

The Nature of Children's Singing Voices: Characteristics and Assessment

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Singing is often the window to the young child's musical life. Children sing during play, alone and with others, and group singing activities are encouraged in day care centers and preschool settings. However, some children seem to have difficulty using their singing voices and that musical window, unfortunately, becomes closed for them. Over the past 50 years, numerous studies have investigated topics related to the child singing voice and its development. Terminology used to describe the various stages of development of the child voice and/or the types of problem singers, however, have been inconsistent. Terms such as "inaccurate singers" (Anderson in Welch, 1979; Reuter, 1956a, 1956b), "backward singers" (Fieldhouse in Welch, 1979), and "non-singer" (McKenzie, 1948) have been utilized. Bentley (1968) disliked the term "monotone" since most of these children did produce more than one tone, but used the term stating that it was less derogatory than other labels presently in use.

Several persons have discussed different types of singers. Nye and Nye (1970) indicated two: "Non-singers", those individuals who do not have use of the singing voice, and "problem singers", individuals who have a very limited range, usually not higher than E3 or F3. Hartzell (1949) established three classifications: Children who can establish and maintain tonality, children who can establish tonality but do not maintain it, and children who can do neither. Kirkpatrick (1962) used Hartzell's classifications but relabeled each category using the terms, "singers", "partial singers", and "non-singers". Gaiser (1961) used the term "non-singer" to refer to "children whose singing performance varies from the norm in that they habitually sing several tones away from the group, usually below, or vary uncertainly from tone to tone" (p. 4). She also employed three classifications of "non-singers": "monotones" who only sing one tone; "near-singers" who sing multiple tones but lack control of tones; and "followers" who imitate a group but cannot sing alone. Joyner (1969), while working with boys age 11, employed four categories to describe their vocal achievement: "Normal singers" were those who could sing in a low and high key; "Grade A monotones" were tuneful in the low key but not in the higher key; "Grade B monotones" were those who were erratic at both pitch levels; "Grade C monotones" are always untuneful. Forcucci (1975) also utilized four categories to describe different types of singers: "independent singers" sing in-tune without assistance; "dependent or lazy singers" sing in-tune within a group; "uncertain singers" sing out-of-tune with or without a group; "restricted range singers" are those usually thought to be "monotones" even though they can actually produce more than one pitch. Gordon (1971, 1979) also used four categories as he described problem singers: "Non-singers" attempt to

sing either in the speaking voice range or above the singing range. "Out-of-tune singers" either have a sense of pitch or lack both aspects. Young (1971) observed several stages of voice range development in kindergarten and first grade children: D3 to F3-sharp or A2 to E3-flat; A2 to F3-sharp; A2 to C4; A2 to D4 and above. These four voice stages were not labeled. Young (1971) and Gordon (1971, 1979) both indicated the existence of a voice break or register lift in the child voice from approximately B3-flat to D4-flat. Children seem to have the most difficulty producing tones in this range. As can be seen, terminology used to describe children's singing has been extremely inconsistent.

Background and Purpose of This Study

Since standard terminology has not been in evidence for labeling the various stages through which a child's voice progresses, Rutkowski (1990a) developed the Singing Voice Development Measure (SVDM) to establish a more consistent means of describing the various stages of child singing voice development and to provide a consistent means for teachers and researchers to more accurately measure and describe the use a child has of his/her singing voice. Precise assessment is of concern when conducting research in which the singing voice is a factor and when designing music instruction for children.

It seems logical that a child must gain use of the singing voice before intonation problems can be researched and evaluated. Surely an instrumentalist must know the fingering for a particular note and be able to produce a sound on the instrument before intonation problems become a concern. (A trumpeter will not play an "F" in-tune until she/he can play an "F".) Further, many children do not demonstrate accurate intonation within a phrase until approximately age 5.5 or 6 years of age (Davidson et al., 1981). Consequently, it seems that the use a child has of his/her singing voice may be a construct separate from and requisite to the ability to sing in-tune. Rutkowski (1990a) investigated this hypothesis and found it valid. The specific focus of this paper is to provide a review of the revisions made to SVDM since its development was first reported (Rutkowski, 1990a).

