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# Affordances as part of the process of object identification in visual search

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**Annotation**: **Introduction.** The study is aimed at studying the role of affordances in the representation of an object and the influence of motor programs on the process of visual search within the framework of the skipping search continuation paradigm (SPPP). A hypothesis was put forward about the occurrence of the effect of compatibility/congruence in the process of searching for real objects among distractors by running motor programs. **Methods.** The study involved 60 people from 18 to 30 years old, with normal or corrected vision, without disorders of the musculoskeletal system. The subjects had to search for target stimuli among the distractors, simultaneously performing a movement with a non-dominant hand, which could be congruent, not congruent, partially congruent to the target given by the word. **Results.** As a result of data analysis, there were no significant differences in accuracy and reaction time depending on the congruence of movement towards the search object in both groups. However, the effect of PPPP was observed in all groups, regardless of the congruence of movement towards the object. **Discussion of the results.** Since previous studies used the task of naming or categorization rather than visual search, a possible explanation for the results may be the following factors: the movement was performed by a non-dominant hand, the target stimulus was given by a word, irrelevant programs were launched, it was impossible to form an affordance situation due to the perception of objects with different from the target motor programs. **Conclusion** _ The study outlines the boundary of the position on the inclusion of functional knowledge in the representation of an object and the influence of the compatibility effect on the process of visual search. The launch of motor programs does not necessarily lead to a significant impact on the process of finding the target stimulus among distractors - there is a compatibility effect. Achieving a state of affordance is probably the key factor for the emergence of such an influence.

**Keywords**: affordance, motor program, functional knowledge, categorization, visual search, target stimulus, distractor, gaps in search continuation, compatibility effect, congruence

## Highlights

- it is assumed that motor programs (functional knowledge) can be part of the representation of an object;

- the launch of motor programs affects the speed of object categorization;
- no significant effect of the congruence of the motor program on the accuracy and speed of visual search was found in the case of the LLPP effect;
- the proposed explanation is the inability to achieve a state of affordance in visual search tasks.

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## Introduction

Looking at a familiar object, a person can easily attribute it to one category or another by analyzing the features of this object. If there is a consensus regarding the role of most basic perceptual features (shape, color, size) in categorization, then the involvement of motor programs in this process raises many questions. There are various definitions of the concept *of affordance,* but the most common understanding of affordance is as a possible way of acting with objects (Osiurak et al., 2017). An important note here is that affordance does not refer exclusively to the properties of an object, but emphasizes its "existence" in the interaction of the object and the actor of the action (Wolf et al., 2020), by which we mean an organism that perceives the environment and implements its behavior in it (Pozzi et al., 2014). Thus, affordance depends on both the properties of the object and the characteristics of the actor. In this case, an important aspect of consideration becomes such a characteristic of the actor as motor programs that implement the methods of action with the object. According to some authors, motor programs (or functional knowledge) are included in the representation of an object (see e.g. Osiurak et al., 2017, Tucker and Ellis, 1998). Assuming that motor programs, and hence affordance, can be part of the representation of an object, the next necessary step in the analysis is the concept of *categorization* - the ability to group objects for efficient storage and manipulation of information (Cohen and Lefebvre, 2005).

There is an idea that motor programs and the categorization process do not depend on each other, since motor programs are traditionally classified as low-level processes, while categorization is more complex and high-level. According to the idea of a hierarchical structure of the cognitive system, low-level processes cannot influence high-level ones (Anderson, 1996). However, within the framework of modern ideas about the system of cognitive processes, the possibility of two-way influence is emphasized (Grafton, 2009).

