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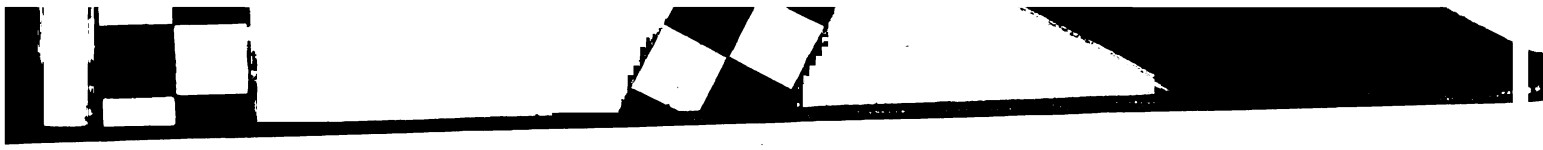

AN INVESTIGATION OF THE USE OF SINGING GAMES IN MEASURING SINGING VOICE DEVELOPMENT IN YOUNG CHILDREN

By

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ABSTRACT

AN INVESTIGATION OF SINGING GAMES AS A MEASURE OF SINGING VOICE DEVELOPMENT IN YOUNG CHILDREN

By

Lea Anne Steenwyk

The purpose of this research was to investigate techniques for measuring singing voice development. The subjects were 78 third grade children from a suburban elementary school. First, children were administered a standardized test of singing voice development, Rutkowski's Singing Voice Development Measure (SVDM). Then, they played a singing game in their music class that required them to sing alone. Their solo performances were recorded and scored by two independent judges using Rutkowski's rating scale. The scores on SVDM were correlated with the scores on the singing game to determine whether singing voice development could be measured with validity in a singing game context. Inter-judge reliability was .84 for SVDM and .90 for the singing game. When the scores for the two measures were correlated, a relationship of .74 was found. This is a moderately high correlation, providing evidence that singing games can be a valid context in which to measure children's singing voice development.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

LITERATURE REVIEW

Singing

Importance of Singing

Many adults, and children as well, take for granted the many venues that include singing; people sing in church, at sporting events, with the radio, around the campfire, and in the shower (Rutkowski, 1996). Yet, many adults have never found their singing voice. In spite of all the techniques music teachers use to help children learn to sing, some leave school unable to use their singing voice properly (Rutkowski & Miller, 2003). Contrary to popular belief, children are not born with a 'singing voice' (Gordon, 2003). Singing is a skill that can be learned. All children, barring a physical handicap, can be taught to sing, with the most success when developmentally appropriate instruction begins in early childhood (Gordon, 2003; Gould, 1969). Because many children cannot find their singing voices on their own, it is up to the practicing music teacher to help guide them toward appropriate use of their voices (Rutkowski & Miller, 2003).

Singing has always played a central role in the elementary music curriculum and has been used to teach most concepts in elementary general music (Green, 1989). For over fifty years, researchers have been studying children's singing ability (Goetze & Horii, 1989) and have come to the conclusion that all children can be taught to sing (Rutkowski, 1996). The National Standards for Arts Education included singing as the first of nine standards to be met when providing a quality music education to students. According to the standards, students in grades K-4 shall "...sing alone and with others, a

varied repertoire of music ...independently, on pitch and in rhythm, with appropriate timbre, diction, and posture and maintain a steady tempo." (MENC, 1994).

Although research in singing has spanned much of the 20th century, still there is a need for continued investigation (Yarbrough, Bowers, & Benson, 1992). Brophy (1997) states that one fifth of all elementary students do not sing on pitch. If many elementary-aged children never learn to use their singing voice, this must be seen as a serious problem for music educators to solve (Yarbrough, Bowers, Benson, & Green, 1991). Children who experience problems with finding their singing voice must be properly diagnosed and treated early. If the problem is not addressed early on, the child runs the risk of developing unfounded psychological beliefs that he or she cannot sing (Gordon, 2003). Students may begin to associate negative feelings and a bad attitude toward singing if they do not learn to control their singing voice (Green, 1989), and this negative attitude may never be reversed (Rutkowski, 1990). Finding singing voice is one of the first steps a child needs to make musically. If he or she does not take this first step, music learning will become more and more difficult. This, in the end, often results in a poor attitude toward music (Gould, 1969).