Singing Voice Development Measure

Initial Version

The initial version of SVDM as reported in 1990 is presented in Figure 1. The initial singing voice behaviors were identified upon "consultation with several elementary vocal music specialists as well as a compilation of results from previous studies" (Rutkowski, 1990a, p. 85). A thorough discussion of the selection of song and pattern material as well as testing and rating procedures can be found in the initial report and are not enumerated here. However, the conclusions and recommendations from that study were as follows.

Several rating scales have been used to assess children's singing voice achievement. However, none exclusively measured use of singing voice: Melodic contour and intonation were of primary concern. Since these existing scales were not appropriate for measuring use of singing voice, a rating scale to measure this domain needed to be designed, piloted, and implemented. SVDM was designed, piloted, and implemented. It was shown to be a valid instrument to measure

children's use of singing voice (Rutkowski, 1984, 1986).

Even though SVDM was shown to be a valid measure for children's use of singing voice, several further revisions were recommended. The testing procedure, while successful, was very time consuming. Since the Patterns and Song subtests were highly correlated on both the pretest and posttest (Rutkowski, 1986), it seemed that one subtest would be sufficient for measuring children's use of singing voice. The children's mean scores on both subtests were very similar. However, their gain scores were slightly better for the patterns. Although reliability coefficients were also similar for both subtests, the raters indicated that once they

Figure 1

SVDM: Initial Version

RATING SCALE

- 1 "Pre-singer" does not sing but chants the song text
- 2 "Speaking Range Singer" sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3)
- 3 "Uncertain Singer" waivers between speaking and singing voices, uses a limited range when in singing voice (usually up to F3)
- 4 "Initial Range Singer" exhibits use of initial singing range (usually D3 to A3)
- 5 "Singer" exhibits use of extended range (sings beyond the register lift: B3-flat and above)

SONG: "Bakerman"

Come a - long, Come a - long, What shall we play?
I'll be a ba - ker - man, just for to - day.

PATTERNS:

See the birds in the tree, Build a nest with some twigs and some leaves.

had become familiar with rating the pattern performances they found these performances easier to rate than the song performances. Furthermore, when utilizing a song for evaluation, a lengthy orientation period is required in order to familiarize the children with the criterion song. While an orientation period is also necessary when utilizing patterns for evaluation, this period need not be as long since the pattern performances are an echo activity. In addition, although singing a song, rather than patterns, is generally considered singing, it seems that performing a song involved aspects other than use of singing voice. These include memorization of text, rhythm patterns, and tonal patterns. A child may not be employing singing voice simply because s/he cannot remember some of these other components. Therefore, measuring use of singing through performance of a song may not yield a valid score. Since the singing of patterns involves echoing, rather than memorization, the role of these other components would be diminished.

Upon consultation with the raters, it was felt that the first and second patterns should be eliminated. Since the first pattern was chanted, rather than sung, it may have encouraged children to use their speaking voice rather than singing voice on the subsequent patterns. Similarly, the second pattern was sung in a speaking voice range and may have encouraged children to use their speaking voice range on the subsequent patterns. Furthermore, while the text used for the pattern performances seemed interesting and easily remembered by the children, the vowel and consonant combinations were not easily sung. The use of a neutral syllable, rather than words, would alleviate this problem. However, this investigator has observed that children often experience difficulty singing on a neutral syllable. Research studies investigating the use of a neutral syllable for singing with children have yielded contradictory results (Goetze, 1985; Levinowitz, 1989; Smale, 1987; White, Sergeant, & Welch, 1997). Until more information is available regarding this matter, it was recommended that new, more singable, text be identified and used for the pattern performances. Finally, it was recommended that the SVDM be used to evaluate use of singing voice for research purposes as well as in a classroom setting to assist the music teacher in providing more appropriate instruction.

