

# Development of the Happy–Sad Distinction in Music Appreciation

## Does Tempo Emerge Earlier Than Mode?

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It is widely held that happiness and sadness in music are associated with two structural properties: tempo (i.e., the number of beats per minute) and mode (i.e., the specific arrangement of intervals among the subset of pitches used to write a given musical excerpt). More specifically, fast tempi tend to evoke a happy tone, whereas slow tempi tend to evoke a sad tone.<sup>1–3</sup> Similarly, the major mode is associated with happiness, and the minor mode is associated with sadness.<sup>4</sup>

There is compelling evidence that the manipulation of tempo and mode affect happy–sad judgments in adults.<sup>5</sup> Yet, it is less clear at what stage of development listeners become sensitive to these manipulations. The capacity to detect changes in tempo seems to be present very early in life, before one year of age;<sup>6,7</sup> nevertheless, sensitivity to tempo has never been considered separately from mode in developmental studies of emotions. By contrast, the ability to emotionally respond to mode has been studied independently from tempo and has been found to emerge later, around the age of seven to eight years.<sup>8,9</sup> However, there are theoretical and empirical grounds for thinking that mode, as well as tempo, may be present very early in development. The major mode is viewed as more consonant than the minor mode.<sup>10</sup> Since sensitivity to consonance emerges within the first year of life,<sup>11</sup> it is likely that the capacity to analyze mode will appear earlier than seven years of age. One study supporting this prediction shows that three-year-old children recognize the emotions associated with modes.<sup>12</sup>

In order to examine the respective roles of tempo and mode in development, the material and procedure employed effectively with adults in a previous study by Peretz and collaborators was adopted here as well. Thirty-two excerpts were taken from the classical repertoire. They were selected so that half ( $n = 16$ ) evoked a sense of happiness and the other half ( $n = 16$ ) a sense of sadness. Happy selections were

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**TABLE 1. Mean percentages of correct responses and standard errors provided by adults, and six- to eight-year-old and five-year-old children, in the different conditions defined by the type of modification applied to the musical excerpts**

Condition	Group					
	Adults		Six to Eight Year Olds		Five Year Olds	
	<i>M</i>	(SE)	<i>M</i>	(SE)	<i>M</i>	(SE)
Original	86.8	(3.9)	88.2	(4.0)	84.2	(4.9)
Tempo change	81.8	(3.2)	74.7	(3.3)	69.2	(4.0)
Mode change	70.7	(3.2)	75.6	(3.4)	79.4	(4.1)
Tempo + mode change	56.4	(2.9)	58.5	(3.0)	59.6	(3.6)

played at a fast tempo and were written in major mode; sad selections were played at a slow tempo and were written in minor mode. Tempo and mode were manipulated in three different conditions. In the “tempo change” condition, all tempi were set to the median value of the original tempi. In the “mode change” condition, the excerpts were changed to the opposite mode (from major to minor or vice versa). Finally, in the “tempo + mode change” condition, both tempo and mode manipulations were employed. A further condition, referred to as “original,” was employed in which excerpts did not undergo any modification.

Adults ( $n = 24$ ;  $M = 20.4$  years of age) and three groups of children (six to eight year olds,  $n = 22$ ; five year olds,  $n = 15$ ; three to four year olds,  $n = 30$ ) were presented with the full set of 32 excerpts in each of the four conditions.<sup>c</sup> Adults were required to judge on a 10-point scale whether the excerpts were happy or sad (1 = sad; 10 = happy). Children were asked to judge whether the excerpts were happy or sad by pointing to one of two face drawings designed to express happiness and sadness.

The mean percentages of correct responses obtained in each condition and provided by adults, six- to eight-year-old, and five-year-old children are presented in TABLE 1. A response was considered correct when it was the same as the intended emotion. For the sake of comparison, adults' responses were dichotomized, considering scores above and below five as happy and sad responses, respectively. Three- to four-year-old children were performing at chance in all conditions. Therefore, they were not considered in the following analyses. The analysis of variance showed that tempo and mode had a different impact on the emotional judgment for the three age groups, as attested by a significant group  $\times$  condition interaction [ $F(6, 174) = 3.08, p < 0.05$ ]. Post hoc comparisons (by Tukey HSD, with  $p < 0.05$ ) revealed an effect of both tempo and mode manipulations in adults and in six- to eight-year-old children. By contrast, five-year-olds' performance was affected exclusively by tempo manipulation.

The present findings clearly show that, from five years of age, children are able to discriminate between happy and sad excerpts. To do so, five-year-old children use

<sup>c</sup>Three- to four-year-old children were unable to focus their attention on the excerpts for the entire duration of the experiment. Therefore, for this group only 16 excerpts per condition (8 happy and 8 sad) were used instead of 32. The full set of 32 excerpts, however, was used across participants.

information about tempo exclusively, whereas six to eight year olds use both tempo and mode as adults do. Altogether, these results substantiate the hypothesis that sensitivity to tempo (i.e., emerging around 5 years of age) appears earlier than sensitivity to mode (i.e., emerging around 6–8 years of age). This is consistent with the idea that sensitivity to tempo requires more fundamental processes than sensitivity to mode. The failure to document sensitivity to the happy–sad distinction in three- to four-year-old children is probably related to the inadequacy of the musical material (i.e., classical music up to twentieth-century composers) for this age group.

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