Rutkowski (1996) has found that approximately eighteen percent of children in grade six and below are considered problem singers and cannot sing simple songs. These children are often labeled monotones. She goes on to say that these 'monotones' cannot successfully participate in the most basic singing activities expected by the general population. As singing can be a social activity, those who cannot use their singing voices may often feel left out or embarrassed. These children growing toward adulthood are deprived of one of the most personal forms of expressing themselves.

Singing Voice Development

Until recently, most researchers were overlooking that singing voice use is different from singing intonation. However, Rutkowski (2004) has found that use of singing voice is not meaningfully related to pitch discrimination or music aptitude. It is possible that a child may have highly developed pitch skills and be unable to use his or her singing voice. Likewise, it is possible that a child will be able to use his or her singing voice and be unable to match pitch or sing in tune.

Intonation is but one of the many complexities of the singing voice. A child needs to be able to control his or her singing voice before a teacher can begin to address intonation problems (Rutkowski, 1990). Singing 'in-tune' and a child's maturing are linked together. Tuneful singing is a psychomotor process; singing voice is both kinesthetic and psychological (Levinowitz et al., 1998). A child must first differentiate the motor skills involved in sustaining vocal sounds from those used in speech (Gould, 1969). Gordon (2003) states that the difference between speaking voice and singing voice is more than the vocal range used when speaking or singing. The difference between speaking voice and singing voice is the tone quality of the voice due to the way the sound is produced. When using a speaking voice, the air flow starts in the vocal chords. While, when using a singing voice the air flow starts in the lungs with support from the diaphragm and flows through the vocal chords. After a child finds his or her singing voice, the child must find the motor skills involved in ascending and descending of melodic contour (Gould, 1969). Melodic contour must first be established before a child can move onto overall key stability (Welch, 1994).

Gordon (1971) states, many times teachers put people into two categories: people who can sing and people who cannot sing; yet there are many different types of 'singers' between. People can be classified as singers who try to sing in a speaking voice range, singers who try to sing higher than the normal singing range, singers who sing out-of-tune and have no sense of melodic contour, singers who sing-out-of-tune and have a sense of melodic contour, singers who can sing in a group but not on their own, and singers who can sing alone but not with a group. Gould (1969) collected survey results from teachers on their perception of the common problems of poor singers. Five categories were defined: the too low singer, the too high singer, the one-note singer, a combination of the three, and the psychologically inhibited singer.

To gain full use of one's singing voice, one must employ three separate registers: the high register, often referred to as head voice, the middle register, and the low register, often referred to as chest voice. The low register is the easiest to 'find,' as this register is what is used for speaking voice, while the high register is the hardest to 'find.' One can determine the register in which one is singing by the quality of the sound being produced, and, to a lesser degree, by the range of pitches being sung (Rutkowski, 2004). Often, children who sing poorly are trying to sing using a speaking voice quality in a speaking voice range (Gordon, 2003). Therefore, many children that are labeled as not being able to sing are trying desperately to use the three-note range classified as the speaking voice range, simply because they have not learned to use the other parts of their singing voices (Gordon, 1971, 2003).

Gordon (2003) states that there are two types of immature singing voices. With the first, a child tries to sing with a speaking voice quality in a speaking voice range and

with the other, a child sings in a squeaky speaking voice in a range far above the normal singing voice. The second is much less common. The speaking range is A below middle C to middle C. The most natural range for the singing voice is from D above middle C and above, with a break occurring around B flat that carries the singer into what is most commonly known as head-voice. When children initially find their singing voice, their range will be from D above middle C to A, favoring F sharp and G. Initially, to push above the break or below middle C will cause tightening of the throat muscles. This often causes a child to revert to using their speaking voice.