In the context of studying the role of motor programs in the process of categorization, the main focus of research is on the so-called "compatibility effect" - the congruence of the position of an object or its parts with the movement of a person. For example, in the experiments of Borji (2007), the subjects did not perform the movements themselves, but only received priming in the form of photographs of movements corresponding to the capture of either large objects or small objects. Next, the subjects had to attribute the presented object to the category of either artificially created or natural. In this case, priming had no effect on the speed of object categorization. However, in the second experiment, a preliminary training was added, where the subjects repeated the movements shown on the screen, after which they proceeded to perform

the experiment itself while maintaining the priming stage. This experiment demonstrated a significant effect of motion congruence on reaction time. The authors explain the results obtained by the direct launch of motor programs during the independent performance of an action, which causes an increase in "sensitivity" to priming and an improvement in the subsequent identification of objects (Borghi et al., 2007). This study outlines the condition for the occurrence of this influence: the observation of the action does not cause the launch of motor programs, however, a short-term imitation of the movement by the subjects themselves, apparently, is sufficient for the occurrence of the compatibility effect.

In a study by Tuker and Ellis (2001), where the subjects also had to assign objects to one of two categories (natural or artificially created), the so-called "object size effect" (object - size effect), which can be referred to as compatibility effects. The size effect is that the perceived size of an object triggers a motor program that is compatible with the presented object, which can be expressed in a decrease in reaction time. An important difference between Tyuker's study and Borgia's is that in the process of categorizing objects, the subjects held a specially designed instrument, with which they gave an answer about the object's belonging to the category. The subjects squeezed the cylindrical base of the instrument if the object was in the artificial category, and squeezed the small switch if the object was in the natural category. As a result, it was found that if the movement and the size of the object are compatible, the reaction time decreases, that is, the answer is given by the subjects faster. In the work of Baba and Maesson (2013), imitation of movements by the subjects was also present. However, the authors paid special attention to various parameters of movement: the use of the left and right hands, vertical and horizontal orientations, various hand positions. The task of the subjects was to familiarize themselves with a set of 96 objects with captions, after which they were sequentially presented with two photographs of hands, the position of which they had to repeat, and then name the presented object. The speed of naming, naming errors, memory errors were analyzed under conditions of congruence/ incongruence of all motion parameters and object category. As a result, significant differences were obtained in the response speed between the conditions of congruence and incongruence of the motion parameter and the object. Thus, the authors conclude that in the case of the coincidence of the motor program and the object, an increase in the speed of object identification is observed.

Of interest are studies aimed at studying the effect of compatibility in the task of visual search. One example of such work is the work of Yamani and colleagues (2016), where the authors conducted an experiment in the visual search asymmetry paradigm (the search asymmetry paradigms). The subjects had to report on the presence or absence of a cup, the handle of which could be turned left or right; depending on the direction of the handle of the target cup, the surrounding distractors (also cups with handles) had the opposite position of the handle: if the target handle is on the right, then the handles of the distractors are on the left and vice versa. The response about the presence of the target stimulus was performed with the index finger of one hand, and the response about the absence was performed with the index finger of the other hand. According to the results of the study, it was found that the reaction time was significantly higher in the case of coincidence (congruence) of the handle of the target object and the hand of the subject. The authors believe that images of objects located by the functional part towards the hand evoke an automatic motor response, which turns out to be relatively faster than in a situation where the orientation of the functional part and the hand does not match.

Thus, certain hand movements presumably trigger motor programs that are appropriate for certain objects and inappropriate for others. The present study raises the question of the influence of motor programs on the categorization process in the visual search task. As a specific study effect, we chose the phenomenon of "skipping while continuing the search" (SPPP) - a decrease in the success of finding the second target stimulus after successfully finding the first target stimulus. There are several theories explaining the mechanism of this effect. The search saturation theory assumes that after finding the first goal (object), a person is "satisfied" with the result of his search, therefore, prematurely terminates it, which is why the situation of missing the second goal arises. The resource depletion theory describes the effect of FLPP in terms of limited cognitive resources - the search for the first goal uses a lot of attention and working memory resources, as a result of which much less resources are left for the search for the second goal, which leads to skipping. Finally, perceptual set theory proposes that finding the first target (or setting the target stimulus through an image) forms a perceptual image that causes attention to be directed to similar objects, so that the probability of missing a second target (not similar to the one previously found) increases (Adamo et al., 2021). However, in addition to the ability to form a perceptual set, there is a possibility that the categorization of stimuli will affect the efficiency of visual search. Thus, in the study by Mitroff and colleagues, using the example of real objects, where target stimuli could have a perceptual similarity (the same color - two red objects) or categorical (the same function or category - a gun and bullets), it was found that categorical similarity more significantly affects the finding second target stimulus versus perceptual similarity (Mitroff et al, 2015). Similar results were obtained in a recent work by Rubtsova and Gorbunova: the role of both perceptual and categorical similarity of target stimuli was revealed, however, categorical similarity had a greater influence on the detection of the second target (Rubtsova and Gorbunova, 2021)

