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SEARCH FOR FAMILIAR AND DANGEROUS: NOT SEEING GOPNIK IN THE CROWD

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Search for familiar and dangerous: not seeing gopnik in the crowd[5]

Subcultures frequently tend to have some distinct fashion style, which eventually becomes their "trademark" and drifts to the common knowledge of one culture or another. However, to what extent can these characteristics of certain groups be intervened with vast cultural heritage? We examined the influence of specific features of "gopnik" fashion on visual search performance. We conducted two experiments to investigate familiarity and threatening effects of these objects in visual search. Overall, our results demonstrate visual search asymmetry for man-like and gopnik-like objects, which could not be explained by basic features differences of these stimuli. We suggest that nowadays in Russia gopniks are represented as familiar group, rather than dangerous.

JEL Classification: Z.

Keywords: visual search, visual search asymmetry, familiarity, gopniks.

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Introduction

Visual search is a crucial part of visual behavior, and many tasks in our lives depend highly on the efficiency of its performance. Thus, visual search has always been a subject of great interest and the considerable amount of knowledge on this theme has been accumulated throughout the years (Treisman & Souther, 1985; Wolfe, Cave, & Franzel, 1989; Wolfe, 1994; Wolfe & Horowitz, 2017; Wolfe, 2010).

Search asymmetry, being one of the phenomena in visual search, was firstly well described by Treisman and Souther in 1985 (Treisman & Souther, 1985). In the experiment, presence or absence of one feature in targets and distractors affected the performance of the subjects, as a circle with a vertical line among circles without any lines was found faster - it "*popped out*" (Treisman, 1985; Wolfe, 1994) by the participants, rather than a circle without a vertical line among circles with one. Treisman argued that search asymmetry is one of the properties of basic, preattentive feature. Since that finding, research was directed on discovering other attributes of objects which can influence visual search asymmetry, some of them being basic features, such as color, shape, motion, orientation and etc. (Foster & Ward, 1991; Kristjánsson & Tse, 2001; Royden, Wolfe, & Klempen, 2001; Treisman & Gormican, 1988).

One of the highly discussed properties of remembered stimuli is *novelty*. For instance, Wang and colleagues demonstrated the "pop-out effect" for novelty stimuli, when the reversed letter "N" - an unfamiliar object - among familiar objects - normal letters "N" - was found faster than vice versa (Wang, Cavanagh, & Green, 1994). Novelty is mainly reported to have "preattentive" qualities, so then new objects are to be find more efficiently (Bruce, Tsotsos, Leibold, & Maximilians, 2011). However, further studies disagree with some results received by Wang and colleagues and show effects of familiarity on visual search more precise. Shen and Reingold showed that the presence of letters familiar to Chinese speakers as distractors fastened the process of searching for both familiar and unfamiliar targets (Shen & Reingold, 2001). Furthermore, Malinowski and Hübner (2001) argued for the significance of familiar distractors in their paper - the more efficient search was showed for condition when distractors were familiar. When the participants were familiar with both types of targets - "N" and mirrored "N" (Slavic group of participants) - the difference between conditions was absent (Malinowski & Hübner, 2001). The notion that mainly the familiarity of distractors is crucial in visual search activity is also supported by many other studies (Becker, Smith, & Schenk, 2017; Gilford & Juola, 1976; Meinecke & Meisel, 2014; Mruczek & Sheinberg, 2005), some even argue that familiar distractors shorten the time spend on observing a group of objects (Greene & Rayner,

2001). Thus, search is most effective when the distractors are familiar and when there are differences between target and distractor in level of basic feature (Wolfe, 2001).

Besides letters or symbols, the search for objects such as normal images of elephants or camels also seems to be affected by the familiarity of distractors and novelty of targets. In Wolfe, 2001 it was reported that the unfamiliar, "dead" (reversed) elephant which is an unusual object to subjects, was found faster than normal (not reversed) (Wolfe, 2001). In addition, the fact that the animal presented was more or less common for the participants contributed to the performance as well.

