very grateful. Finally, two anonymous referees for Cambridge University Press provided a wealth of detailed and incisive comments. I have not managed to heed all their advice and answer all their questions, but I hope that I have gone some distance in that direction. At Cambridge, Hilary Gaskin was the model of efficiency and magnanimity, going out of her way to accommodate some of my demanding requests.

It is customary at this point to say that my greatest debt is to my family, but I'd rather not think of my relationship with them in transactional terms, because that would leave me feeling much worse off. Speaking of family, this book is dedicated to my father, Tarif Khalidi, a very philosophical historian. Our conversations and debates, on figures ranging from al-Farabi to Wittgenstein, and on topics as diverse as historiography and physiognomy, first sparked my interest in philosophy. He likes to say that he understands around 10 percent of what I write; I worry that that may be the only cogent part.