On the basis of the reviewed studies, we developed an experiment design aimed at clarifying the relationship between the activation of motor programs and categories in the condition of the visual search task, using the example of the PPPP effect. Based on the study of perceptual and categorical attitudes within the framework of the PPPP effect, as well as ideas about the inclusion of motor programs/functional knowledge in the representation of an object, a hypothesis can be put forward about the effect of the congruence of the triggered motor program to target stimuli on the efficiency of visual search. It is assumed that the motor program can act as an installation that ensures the direction of attention to objects that are congruent to the running program.

## Methods

We have formulated a hypothesis that the congruence of movement to an object affects the accuracy and time of finding target stimuli in the visual search task within the framework of the PPP paradigm.

A mixed experimental plan was used in the experiment: the intergroup variable was the type of movement (grasping / pinching, in the further description the following abbreviations will be used: the grasping group will be designated as Grasp, the pinching group - Pinch), intragroup variables - congruence (correspondence) of the movement to the stimulus (3 block: congruent, not congruent, partially congruent) and the number of target stimuli on the screen (two, one, none). The dependent variables were the number of correct answers and reaction time. In the block of partial congruence, two words were presented; the first word in the presentation could

be congruent or not congruent to the movement being performed. Thus, there were 4 groups of subjects in the experiment (see Table 1). In addition to this, in this experiment, a new method of conducting the experiment and analyzing the effect of SPPP was implemented (Adamo, 2019), in which the positions of single target stimuli (in the corresponding samples) corresponded to the coordinates of the samples with two stimuli and were surrounded by the same distractors.

**Table 1**

Designation of 4 experimental groups

| Traffic | First word in partial congruence block | Symbol |
|---|---|---|
| capture | congruent | GraspCongru |
| capture | not congruent | GraspIncongru |
| Pinching | congruent | PincgCongru |
| Pinching | not congruent | Pinch Incongru |

*Sample*

The empirical part of the study was implemented on the basis of the HSE Department of Psychology. Students of the educational program "Psychology" with normal or corrected to normal vision, without neurological disorders, were involved in the participation. Passing the experiment was rewarded with a bonus point in academic disciplines. The study involved 60 people (*M = 20.5, 27 women, 55 right-handers, 15 in each group)*. The experiment was conducted online on the Pavlovia service.

*Stimulus material*

Images of objects were taken from the open database of stimuli by T. Brady (2008) and were pre-selected through a survey. The final set of stimuli consisted of 50 object images.

*Procedure*

A pilot study was conducted in advance, in which 18 people took part. Half of the participants underwent the experiment with the presence of the experimenter; experimenter and participant communicated via Skype. As a result of comparing groups with and without the presence of the experimenter, no significant differences were found, which was the basis for conducting the main part of the experiment online. During the experiment, the subjects had to find the target stimulus given by the word, while performing a gripping or pinching hand movement in the search process. The action could be congruent to the target stimuli, not congruent, partially congruent (one target stimulus is congruent, the other is not). The word was presented for 1 second, then a search space appeared, where 18-20 distractors and there could be two, one or no target stimulus. If there were two target stimuli, then it was necessary to sequentially click on each of them. If there was one target stimulus, then it was necessary to click on the object, and