Since content validity was established for SVDM for measuring children's use of singing voice (Rutkowski, 1984, 1986), it was inferred that the categories established for use of singing voice do exist. It should be re-emphasized that these categories are not concerned with accuracy of intonation or melodic contour. Some children in stages 2 to 5 will sing in-tune within the limits of their voice range. However, many children in these stages will be out-of-tune singers.

Version 2

Based on previous recommendations, SVDM was revised to include only pattern performances within a singing voice range and more singable text (See Figure 2). This version of the instrument was used in a study conducted during the 1989-1990 school year (Rutkowski, 1996). In addition, since some evidence existed to indicate that those children with above average music aptitude may in

Figure 2

SVDM: Version 2

RATING SCALE

- 1 "Pre-singer" does not sing but chants the song text
- 2 "Speaking Range Singer" sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3)
- 3 "Uncertain Singer" waivers between speaking and singing voices, uses a limited range when in singing voice (usually up to F3)
- 4 "Initial Range Singer" exhibits use of initial singing range (usually D3 to A3)
- 5 "Singer" exhibits use of extended range (sings beyond the register lift: B3-flat and above)

PATTERNS:



fact be "non-singers" (Rutkowski, 1986), the relationship between use of singing voice and developmental music aptitude, as measured by the *Primary Measures of Music Audiation* (PMMA) (Gordon, 1979) was also investigated.

PMMA was administered following the guidelines in the test manual. Prior to administration of SVDM, the teacher practiced the patterns with the children (6-year-olds) following the exact procedure that was used for individual testing. For individual testing, each child reported to a familiar, private room where his/her voice was tape recorded as s/he echoed the teacher singing the SVDM patterns. Two raters, who had used SVDM in previous research, were employed to score SVDM for this study. These raters have been shown to have high inter- and intra-rater reliability (Rutkowski, 1990b). The raters completed their evaluations privately; they were not together while rating the performances. Inter-class correlation coefficients were computed to determine the agreement between raters when scoring for SVDM. High coefficients of .90 and .99 indicated that the raters used the SVDM similarly when rating the children's singing voice performance.

Pearson product moment correlations were computed to determine the relationship between SVDM and PMMA scores. All correlation coefficients were low (.126 to .182) and suggest a very small relationship between use of singing voice and developmental tonal aptitude. Based on these results, it was recommended that research investigating children's music abilities be conducted with children who have use of singing voice and that teachers caution against using a child's singing ability to determine his/her music potential.

The raters commented that many children seemed to be inconsistent in their use of singing voice: They fluctuated between two stages. The SVDM scale was expanded to allow for these behaviors and is presented below:

- 1 "Pre-singer" does not sing but chants the song text.
- 1.5 "Inconsistent Speaking Range Singer" sometimes sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3).
- 2 "Speaking Range Singer" sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3).
- 2.5 "Inconsistent Limited Range Singer" wavers between speaking and singing voice and uses a limited range when in singing voice (usually up to F3).
- 3 "Limited Range Singer" exhibits use of limited singing range (usually D3 to F3).
- 3.5 "Inconsistent Initial Range Singer" sometimes only exhibits use of limited singing range, but other times exhibits use of initial singing range (usually D3 to A3).
- 4 "Initial Range Singer" exhibits use of initial singing range (usually D3 to A3).
- 4.5 "Inconsistent Singer" sometimes only exhibits use of initial singing range, but other times exhibits use of extended singing range (sings beyond the register lift: B3-flat and above).
- 5 "Singer" exhibits use of extended singing range (sings beyond the register lift: B3-flat and above).

The raters also noted that it may be more appropriate to have children sing 8 patterns rather than 4 in order to provide a more valid assessment of their singing voices.

Version 3

The revised version of SVDM (Version 3), developed and used in a study conducted during the 1991-1992 school year (Rutkowski, 1993a, 1993b), is presented in Figure 3. As can be seen, the additional rating levels allowed for more accurate evaluation of the children's use of singing voice and 8 patterns were included rather than 4. The question of whether to evaluate children's use of singing voice with text or neutral syllable performances, raised in previous studies (Goetze, 1985; Levinowitz, 1989; Rutkowski, 1990b; Smale, 1987, White, Sergeant, & Welch, 1997), was investigated also.

