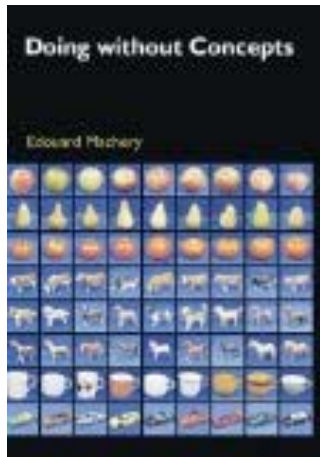


## Book Review

# Doing Without Concepts

Edouard Machery  
Oxford University Press, Oxford, 2009

Marco Fenici  
[marco.fenici@humana-mente.it](mailto:marco.fenici@humana-mente.it)



Edouard Machery's book is a book-length discussion of the thesis that «the notion of concepts ought to be eliminated from the theoretical vocabulary of psychology» (p. 4). This thesis is the conclusion of a five-step argument, which Machery calls the *Heterogeneity Hypothesis* (HH). The book is structured as follows: the central chapters (4-7) are a justification of the four main assumptions made by HH, which are introduced in the third chapter; the first two chapters are introductory to concepts, while the last one discusses the eliminativist conclusion.

The first two chapters explain what the notion of concept means respectively in psychology and philosophy. In Chapter 1, Machery firstly distinguishes between higher (categorization, deduction, induction, analogy-making, linguistic understanding, planning) and lower (perception, syntactic parsing motor planning) cognitive processes. Then, he provides a (psychologically interesting) notion of knowledge as «any contentful state that can be used in cognitive processes» (p. 8). Finally, he defines the notion discussed through the whole book:

A concept of *x* is a body of knowledge about *x* that is stored in long-term memory and that is used by default in processes underlying most, if not all, higher cognitive competences when these processes result in judgements about *x*.<sup>1</sup> (p. 12)

Psychologists usually assume that «the processes underlying different cognitive competences [...] use the same bodies of knowledge» (p. 16), and try to find out the general properties common to every concept. These properties concern: (i) the kind of knowledge stored in concepts (i.e., whether they store knowledge for individuals, categories or other kinds of causal relations); (ii) the representational format of concepts (i.e., whether they are amodal symbols, images or something else); (iii) the cognitive processes in which concepts occur; (iv) the possibility to acquire them; and (v) their neural localization.

Machery concludes the chapter by challenging two different definitions – i.e., concepts as temporary bodies of knowledge in working memory (Barsalou 1993), and concepts as representations under organismic control (Prinz 2004, Dennett 1993, 1996). He also discusses two alternatives consistent with his proposal, but less appealing. Namely, the definition of concepts as the constituents of thought is obscure and plays little role in the experimental psychology of concepts. Instead, the definition of concepts as categorization devices is too narrow, and leaves outside other important cognitive competences.

---

<sup>1</sup> Reference to the *default* conditions allows distinguishing knowledge stored in concepts from «background knowledge» (p. 11) associated with those concepts. Gradual factors such as the frequency of the association and explicit teaching determine the difference between the two kinds of knowledge.



In Chapter 2, Machery distinguishes psychological from philosophical theories of concepts, according to which «having a concept of *x* is being able to have propositional attitudes about *x* as *x*» (p. 32). He notes that, given the diversity of the two notions, psychological and philosophical theories of concepts have entirely different goals, and «there is little point in evaluating psychological theories of concepts according to the criteria used to evaluate philosophical theories» (p. 37), or vice versa. Philosophical and psychological theories of concepts have little in common, and must be evaluated independently one from each other.

Therefore, Machery challenges two different accounts that might be advanced to fill the gap between philosophical and psychological theories. According to the first proposal, explored by Peacocke (1992), philosophers should define the possession conditions for a concept while psychologists should explain how people can meet those conditions. Machery notes against it that Peacocke does not suggest any clear method to investigate how to spell out the possessing conditions of a concept. The second proposal, the “Foundationalist Account”, states that philosophers should identify the conditions (presupposed by psychologists) that «people must meet in order to have propositional attitudes about the object of their attitudes» (p. 48). In this case, Machery notes that it is dubious whether there are constants in the attribution of propositional attitudes. Indeed, a study by Hewson (1994) showed that people disagree about the beliefs to attribute in front of the same situation.

