How Recent History Affects Perception: The Normative Approach and Its Heuristic Approximation

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Abstract:

Author Summary

In this paper we study how history affects perception using an auditory delayed comparison task, in which human participants repeatedly compare the frequencies of two, temporally-separated pure tones. We demonstrate that the history of the experiment has a substantial effect on participants' performance: when both tones are high relative to past stimuli, people tend to report that the 2nd tone was higher, and when they are relatively low, they tend to report that the 1st tone was higher. Interestingly, only the most recent trials bias performance, which can be interpreted as if the participants assume that the statistics of stimuli in the experiment is highly volatile. Moreover, this bias persists even in settings, in which it is detrimental to performance. These results demonstrate the abilities, as well as limitations, of the cognitive system when incorporating expectations in perception.

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