



Unconscious perception of ambiguous information.

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It's not a secret, that people perceive much more information, than they become aware of. In spite of long history (of this issue) the problem of unconscious perception is still one of the most vague and unexplored questions in psychology. Perception of ambiguous figures can be seen as a particular case of the problem in question. In special literature there are data that if perceiving such a picture person realizes only one of its meanings he also perceives the second one, but doesn't become aware of it. According to Allakhverdov's theory, person chooses one of the meanings as positive one, whereas the second one, which is unconscious, corresponds to the negative choice. In Allakhverdov's opinion, those negatively chosen meanings are not neutral for consciousness, they are not just passively stored, but are actively rejected by it. [*Сознание как парадокс*, СПб, 2000]. The given study is devoted to the experimental verification of this assumption; the project is supported by grant from РГНФ (Russian Humanity Scientific Fund), № 05-06-06034a.

Method

Participants

40 subjects, 20 men and 20 women, all students of Saint-Petersburg State University were asked to participate in this study. Mean ages were 22. Participants were individually divided in to 2 experimental series, and received no compensation. Participants had normal (20/20) vision.

Design

Ambiguous figures were used as primes in the research. A mixed design was used, with the dependent variable (time of participants response) and 4 independent variables. The first independent variable (nature of relation between test-stimulus and ambiguous figure-prime) has 3 levels (1. test stimulus is related to the meaning, of which subject realizes, 2. test stimulus is related to the meaning, which subject hasn't realized, 3. test stimulus is not related to ambiguous figure). Second independent variable is type of task. There are 4 types: solving anagrams, identification of slowly becoming apparent pictures and words, identification of pictures by its fragments. Third independent variable is type of trial. There are 3 types of trials: 1. trials where subjects haven't realized "new" meanings; 2. trials where subjects simultaneously realize both meanings and 3. trials where subjects realize "new" meanings. And the fourth independent variable (realization of new meanings) had 2 levels: before realization and after realization.

Materials

There were 16 different ambiguous figures that were divided in to 2 experimental series. Ambiguous figures are pictures that can be simultaneously interpreted as 2 objects of a different class. For example, the ambiguous figure presented in **Figure 1** can be identified either as a man playing the saxophone (**Figure 2**) or as a woman's face (**Figure 3**).

Figure 1



Figure 2



Figure 3



If a subject initially identified the given picture as a "saxophone player", the picture started transforming towards the meaning, that the subject hadn't realized, in our case – that is woman face (**Figure 3**). It was specially done for to help subjects to realize “new” meanings in the course of experiment.

Part of experimental tasks was related with ambiguous figure-prime (half of them - with the first interpretation of the prime, in given case with the «saxophone player», another half - with the second interpretation, in given case with the «woman's face»), another part was not related with ambiguous figure-prime. As test-stimuli we use answers on the experimental tasks that subjects solve. There are 4 types of experimental tasks:

1. Anagram solving (for example, word «woman», which is related with second interpretation of the prime),
2. Identification of slowly becoming apparent words (for example, word «lipstick», which is also related with second interpretation),
3. Identification of slowly becoming apparent pictures (for example, picture of «saxophone», which is related with first interpretation of the prime), and
4. Identification of pictures by its fragments (for example, picture of «bicycle», which is not related with the prime).

After being presented with one ambiguous figure the subject was to solve 16 experimental tasks (4 of each mentioned types), then he was presented with the next picture and other 16 tasks.

