

**Review of**

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Creations of the mind. Theories of artifacts and their representation.  
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A rose is a rose is a rose. But what is a bed of roses? Or a bunch of roses? Or a vase to put the roses in? Roses are what they are, belonging to a natural kind. Beds and bunches and vases, in contrast, are what we make them to be: artifacts.

While a lot of good interdisciplinary work in philosophy and cognitive science in the last years and decades has dealt with natural kinds and their representations, "Creations of the minds" is the first comprehensive anthology about recent work on the nature and representation of artifacts – a book that was long needed.

It is an impressive and valuable book, bringing together perspectives on artifacts from philosophy, psychology, primatology, anthropology, ethology, neuroscience and archeology.

"Creations of the Mind" comprises 16 chapters all of which are written on an exceptionally high level by leading figures of the respective fields. The chapters are organized into 4 parts, dealing with the metaphysics of artifacts (part I), concepts of artifacts (part II), and their development (part III) and evolution (part IV).

### **Part I: Metaphysics of Artifacts**

Roses are what they are due to their nature. Beds, bunches and vases, in contrast, are what they are not because of their intrinsic nature, but because of us. Or so a traditional view on natural versus artificial kinds (or real versus nominal essences) goes. One way of spelling this is out is to say that natural kinds are "out there", robustly real in the sense of being independent of us or any sentient beings. Artifacts, in contrast, though real, are so in a less robust sense: their identity and persistence conditions depend crucially on our stances towards them, in particular on the intentions of the makers and users.

On the conceptual side, this brings with it radically different ways in which we refer to natural kinds versus artifacts. Our natural kinds concepts function much like the Kripke-Putnam direct causal-historical theory of reference claims: most of us use "beech" and "elm" to refer to kinds of trees without having any individuating descriptive content associated with these terms; they refer to elms and beeches because of causal-historical relations (via experts involving linguistic division of labour etc.) with the kinds of trees themselves. Artifact concepts, in contrast, because they are partly constituted by our practices, necessarily involve some descriptive content that makes reference to the intentions of makers and users ("knives" are sharp objects used for such an such purposes...).

Two chapters in this section articulate and defend sophisticated positions along such lines: John Searle in "Social Ontology and the Philosophy of Society" gives a very useful and precise summary of his recent work in social ontology. In contrast to natural kinds, artifacts have an observer-dependent mode of existence – being what they are because we assign certain functions to them. Artifacts can be further subdivided into tools broadly conceived (where the function is anchored in the causal structure – the sharpness of the knife etc.), and such that have collectively assigned *status functions*, i.e. purely conventional, symbolic functions (the value of money bills etc.). The latter lay the logical foundation of society and institutional life.

In "Artifacts and Human Concepts", Amie Thomasson, in a similar spirit, presents a thorough, detailed and careful defense of the claim that natural kinds and artifact kinds are constituted in radically different ways. Artifacts are constituted by observers, makers and users; that means that these makers and users cannot be as ignorant or in error about them as they can with natural kinds; and that they cannot refer to them with as little descriptive content as they can in the case of natural kinds.

Three chapters, in one way or the other, put into question this sharp and clear dichotomy natural – artificial kinds: Richard Grandy in "Artifacts: Parts and Principles" questions the dichotomy by putting forward some very thoughtful arguments against a simple direct reference theory with regard to natural kinds. The upshot of these arguments, Grandy claims, is that the qualitative dichotomy should be given up in favor of a graded continuum along which natural and artificial kinds can be ordered. Hilary Kornblith in "How to Refer to Artifacts" (formally in the second part, but in the philosophical spirit more related to the other chapters in part I) grants that natural kinds and artifacts are *metaphysically* constituted in qualitatively different ways, but, drawing on a wealth of arguments by Putnam and himself rejects any sharp dichotomy between the *semantics* of natural kind and artifact concepts and the related *epistemologies*. Crawford Elder in "On the Place of Artifacts in Ontology", rejecting any simple natural kind – artifact dichotomy, seeks to develop a comprehensive Millikan-style taxonomy of different kinds of kinds that comprises both biological kinds and some artifacts as perfectly and equally real. The core notion he introduces is that of a "copied kind" – kinds that reproduce over time in characteristic fashion, yielding members with typical forms and proper functions. And the core claim Elder makes an impressive case for is that besides biological devices and cultural forms, some artifacts themselves constitute a sub-class of copied kinds.

Jerrold Levinson, in "Artworks as Artifacts", finally, puts forward a more fine-grained distinction with the class of artifacts. He argues, drawing on his intentional-historical theory of art that works of art differ fundamentally from other kinds of artifacts in that they are more self-referential (involving reference

to a tradition etc.) and less restricted (in fact, hardly restricted at all) in terms of form and function.

