

## *Children's judgements of emotion in song*

Psychology of Music

*Psychology of Music*

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Society for Education, Music  
and Psychology Research

vol 35(4): 629–639 [0305-7356

(200710) 35:4: 629–639

10.1177/0305735607076445

<http://pom.sagepub.com>

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**ABSTRACT** Songs convey emotion by means of expressive performance cues (e.g. pitch level, tempo, vocal tone) and lyrics. Although children can interpret both types of cues, it is unclear whether they would focus on performance cues or salient verbal cues when judging the feelings of a singer. To investigate this question, we had 5- to 10-year-old children and adults listen to song fragments that combined emotive performance cues with meaningless syllables or with lyrics that had emotional implications. In both cases, listeners were asked to judge the singer's feelings from the sound of her voice. In the context of meaningless lyrics, children and adults successfully judged the singer's feelings from performance cues. When the lyrics were emotive, adults reliably judged the singer's feelings from performance cues, but children based their judgements on the lyrics. These findings have implications for children's interpretation of vocal emotion in general and sung performances in particular.

**KEYWORDS:** *development, music, perception, songs, vocal emotion*

### *Introduction*

Songs are important for their role in social and emotional regulation across age and culture. Infants in all societies are routinely exposed to lullabies or play songs performed by their caregivers (Trehub and Trainor, 1998). Preschool and school-age children commonly sing as they play, their invented playground songs exhibiting similarities across cultures (Kartomi, 1980; Opie and Opie, 1960). In addition to the emotion regulatory role of songs for adolescents and adults (Sloboda and O'Neill, 2001), songs also enhance identity and group solidarity (Pantaleoni, 1985), mark significant rites of passage (Finnegan, 1977) and provide socially acceptable means of expressing negative sentiments (Merriam, 1964).

*sempre :*

The most obvious means of conveying basic emotions (e.g. happiness, sadness) in song is through aspects of performance, including pitch level (e.g. higher pitch for more joyful purposes), tempo (e.g. faster tempo for happier renditions) and vocal tone. Song lyrics also contribute to the emotional interpretation of songs, but the extent to which child and adult listeners focus on the meaning of sung lyrics as opposed to their form is unclear. For example, children commonly produce the ABC song before they have any conception of letters, although the memorized words become useful in subsequent years. Moreover, they readily learn the words of foreign songs (e.g. 'Frère Jacques'), which, like the songs of their culture, may sacrifice meaning to meet metrical constraints of the music (Rubin, 1995).

In general, the lyrics and performing style of songs are consistent in valence, as in the case of 'You are My Sunshine'. At times, however, gruesome lyrics occur in the context of cheerful children's songs (e.g. the three blind mice who had their tails cut off) or soothing lullabies (e.g. the falling cradle in 'Rock-a-bye Baby'). In such cases, the negative text does not disrupt the mood of the song, which implies that casual singers and listeners do not pay close attention to the verbal details but rather to the sound effects created by rhyme, alliteration, assonance or repetition. In other cases, the lyrics are critical, as when they tell a story ('There Was an Old Lady who Swallowed a Fly') or invite singers or listeners to action ('If You're Happy and You Know It, Clap your Hands').

Aspects of sung performance are highly salient to listeners from the early days of life. For example, newborns prefer infant-directed performances of songs, which are infused with positive emotion, to informal but non-infant-directed performances of the same song by the same singer (Masataka, 1999). Preschool and school-age children manipulate tempo and pitch level to produce happy and sad renditions of familiar songs (Adachi and Trehub, 1998), and same-age listeners readily discern the intended emotion (Adachi and Trehub, 2000).

Prosodic aspects of speech, which are analogous to melodic and expressive aspects of song, provide cues to a speaker's feelings, attitudes and communicative intentions (Bolinger, 1989; Frick, 1985). When children are asked to judge the speaker's feelings from the sound of their voice, they base their judgements on the message content (Friend, 2001; Morton and Trehub, 2001). Specifically, they regard the speaker as happy when they talk about pleasant events and as sad when they talk about unpleasant events, in spite of obvious prosodic and paralinguistic cues to the opposite feelings. Unlike adults, who readily set aside salient but irrelevant cues, children have difficulty altering their characteristic focus on message content to meet the demands of the task (Morton et al., 2003). Their performance is not attributable to an inability to label paralinguistic cues to emotion. When the words are indecipherable (Morton and Trehub, 2001) or emotionally neutral (Dimitrovsky, 1964; Morton et al., 2003), children successfully identify the

speaker's feelings from the prosodic and paralinguistic cues, which confirms their understanding of the emotional implications of those cues.