then on the word OK. If there was no target stimulus, then it was necessary to click twice on the word NO. During the search, the subject had to move not with the leading hand, but with the leading hand to control the mouse, with which he clicked on objects. In the case of a block with partial congruence, two words were presented for memorization - congruent and non-congruent. A total of 307 trials were performed, not counting 8 training trials: 86 trials per congruent and non-congruent blocks, 135 trials per block with partial congruence. In blocks with 86 trials, 25 trials were with two target stimuli, 50 with one, and 11 trials without a target stimulus. In the block with 135 trials, the number of trials with two target stimuli and their absence remained the same; there were twice as many trials with one target stimulus. The experiment was conducted online on the Pavlovia platform.

## Results

Data analysis and visualization were carried out in the R v software environment. 1.2.1335. Measures of accuracy and reaction time (time of the first and second clicks) were compared for conditions with one and two target stimuli, as well as a comparison of indicators between blocks of congruence within groups. Three-way mixed analysis of variance was used as a data processing method, where the group was an intergroup variable, and the block and sample type were intragroup variables, if necessary, a correction for Greenhouse - Geisser sphericity was applied (data are corrected).

Accuracy scores and response times (first and second clicks) were analyzed using a three-way mixed ANOVA. A significant influence of the "sample type" factor on the accuracy indicator was found ($F(2,110 > 865.35, p < .000, \eta_p^2 = .856$), the reaction time indicators (first and second clicks) are significantly affected by the "sample type" factors (RT 1: $F(2,110) > 173.39, p < .000, \eta^2 = .097$, RT 2: $F(2,110) > 76.12, p < .000, \eta_p^2 = .084$) and "block" (RT 1 : $F(2,110) > 102.47, p < .000, \eta^2 = .327$, RT 2: $F(2,110) > 82.34, p < .000, \eta_p^2 = .328$), and analysis showed a significant interaction of these factors (RT 1: $F(4,220) > 23.31, p < .000, \eta_p^2 = .022$, RT 2 : $F(4,220) > 9.68, p < .000, \eta_p^2 = .011$). "group" has no significant effect ($p > 0.05$).

For further analysis, a mixed three-way analysis of variance was performed for each group, where type and block were the intragroup factor, and subgroup was the intergroup factor (congruence or incongruence of the first word in a partially congruent block). As a result of the analysis, it was revealed that for the Grasp group (GraspCongru and GraspIncong), the subgroup factor does not have a significant effect ($p > 0.05$). For the accuracy score in the Grasp group, only the type of sample is significantly affected ($F(2.54) > 656.17, p < .000, \eta_p^2 = .883$); no influence of the "block" factor was found ($p > 0.05$). For reaction time indicators (first and second clicks), the block has a significant effect (RT 1: $F(2.54) > 41.27, p < .000, \eta_p^2 = .287$, RT 2: $F(2.54) > 54.18, p < .000, \eta_p^2 = .337$) and type (RT 1: $F(2.54) > 68.91, p < .000, \eta_p^2 = .089$, RT 2 : $F(2.54) > 31.85, p < .000, \eta_p^2 = .086$), and their interaction is also observed (RT 1: $F(4.108) > 8.28, p < .000, \eta_p^2 = .016$, RT 2: $F(2,108) > 5.47, p < .004, \eta_p^2 = .015$).

For the Pinch group (PinchCongru and PinchIncong), a similar situation is observed: the subgroup factor has no significant effect ($p > 0.05$). Only the type of sample affects the accuracy index ($F(2.56) > 3.24, p < .000, \eta_p^2 = .831$). For reaction time indicators (first click) – sample type ($F(2.56) > 114.16, p < .000, \eta_p^2 = .104$), block ($F(2.56) > 63.64, p < .000, \eta_p^2 = .366$), the interaction of these factors was revealed ($F(4,112) > 16.48, p < .000, \eta_p^2 = .304$). Second click time is affected by probe type ($F(2.56) > 48.93, p < .000, \eta_p^2 = .081$), block (F $(2.56) > 55.15, p < .000, \eta_p^2 = .322$),

and the interaction of these factors was revealed (*F(4,112) > 5.16, p <.007, $\eta_p^2$ =.008)*.