After finding initial singing range, children often sing out of tune. There are two types of out-of-tune singers. A child can lack a sense of melodic contour (Gordon, 1971, 2003) and a sense of pitch or resting tone. Otherwise, a child can have a sense of melodic contour but has no sense of pitch or resting tone. The second is harder to fix, for singing in tune is not a matter of how pitches relate to each other, but rather how each pitch relates to the resting tone (Gordon, 2003). Singers who sing out-of-tune have not developed musically their sense of tonality, which results in a poor sense of melodic contour and pitch (Gordon, 1971, 2003). Welch (1994) agrees that many children will find the melodic contour of a song before coming into key stability. A child's range will increase as he or she learns to sing in-tune in the initial singing range (Gordon, 1971, 2003). After children have good use of their singing voice in the initial singing range, they may proceed to learning songs in the singing range from middle C to high D (Gordon, 2003). A child needs to feel confident in his or her conversational singing range before they can progress farther. If not, the child might regress in singing voice use instead of making progress (Gould, 1969).

Criterion Measures

Starting in the 1970's, teachers have been held more accountable for what they teach with each passing year (Levinowitz et al., 1998). In 1994, the National Standards for Arts Education were established, raising the bar even higher for music educators across the country (MENC, 1994). These standards provided music teachers clear expectations for the skills their students should be able to demonstrate at specific grade levels. As a result, some teachers found that they were not adequately equipping their students musically and had to refocus some of their teaching (Byo, 2000; McGuire, 2002). Accountability and the standards created an even greater need for quality assessment tools in music education (Levinowitz et al., 1998). Valid methods of measurement need to be developed to measure children's use of their singing voices (Geringer, 1983). Many different methods of measuring singing voice use have been developed and shown to be valid in research settings. Much of this research has focused on tessitura (Levinowitz et al., 1998), pitch discrimination and pitch matching (Brophy, 1997; Geringer, 1983; Goetze & Horii, 1989; Green, 1989; Jordan-DeCarbo, 1982; Moore, 1994; Yarbrough, Bowers, & Benson, 1992; Yarbrough, Green, Benson, & Bowers, 1991), vocal model (Green, 1989; Yarbrough, Bowers, & Benson, 1992; Yarbrough, Green, Benson, & Bowers, 1991), age (Geringer, 1983; Green, 1989; Moore, 1994; Yarbrough, Green, Benson, & Bowers, 1991) and gender (Jordan-DeCarbo, 1982; Moore, 1994). Welch (1994) states there are two basic forms of singing assessment: human and machine-based.

Geringer (1983) used a machine-based measurement when he investigated the relationship between pitch-matching and pitch-discrimination abilities. Subjects in his study were (n = 144) four and five-year-olds from an ethnically diverse preschool and fourth graders from five different public schools. After spending three days in their classrooms to establish rapport with the students, Geringer tested the students individually on pitch-discrimination and pitch-matching abilities. For the pitch-discrimination test, three tapes were produced on a Johnson Intonation Trainer in the vocal range of the children with varying order of twelve tonal pairs. All tapes were monitored by a Conn Chronatice Stroboscope for pitch accuracy. Each tone was one second long with .1 seconds between the pair and ten seconds to respond verbally. The children listened to the recordings and were asked if the second tone heard was the same or different than the first, or if they were uncertain.

For the vocal pitch-matching test, Geringer used a simple unaccompanied three-measure song with simple words. The song included three pitches and started and ended on tonic. The song was recorded in three keys by a female singer viewing a strobotuner to ensure pitch accuracy. Further, a panel of graduate students in music education selected the most accurate recordings made in each of the three keys while also watching the strobotuner. After each child listened to the recording, that child was told to sing back the last pitch he heard after the song was played in each of the three keys. The responses were tape recorded for analysis using a strobotuner. Geringer found no significant difference between groups for the pitch-discrimination test, while the pitch-matching test showed a significant difference between the groups, with the fourth graders matching pitch more correctly than the preschoolers (Geringer, 1983).

