**How do 25,000+ visual searches change the visual system?**

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Inefficient visual searches are those where reaction time (RT) increases substantial as the number of items in the visual display (set size) increases. After extended practice, an inefficient search can become efficient (little RT increase with set size). What changes occur in the visual system during search practice? Treisman (2006) suggested that observers might "grow" new feature detectors, capable of preattentively registering trained complex targets. To test this, we trained two groups of five participants to search for an artificially created complex feature: "openness to the right". For one group, stimuli were curved "amoebas"; for the other, straight line "trees". Participants were trained for 16 days (25,600 trials per participant in total). A control group was trained to search for color-color conjunctions. To estimate specific effects of training, we pre-tested and post-tested, participants on all three tasks ("amoebas", "trees", and color-color conjunctions). We measured search efficiency and search asymmetry. We also measured transfer of training from "amoebas" to "trees" and vice versa to estimate the generality or specificity of the "feature". Critically, the presence of a new feature was assessed with selective adaptation. It should be possible to adapt a feature (Treisman, 2006). We found a general effect of training on search efficiency (post-test RT slopes were 55% of pre-test). We also found strong asymmetries specific for the training tasks (slopes decreased 6-7 times for trained targets vs. 1.04-1.19 times for trained distractors). Transfer from amoeba to tree or tree to amoeba was weak (~13% slope benefit). No selective adaptation was found. Our results do not support formation of a general feature detector with practice. It is more likely that, with practice, participants learned more effective top-down guidance by existing features. Seen as a form of perceptual learning, our results represent a different form of a failure of far transfer.