The effect of the emotional stimuli on the visual search has also been researched, so that, for example, an angry face is found faster among other faces than happy or neutral faces (Hansen & Hansen, 1988). Hansen and Hansen argue that faces are biologically and evolutionary more efficient to process them, so because of this, their processing are special and "facial threat commands attention". However, Coelho and colleagues disagree with this hypothesis and suggested another explanation (Coelho, Cloete, & Wallis, 2011). They claim that angry faces contain some special features, so they could be easily found from other faces. This means that these differences in visual search could be explained through standard search asymmetry effect similarly to bump - un-bump objects (Wolfe, 2001). Coelho and colleagues through several experiments shows that face-in-the-crowd effect could be explained via low-level image features: such as specific line orientation, which have no explanation (so far) to be connected with faces. There are other threaten stimuli, such as snakes, spiders, for which effects similar to angry faces observed (Flykt, 2005; Ohman, Flykt, & Esteves, 2001). But still, there are debates between these two explanations of threatening effect, which could be also observed in other paradigms (for example continuous flash suppression) and for other threatening stimuli (for example weapons or knives) (Bar & Neta, 2006; Fox, Russo, & Dutton, 2002; Gray, Adams, Hedger, Newton, & Garner, 2013; Hedger, Adams, & Garner, 2015; Horstmann, 2007; LoBue, 2010; Öhman, 2005; Öhman, Soares, Juth, Lindstrm, & Esteves, 2012; Schubö, Gendolla, Meinecke, & Abele, 2006; Stein & Sterzer, 2012; Sulikowski & Burke, 2014).

The subculture of gopniks is one of the widely known cultural and social groups in Russia (Gavriliuk, 2011). It mainly flourished as it is in 1990s (Tikhomirov, 2011) and it's well-defined characteristics and a special place in Russia's socio-cultural development in 90's and early 2000's allowed this subculture to make its place in the pool of basic knowledge of Russian people. "Gopniks" can be defined as a marginal subculture consisting of predominantly white young men, who tend to have aggressive attitudes and often participate in criminal activities. Moreover, gopniks have a prominent style of clothing - they often wear an Adidas tracksuit with a cap and pointed shoes (Yakovleva, 2013). Gopniks can be compared with other low class semi-criminal subcultures as chavs

in England or racailles in France; all of them have a distinct fashion style and are perceived by majority of people as threatening and violent.

While gopniks still possess the qualities, which make them a familiar target, they also have been seen by society as threatening individuals, so it must be noted, that the search for the objects with some of the "gopnik" attributes can be also affected by this "face-in-the-crowd effect" as well as by familiarity. Here we will investigate how visual search act for these familiar and dangerous stimuli, and how gopniks could be perceived by Russian people today. We also conducted an additional experiment, where we control for differences in visual search for basic features of man-like and gopnik-like objects.

Experiment 1

To define gopnik we used the most famous gopnik attribute – Adidas-like pants with two white vertical stripes. Other man-like objects in visual search had similar pants but with horizontal stripes (perceptually equal by area and size). We expect to find visual search asymmetry for dangerous and familiar gopnik-like objects.

Method

Participants

24 volunteers, students of National Research University Higher School of Economics participated in the study (19 female). All of them were native Russian speakers with normal or corrected to normal vision and with no reported neurological problems. The age varied between 18 and 24 y.o. (M = 19.37, SD = 1.40). All participants were naive to the experimental hypothesis. In this and the following experiment, sample sizes were determined based on similar studies addressing the issue of visual search (from 8 to 20; for example (Gilford & Juola, 1976; Mruczek & Sheinberg, 2005; Treisman & Souther, 1985; Wolfe et al., 1989)).

Stimuli and apparatus

In this experiment we used contour images of people with either vertical (gopnik-like, Fig. 1A) or horizontal white stripes (Fig. 1B) of the same length and area on their pants. Each image size equal to .59°×2.1°. Four set sizes were used: 3, 6, 9 and 12. The stimuli were presented on gray background and located in random order in the irregular 11.3°×15.7° grid not intersecting with each other.

Stimuli were displayed with PsychoPy v. 1.85.2 (Pierce, 2007), OS Windows 7, 21.5-Inch Diagonal LCD Monitor, resolution 1920x1080 (16:9), response time 6 ms.

