

Thirty Years Cognitive Studies of Categorization: What's behind the Reported Progress



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WHY CATEGORIZATION?

- **Howard Gardner [1984] “*The Mind’s New Science. A History of the Cognitive Revolution*”:**

The work on categorization as one of the great success stories of the early cognitive science;

- **25 years later:**

A new history of cognitive science is expected to provide answer to the question “What is the continuation of the early success story?”

IN THIS TALK:

- **Conceptual preliminaries;**
- **The history of the categorization studies at a glance;**
- **Some important details;**
- **The measures of progress;**
- **Discussion**

CONCEPTUAL PRELIMINARIES

CATEGORIES: groups of entities which have something in common;

CATEGORIZATION:

- the process of formation of categories;
- the process of identifying X as a member of a particular category Y;

CONCEPTS: (mental) representations of categories

THE MAIN VIEWS ON CATEGORIZATION

THE CLASSICAL VIEW: the members of a category share a list of defining features;

THE PROTOTYPE VIEW: the members of a category are more or less similar to a typical representative of the category;

THE EXEMPLAR VIEW: the members of a category are more or less similar to one of the typical examples of the category;

THE THEORY VIEW: the members of a category fit the same theoretical account.

THE HISTORY OF THE CATEGORIZATION STUDIES AT A GLANCE

- **1972-1978: revealing the typicality effects.**

The typicality effects were recognized as evidence against the received view of concepts and categorization (later named "the classical view");

- **1978: E. Rosch, "*Principles of Categorization*"**

An attempt to formulate an alternative to the received view; according to Rosch the classical view and the prototype view describe the different means which people use to categorize the world.

- **1981: E. Smith and D. Medin "*Categories and Concepts*"**

Smith and Medin launch the term "classical view"; for them the classical view is a wrong (or at least incomplete) theory of categorization which should be replaced by a more elaborated view. They review two alleged alternatives to the classical view: the prototype view (they call it "probabilistic view") and the exemplar view.

THE HISTORY OF THE CATEGORIZATION STUDIES AT A GLANCE

- **1984: H. Gardner "The Mind's New Science" (Chapter 12. A World Categorized)**

Gardner proclaims that the disavowal of the classical view of concepts and categorization is one of the greatest achievements of the young cognitive science.

- **1985: G. Murphy and D. Medin "The Role of Theories in Conceptual Coherence"**

The theory view of concepts and categorization is introduced.

- **1999: E. Margolis and St. Lawrence (Eds.) "Concepts. Core Readings".**

A collection of classical papers representing the state of the art in the field.

THE HISTORY OF THE CATEGORIZATION STUDIES AT A GLANCE

□ 2002: G. Murphy “The Big Book of Concepts”

A summary of the most important empirical findings and their interpretations. In this book G. Murphy makes the following important confession: “One might have hoped that twenty years after Smith and Medin’s review, the field would have sorted out many of the issues their book raised. However, there is as much, and perhaps more, dissension now as there was then. Focusing on theories, therefore, is not the best way to document the important progress that has been made ... Many interesting principles and generalizations have been discovered”, which “have been a real advance” although they have not contributed to the solution of the problems stated as central by Smith in Medin in 1981. [Murphy, 2002; 4].

□ 2005: H. Cohen and Cl. Lefebvre (Eds.) “Handbook of Categorization in Cognitive Science”

The handbook provides evidence for the diversity of topics and approaches covered by contemporary studies of categorization.

DETAILS: TYPICALITY EFFECTS

- ❑ **Some instances are categorized faster than others;**
- ❑ **Some instances are treated as “unclear cases” (the subjects hesitate how to categorize them);**
- ❑ **The members of a given category are not conceived as equally representative of this category.**

THE MEASURES OF PROGRESS

- **On the level of theories/views:**

- Have been suggested any new theories/views on categorization?

- Have been obtained decisive evidence in support of the already existing theories?

- **On the level of data (empirical findings):**

- Have been obtained any new and important empirical results?

- **On the level of methodology:**

- Have been introduced new (important and fruitful) experimental techniques?

- **On the level of the explored questions:**

- Have there been important problem-shifts in the study of categorization?

EVALUATION OF THE DECLARED PROGRESS

- **No real advance on the level of theories;**
- **A lot of new interesting empirical findings;**
- **Increased scope of the studies:**
 - **experimental and field research of real-world categorization;**
 - **studies of the neural correlates of categorization;**
- **Added new questions to the research agenda.**

EVIDENCE FOR THE PROGRESS: EMPIRICAL FINDINGS

- **Heidi Kloos, Vladimir Sloutsky (2008) What's behind different kinds of kinds: effects of statistical density on learning and representation of categories. *Journal of Experimental Psychology: General*. Vol.137, No 1, 52-72.**
- ***Dense categories*** invoke similarity- based categorization;
- ***Sparse categories*** call for rule-based categorization
- **Statistical density** is «the ratio of category-relevant (in-category) invariance to the total (between-categories) variance» (p.4)

EVIDENCE FOR THE PROGRESS: REAL-WORLD CATEGORIZATION

- **Ahn, W., Novick, L., Kim, N. (2003).
“Understanding It Makes It Normal”:
Causal explanations Influence Person
Perception. *Psychonomic Bulletin &
Review*, 10, 746-752.**
- **Providing clinicians with an
explanatory context for a person’s
mental disorder symptoms results in
the person being categorized as more
“normal”.**

EVIDENCE FOR THE PROGRESS: THE DEVELOPMENT OF THE RESEARCH AGENDA

From

□ **How do people categorize the world? (Rosch)**

to

□ **How do people represent the categories? (Smith and Medin)**

to

□ **Which factors influence the processes of categorization?**

□ **What is the connection between categorization and other cognitive processes (memory, learning, reasoning, language production)?**

DISCUSSION

- ❑ **Experimental results – life of their own?**
- ❑ **Undermining the role of theories?**
- ❑ **What kind of lessons can be drawn from the recent history of the categorization debate?**