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THE INFLUENCE OF EXPERTISE ON THE BASIC LEVEL EFFECT IN ABSTRACT CATEGORIES

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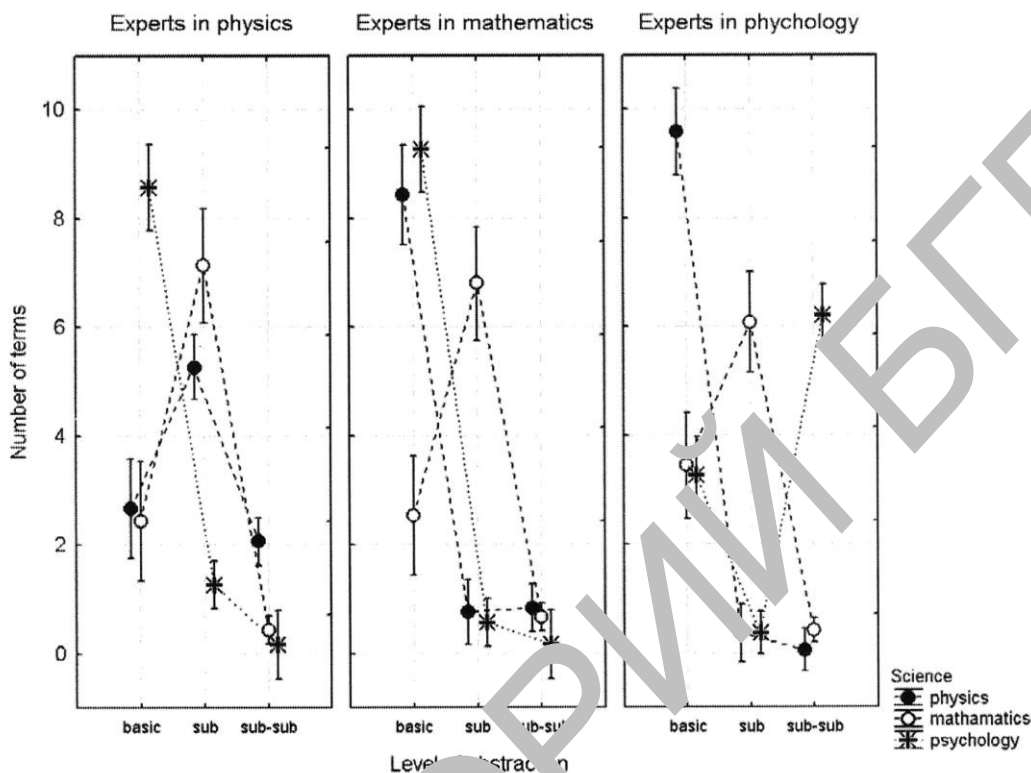
Psychologists noticed that people tend to name objects at one particular level of abstraction (so called 'basic level'). E. Rosch tried to define basic level through the series of converged operational definitions and connect it with prototype theory (Rosch et al., 1976). The idea of prototype describes the internal structure of category: it is assumed that category members are different in typicality, and more typical members have more common features

with other members of this category and less with the members of contrast categories. Experiments showed that category typicality is an important dimension of semantic memory influencing a wide range of experimental measures and tasks – categorization time, productive frequency, inductive inferences, episodic memory, etc. (Hampton, 1997)

The idea of basic level describes similar effect in the hierarchy of categories. One level of abstraction is considered as cognitively privileged with respect to cue validity, gestalt perception, image recognition, motor movement, knowledge organization, etc.

Typicality effect is investigated in depth. It could be found not only in natural categories but

РЕПОЗИТОРІЙ БІЛШ



Picture 1. Number of terms used to name the science dealing with particular problem for three groups of experts. Vertical bars denote 0,95 confidence interval.

also in strictly defined and abstract categories, in various fields such as personality perception, categorization of everyday situations, psychotic diagnoses (Hampton, 1990), linguistic categories (Lakoff, 1987). However, the absence of typicality effect in some categories (ad hoc categories, some abstract categories) may be regarded as the evidence that this mechanism is not universal for categorization explanation. That's why it is interesting to check whether basic level effect exists in abstract categories. The category of *science* was chosen as such abstract category because it has wide and well-defined structure. Usually the most frequently used word in object naming task is considered as basic. Similarly it is proposed to consider the task of attributing some problem to the competence of certain field of human activity as operational definition of basic level in the hierarchy of abstract categories.

For the present study three sciences were chosen (*mathematics*, *physics*, and *psychology*). For each science 10 different problems were formulated (e.g., *to find the roots of quadratic equation*). Subjects were to define what field of knowledge solves the particular problem. It was assumed that

for novices (non-experts in any of these domains) categories such as *physics* or *mathematics* would be the basic level terms. Consequently, this level of abstraction will be used more frequently.

It is known that the special psychological status of the basic level can be modified by experience: in the domain of expertise subordinate-level categories become as differentiated as and sometimes even more differentiated than basic-level categories (e.g., Tanaka&Taylor, 1991; Johnson&Mervis, 1997). Consequently, the same effect should be observed in the system of abstract categories. These hypotheses were checked in two experiments.

For the first experiment two groups – novices (first-year psychology students) and experts (last-year psychology students and Ph.D. students) – were chosen for naming task. Statistical analysis shows that expertise influences the level of naming of abstract categories. With the increase in expertise the number of sub-subordinate names is increased and the number of basic level terms is reduced in the domain of expertise. The results also show that there could exist such taxonomic chains where it's impossible to find a basic level category, e.g. *science – mathematics – algebra, geometry – linear*

algebra, analytic geometry. Two levels of abstraction (*mathematics* and *algebra, geometry*) were used equally frequently by the participants of the experiment.

For the second experiment three groups of experts (last-year students) in each of the domains were taken. The results presented on the picture show that for two groups of experts basic level shift did occur. For students of physics department former subordinate level became the most frequently used, for students of psychology department even sub-subordinate level became the most frequently used. The patterns of answers of physicists and psychologists in the domain of expertise were very different from the patterns of answers in other domains. Only students of mathematics department showed the same pattern as novices.

The results of the experiments show that abstract concepts could demonstrate basic level effect although there exist hierarchical chains without clear basic level. Expertise in any field of study leads to the shift of basic level effect to more concrete levels of abstraction.

All these facts confirm that we operate with abstract concepts in the same manner as with concrete ones: a certain privileged level of abstraction could exist in concepts' hierarchy and experience in a particular domain may result in cognitive preference of more concrete levels of abstraction.

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