Green (1989) studied the effect of vocal model on pitch-matching accuracy. The purpose of his study was to determine the effect of female, male, and child vocal modeling on pitch-matching abilities of grade school children. Green also used a machine to measure pitch accuracy.

Audiotapes were made of a female soprano, male tenor, and a nine-year-old child singing a descending minor third on the syllable 'la'. Two-hundred eighty-two elementary students in grades one through six were tested individually three times at seven day intervals. At each testing all factors were the same except for the vocal model. Each child was asked to echo the descending minor third after the presented vocal model at each session. The children's responses to the vocal model were recorded. A Korg Auto Chromatic Tuner, Model No. AT-12 was used to evaluate the pitch accuracy of each response (Green, 1989).

Green (1989) concluded that vocal model had a significant effect on pitch-matching ability. The child model resulted in the most correct responses, followed by the female model, with the male model resulting in the least amount of correct responses. Of the six grades tested, children in grades one and six had the highest percentage of incorrect responses.

Many researchers have investigated the effect of different vocal models. Yarbrough, Bowers, & Benson (1992) studied vocal models as well, focusing on the effects of vibrato on pitch-matching accuracy. Tapes were made of a child model, a female model with vibrato, and the same female model with no vibrato, all singing a descending minor third. The tapes were analyzed using a digigram MIDIMIC and

Macintosh SE computer system for accuracy. Two-hundred kindergarten through third grade students were tested individually, echoing each model.

Twenty-five percent of the responses were sent to an independent judge to evaluate. There was a ninety-seven percent agreement between the experimenter and the independent judge. The child model resulted in the most correct responses, followed by the no-vibrato model. Also, certain singers had a high percentage of correct responses regardless of gender, grade level, or model (Yarbrough, Bowers, & Benson, 1992).

All of the studies discussed so far required a specifically designed test outside of the classroom setting to measure vocal accuracy. In an effort to provide information that is useful to the classroom music teacher, Goetze & Horii (1989) used live performances to assess students in as similar situation as possible to the 'normal' music classroom. The study focused on accuracy of pitch singing in a group and singing individually.

One-hundred children in kindergarten through third grade participated in this study. The investigator established rapport with the children before the testing and presented the melodies by rote that the children would encounter during subsequent testing. The students were tested in small groups. Each student had their own contact microphone that recorded them at the same time on separate tracks by using a four-track tape recorder. The researchers played the responses back into a 'Visi-Pitch' machine that made a graphic of the singing and gave it a number value to represent skill in pitch matching accuracy. Nine months later, the researchers went back to their data with an additional judge that reviewed the scores again. Results showed that the children sang more closely to the pitch when singing individually than in a group. Third graders sang more accurately most often. Girls sang more accurately than boys, especially in group

singing (Goetze &Horii, 1989). Although their testing was in small groups, it still required a considerable amount of equipment, making it impractical in most classroom settings.

Yarbrough, Bowers, Benson, & Green (1991) studied vocal models and response modes. One-hundred sixty-three children were chosen by a music teacher for their inability to match pitch to a previously recorded male and female model singing a descending minor third. All of those children then received instruction in Kodaly hand signals and solfege syllables as they performed. Two weeks after the initial testing, students were tested again with the two models, but this time they used the Kodaly hand signals or solfege syllables. Judges rated the performances. There was no difference between the Kodaly response modes. However, children were able to match the female model better than the male (Yarbrough, Bowers, Benson, &Green, 1991).

