

Words activate categorization even before the category forming task has been offered



Alexey A. Kotov^{1,2}, Tatyana N. Kotova², Elizaveta F. Vlasova²

¹ The National research university "Higher school of economics"

Problem

Previous research revealed a great role that verbal labels play in categorical perception. For example, verbal description of faces impairs their later recognition among other faces (Schooler, Engstler-Schooler, 1990). That impairment a word causes in individual-feature memory and improvement it causes in categorical memory get stronger on basic level categorization (Lupyan, 2008).

In our research (Kotov et al., 2012) we found that labels can cause categorical attitude to objects even before the category task is given. If a subject names objects by two different labels and sees just a part of all features then he, being presented with the rest of them, will find more frequent features (i.e. categorical) faster than if he names objects by a single general label.

Can the lexical contrast accompanied with uncategorical actions help to define the whole categorical structure when the conditions for categorization will appear but labels won't longer be there?

Discussion

1. The subjects in visual detection task (label condition) could define the categorical structure of objects when labels weren't there anymore but they couldn't do it in the no-label condition
2. The categorical structure was learned not only for the full-image objects but also for the object-distractors (hybrid)
3. Words activate categorization even before the category learning task has been offered on artificial material. And it can help us understand the influence of language on cognitive processes and not direct influence it has on actions connected with categorical perception and semantic knowledge but influence it has on preverbal stages of individual development

References

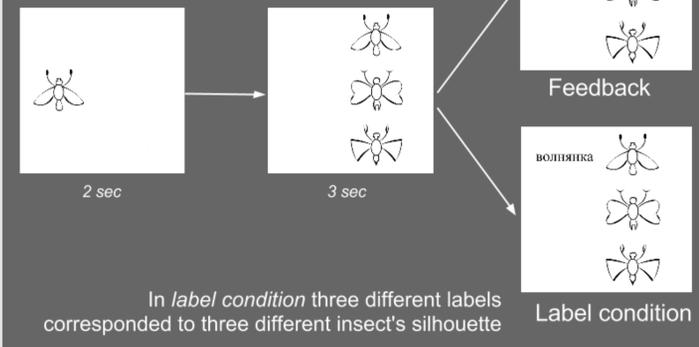
Schooler, J. W., & Engstler-Schooler, T. Y. (1990). Verbal overshadowing of visual memories: Some things are better left unsaid. *Cognitive Psychology*.
 Lupyan, G. (2008). From chair to "chair": a representational shift account of object labeling effects on memory. *Journal of experimental psychology. General*.
 Kotov A.A., Kotova T.N., Vlasova E.F., Agrba L.B. (2012) The Effect of the Category Intention: How the Mere Presence of a Word Activates Categorization. *Journal of Psycholinguistics*.

Between-subject experimental design (label- and no-label conditions)

Dependent variables – proportion of correct answers and reaction time

Task 1. Visual detection

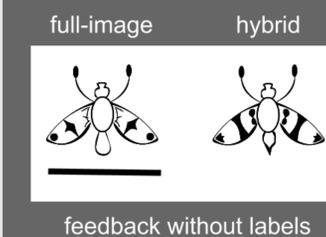
Subjects' goal was to find the target insect in the group of different insects as soon as possible



Method

Task 2. Categorization

Subjects had to define which image was the full version i.e. one of targets in previous task (and memorize its wing pattern) and which one was the hybrid (and pay no attention to its wing pattern).



Category structure (wing pattern features)

		full-image		hybrid	
1	1	0	0	0	1
1	0	1	0	1	0
0	1	1	1	0	0

Subjects: Sixty-four subjects, 18-24 years old volunteered for the experiment in exchange for course credit

Task 3. Test

Subjects were shown only full version images with some wing pattern for 3 sec. They were asked to assess if the wing pattern corresponded with the silhouette image

Test items	
Full-example	1 1 0
Hybrid-example	0 0 1
Full-prototype	1 1 1
Hybrid-prototype	0 0 0

Repeated measures analysis of variance (ANOVA) didn't reveal significant difference in reaction time, $F(1;563)=0.92, p>0.1, \eta^2_p=0.002$.
 Main factor of the block number was significant but not a very strong one - on average it took 1.39 sec to find the target in first 9 trials (SE=0.23) and 1.17 sec in the following 9 ones (SE=0.20), $F(1;563)=99.32, p<0.001, \eta^2_p=0.15$.
 There was no interaction between factors, $p>0.1$

Percentage of mistakes in target finding (in first and second blocks correspondently)

No-label condition	Label condition	
3.4%	13.5%	$\chi^2(1)=19.65, p<0.001$
3.8%	8.4%	$\chi^2(1)=6.83, p<0.01$

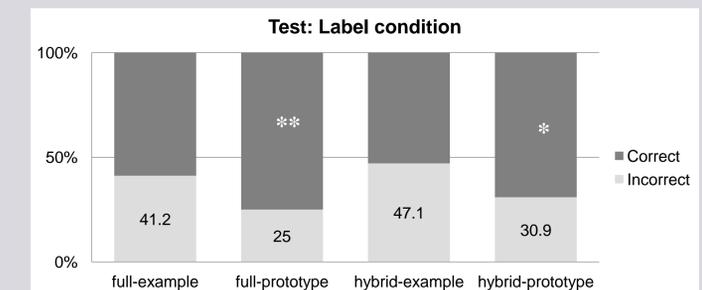
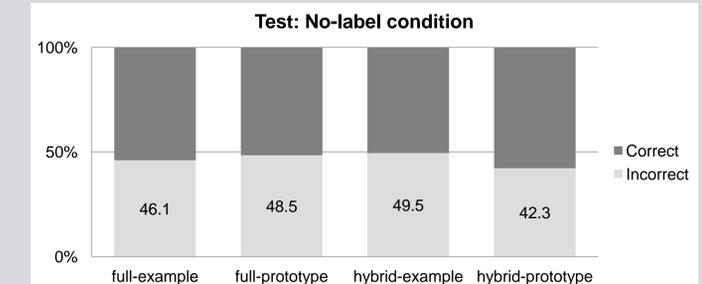
Percentage of incorrect identifications of the full-images

No-label condition	Label condition
28.6%	22.4%
$\chi^2(1)=3.62, p>0.05$	

Reaction Time

No-label condition	Label condition
M=2.55 sec, SD=1.02	M=2.70 sec, SD=0.97
$t(708)=2.11, p=0.35, \eta^2_p=0.006$	

Results



Funding

The study was implemented in the framework of the Basic Research Program at the National Research University Higher School of Economics in 2013 and was partially supported by RFBR, research project No. 13-06-00432.

Contact

Alexey Kotov al.kotov@gmail.com
 Tatyana Kotova tkotova@gmail.com
²Research Group for Concept and Cognitive Development
www.cogdevelopment.com