Perceptual learning is specific to the trained structure of information.

Abstract:
What do we learn when we practice a simple perceptual task? Many studies have suggested that we learn to refine or better select the sensory representations of the task-relevant dimension. Here we show that learning is specific to the trained structural regularities. Specifically, when this structure is modified after training with a fixed temporal structure, performance regresses to pretraining levels, even when the trained stimuli and task are retained. This specificity raises key questions as to the importance of low-level sensory modifications in the learning process. We trained two groups of participants on a two-tone frequency discrimination task for several days. In one group, a fixed reference tone was consistently presented in the first interval (the second tone was higher or lower), and in the other group the same reference tone was consistently presented in the second interval. When following training, these temporal protocols were switched between groups, performance of both groups regressed to pretraining levels, and further training was needed to attain postlearning performance. ERP measures, taken before and after training, indicated that participants implicitly learned the temporal regularity of the protocol and formed an attentional template that matched the trained structure of information. These results are consistent with Reverse Hierarchy Theory, which posits that even the learning of simple perceptual tasks progresses in a top-down manner, hence can benefit from temporal regularities at the trial level, albeit at the potential cost that learning may be specific to these regularities.
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