There are many things that can be gleaned from the above studies. Research has focused on many different aspects of singing, mostly focusing on pitch or pattern matching outside of a musical context. Much time, energy, resources, and expensive, fine-tuned equipment have been essential to the success of these studies. Other than with the study by Goetze & Horii (1989), no attempt has been made for testing to take place under the 'normal' conditions, encountered in a typical general music classroom. Gould (1969) states that there is little reason to carry out research if it does not reach and benefit the classroom teacher. However, none of these studies include a measure of singing voice that would be practical in a 'real world' teaching situation.

Practical Assessment

Assessment of vocal pitch accuracy has been approached in a variety of ways. Researchers have used the precise measurements of computers and employed highly skilled judges to use their rating scales. Children have been asked to sing both familiar and unfamiliar songs, as well as patterns and individual pitches. They have been tested privately as well as in a group (Brophy, 1997). Yet, there still exists a need for practical assessment tools for the elementary general music teacher to use in measuring singing voice in their classroom. Goetze, Cooper, &Brown (1989) report that stroboscopic and oscilloscopic devices provide the most accurate and objective measure of pitch, for they give a precise evaluation of singing accuracy that teachers can not make on their own in the classroom. However, elementary music teachers need to assess many students. This is difficult, because they see their students once or maybe twice a week in a group and do not have the time to assess students privately or even in small groups (Brophy, 1997). Also, those devises measure absolute pitch rather than pitch in the context of a tonality, which are slightly different. Using technology to analyze pitch is time consuming and impossible with a large group of students (Rutkowski, 1996); it is also expensive and requires computer software that is not readily available (Brophy, 1997).

Formal singing assessments incorporating various measurement devices are different from what a child typically experiences in the general music classroom, making them less valid. This can have a negative effect on a child's ability to understand the singing task and demonstrate singing proficiency (Brophy, 1997). Elliot (1995) states that assessment should be embedded in the process of learning. Although researchers

have studied the factors effecting singing accuracy, there is little research on how to judge vocal pitch accuracy in the context of a normal music classroom (Brophy, 1997).

If practicing elementary music teachers are to meet the singing benchmark outlined in the National Standards, there must be practical and accurate assessments that they can use to measure the singing achievement of their students. To this end, Goetze, Cooper, & Brown (1989) suggest a study of the relationship between a subjective rating scale and an objective acoustic analysis would be useful.

Children enjoy games and sing alone with more ease and confidence in a playful environment (Brophy, 1997). Singing games are already incorporated into most elementary general music classrooms (Brophy, 1997). Practicing elementary music teachers might be able to assess students vocal pitch accuracy by using singing games without creating an artificial environment, as children sing alone during many traditional singing games. Children might not know that they are being assessed while playing the game, so they would not get nervous; this results in a truer evaluation of the child's vocal achievement (Gagne, 1997).

Brophy (1997) conducted the only study investigating whether singing games can be used when measuring vocal pitch accuracy. Brophy found that using children's singing games to measure pitch accuracy was effective. He also found that older students were more consistent in singing accurate pitches than younger students when using singing games as assessment tools. In Brophy's study, he measured the accuracy of specific pitches within the singing games. Two songs with the same target pitches were used in the assessment to measure validity of the singing games as a measure of vocal pitch accuracy in the general music classroom. The rating consisted of a + or -. The

child either sang the correct target pitches at the correct pitch level, or they did not. Teachers need to know the level of singing voice development if they are to meet the instructional needs of each child. He concluded that singing games can be considered to be a valid tool in measuring of singing accuracy. However, whether children can use their singing voices is not a 'yes' or 'no' question.

