Conclusion I: The Origins of Concepts
Susan Carey

This chapter summarizes the main points from the preceding chapters. It provides an overview of the argument and a road map through it. It argues that distinguishing theory changes that involve conceptual change from those that do not is as central to understanding individual conceptual development as it is to understanding theory acquisition in historical time. Conceptual change constitutes a form of genuine developmental discontinuity and thus poses a very difficult explanatory challenge. Quine's bootstrapping plays a role in the acquisition of both intuitive theories during childhood and explicit theories during the history of science.

Conclusion 2: Implications for a Theory of Concepts
Susan Carey

This chapter considers the implications of the picture of conceptual development offered in this book for a theory of concepts. It introduces new material, placing work on the origin of concepts in the context of selected controversies from cognitive science and philosophy concerning the very nature of concepts.
The Origin of Concepts
Susan Carey

Only human beings have a rich conceptual repertoire with concepts like tort, entropy, Abelian group, mannerism, icon, and deconstruction. How have humans constructed these concepts? And once they have been constructed by adults, how do children acquire them? While primarily focusing on the second question this book shows that the answers to both overlap substantially. The book begins by characterizing the innate starting point for conceptual development, namely systems of core cognition. Representations of core cognition are the output of dedicated input analyzers, as with perceptual representations, but these core representations differ from perceptual representations in having more abstract contents and richer functional roles. The book argues that the key to understanding cognitive development lies in recognizing conceptual discontinuities in which new representational systems emerge that have more expressive power than core cognition and are also incommensurate with core cognition and other earlier representational systems. Finally, the book fleshes out Quinian bootstrapping, a learning mechanism that has been repeatedly sketched in the literature on the history and philosophy of science. It demonstrates that Quinian bootstrapping is a major mechanism in the construction of new representational resources over the course of children's cognitive development.

Darwin and development: Why ontogeny does not recapitulate phylogeny for human concepts
Frank C. Keil and George E. Newman

This chapter argues that human cognitive development tells us a great deal about what makes human thinking qualitatively unique, but it does so in the same way that current evolutionary biologists explain how organisms are particularly well adapted to niches; that is, the way in which human concepts are specialized, rather than the product of a linear increase in complexity. The chapter outlines a few
key developmental transitions that are commonly assumed in human cognitive development and then demonstrates how these ontogenetic distinctions fail to contribute to our understanding of cross-species differences.

The making of an abstract concept: Natural number
Susan Carey
in The Making of Human Concepts
Published in print: 2010 Published Online: May 2010
DOI: 10.1093/acprof:oso/9780199549221.003.013
Item type: chapter

This chapter argues for three points: First, it denies that nonhuman animals or human infants lack the capacity to represent abstract concepts. In particular, it argues that the initial state includes several systems of core cognition with long evolutionary histories. Core cognition includes abstract concepts with conceptual content. Second, nonetheless, there are discontinuities in conceptual development at two different levels of generality. At a general level, most human concepts differ from those embedded in core cognition in many ways, and, at a specific level, core cognition does not have the resources to represent most specific abstract concepts. Third, it characterizes one class of learning mechanism that underlies the discontinuities of interest: Quinian bootstrapping. With this analysis in hand, the chapter speculates on some aspects of conceptual representations unique to humans. These points are illustrated with a single case study of the making of the human capacity to represent natural number.

Building Intentional Action Knowledge with One’s Hands
Sarah Gerson and Amanda Woodward
in Neoconstructivism: The New Science of Cognitive Development
Published in print: 2009 Published Online: February 2010
DOI: 10.1093/acprof:oso/9780195331059.003.0015
Item type: chapter

This chapter considers the potential origins of the ability to discern others' intentions in acting. It focuses on a category of experience that has long been hypothesized to contribute to intentional understanding: namely, first-person agentive experience. Theoretically, it seems reasonable that one's own experience as an agent could provide useful information for understanding other agents. A true test of this general
hypothesis requires (1) measuring infants' analysis of observed action structure and (2) relating this measure to variations in infants' own actions. The chapter turns first to recent studies that have done just this, and in so doing provided initial evidence that this general proposal is on the right track. It then turns to the much harder question of why self-produced experience might have an effect on the development of action understanding. This question will leads to the consideration of recent work on mirror systems, the limits of mirror systems, and the role of analogy in conceptual development.