A two-way analysis of variance was also performed for each of the subgroups. The intragroup factors were the type of sample and the block. For GraspCongru, a significant influence of the sample type factor on all indicators was found: accuracy (*F(2.26) > 225.99, p <.000, $\eta_p^2$ =.839)*, first click (*F(2.26) > 32.43, p <.000, $\eta_p^2$ =.127)*, second click (*F(2,26) > 14.92, p <.000, $\eta_p^2$ =.108)*. Additionally, for the reaction time indicators, a significant influence of the block was established (RT 1: *F(2.26) > 22.55, p <.000, $\eta_p^2$ =.393*, RT 2 *: F(2.26) > 13.54, p <.000, $\eta_p^2$ =.317)*, as well as a significant interaction between the factors "sample type" and "block" (RT 1: *F(4.52) > 5.96, p <.004, $\eta_p^2$ =.038*, RT 2: *F(4.52) > 4.82, p <.02, $\eta_p^2$ =.030)*. For the PinchCongru group, similar results were obtained: the effect of sample type on accuracy (*F(2,28) > 121.11, p <.000, $\eta^2$ =.814)*, the effect of sample type on reaction time - first click (*F(2, 28) > 51.23, p <.000, $\eta_p^2$ =.084)*, second click (*F(2,28) > 24.53, p <.000, $\eta_p^2$ =.086)*. Block effect on reaction time for the first click (*F(2,28) > 36.16, p <.000, $\eta_p^2$ =.385)* and for the second (*F(2,28) > 24.65, p <.000, $\eta_p^2$ =.313)*, and the interaction of the factors "sample type" and "block" influenced the reaction time - the first click (*F(4,56) > 8.71, p <.000, $\eta_p^2$ =.037)*, the second click (*F(4.56) > 3.32, p <.023, $\eta_p^2$ =.011)*. For the GraspIncong group, a significant influence of the "sample type" factor on all indicators was found: accuracy (*F(2.28) > 524.86, p <.000, $\eta_p^2$ =.925)*, first click (*F(2.28) > 37.44, p <.000, $\eta_p^2$ =.080)*, second click (*F(2,28) > 20.57, p <.000, $\eta_p^2$ =.076)*. The "block" factor has a significant impact on the reaction time indicators: the first (*F(2,28) > 22.08, p <.000, $\eta_p^2$ =.275)* the second click (*F(2,28) > 23.17, p <. 000, $\eta p^2$ =.375)*, as well as accuracy scores (*F(2,28) > 4.77, p <.03, $\eta_p^2$ =.061)*. Interaction between factors "type" and "block" was found only for the first click (*F(4,56) > 3.39, p <.02, $\eta_p^2$ =.01)*. Similar results were obtained for the PinchIncong group. The sample type factor has a significant impact on all indicators: accuracy (*F(2.28) > 228.94, p <.000, $\eta_p^2$ =.844)*, first click *(F(2.28) > 64.31, p <.000, $\eta_p^2$ =.148)*, second click (*F(2,28) > 24.82, p <.000, $\eta_p^2$ =.095)*. The "block" factor has a significant effect on the reaction time indicators: the first (*F(2.28) > 27.67, p <.000, $\eta_p^2$ =.351)*, the second click (*F(2.28) > 31.48, p <.000, $\eta_p^2$ =.331)*. No interaction was found between the factors "sample type" and "block" for the first click (*F(4.56) > 8.33, p <.000, $\eta_p^2$ =.048)*.

In order to analyze the presence of the effect of SPPP, a one-way analysis of variance was performed (factor - type of sample). Previously, the data were grouped based on the block type: congruent, not congruent, partially congruent. The analysis was carried out within each group (GraspCongru, GraspIncong, PinchCongru, PinchIncong). The type of sample has a significant effect on all indicators, regardless of the block in each group. For convenience, the results of this analysis are shown in Table 2.