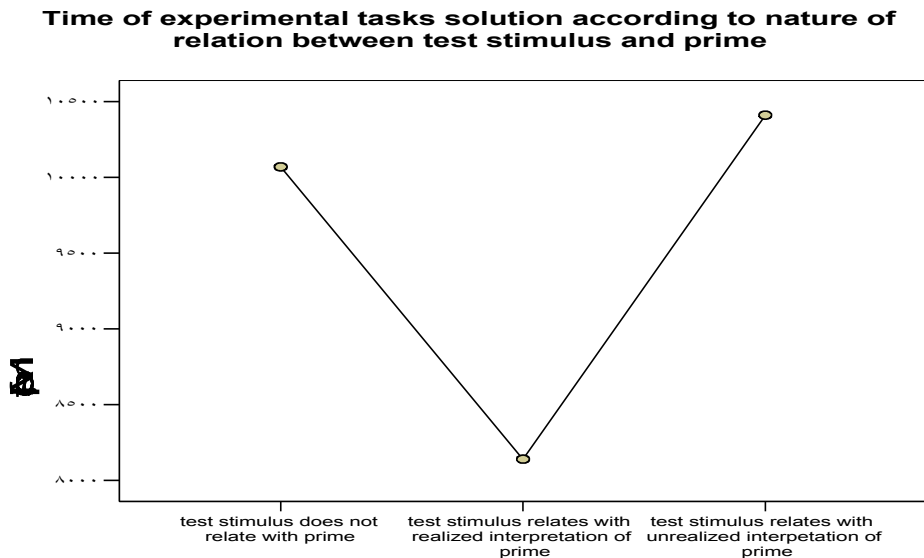
Procedure

We worked individually with each subject. And the whole experiment took about 40 minutes. That was the time taken for identification of 8 ambiguous figures and solution of 128 experimental tasks. According to the instruction, before starting solving the experimental tasks, subject was to relate double meaning figure (which was displayed for 5 sec) to one of given classes. After this, the computer program defined how to change the ambiguous picture setting context. Transforming ambiguous figure constantly was displayed at the left side of the screen while subject was solving experimental tasks at the right. As soon as he notices that the picture at the left had taken another meaning, he could return to it and change the answer that he had given before. The moment of answer correction was considered as the moment of realization of “new” meaning.

Results

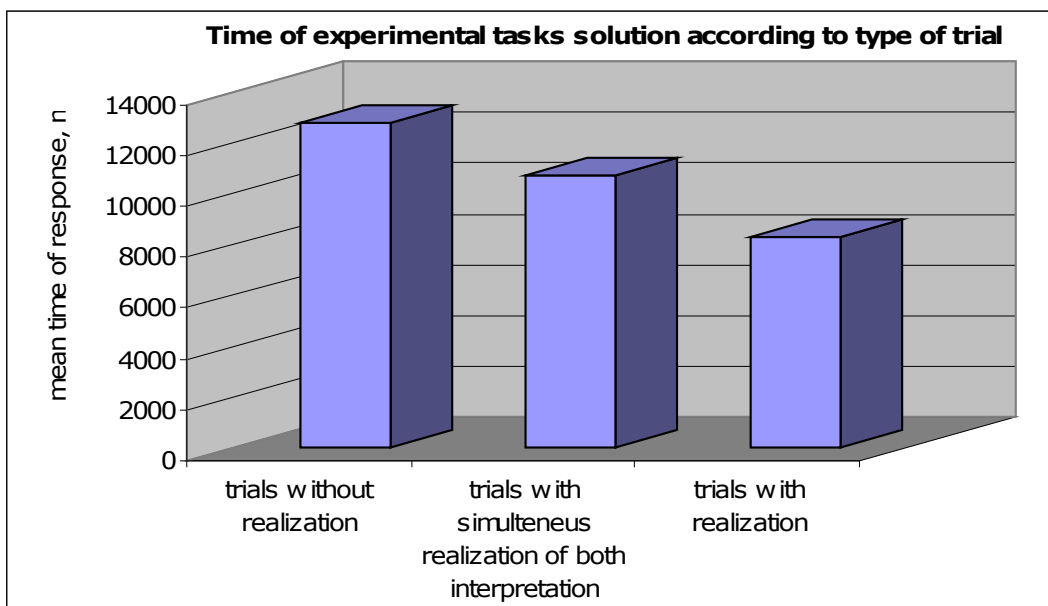
The data were analyzed using a mixed design ANOVA. At first, we compared the time taken for task solution with the nature of relation between test stimulus and ambiguous figure-prime. As you can see on **Graph 1**, tasks, where test stimulus were connected with the meanings realized by subjects, were resolved quickest. We didn't find significant differences between time of tests solution, in which test stimulus were related to meanings which subjects haven't realized and time of tests solution, where there were no any relation to the figure-prime.