First grade children's singing performances were tape-recorded as in previous studies. Each child sang the 8 patterns on both the neutral syllable "bum" and text. Half of the children sang the patterns first with words and then with the neutral syllable; the other half of the children sang the neutral syllable first.

The same two raters who evaluated children's singing performances in the previous Rutkowski studies were employed for this investigation as well. Two tape recordings were prepared for each rater: One with the word performances and the other with the neutral syllable performances. Although these raters had already been shown to have high intra-rater reliability, it was felt that the refining of the singing stages on SVDM warranted a re-examination of each rater's consistency with the scale. Therefore, 16 performances were repeated on each tape to allow for investigation of intra-rater reliability. The raters completed their evaluations privately; they were not together while rating the performances.

Pearson product moment correlation coefficients were computed to determine inter- and intra-rater reliability for SVDM. Inter-rater reliabilities ranged from .80 to .85 while intra-rater reliabilities ranged from .82 to .93. These coeffi-

Figure 3

SVDM: Version 3

RATING SCALE

- 1 "Pre-singer" does not sing but chants the song text
- 1.5 "Inconsistent Speaking Range Singer" sometimes chants, sometimes sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3)
- 2 "Speaking Range Singer" sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3)
- 2.5 "Inconsistent Limited Range Singer" waivers between speaking and singing voices and uses a limited range when in singing voice (usually up to F3)
- 3 "Limited Range Singer" exhibits consistent use of limited singing range (usually D3 to F3)
- 3.5 "Inconsistent Initial Range Singer" sometimes only exhibits use of limited singing range, but other times exhibits use of initial singing range (usually D3 to A3)
- 4 "Initial Range Singer" exhibits consistent use of initial singing range (usually D3 to A3)
- 4.5 "Inconsistent Singer" sometimes only exhibits use of initial singing range, but other times exhibits use of extended singing range (sings beyond the register lift: B3-flat and above)
- 5 "Singer" exhibits use of extended singing range (sings beyond the register lift: B3-flat and above)

PATTERNS:

See the bird; in the tree; see it fly; o - ver me.

Look up now; in the sky; there it goes; fly - ing by.

clients indicate that the raters used the SVDM similarly when rating the children's singing voice performances. While the raters were not as consistent with each other as they have been in previous studies, coefficients from .80 to .85 still indicate a reliable measure.

An analysis of variance was performed to determine if a significant difference existed between the neutral syllable and text performances. Though not statistically significant ($p \leq .07$), the mean for neutral syllable performances (7.032) was higher than the mean for word performances (6.436).

It was concluded that first graders did not perform significantly better on SVDM when using a neutral syllable than when using words. However, in many

instances, individual children scored 2 to 6 points higher when singing on a neutral syllable, a noticeable difference on a 9-point scale. It seems that some children sing better when they are not asked to sing words, perhaps since singing words is too closely related to their speech patterns, while other children do not find singing words a problem. Therefore, it is strongly recommended that both types of performances be utilized for evaluating children's use of singing voice.

Conclusions and Recommendations

In conclusion, it appears that the hypothesis regarding use of singing voice as a separate but requisite behavior to the ability to sing with accurate intonation is well-founded. Consequently, it seems appropriate for this domain to be considered when singing voice development or achievement is being evaluated. However, since use of singing voice, as measured by SVDM, has been shown to have a weak relationship with tonal aptitude, as measured by PMMA, teachers and researchers need to be aware that singing ability does not necessarily reflect a child's music ability. The revised SVDM appears to be a valid measurement instrument to assess use of singing voice. It seems that the 9-point scale is functional and easily used by raters and that the task of echoing 8 short tonal patterns on text and a neutral syllable, that exhibit various levels of singing voice development, is appropriate.

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