Crossmodal to unimodal transfer of temporal perceptual learning

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Article

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Crossmodal to unimodal transfer of temporal perceptual learning

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Abstract

Subsecond temporal processing is crucial for activities requiring precise timing. Here, we investigated perceptual learning of crossmodal (auditory–visual or visual–auditory) temporal interval discrimination (TID) and its impacts on unimodal (visual or auditory) TID performance. The research purpose was to test whether learning is based on a more abstract and conceptual representation of subsecond time, which would predict crossmodal to unimodal learning transfer. The experiments revealed that learning to discriminate a 200-ms crossmodal temporal interval, defined by a pair of visual and auditory stimuli, significantly reduced crossmodal TID thresholds. Moreover, the crossmodal TID training also minimized unimodal TID thresholds with a pair of visual or auditory stimuli at the same interval, even if crossmodal TID thresholds are multiple times higher than unimodal TID thresholds. Subsequent training on unimodal TID failed to reduce unimodal TID thresholds further. These results indicate that learning of high-threshold crossmodal TID tasks can benefit low-threshold unimodal temporal processing, which may be achieved through training-induced improvement of a conceptual representation of subsecond time in the brain.

Keywords

multisensory/crossmodal processing, perceptual learning, specificity/transfer, time perception

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Methods

Participants and Apparatus

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Stimuli and Procedures

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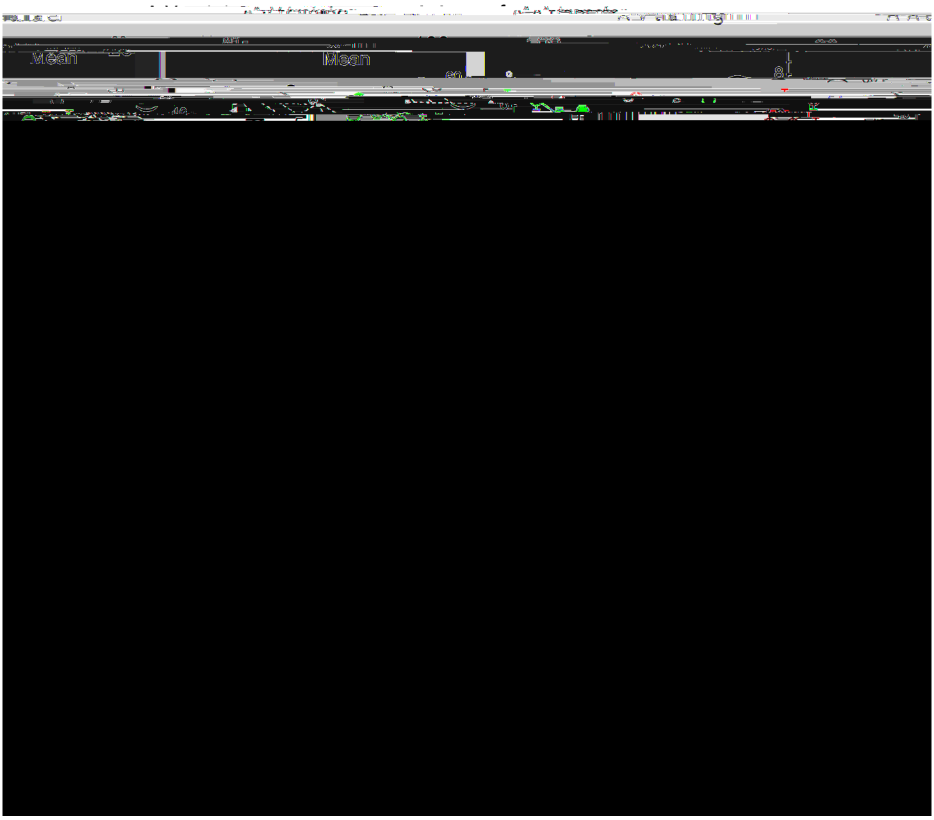

Figure 3. Transfer of crossmodal auditory–visual TID learning to unimodal auditory TID. Upper panels: The average A–V TID learning curve (left), the average A–A TID thresholds before and after A–V TID learning and with extra direct A–A TID training (middle), and a summary of individual and average percentage improvements (right). Lower panels: Individual data.

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References