In Chapter 3, Machery proposes the Heterogeneity Hypothesis (HH) against the commonly shared view that «concepts share many scientifically relevant properties» (p. 54). In detail, HH affirms that:

1. for each category an individual typically has several concepts<sup>2</sup>;
2. coreferential concepts have very few properties in common;
3. prototypes, exemplars, and theories are among these heterogeneous kinds of concepts;
4. prototypes, exemplars, and theories are typically used in distinct cognitive processes;
5. the notion of concepts ought to be eliminated from the theoretical vocabulary of psychology (p. 52).

The chapter is then devolved to pave the way to the first two tenets. Machery contrasts HH against weaker proposals, namely Scope Pluralism, according to which different kinds of concepts (prototypes, exemplars, theories) are associated with different types of entities, and Competence Pluralism, according to which different kinds of concepts are specific to different cognitive processes. Against the former, HH claims that most categories are represented at the same time by different kinds of concepts while against the latter it claims that concepts do not vary across cognitive competences. Then, Machery criticizes hybrid theories of concepts, according to which concepts are composed from different parts necessarily linked together in a non-contradictory way. He contends that hybrid theories have a hard work in explaining «what is meant by claiming that several bodies of knowledge are the parts of a single concept, in contrast to being distinct concepts» (p. 64). Moreover, they make the empirically disconfirmed assumption that different parts of concepts cannot lead to inconsistent categorization judgements. HH, instead, does not negate that bodies of knowledge can be connected, but affirms that this can happen only as a contingent matter of fact. Moreover, it

---

<sup>2</sup> That is, several bodies of knowledge stored in long-term memory and used by default in higher-level cognitive processes.



predicts the empirically tested hypothesis that these different parts will lead sometimes to conflicting outcomes.

In Chapter 4, Machery describes in depth well-known paradigms of concepts, that is, the prototype, the exemplar and the theory paradigm. He also critically assesses the Neo-Empiricist view of concepts (Barsalou 1999, Prinz 2002). According to it, the knowledge stored in a concept is encoded in several perceptual – therefore, modally determined – representational formats; moreover, conceptual processing involves re-enacting and manipulating some perceptual states (p. 109). Against the former assumption, Machery points out that empirical results often provided by neo-empiricist theorists are inconsistent with some, but not all, amodal models of cognitive processes. Therefore, those results do not deny the general claim that concepts are amodal symbols. With respect to the latter claim, Machery notes that evidence that perceptual simulation is used to solve cognitive tasks does not support neo-empiricist theories over amodal theories, because even amodal theories recognize the importance of modal imagery. Therefore, «there is no strong evidence that concepts (or some concepts) are in fact similar to perceptual representations» (p. 116). Neo-empiricist theories of concepts are consequently set aside.

Then, Machery argues that prototypes, exemplars and theories store different kinds of knowledge so that, «consistent with the Heterogeneity Hypothesis, most categories could be represented by a prototype, a theory and a set of exemplars» (p. 119). Since the processes involving prototypes and exemplars rely on the computation of similarity between bodies of knowledge, while the processes involving theories rely on inference to the best explanation, his conclusion is that «when we reason, categorize, and draw analogies, we use three different kinds of cognitive processes» (p. 119).

In Chapter 5, Machery paves the way to his explanation of why prototypes, exemplars, and theories are typically used in distinct cognitive processes by contrasting what he calls the Unified View of Cognition with multi-process theories. According to the former, each cognitive competence (e.g., categorisation) is the outcome of a single cognitive process, while multi-process theories assume that «a cognitive competence is underwritten by several cognitive processes, each of which accesses a specific kind of concept» (p. 121). While the Unified View of Cognition focuses on cognitive competences, multi-process theories consider also the cognitive processes underlying a competence. Consequently, they are more interesting in order to understand the computational properties of the mind. Multi-process theories may be differentiated according to (i) whether the processes that they presuppose always run simultaneously as opposed to in particular situations, and to (ii) whether the outputs of different processes in the case of parallel running are merged or not. They can call on three kinds of evidence. The first kind is based on specific performance profiles in different experimental tasks. The second kind of evidence reinforces such results by showing that different processes produce outputs that reinforce each other in some situations and conflict in others. Finally, functional dissociations of cognitive processes might provide a third kind of evidence for multi-process theories. The chapter ends with a presentation of some examples of multi-process theories: the model of explicit and implicit cognition of Ashby et al. (1998), the dual-process theories of cognition (e.g., Stanovich and West 2000), and the fast and frugal heuristics research program (Gigerenzer et al. 1999).

