CONCEPTS AND CATEGORIES:

THEIR REPRESENTATION, STRUCTURE, AND PROCESS

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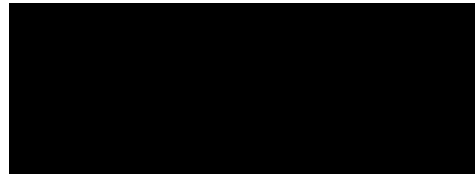
CERTIFICATE

I certify that the substance of this thesis has not already been submitted for any degree and is not being currently submitted for any other degree.

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in the thesis.

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ABSTRACT

This thesis examines people's mental representation, membership structure and categorization processes with respect to concepts and categories. The aim of Experiment 1 was to discover whether three category-types (natural superordinate, property and ad hoc types) have graded structure. The study looked at two possible underlying causes for the gradience commonly found in the production frequencies of category instances: statistical artifacts or typicality structures. Results supported the hypothesis that people consult a common representation when they produce exemplars according to their degree of typicality. These results imply that all the instances in the three category-types have a normative, graded structure. The next experiment compared a normative graded structure with an idiosyncratic organization of membership.

The aim of Experiment 2 was to test four assumptions made by the unitary approach to categories, which assumes that human cognition directly reflects the naturally occurring categories in the world. The empirical aim was to discover whether people used typicality or direct experience as a basis for their generation of instances and their membership decisions. Mental representation was measured by the exemplar generation to a category label task; categorization processes were measured by the membership decision task on a computer; and internal membership structure was measured by the membership decision response times converted into ranks.

Two kinds of word stimuli were used: the frequency norms collected in Experiment 1 (normative stimuli); and the individual exemplars each participant generated to a category label (idiosyncratic stimuli). Overall, the idiosyncratic stimuli seemed to elicit a more finely-tuned performance from participants. Concerning membership decision, when the data were analyzed as to whether people were using a one stage process of categorization (as advocated by the unitary approach), or a two stage processing of potential instances, a greater number of significant results were found with the idiosyncratic stimuli. It was concluded that people use a two stage processing of potential instances. Concerning representations of the three category-types, people did not include typicality information (as a significant predictor of the representation criterion) when their own idiosyncratic exemplars were used as stimuli; but typicality became a significant predictor also when normative stimuli were used. It was found that all three category-types differed on the basis of what information was represented about them. Their membership structures, however, did not in that all three types had graded structures. Clear-cut boundaries were evident when data gained with the normative stimuli were analyzed, but fuzzy boundaries

were the result when idiosyncratic stimuli were used in the membership decision task.

The overall finding of Experiment 2 was that the unitary view's four assumptions lacked empirical support. The main conclusion was that the participants' mental representations do not reflect only typicality or experiential information or rules, since the semi-partial correlation values for these predictors were small. The implication was that participants were using conceptual knowledge as a basis for their exemplar generation and membership decision, and this possibility was investigated in Experiment 3.

Experiment 3 compared the use of conceptual knowledge, physical appearance, knowledge of function-parts, and essential features in people's judgments of typicality, similarity and categorization. The stimuli consisted of stories whose common theme was one of transformation, either of an animal or of an artifact. The control condition consisted of stories where the animal or artifact was simply described and nothing else. In the six experimental conditions, something happened which changed the animal/artifact's appearance, essence or functions. In story conditions 5, 6 and 7, various kinds of explanation for the event were either explicitly stated or implicitly provided.

The overall conclusion was that conceptual knowledge (such as explanations) influences people's judgments of similarity, typicality and category identity. More specifically, the greatest rate of change (as compared to the control condition) in the participants' judgments was elicited by the story condition which detailed personal details about the animal, such as its goals, needs, or preferences. One unpredicted finding was that story descriptions of alterations to physical appearance achieved just as high a rate of changed judgments, as did the story condition where an explanation for the alteration was provided. It was concluded that whilst theory-based concepts do give the best account of people's concept and category behaviours, participants are also judging the credibility or plausibility of any explanation given. People make use of their subjective knowledge (such as the needs of creatures, and functions of artifacts) gained through their interaction with the world, to decide whether an explanation is plausible or credible.

The thesis suggests that empirical studies should take the importance of subjective knowledge (as well as normative knowledge) into consideration when further empirical studies are carried out, for example, by using idiosyncratic stimuli. Theoretically, the three studies have shown that we have the categories we do because of the concepts we construct (rather than concepts being inductively derived to fit the naturally occurring categories in the world).

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