

## Role of emotional and perceptual features in visual search task

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Duration of visual search for emotionally neutral faces increases gradually, while happy faces pop-out in visual search task [1]. One explanation of these results is perceptual difference between emotional target and distractors. If differences in processing are result of perceptual differences, then inverting the stimuli would not make difference in the result pattern [2], which was confirmed in some studies [3].

In order to examine importance of perceptual and emotional factors in visual search task two experiments were conducted. In both experiments, stimuli were happy and sad schematic (smiley-like) face in upward or inverted position presented in sets of 4, 8, or 12. In the first experiment, target was happy upward face and distractors were stimuli that shared either emotional (inverted happy), or perceptual features (inverted sad), or none (upward sad). Repeated measures ANOVA revealed interaction of two factors (set size x distractor type), in reaction time (RT),  $F(432, 4) = 14, 08, p < .01$ ; and proportion of errors (pE),  $F(432, 4) = 10, 57, p < .01$ . When emotional features were shared, combined pattern of results was found, meaning that RT decreased with bigger set size. When target shared perceptual features with distractors, serial search pattern was found. When there were no shared features, pop-out effect was found. Same pattern of results was shown for RT and pE in all situations.

In second experiment, inverted, happy face was used as a target among other stimuli as distractors. Repeated measures ANOVA revealed interaction of two factors in RT,  $F(432, 4) = 11, 54, p < .01$ ; and pE,  $F(432, 4) = 9, 67, p < .05$ . When emotional features were shared (now: happy upward), pop-out effect was found in RT, while pattern for pE was somewhat different. In the case of shared perceptual features (sad, upward), serial search pattern was found in RT and pE. When there were no shared features with the target (sad, inverted), pop-out effect was found for RT and pE.

In bigger set sizes, perceptual similarities between target and distractors impaired the search, while emotional similarities enhanced the search. Results of both experiments suggest that shared perceptual and emotional features provoke two different search patterns and that their relative importance may depend on attentional load. Different results of previous studies may be explained by moderation effect of set size

1. Becker, D. V., Anderson, U. S., Mortensen, C. R., Neufeld, S. L., & Neel, R. (2011). The face in the crowd effect unconfounded: happy faces, not angry faces, are more efficiently detected in single-and multiple-target visual search tasks. *Journal of Experimental Psychology: General*, 140(4), 637.

2. Eastwood, J. D., Smilek, D., & Merikle, P. M. (2001). Differential attentional guidance by unattended faces expressing positive and negative emotion. *Perception & psychophysics*, *63*(6), 1004-1013.
3. Calvo, M. G., & Nummenmaa, L. (2008). Detection of emotional faces: salient physical features guide effective visual search. *Journal of Experimental Psychology: General*, *137*(3), 471.