Generally, the philosophical contributions in part I are all of outstanding quality, present clear, innovative, elaborated and stringent lines of arguments for this or that metaphysical position, often including cross-references to other contributions, replying to their objections (the chapters by Thomason and Kornblith are particularly noteworthy in this respect). This high level of argumentation is one of the great strengths of this book.

Some of these arguments, however, are relatively technical, presuppose considerable background, and might therefore not be appreciated by non-philosophers as much as they could be appreciated if these readers could place them appropriately in the theoretical landscape. This is not the fault of the authors of the individual chapters. Rather, it is a general shortcoming of the book: Without any real introduction and discussion sections, it still is a great interdisciplinary volume. But it could be much more so if there were introductions, both a general one, and specific ones to the different parts, supplying the theoretical background to each of the different fields involved for an interdisciplinary audience. The book would then be truly interdisciplinary in the sense of being more than just the sum of its excellent disciplinary parts.

## **Part II: Concepts and Categories**

Moving from the armchair into the field and into the laboratory, the second part deals with conceptualization and categorization of artifacts from a mainly empirical point of view. The guiding questions relate to how people perceive, conceive and categorize artifacts and how that relates to perception, conception and categorization of natural kinds, and of other kinds of objects generally.

Dan Sperber, in "Seedless Grapes: Nature and Culture" starts off from considering mixed kinds that do not easily fit either paradigmatic natural kind or artifact categories such as human-bred seedless grapes, domestic animals and the like. "Artifacts" as such, Sperber argues forcefully, is not a very useful category in light of such examples. Rather, we should classify objects in more subtle ways according to different kinds of functions they have: biological teleo-functions, cultural teleo-functions and intended artifact functions. Furthermore, such more subtle, non-disjunctive classification schemes overcome any simple-minded nature-culture distinction.

In a similar vein, Paul Bloom in "Water as an Artifact Concept" starts off from one of the philosophical standard examples of a natural kind term since Putnam,

"water", and argues that "water" is not a clear-cut natural kind concept at all, but polysemous: in one of its meanings (tapped by certain psychological tasks), "water" is indeed a natural kind concept and refers to H<sub>2</sub>O. But there is a second meaning to "water" (tapped in other types of tasks) that is actually an artifact-like concept. And likewise for many concepts. Natural kind and artifact concepts, so the broader moral goes, are psychologically just not disjunctive categories.

In "Artifact Categorization: The Good, the Bad and the Ugly", Barbara Malt and Steven Sloman supply an impressive review of a wealth of psychological studies on categorization of artifacts and other objects. Considering a variety of types of tasks supposed to tap at different types of mental activity subsumed under the heading of categorization (naming, induction, planning etc.), they reach the rather radical conclusion that there is no such things as *the* psychological system of categorizing artifacts. Rather, different types of activities call for different ways of grouping things. Categorization, one could say, according to their position is not a proper natural kind.

In "The Organization and Representation of Conceptual Knowledge in the Brain: Living Kinds and Artifacts", another impressive review of empirical results, Bradford Mahon and Alfonso Caramazza summarize recent neuropsychological studies with patients and neuroimaging studies with healthy subjects on the neural basis and mechanisms involved in thinking about artifacts and other objects. Their conclusion from these studies is that conceptual knowledge is organized in a domain-specific way with different functional substrates for different domains.

### **Part III: Cognitive Development & Part IV: Evolution**

The notion of "domain-specificity" nicely spans the bridge from part II to the last two parts dealing with cognitive development and evolution. Central questions underlying the ontogeny and phylogeny of artifact cognition are: How does reference to and thought about artifacts develop? And how does it relate to other kinds of reference to and thought about objects? Does cognition about artifacts work and develop in the same way as cognition about other kinds of objects?

Domain-specific and modularity theories say "no". According to such positions, the mind is not an all-purpose system, but more like a Swiss army-knife with functionally independent departments (with different theories differing in the degree of independence between departments they assume).

Marc Hauser and Laurie Santos, in "The Evolutionary Ancestry of Our Knowledge of Tools: From Percepts to Concepts" give a systematic and very informative overview over their own and others' recent experimental work on

primates' tool-use and tool-understanding and interpret the findings in the spirit of domain-specific theories of conceptual development. Many primates –both ones that do use tools in the wild (such as chimps) and ones that do not (such as cotton-top tamarins)- they argue on the basis of the reviewed findings, do not think about the domain of (potential) tools in the same way as about other domains of objects.