If expressive vocal features are more salient in songs than in speech, then children should judge the singer's feelings on the basis of performing style, regardless of the lyrics. The possibility remains, however, that children's attention would be dominated by events portrayed in the lyrics of songs. If so, they would judge the singer's feelings primarily from verbal cues, even when the performing style conveys very different feelings. The present study is the first to examine this issue in the context of music. Specifically, we sought to determine whether children would judge the feelings of a singer (happy or sad) from the valence of the expressive cues or from the valence of events depicted in the lyrics.

Children 5–10 years of age and adults listened to song fragments consisting of tunes specially composed for one-sentence descriptions of happy or sad events (from Morton and Trehub, 2001). For each song sample, listeners were asked to attend to the singer's voice and to judge her feelings as happy or sad. The use of verbal materials from Morton and Trehub (2001) made it possible to determine whether the singing context eliminated the bias to verbal emotion cues that children exhibited in the speech context.

The happy performances were sung in the major mode and at a higher pitch level and faster tempo than the corresponding sad performances, which were sung in the minor mode. Children in the age range of interest readily identify the emotional valence of music from pitch, mode and tempo cues (Adachi and Trehub, 2000; Dalla Bella et al., 2001; Kastner and Crowder, 1990). To confirm listeners' understanding of the emotional connotations of these features, a supplementary task was included in which they judged the singer's feelings from tunes sung to the repeated syllable 'da'. As noted, the overriding goal was to determine whether listeners judged the singer's feelings from her performance style or from the lyrics.

## *Method*

### PARTICIPANTS

Participants included 25 5- to 6-year-olds (13 boys, 12 girls;  $M = 6$  years, 1 month), 25 7- to 8-year-olds (10 boys, 15 girls;  $M = 7$  years, 9 months), 25 9- to 10-year-olds (12 boys, 13 girls;  $M = 9$  years, 11 months) and 25 adults (11 men, 14 women;  $M = 20$  years, 6 months). Children were recruited from the general community and through local schools. Adults were undergraduate students in an introductory psychology class who received partial course credit. English was the native or dominant language of all participants.

### APPARATUS

Testing was conducted individually in a quiet room, either at a university laboratory (for 5- and 6-year-olds, and adults) or in community schools (for

7- to 10-year-olds). Stimuli were presented by means of a Macintosh® computer and PsyScope software (Cohen et al., 1993) or a PC and E-Prime software (from Psychology Software Tools, Inc.) and Altec computer speakers. Responses were entered by means of a two-button response box, one button labeled with a happy face, the other with a sad face.

Children sat facing the computer monitor and an adult experimenter sat beside them. The experimenter used the computer keyboard to initiate trials, and children used the button box to indicate their responses. The computer randomized the order of stimuli and recorded responses to each stimulus. A self-administered version of the task was used for adults.

#### STIMULI

The stimuli consisted of 20 song fragments written specifically for 20 different sentences, 10 describing happy events (e.g. 'My mommy gave me a treat') and 10 describing sad events (e.g. 'My dog ran away from home') adopted from Morton and Trehub (2001) (see appendix).

Each of the 20 tunes was sung once in a happy style (i.e. in the relative major key with rapid tempo – around 120 b.p.m) and once in a sad style (i.e. in the relative minor key with slow tempo – around 60 b.p.m), creating a total of 40 songs, 20 with consistent musical and verbal cues to emotion (e.g. happy tune, happy melody), 20 with conflicting musical and verbal cues (e.g. happy tune, sad melody). Five of these tunes were also sung once in a happy style and once in a sad style to the repeated syllable 'da', creating a total of 10 songs with musical cues to emotion but no verbal cues. All songs were performed by the same musically trained female singer and were digitally recorded by means of a Radius computer and SoundScope software (GW Instruments Inc.).

#### PROCEDURE

The task was self-administered in the case of adults and experimenter-administered for the children. Listeners were instructed to listen to the sound of the singer's voice and to indicate whether she felt happy or sad by pressing the appropriate button on the button box. After two practice trials with congruent musical and verbal cues (happy in one case, sad in the other), listeners proceeded to the test phase, which consisted of the remaining 38 tunes with words presented in random order followed by the 10 tunes sung to meaningless syllables, also in random order.<sup>1</sup> The entire session was approximately 20 minutes in duration.