The Role of Language and Culture in Universality and Diversity of Human Concepts
Mutsumi Imai and Takahiko Masuda

in Advances in Culture and Psychology: Volume 3
Published in print: 2013 Published Online: May 2013
DOI: 10.1093/acprof:oso/9780199930449.003.0001
Item type: chapter

The influence of language and culture has been investigated across different research disciplines such as anthropology, cognitive psychology, and cultural psychology, but such research all tends to ask whether language (or culture) influences cognition in general, without clearly specifying what is meant by “language” or “culture.” This chapter proposes an alternative approach, whose aim is to specify a complex interplay among various factors—including universal cognitive constraints, perceptual affordances provided from the world, task-specific constraints, language-specific biases, and culture-specific cognitive styles—to account for people’s behavior in a given cognitive task and the developmental trajectory of that behavior. To establish this point, four research programs examining the roles of language and culture in terms of construal and organization of objects, relations among objects, and actions are reviewed.

Dependent and Dynamic Processes
Ezra Susser, Sharon Schwartz, Alfredo Morabia, and Evelyn J. Bromet

in Psychiatric Epidemiology: Searching for the Causes of Mental Disorders
Published in print: 2006 Published Online: September 2009
DOI: 10.1093/acprof:oso/9780195101812.003.37
Item type: chapter
Although critiques of current epidemiologic methods frequently invoke concepts derived from a complexity framework, applications of these approaches to epidemiologic problems are scarce. Broader application awaits both conceptual and methodological development. This chapter describes the broad outlines of this approach to explore and envision its potential for psychiatric epidemiologic research. It also draws attention to some nascent examples on the horizon.

Summary Observations and Speculations: General and Particular
K. J. M. Smith
in Lawyers, Legislators and Theorists: Developments in English Criminal Jurisprudence 1800-1957

Looking across the century and a half of conceptual developments in the criminal law, what broad conclusions can be hazarded as to the nature and processes of change? More particularly, what were the principal changes in legal cultural and formal institutional mechanisms which carried the potential to influence law making? Of greatest likely impact on legal culture were matters relating to the education of lawyers and the coming of age of university law teaching, with the accompanying growth in textbooks and academic journals. In mechanistic terms, patently the most significant institutional innovations over the period were the refashioning of the appeals courts and procedures in 1848 and 1907. This chapter reviews each of these areas of change and potential influence in relation to the law's conceptual development.

The role of similarity in natural categorization
James A. Hampton
in Similarity and Categorization

The intuitive idea that one puts things into categories because one finds them similar appears to be non-controversial, if not circular. Cars are clearly more similar to other cars than they are to trees, and trees more similar to other trees than they are to cars. However, a
number of theorists have recently questioned the degree to which the notion of similarity is sufficiently clearly defined and constrained to serve as an explanation of the categorization. This chapter discusses the arguments for and against basing categorization on a notion of similarity, and concludes that, construed broadly, similarity may yet be the best explanation of how most of our conceptual categories function. It proposes a distinction between concepts viewed as a cultural phenomenon and concepts at the psychological level, and suggests a naive model of conceptual development that starts with concepts as similarity clusters.

Essentialism as a Generative Theory of Classification
Bob Rehder

in Causal Learning: Psychology, Philosophy, and Computation
Published in print: 2007 Published Online: April 2010
Item type: chapter

Essentialism is the view that kinds are defined by underlying properties or characteristics (an essence) that is shared by all category members and by members of no other categories and that are presumed to generate, or cause, perceptual features. Although unobservable, essential features can nonetheless affect classification by changing the evidence that observable features provide for category membership. This chapter proposes treating essentialized categories as a generative causal model and provides evidence for four phenomena that follow from this view: (a) classification as diagnostic reasoning; (b) classification as prospective reasoning; (c) boundary intensification; and (d) the effect of coherence on classification. The chapter also characterizes the development of conceptual knowledge in terms of an evolving set of causal models.