The evolution of tools use in the hominid line is the topic of Steven Mithen's chapter "Creations of Pre-Modern Human Minds: Stone Tools Manufacture and Use by *Homo habilis*, *heidelbergensis*, and *neanderthalis*". In a very enlightening and entertaining review Mithen conveys a lively image to the reader what it must have been like to be a *Homo habilis* using (still relatively chimp-like) stone tools, a *Homo heidelbergensis* using more complex handaxes that even serve some aesthetic function, and finally a Neanderthal coming close to the technology of modern humans in some respects. The main theoretical conclusion Mithen draws from the carefully reviewed archaeological records is that the uniqueness of the modern human mind consists in its being the first on the scene to be "cognitively fluid", that is, not confined to being utterly domain-specific. Even Neanderthals, though technologically smart, remained narrow-minded in that they could not connect technological and social cognition – and therefore could not develop anything like the socially shared cumulative cultural evolution that marks modern human culture.

In a similar vein, James Gould in "Animal Artifacts" presents an impressive and careful overview over non-human animals' object creations in the field of foraging (spider nets etc.), housing (nests etc.) and sexual attraction (birds' bowers etc.) and argues that the vast majority of such building behaviour in non-human animals is relatively inflexible, hard-wired and far from the cognitively fluid, domain-general abilities to produce artifacts in humans.

Regarding ontogeny, Frank Keil, Marissa Greif and Rebekkah Kerner in "A World Apart: How Concepts of the Constructed Worlds Are Different in Representation and in Development" give a very good overview of peculiar aspects of conceptual development in the area of thinking about artifacts as compared to other kinds of objects.

Along similar lines, Deborah Kelemen and Susan Carey in the "The Essence of Artifacts: Developing the Design Stance", very carefully review the development of artifact cognition from the perspective of domain-specific cognitive development. In their excellent chapter, they distinguish different stages of reasoning about artifacts in early childhood: children first come to see the affordances of artifacts and use them accordingly; they then (from around 1 year) understand that some objects are used for specific purposes by specific individuals and imitate such usage; and finally (from around 4 years), they come to acquire a full-blown 'design stance', understanding the intentional

constitution of artifacts through the attitudes of its makers and users. Theoretically, they view the 'design stance' as a relatively late (compared to naïve physics, for example) and derived developmental phenomenon, derived from the interaction of domain-general learning abilities plus innate domain-specific abilities in naïve physics and folk psychology.

Jean Mandler, in "The Conceptual Foundations of Animals and Artifacts" thinks that the postulation of such heavy domain-specific machinery is unnecessary. She supplies a very good overview over her impressive research program in the last decades on infant categorization. Empirically, she shows surprisingly early competence in infants' discriminations between different kinds of objects. And theoretically, she takes these findings to be explainable by mere domain-general cognitive processes and learning mechanisms.

Such debates around the domain-specificity or domain-generality of human and other animals' thought are among the most exciting and fruitful debates there currently are in cognitive science. The chapters in this volume dealing with the question how domain-specific artifact cognition is present an excellent token of that more general type of debate.

One central problem in this debate, however, is that it mostly is far from clear what people mean by a "domain" and therefore by "domain-general" / "domain-specific". And if it is clear, then often different people mean different things and talk past each other. This is a problem for the present volume in particular, again, because there is neither an introduction in which terminology and background debates are introduced nor a discussion section where authors of individual chapters directly debate each other and respond to each other's contributions (although some of the chapters are really noteworthy in achieving some thoughtful interdisciplinary connection between different chapters already, even without a dedicated section; e.g. Deborah Kelemen & Susan Carey, or Richard Grandy).

How much good interdisciplinary introductions can do to make interdisciplinary volumes outstanding works going beyond being a mere mereological sum is shown, for example, by a recent volume edited by the late Susan Hurley and by Matthew Nudds (Hurley & Nudds (Eds.) 2006. *Rational Animals*. Oxford: OUP). How much innovative new formats such as direct comments and debates between contributors can add to the readability and depth of an interdisciplinary volume is illustrated by another book edited by Susan Hurley (Hurley & Chater (Eds.) (2005). *Perspectives on Imitation*. Cambridge: MIT Press). "Creations of the Mind" would have profited very much from such systematic and /or innovative forms of achieving interdisciplinary integration.

But that "Creations of the Mind" could have been even better should not obscure the fact that it is a great book. It is a collection of relatively independent

excellent essays, covering the current state of the art regarding artifacts from the perspectives of different cognitive science disciplines. It will soon become a standard reference in this area. No one vaguely interesting in such matters can afford to not read it.