### *Results*

When the verbal and musical cues to emotion were consistent (both happy or both sad), judgements based on word or musical cues were indistinguishable. Therefore, the analysis focused on judgements of the 20 tunes with

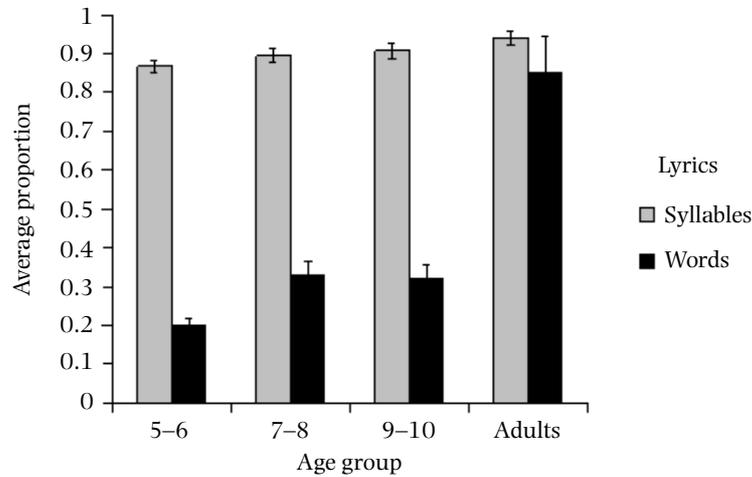


FIGURE 1 Proportion of judgements based on musical cues for children and adults.

contradictory cues to emotion from the words and music (e.g. happy verbal events and sad musical cues), and 10 tunes with nonsense syllables (i.e. happy or sad tunes sung to 'da'). Mean proportions for the four age groups are presented in Figure 1.

For tunes sung with nonsense syllables, all groups performed near ceiling, judging stereotypically happy versions (relative major, rapid tempo) as happy and stereotypically sad versions (relative minor, slow tempo) as sad. For tunes sung with lyrics depicting positive or negative events, most adults based their judgements on the musical cues. By contrast, most children based their judgements on the emotional implications of the lyrics, regardless of whether the lyrics described happy or sad events. A two-way mixed analysis of variance (ANOVA) on the proportion of responses based on musical cues with Age as a between-subjects variable and Lyrics (Words vs Syllables) as a within-subjects variable revealed significant main effects of Age,  $F(3,96) = 21.9, p < .01$ , and Lyrics,  $F(1,96) = 212.2, p < .01$ , and a significant Age  $\times$  Lyrics interaction,  $F(3,96) = 16.2, p < .01$ . To identify the source of the interaction, separate one-way ANOVAs examined the effect of Age at each level of Lyrics. Age had no effect on responses to songs with nonsense syllables,  $F(3,96) = 2.27, NS$ , but it had a significant effect on responses to songs with positive or negative lyrics,  $F(3,96) = 20.8, p < .01$ . Post-hoc analyses using Tukey's HSD (honestly significantly different) procedure revealed that the proportion of adults' responses to musical cues exceeded those of 5- to 6-year-olds (HSD = 0.66,  $p < .05$ ), 7- to 8-year-olds (HSD = 0.52,  $p < .05$ ), and 9- to 10-year-olds (HSD = 0.53,  $p < .05$ ), but the three child groups did not differ from each other.

### *Discussion*

Regardless of the prominence of pitch, tempo and mode cues in the sung samples, children judged the singer's feelings mainly from the content of the lyrics, in contrast to adults, whose responses were based on expressive cues to emotion. Although expressive musical cues to happiness (i.e. pitch level, rapid tempo, major mode) or sadness (i.e. low pitch level, slow tempo, minor mode) led to correct judgements in the absence of meaningful lyrics, the same cues were fairly ineffectual for 5- to 10-year-old children when the lyrics depicted events with the opposite emotional implications. Children seemingly ignored the instructions to listen to the singer's voice, focusing on *what* she sang about rather than *how* she sang. Their problem was not one of emotion decoding but rather of verbal cues to emotion overshadowing expressive cues to emotion.