**Table 2**

Results of one-way analysis of variance for 4 groups. Reflected indicators of accuracy, first and second clicks for each of 3 blocks: congruent, not congruent, partially congruent

| GraspCongru group | Accuracy | First click | Second click |
|---|---|---|---|
| Congruent | F(2.26) > 100.6, p <.000, $\eta p^2$ =.862 | F(2.26) > 5.936, p <.007, $\eta p^2$ =.051 | F(2,2 6) > 9.24, p <.00 0, $\eta p^2$ =.1 34 |
| not congruent | F(2,2 6) > 160. 62, p <.000, $\eta p^2$ =. 801 | F(2,2 6) > 5. 14, p <.0 14, $\eta p^2$ =. 078 | F(2,2 6) > 9. 71, p <.0 00, $\eta p^2$ =.123 |

| | | | |
|---|---|---|---|
| Partially congruent | F(2,2 6) > 488. 93, p <.00 0, ηp 2 =. 951 | F(2,2 6) > 40. 6, p <.000, ηp 2 =.38 8 | F(2,2 6) > 10. 92, p <. 000, ηp 2 =. 144 |
| **PinchCongru Group** | **Accuracy** | **First click** | **Second click** |
| Congruent | F(2.28) > 84.66, p <.000, ηp 2 =.833 | F(2.28) > 14.18, p <.000, ηp 2 =.094 | F(2.28) > 7.83, p <.001, ηp 2 =.1 |
| not congruent | F(2.28) > 40.56, p <.000, ηp 2 =.713 | F(2.28) > 10.90, p <.000, ηp 2 =.056 | F(2.28) > 10.99, p <.000, ηp 2 =.065 |
| Partially congruent | F(2.28) > 205.36, p <.000, ηp 2 =.917 | F(2.28) > 32.11, p <.000, ηp 2 =.138 | F(2.28) > 20.48, p <.000, ηp 2 =.094 |
| **Gras p Incong group** | **Accuracy** | **First click** | **Second click** |
| Congruent | F(2, 28) > 84 8. 00, p <.000, ηp 2 =. 987 | F(2,2 8) > 12.44, p <.000, ηp 2 =.070 | F(2,2 8) > 17.88, p <.000, ηp 2 =.093 |
| not congruent | F(2, 28) > 353. 02, p <.000, ηp 2 =. 954 | F(2,2 8) > 9. 97, p <.000, ηp 2 =.0 62 | F(2,2 8) > 8.04, p <.00 1, ηp 2 =.0 61 |
| Partially congruent | F(2,2 8) > 145. 54, p <.00 0, ηp 2 =. 856 | F(2,2 8) > 30. 24, p <.000, ηp 2 =. 113 | F(2,2 8) > 8. 62, p <.0 01, ηp 2 =.078 |
| **Pinch Incong Group** | **Accuracy** | **First click** | **Second click** |
| Congruent | F(2,28) > 1 39. 19, p <.000, ηp 2 =. 796 | F(2,28) > 5. 764, p <.00 8, ηp 2 =.0 56 | F(2.28) > 15. 491, p <.00 0, ηp 2 =.0 61 |
| not congruent | F(2.28) > 142.61, p <.000, ηp 2 =.801 | F(2.28) > 16.06, p <.000, ηp 2 =.077 | F(2.28) > 7.82, p <.001, ηp 2 =.057 |
| Partially congruent | F(2.28) > 256.87, p <.000, ηp 2 =.942 | F(2.28) > 71.72, p <.000, ηp 2 =.33 | F(2.28) > 20.04, p <.000, ηp 2 =.180 |

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Pairwise comparisons (with Bonferroni -Holm correction for multiple comparisons) were used to compare accuracy and reaction time (first and second clicks separately) in trials with two and one target stimulus. Trials with two target stimuli were compared with each of the two types of trials with one stimulus, and two types of trials with one target stimulus were compared with each other. The analysis showed that in all compared triplets, the indicators of accuracy and reaction time in trials with two target stimuli differed significantly from each type of trial with one target stimulus. At the same time, comparison of two types of trials with one target stimulus showed no significant differences in any of the indicators.