Developmental Origins of Social Group Preferences
Andrew Scott Baron, Anthea Pun, and Yarrow Dunham

in Core Knowledge and Conceptual Change
Published in print: 2016 Published Online: August 2016
Item type: chapter

Representations of social groups emerge early in infancy and undergo considerable enrichment across development. Such representations are
deployed over vastly different kinds, including shared belief systems, shared interests, rituals, relational structures, occupation, language, and morphology. Over the course of development social category concepts become inferentially rich, constraining patterns of induction and evaluation of group members. For example, the earliest forms of preference emerge in infancy and appear to be driven primarily by a preference for the familiar. However, among older children and adults these preferences become conceptually richer by being more closely linked to the self and more explicitly defined in terms of ingroups and outgroups. This chapter explores the emergence of evaluative preferences toward social groups in infancy and their change across early childhood, with a particular focus on the independence and convergence of implicit and explicit processes. The aim is to review and raise pressing questions about the nature of conceptual development in the domain of intergroup cognition.

Can Children Benefit from Thought Experiments?
Igor Bascandziev and Paul L. Harris

in The Scientific Imagination

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Publisher: Oxford University Press
DOI: 10.1093/oso/9780190212308.003.0012

Item type: chapter

The “child as scientist” metaphor has been a source of many important insights about how children learn about the world. Extensive research has shown that, like scientists, children construct and test theories about the world through observation, exploration, and experimentation. What is not known, however, is whether children are similar to scientists in their employment of thought experimentation and other rationalistic processes when trying to learn about the world. Although the history of science has documented many instances of thought experiments being central to conceptual revolutions, there have been no empirical studies that ask the same question within developmental psychology. Such empirical studies are needed and warranted. Contrary to popular belief, children’s imagination is not fanciful or poorly disciplined. Instead, their imagination is constrained by knowledge of causal principles across different domains. Thus, engaging children in thought experiments should not produce unrealistic or impossible outcomes; rather, it should produce outcomes consistent with the causal structure of the world. Indeed, the consideration of hitherto unacknowledged implications of such outcomes may teach children something new about the world. This chapter reviews evidence from several studies that were not originally designed to test whether children can benefit from thought experiments.
but which nonetheless provide encouraging preliminary evidence of such benefit. Somewhat surprisingly, they hint that at least under some circumstances, the benefit from thought experiments may be greater than the benefit from direct observations of the world.

Beyond Concepts
Ruth Garrett Millikan

This book weaves together themes from natural ontology, philosophy of mind, philosophy of language and information, areas of inquiry that have not recently been treated together. The sprawling topic is Kant’s how is knowledge possible? but viewed from a contemporary naturalist standpoint. The assumption is that we are evolved creatures that use cognition as a guide in dealing with the natural world, and that the natural world is roughly as natural science has tried to describe it. Very unlike Kant, then, we must begin with ontology, with a rough understanding of what the world is like prior to cognition, only later developing theories about the nature of cognition within that world and how it manages to reflect the rest of nature. And in trying to get from ontology to cognition we must traverse another non-Kantian domain: questions about the transmission of information both through natural signs and through purposeful signs including, especially, language. Novelties are the introduction of unitrackers and unicepts whose job is to recognize the same again as manifested through the jargon of experience, a direct reference theory for common nouns and other extensional terms, a naturalist sketch of uniceptual—roughly conceptual — development, a theory of natural information and of language function that shows how properly functioning language carries natural information, a novel description of the semantics/pragmatics distinction, a discussion of perception as translation from natural informational signs, new descriptions of indexicals and demonstratives and of intensional contexts and a new analysis of the reference of incomplete descriptions.

How Unicepts Get Their Referents
Ruth Garrett Millikan
The question what determines the referents/extensions of unicepts is
the same as the question how their unitrackers are set up and tested for
adequacy, a question that concerns, roughly, conceptual development. A
unicept’s referent is what its unitracker is designed to track—its target.
The central question of this chapter is how selection for same-tracking
a target occurs, what kinds of selection mechanisms are involved.
Certain inborn mechanisms and mechanisms derived from prior learning
can determine how experience sets some targets for new unitrackers.
An animal’s native reward system can also furnish targets for new
procedural unitrackers. New kinds of substance and attribute unitrackers
can also be tested through a kind of coherence. The laws of identity
and noncontradiction work together as a confirming signal and an error
signal during the development of substance and attribute unicepts, local
coherence indicating distal correspondence.

Introduction to Part I
Ruth Garrett Millikan

in Beyond Concepts: Unicepts, Language, and Natural Information
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This book weaves together themes from natural ontology, philosophy
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