Children's failure to judge the singer's feelings from expressive cues in her sung performance parallels their use of verbal rather than expressive cues (i.e. prosody and paralanguage) in speech contexts with the same verbal materials (Morton and Trehub, 2001). Children hesitate in the face of conflicting verbal and expressive cues to emotion in speech (Morton and Trehub, 2001), suggesting they process the emotional implications of both speech content and prosody.<sup>2</sup> Nevertheless, very detailed instructions are ineffective in eliminating children's inclination to judge a speaker's feelings from verbal content unless they are combined with immediate feedback (correct or incorrect; Morton et al., 2003), suggesting possible constraints on children's attention flexibility (Morton and Munakata, 2002) or reasoning about communicative intentions (Tomasello, 1999).

The present findings have parallels in research on memory of songs. For children and adults, the words and melodies of songs are integrated in memory (Feierabend et al., 1998; Serafine et al., 1986) such that melodies help listeners remember the lyrics, and lyrics help them remember the melodies. There are indications, however, that children's representation of words and music is less integrated than that of adults, and that the lyrics of songs provide better memory cues than do the melodies (Feierabend et al., 1998; Morrongiello and Roes, 1990). These studies, which focused primarily on memory, were unconcerned with emotional aspects of sung performances. Thus, listeners' recognition of the words or melodies of songs does not shed light on their emotional interpretations of the songs or the basis for those interpretations.

Although children focused on the emotional implications of the lyrics in the context of contradictory cues from expressive and verbal aspects of the song fragments, it is unclear whether they would do so in the context of more conventional lyrics. Note that the lyrics in the present study did not use poetic devices such as rhyme, alliteration, assonance and repetition. Instead, they consisted of utterances sung only for the present purposes. Lyrics that depict

events may attract more attention to their meaning than do poetic lyrics that create a mood. Thus, an important question for future research is whether children would be more inclined to focus on expressive musical cues for songs with poetic lyrics.

Finally, there may be pedagogical implications of the present findings. If children accord greater attention to the words than to the melodies of songs (Feierabend et al., 1998; Morrongiello and Roes, 1990) and if they have difficulty focusing on expressive aspects of sung performances, as in the present study, then there may be situations in which Gordon's (1993) suggestion of introducing songs initially without words warrants serious consideration.

#### NOTES

1. A within-subjects design was used to increase statistical power, but melody-only stimuli were always presented last to avoid order effects (see Morton et al., 2003).
2. Variation in the length of stimuli used in the present study made it impossible to compare response times across songs with consistent and inconsistent emotional cues.

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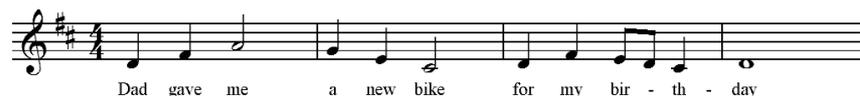
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## Appendix

Song fragments combining lyrics from Morton and Trehub (2001) and short melodies were used as stimuli. Happy melodies (shown) were performed in major keys with fast tempi. Sad melodies were performed in the diatonic minor with slow tempi.

### MELODY 1



MELODY 2

My mom - my ga - ve me a treat

MELODY 3

My soc - cer team just won the champ - ion - ship

MELODY 4

My teach er says that I'm the smart est in the class

MELODY 5

My Grand mo - ther told me I'm ve - ry spe - cial

MELODY 6

I came in first place in a race to - day

MELODY 7

I fell off my bike and ever-y-one made fun of me

MELODY 8

I lost the toy my grand-moth - er gave me for Christ - mas

MELODY 9

All the kids at camp tease me

MELODY 10

I lost all my mon - ey on the way to the store

MELODY 11

My dog ran a - way from home

MELODY 12

I - - - lost my base - ball glove to - day

MELODY 13

My bike is bro - ken so - I can't go rid - ing with my friends

MELODY 14

I lost my sti - cker coll - ect - ion

MELODY 15

I am not al - lowed to go out - side and play with my friends

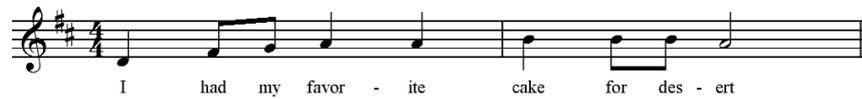
## MELODY 16



## MELODY 17



## MELODY 18



## MELODY 19



## MELODY 20



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