## Discussion

When analyzing the accuracy and reaction time, depending on the type of test, the effect of TPPP was found: in all groups and blocks, a significant decrease in reaction time was observed in the conditions of trials with two stimuli compared to trials with one stimulus; Accuracy scores in trials with two stimuli were also significantly lower than in trials with one stimulus.

As a result of data analysis, no significant differences were found in terms of accuracy and reaction time depending on the congruence of movement towards the search object in all groups. Presumably, this may be due to the way the target object is specified through the word, which does not allow the formation and retention of a specific image used as a search template, and therefore does not allow creating a situation of affordance - a certain position of the object (the functional part of the object) in combination with the ability to adjust the position hands to this object. In addition, in the process of performing the task, the subjects worked with a task space filled with other objects, which, in turn, can launch other motor programs. Together, these aspects do not allow creating an affordance situation, which leads to the impossibility of influencing the accuracy or speed of visual search, which was demonstrated in previous experiments. Based on the works mentioned in the theoretical part, it can be assumed that the indicated aspects can also act as factors that should be taken into account and corrected in further studies. For example, in the study of Baba (2013), the position of the hand was regulated not only by the method of gripping the object, but also by the orientation of the hand, and the movement was performed by the leading hand. In the conducted studies, the object was not specified by a word, but presented as an image in the absence of distractors, however, in all studies, the subject's task was to categorize the object.

The discrepancy in the occurrence of the effect with the studies mentioned in the theoretical review may also be related to the type of task or the format of the objects representation. This assumption is based on the fact that in most works in this area, the compatibility effect was studied using the example of the problem of assigning an object to one category or another (Tucker and Ellis, 2001 et al., 2007, Bub et al., 2013). The results of the studies mentioned in the theoretical review are generally consistent with studies that used the fMRI method : upon presentation of images or words, activation of motor zones was observed if the given stimulus was an object with which action was possible (for example, a hammer); significant activation occurred upon presentation of stimuli denoting movement (verbs) (Popp, et al., 2019). It can be said that the task of assigning an object to one category or another is closer to the experimental conditions of studies using fMRI than the task presented in this study.

Another important fact related to the format of the task is that in the present study, the movement was performed with a non-dominant hand, since the subjects performed actions with a

computer mouse with the help of the dominant hand. In all the studies mentioned above, the subjects performed the movement with their dominant hand. According to some studies, in the case when the object is located near the dominant hand, the identification of this object is faster (Rowe et al., 2017).

Accordingly, assumptions that viewing objects triggers motor programs or that performing a movement results in the activation of the corresponding motor patterns require clarification. For example, according to the studies of Baba and colleagues (2013), the launch of motor programs can affect the speed of naming, however, in the studies mentioned, the position of the hands and the position of the functional parts of objects were maximally adapted to each other. Thus, the launch of motor programs with subsequent influence on certain processes is possible under the condition of presenting the object (its functional part) in the position that best suits the position of the hand. The hand itself must be in a position that is adequate to the method of action with the object, and be the leading one. In this case, a situation of affordance may arise : the properties of the object and the characteristic of the actor will be in the optimal ratio to each other for the implementation of the action. Probably, it is in this case that we can talk about the influence of functional knowledge as part of the representation of an object on the performance of a task other than naming/categorization.

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**Anastasia Anatolyevna Anufrieva** - generating the idea of the study, conducting the empirical part of the study, analyzing the results, systematizing materials, writing the text of the article.
**Elena Sergeevna Gorbunova** - generation of research ideas, setting research objectives, analysis and interpretation of the results, writing the text of the article.

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**Information about the conflict of interest**

The authors declare no conflict of interest.