In Chapter 6, Machery provides empirical results to show that categorization and concept learning are underwritten by distinct cognitive processes, each of which involves its own kind of concepts. He firstly defines categorization and concept learning, and discusses critically the methodology of experiments in psychology about these two different competences. Then, he reviews the empirical evidence that supports the prototype, the exemplar and the theory paradigms of concepts. Showed that we have different mechanisms for categorizing objects,



events, and substances that rely on different kinds of concepts, he surveys the empirical literature and finds that there is little evidence that these three processes are organized together. Indeed, «in experimental conditions, the three categorization processes can be triggered selectively» (p. 194), depending on differences in the presentation of the input stimuli, and in the kind of output requested. Moreover, empirical studies (Allen & Brooks 1991) suggest that categorization tasks sometimes lead to conflicting categorization judgments. Therefore, not only we possess several kinds of concepts, but these kinds also involve distinct processes for learning and for categorizing.

Chapter 7 discusses other two important cognitive abilities, namely, induction and concept combination, and suggests that empirical research supports the conclusion that distinct cognitive processes underwrite also these cognitive competences. With respect to induction, there is emerging consensus between psychologists that people rely on several non-integrated induction processes. In the case of concept combination, Machery refers to Hampton's (1987) model to claim that prototypes, exemplars, and theories «are retrieved from long-term memory to create complex concepts» (p. 212). He also notes that Hampton's (1987) model does not assume a multi-process theory, but considers instead a single process to be responsible for the combination of different kinds of concepts. Finally, Machery scans neuropsychological data in search of dissociations attesting distinct processes for induction and concept combination. However, he does not find decisive results supporting his thesis.

Provided that the processes responsible for categorization, induction, concept learning and concept combination rely on different kinds of concepts, Machery dedicates Chapter 8 to the eliminativist conclusion of HH. He firstly challenges two kinds of eliminativist arguments for concepts: the anti-representationalist argument coming from the dynamical-systems approach (Thelen & Smith 1994) and situated robotic (Brooks 1999), and the argument from context-sensitivity (Smith & Samuelson 1997). These two arguments share the same structure: they firstly provide a theoretical definition for concepts, then they claim that as a matter of fact the best empirical evidence suggests that nothing satisfies the previously proposed definition. Therefore, they conclude that concepts do not exist. Machery notes that such a conclusion depends on a descriptivist theory of reference, according to which, if a term stands for a definition that is not referring to anything real, the term is empty and the generalizations made with it are false. However, if one supports a different theory of reference (e.g., a historical causal theory) the eliminativist argument loses much of its appeal.

Given that «concept eliminativism should not be hostage to the debate about reference» (p. 230), Machery hence introduces a kind of «scientific» eliminativism, which does not dispute whether concepts refer to an empty class of entities, but whether they «possess the properties that characterize the classes that matter for the empirical research» (p. 230). With this respect, Machery claims to have showed that «very few generalizations are true of all (or most) concepts besides the properties that are used to identify them, while many generalizations are true of some subset of concepts» (p. 241), namely prototypes, exemplars and theories. His conclusion, then, is that «the class of concepts is not a natural kind, while these subsets are natural kinds» (p. 241). Machery argues that eliminating concepts from the vocabulary of cognitive science will positively affect empirical research by eliminating the controversies between theorists of different paradigms. Moreover, it will drive researcher to focus on open questions such as the best models for prototypes, exemplars, and theories, how multi-processes run in different cognitive competences, and how their specific outputs are eventually processed.

Machery's book shows a remarkable mastering of the huge literature about concepts coupled with the capacity to summarize it in a reasonable number of pages. Much effort is put



in explaining different theories, therefore in developing a common framework where the strengths and flaws of each of them can be compared. Moreover, since Machery does not aim to support some theories over the others, his analysis is at the same time critic and impartial. For all these reasons, Machery's book is a very good introduction to the topic.

Furthermore, Machery conveys a particular eliminativist conclusion about concepts, which denotes a genuine philosophical attitude away from armchair philosophy. He never forgets to remind the reader the empirical nature of his argument. Concepts should be eliminated from the vocabulary of psychology not because they refer to an empty category but because the very term is misleading with respect to its use in the empirical literature. Machery is able to select and to report the results relevant to his discussion, always showing the specific contribution of each to his main thesis. Therefore, even though his conclusion might be rejected by the development of our knowledge about cognition (he recognises, for example, that the development of neo-empiricist views of concepts might provide good reasons why to revise his conclusion), his argumentation remains a succeeded example of how philosophy should apply to the scientific practice. That is, Machery's book is a bright example of clear analysis applied to empirical investigation, and it is strongly recommended to every one – philosopher or psychologist – interested in cognitive science.

