Long-Term Memory for Pitch in Six-Month-Old Infants

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ABSTRACT: We examined 6-month-old infants' long-term memory representations for the pitch of familiar melodies. Infants remembered the relative pitch of the melodies, but the absolute pitch was either not remembered or not a particularly salient attribute.

KEYWORDS: infant; memory; melody; absolute pitch; relative pitch

INTRODUCTION

Understanding pitch perception in infancy is basic to understanding the development of music perception. It has been proposed that absolute pitch is a primitive ability and that infant perception is dominated by absolute pitch.[1,2] According to this view, the ability to encode the relative pitch of a melody develops with experience.[2–4] To evaluate this proposal, we carried out studies to determine the nature of infants' long-term memory representations. Previous research has shown that infants remember musical pieces over long periods of time.[5,6] Furthermore, infants remember the timbre and tempo of these compositions.[6] We expected, then, that infants would remember the absolute pitch.

MATERIAL AND METHODS

Experiment 1. Sixteen infants heard six repetitions each day of one of two old English folk songs, "The Country Lass" or "The Painful Plough*,"* at home for seven days. On the eighth day they were given a visually based preference test in which trials of the novel and familiar pieces alternated. Each trial began when the infant looked at a flashing toy on one side, causing the music for that trial to begin playing. Each trial ended when the infant looked away, causing the music to stop. The measure of preference was the average looking time per trial in order to hear the novel versus the familiar piece. Infants preferred the novel over the familiar melody, $F(1,12) = 7.20$, $P < 0.02$, indicating that they remembered the familiarized melody.

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Experiment 2. We tested whether infants would recognize a familiar song in transposition. The familiarization and testing were the same as in experiment 1, except that 32 infants were tested in one of four conditions where, compared to familiarization, both the novel and the familiar melodies were: (1) transposed up a perfect fifth, (2) transposed down a perfect fifth, (3) transposed up a tritone, or (4) transposed down a tritone. Infants preferred the novel over the familiar melody, $F(1,28) = 5.54$, $P = 0.02$, regardless of whether the transposition was up or down by a perfect fifth or a tritone, indicating that they encoded the relative pitch of the melodies in long-term memory.

Experiment 3. We tested whether infants remembered the absolute pitch of the melodies. After familiarization, 16 infants were tested in one of two conditions where the familiar melody was tested against (1) the familiar melody transposed up a perfect fifth or (2) the familiar melody transposed down a perfect fifth. Infants showed no preference for the familiar song at a novel pitch (transposed version of the song) over the familiar song at the familiar pitch, $F(1,14) = 0.003$, $P = 0.95$.

CONCLUSIONS

Contrary to our original hypothesis, we conclude that 6-month-old infants remember melodies in terms of relative pitch, that they do not remember absolute pitch or it is not salient to them, and that if a developmental shift in perception from absolute to relative pitch occurs, it takes place before 6 months of age.

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