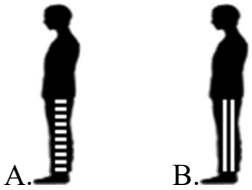

Figure 1 – An example of stimuli for the first experiment (A - image with horizontal stripes, B - image with vertical stripes)

Procedure

Participants sat in a light room 60 cm from a monitor. The experiment consisted of 560 trials divided into two sessions. In each session there were 50 trials where the target was present and 20 trials without a target for every set-size (for 3, 6, 9 and 12 stimuli). The order of presentation was randomized. Participant's task was to find the target stimulus or to report its absence. 12 participants were asked to find man-like object with vertical stripes among contour man-like objects with horizontal stripes on their pants in the first session, and vice versa in the second session. For 12 people the order was reversed. Participant's answers were registered with “left” and “right” keyboard buttons assigned for the answers “no” (target is absent) and “yes” (target is present) respectively. Features of target stimuli were precued during the instruction at the beginning of each trial using written words on the screen (e.g. “find vertical stripes amongst horizontal”). Each trial had a limit of 5 s, after which the screen cleared. The participant pressed “space” keyboard button at the end of both trial and main sessions to proceed to the next one. The participants were able to make small breaks during the experiment between the sessions. The participants were instructed to perform as fast and accurate as they can. A training session of 12 trials preceded each part of the experiment.

Results

The mean reaction time for two types of patterns of a man-like figure within 4 set sizes were compared. Data analysis was performed using IBM SPSS Statistics 23.0 and R (R core team, 2017). Repeated measures ANOVA was used. Correct answers with target absent were not analyzed; errors of the participants were not analyzed as well. The descriptive statistics are present in Table 1.

Table 1. **Descriptive statistics for reaction time in correct answers with target present (*Vertical (Mean, SD)* – participants were trying to find a vertical stimulus among horizontal stimuli, *Horizontal (Mean, SD)* – vice versa)**

	Set size			
Pattern	**3**	**6**	**9**	**12**
Vertical, Mean	.741	.885	1.030	1.178
Vertical, SD	.088	.158	.180	.222
Horizontal, Mean	.701	.783	.854	.927
Horizontal, SD	.113	.126	.157	.167

The repeated measures ANOVA revealed a main effect of pattern on the reaction time for visual search, F (3,66) = 10.94, $p < .001$, $p\eta^2 = .332$). Significant differences were found for all types of set sizes. Pairwise comparisons revealed the significant differences between all 4 set sizes. p-Value Bonferroni multiple comparisons adjustment was applied. The results are presented at Table 2.

Table 2. Pairwise comparisons for reaction time in correct answers with target present - *Vertical* - participants were trying to find man-like object with vertical stripes among horizontal stimuli, *Horizontal* – vice versa, with set size equals to *3, 6, 9, 12*

	Set size			
Pattern	**3**	**6**	**9**	**12**
Vertical	.038	.001	.000	.000
Horizontal	.038	.001	.000	.000