#### BIBLIOGRAPHY

- Allen, S. W., & Brooks, L. R. (1991). Specializing the Operation of an Explicit Rule. *Journal of Experimental Psychology: General*, 120: 3-19.
- Ashby, F. G., Alfonso-Reese, L. A., Turken, A. U., & Waldron E. M. (1998). A Neuropsychological Theory of Multiple Systems in Category Learning. *Psychological Review*, 105: 42-481.
- Barsalou, L. W. (1993). Flexibility, Structure, and Linguistic Vagary in Concepts: Manifestations of a Compositional System of Perceptual Symbols. In A. C. Collins, S. E. Gathercole, & M. A. Conway (Eds.), *Theories of Memory* (pp. 29-101). London: Lawrence Erlbaum Associates.
- Barsalou, L. W. (1999). Perceptual Symbol Systems. *Behavioral and Brain Sciences*, 22: 577-609.
- Brooks, R. A. (1991). Intelligence Without Representation. *Artificial Intelligence*, 47: 139-159.
- Dennett, D. C. (1993). Learning and Labelling. *Mind and Language*, 8(4): 540-548.
- Dennett, D. C. (1996). *Kinds of Minds: Towards an Understanding of Consciousness*. London: Weidenfeld & Nicolson.
- Gigerenzer, G., Todd, P. M., & The ABC Research Group (1999). *Simple Heuristics that Make us Smart*. New York: Oxford University Press.
- Hampton, J. A. (1987). Inheritance of attributes in natural concept conjunctions. *Memory & Cognition*, 15: 55-71.
- Hewson, C. (1994). 'Empirical Evidence Regarding the Folk Psychological Concept of Belief', *Proceedings of the Cognitive Science Society*.
- Peacocke, C. (1992). *A Study of Concepts*. Cambridge, MA: MIT Press.



- Prinz, J. (2002). *Furnishing the Mind: Concepts and Their Perceptual Basis*. Cambridge, MA: MIT Press.
- Prinz, J. (2004). *Gut Reactions: A Perceptual Theory of Emotion*. New York: Oxford University Press.
- Smith, L. B., & Samuelson, L. K. (1997). Perceiving and Remembering: Category Stability, Variability, and Development. In K. Lamberts & D. Shanks (Eds.) *Knowledge, Concepts, and Categories* (pp. 161-195). Cambridge: Cambridge University Press.
- Stanovich, K. E. & West R. F. (2000). Individual Differences in Reasoning: Implications for the Rationality Debate?. *Behavioral and Brain Sciences*, 23(5): 645-665.
- Thelen, E., & Smith, L. (1994). *A Dynamic Systems Approach to the Development of Cognition and Action*. London-Cambridge, MA: MIT Press.

#### TABLE OF CONTENTS

##### Chapter 1 Concepts in Psychology

1. "Concept" in Psychology
2. Evidence for the Existence of Concepts
3. What is a Psychological Theory of Concepts?
4. Alternative Characterizations of the Notion of Concept

##### Chapter 2 Concepts in Philosophy

1. "Concept" in Philosophy
2. Concepts in Philosophy versus Concepts in Psychology
3. How are the Psychological and the Philosophical Theories of Concepts Connected? Peacocke's Simple Account
4. How are the Psychological and the Philosophical Theories of Concepts Connected? The Foundationalist Account

##### Chapter 3 The Heterogeneity Hypothesis

1. The Received View
2. The Heterogeneity Hypothesis
3. Hybrid Theories of Concepts

##### Chapter 4 Three Fundamental Kinds of Concepts: Prototypes, Exemplars, Theories

1. The Classical Theory of concepts
2. The Prototype Paradigm of Concepts
3. The Exemplar Paradigm of Concepts
4. The Theory Paradigm of Concepts



5. Alternative Views of Concepts

6. Three Theoretical Entities that Have Little in Common

Chapter 5 Multi-Process Theories

1. Multi-Process Theories

2. Examples of Multi-Process Theories

Chapter 6 Categorization and Concept Learning

1. Categorization and Concept Learning

2. Studying Categorization and Concept Learning

3. Evidence for the Existence of Prototypes

4. Evidence for the Existence of Exemplars

5. Evidence for the Existence of Theories

6. Organization of the Categorization Processes and of the Concept Learning Processes

Chapter 7 Induction, Concept Combination, Neuropsychology:

1. Induction

2. Concept Combination

3. Neuropsychology

Chapter 8 Concept Eliminativism

1. Two Inconclusive Arguments against the Notion of Concept

2. Natural Kinds and Scientific Eliminativism

3. The Argument for the Elimination of "Concept"

4. Objections and Replies

Conclusion