Graph1



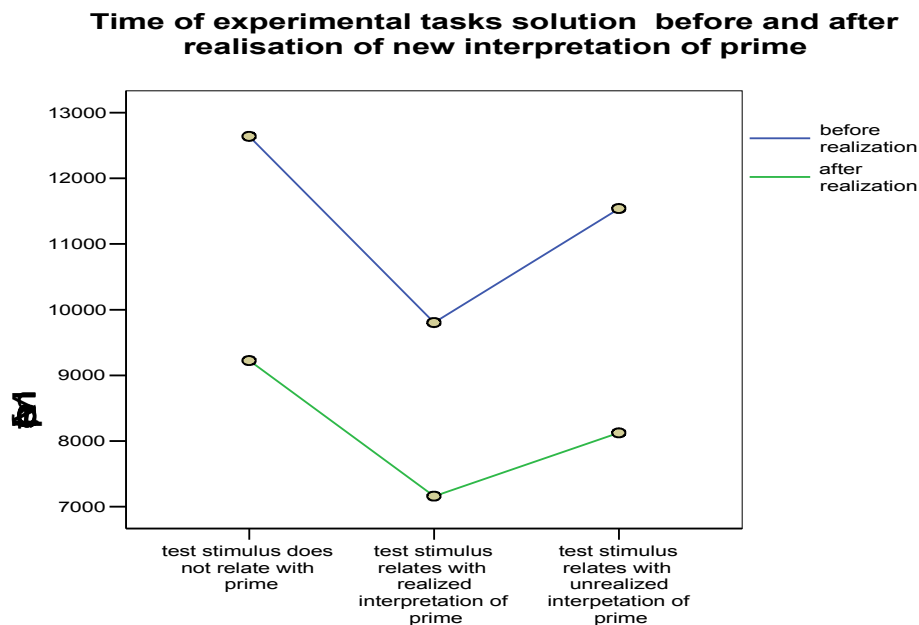
Then we analyzed trials, where there were no realization of “new” meanings and trials, during which performance, there was such a realization. As a controlling condition we use trials where subjects realized both meanings at the first presentation of the picture. We found significant differences between those trials ($F= 4.027$, $df=2$, $Sig.=.018$). As you can see on **Graph 2**, subjects resolve tasks quicker in those trials where they managed to realize “new” meaning of ambiguous picture.

Graph 2



Finally we analyze separately those trials where subjects realized “new” meanings. As you can see on **Graph 3** speed of tasks solution is significantly greater after realization ($F= 7.067$, $df=1$, $Sig.=.008$).

Graph 3



The matter is that this law applies to all tasks solutions, both related to and not related to ambiguous figure-prime, and also applies to solution of all types experimental tasks. Hence, we conclude that type of experimental task was not important.

Discussion

The given experimental investigation allowed us to define several particular qualities of ambiguous information perception. Our results showed that if subject do not realize all meanings of ambiguous stimuli, the speed of experimental tasks solution falls in comparison with controlling condition, where there are no unrealized meanings (i.e. subject realize both interpretations of an ambiguous picture from the beginning). This result shows first of all that in spite of the fact that not all meanings were realized by the subjects, they nevertheless were perceived by them (otherwise we do not register their influence on conscious activity). We consider that dealing with ambiguous information, the presence of unconscious perception itself interferes with conscious activity, which is performed in its context, that is why speed of experimental tasks solutions falls. According to Allakhverdov’s theory, “the mechanism of consciousness” specially “decides” what should be realized and what should not. In Allakhverdov’s opinion, the function of consciousness is to construct guesses about consistent and unambiguous world organization that is why it resists from realizing the second meaning of ambiguous stimulus, which is also perceived. So it makes sense to consider unrealized meanings of ambiguous stimulus as negative choice. We suppose that presence of negatively chosen meanings evokes inner tension in person, which is specific for problem situations.

Experimental results also allow us to consider that psychical interference disappears after subject realizes all meanings of ambiguous information that is why speed of experimental tasks solutions grows. Thus, we suppose that realization of negatively chosen meanings influence on current conscious activity similar to “insight” described in psychotherapy: sudden realization of previously unrealized meanings, even irrelevant to current activity, increases its efficiency. The differences are only in levels of considerations of this phenomenon.