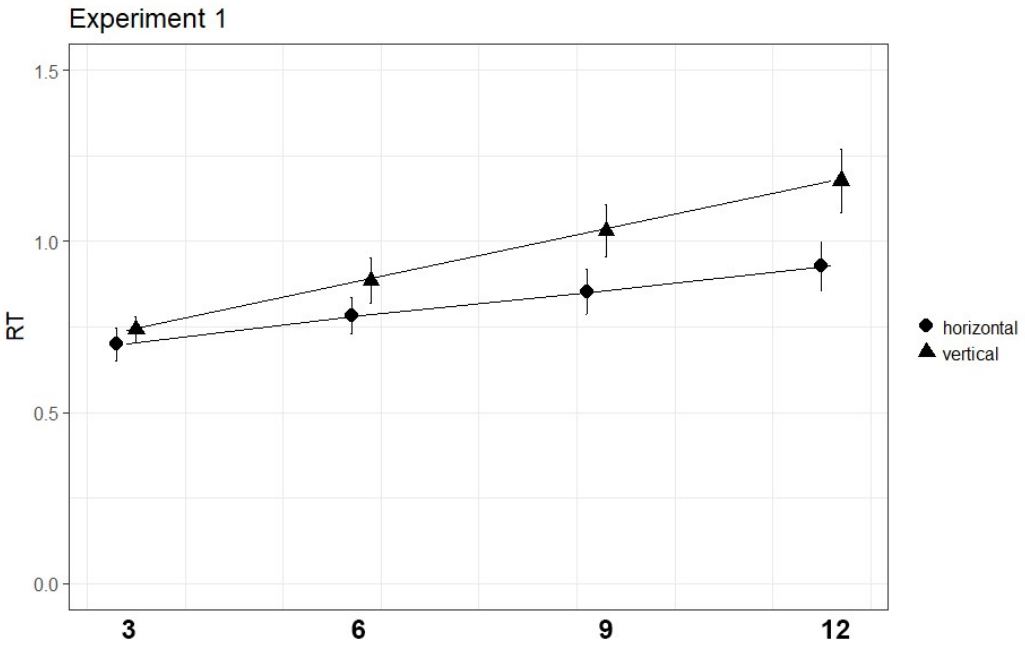

Figure 2 – Mean reaction time for 4 set size (3, 6, 9, 12 stimuli present) for 2 kinds of patterns

Experiment 2

To check whether results of Experiment 1 could not be explained only by low level characteristics of stimuli, we conducted Experiment 2, where we tested similar to Experiment 1 stimuli, but without contour of people. Thus, these stimuli were the same on feature level, but have no connection to gopnik.

Method

The method of second experiment was similar to the first experiment, but the stimuli were images of either vertical or horizontal white stripes resembling the stripes in the first experiment. The stimuli size was .14°×.86°.

Participants

24 volunteers, students of National Research University Higher School of Economics participated in the study (21 female). All of them were native Russian speakers with normal or corrected to normal vision and with no reported neurological problems. The age varied between 18 and 23 y.o. (M = 19.45, SD = 1.06). All participants were naive to the experimental hypothesis.

Procedure

The second experiment was constructed the same way as the first one with an only difference that instead of contour images of people, simple images of stripes were used. Analogically 12 participants were to find vertical stripes among horizontal stripes in the first session, and vice versa in the second session. For 12 people the order was reversed.

Results

The mean reaction time for two types of patterns within 4 set sizes were compared. Data analysis was performed using IBM SPSS Statistics 23.0 and R (R core team, 2017). Repeated measures ANOVA was used. Correct answers with target absent was not analyzed; errors of the participants were not analyzed as well. The descriptive statistics are present in Table 3.

The repeated measures ANOVA revealed no effect of the pattern (horizontal or vertical) on reaction time, F (3,69) = .305, p = .882, $p\eta^2$ = .013. The results are presented at Figure 3.

Table 3. **Descriptive statistics for reaction time in correct answers with target present (*Vertical (Mean, SD)* – participants were trying to find a vertical stimulus among horizontal stimuli, *Horizontal (Mean, SD)* – vice versa)**

	Set size			
Pattern	**3**	**6**	**9**	**12**
Vertical, Mean	.679	.733	.797	.897
Vertical, SD	.163	.184	.188	.216
Horizontal, Mean	.644	.723	.777	.886
Horizontal, SD	.153	.180	.228	.225

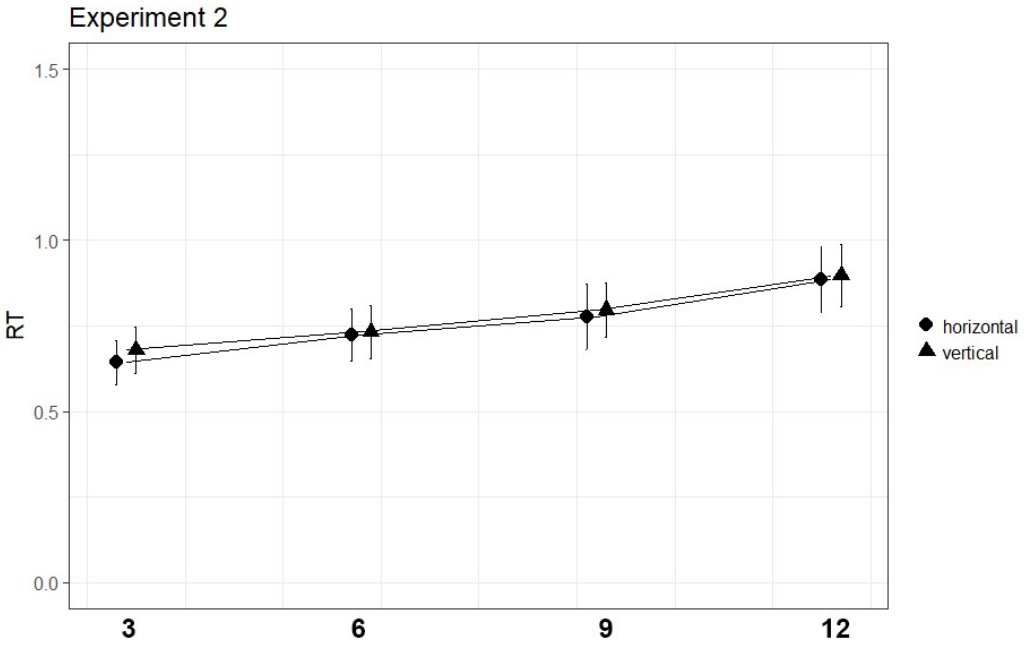

Figure 3 – Mean reaction time for 4 set size (3, 6, 9, 12 stimuli present) for 2 kinds of patterns

General Discussion

In our work the influence of cultural and specific features of "gopniks" subculture on visual search were tested. In Experiment 1 we observe visual search asymmetry for man-like and gopnik-like objects. Man-like objects (with horizontal stripes on pants) were found faster among gopnik-like objects (with vertical stripes on pants), but not vice versa. Thus, we could observe standard visual search asymmetry for familiar distractors (Wolfe, 2001). This experiment shows additional evidence that familiarity of objects (having cultural background and not letters (Malinowski & Hübner, 2001; Shen & Reingold, 2001)) influences visual search. In Experiment 2 we did not observe any differences in visual search for vertical and horizontal stimuli, which suggests that visual search asymmetry was not cause by differences in basic features for man-like and gopnik-like objects.

However, we did not observe any effect of threatening stimuli on visual search, which was shown for various threatening stimuli before (Hansen & Hansen, 1988; LoBue, 2010; Ohman et al., 2001; Öhman et al., 2012; Sulikowski & Burke, 2014). There are two different explanations of these results:

1) In contrast to snakes and spiders, which evolutionally represent danger to us (Ohman et al., 2001; Öhman et al., 2012), gopniks is a subculture, which was created not so long ago. Still, this group had big cultural influence (movies, books, music, etc (Tikhomirov, 2011)) and a lot of people are familiar with this subculture. However, it is possible that gopniks nowadays are perceived as not threatening group, but as one of the modern subcultures. For example, one of the new subcultures in Russia is A.U.E. (Арестанский уклад един - Convict's/Prisoner's Practice/(way of life, law)/Codex) (Lyadova, 2018). This youth community promotes among minor thieves concepts of the Russian criminal environment and prison concepts. Subculture appeared in 1990, but in 2016, the subculture received a new round of popularity among young people, when a gang of teenagers AUE attacked a police station in Transbaikal region. This group had strong associations with criminal and prison (and perhaps more dangerous than gopniks) but perceived by some people just like one of the new popular subcultures (similarly to popular subcultures of goth and emo in 1990's - 2000's in Russia (Novak & Ignatov, 2014)), and not as criminal gang. This could be the same to gopniks. It is already well-established group of people, having its own attributes and cultural background. So, perhaps nowadays they are perceived dangerous only in personal meeting in a dark street.
2) Another explanation is that participants did not explicitly understand that they search for gopniks in the task. Thus, it is possible that they did not understand the threat of these objects. However, we observed familiarity effect on these stimuli. It means that at least

implicitly these objects were associated with a well-known subculture in Russia. This is one of limitations of our study, however we could not inform in advance participants about objects, because it could cause some participants effects.

It is rather practical stimuli for investigation visual search asymmetry. We could easily manipulate features of these objects to create gopnik-like or man-like objects. And according to Experiment 2 these features did not cause any visual search asymmetries on their own. Thus, in further experiments we could investigate how participants, which consider that gopniks threatening group, perform visual search for this kind of stimuli. Such experiment will shed light on nature of effect of threatening stimuli in visual search (Coelho et al., 2011; Hansen & Hansen, 1988; Horstmann, 2007; Ohman et al., 2001; Öhman et al., 2012; Stein & Sterzer, 2012).

Conclusion

Our study, in addition to earlier findings, shows that asymmetry in visual search can also be induced by deeply culturally marked stimuli such as the figure of gopnik which portrays a prominent and notorious Russian subculture.

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