All of the measures that are available, regardless of whether they are practical for the music teacher, have either focused narrowly on intonation or have combined the aspects of singing in-tune and singing voice achievement into one measurement. However, a rating scale should measure one thing at a time if it is valid (Gordon, 1971). To date there is only one measurement tool that focuses on measuring the development of a child's singing voice, as opposed to measuring pitch accuracy or intonation. That is Rutkowski's Singing Voice Development Measure (SVDM). She developed this measure based on the belief that use of singing voice is a separate behavior from the ability to sing in-tune (Rutkowski, 1996). One of the reasons Rutkowski developed SVDM was to provide a more consistent structure when identifying various stages of a child's singing voice (Rutkowski, 1990). This is important to practicing music teachers and researchers alike, because this information can be used by elementary music teachers to provide more appropriate singing voice instruction. Rutkowski talked with many child voice experts before designing her first draft of SVDM (Rutkowski, 1990). SVDM has been shown to be a valid measure of singing voice achievement (Levinowitz et al., 1998; Rutkowski, 1990; Rutkowski, 1996; Rutkowski & Miller, 2003).

Rutkowski's measure initially had five levels to describe a child's singing voice, but she expanded it after receiving feedback from raters used in her pilot study, during

which they stated that they observed that children often bordered between two of the levels on the rating scale. She chose to keep the continuum for the rating scale under five for ease of rating. The following is the scale as it is now used: 1- Presinger, 1.5 – Inconsistent Speaking Range Singer, 2 – Speaking Range Singer, 2.5 – Inconsistent Limited Range Singer, 3 – Limited Range Singer, 3.5 – Inconsistent Initial Range Singer, 4 – Initial Range Singer, 4.5 – Inconsistent Singer, 5 – Singer. Rutkowski also developed a set of vocal patterns to be echoed by children that include all of the ranges of a child's singing voice, so that one can get a complete picture of a child's singing voice development using her scale (Rutkowski, 1990).

Even with the success of SVDM in measuring singing voice achievement, Rutkowski admits that testing individually takes a great deal of time and is tedious (Rutkowski, 1996). Welch (1994) believes that children are often misdiagnosed as poor singers in research studies because of the formal nature of the assessment procedure as opposed to the natural environment the child is accustomed to in the general music classroom. Gould (1969) suggests that there is a loss of communication somewhere between the findings of research and the classroom. Consequently, there is still a need for a tool for measuring singing voice development that music teachers can easily use in their general music classroom.

Brophy was successful in using singing games as a venue through which to measure intonation while in the music classroom (Brophy, 1997). Rutkowski developed a reliable assessment for measuring singing voice achievement, but it is difficult to use in a classroom setting (Rutkowski, 1990). Could one successfully use the rating scale

developed for SVDM in assessing singing voice achievement in the context of singing games, during which children are in a natural and uninhibited environment of play?

Young Children's Growth and Development

Play

Since the beginning of man, play has been seen as a dominant behavioral aspect of our species, specifically if one looks at our children (Brophy, 1992). Children express themselves through play by exploring the world around them. Through play, they rehearse things that have already taken place, as well as things to come, practicing skills and refining them. Play helps them to learn and assimilate important knowledge. In short, they use play to make sense of the adult world around them (Van Der Linde, 1999). Piaget (1962) describes children's quest for cognitive development as 'trial-and-error' behavior. Children work out this 'trial-and-error' behavior through play. Neuroscientists have discovered that play, once seen as frivolous and unimportant, is actually as important as other basic drives, such as sleep, rest, and food (Frost, 1998).

Researchers have been studying play for many decades (Berger & Cooper, 2003). Frost (1998) reports that play is important for children's brain growth and development. Between the ages of three and ten, a child's brain contains two times more synapses than that of an adult. The play process during childhood refines the uses of the synapses and a child's intellectual ability for life. Brain development is a 'use it or lose it' process, says Frost. Synapses that are not activated in a young child through their experiences will cease to exist. In early childhood, a child's brain is highly influenced by environmental stimulation, and 'playful activity' makes a positive difference in how the brain develops

(Frost, 1998). Because neural synapses in the brain and a child's music aptitude are developmental, they must be nurtured in early childhood. Otherwise, the result of neglect will be a lifetime of less than optimal potential (Taggart, 2003). Frost (1998) recommends that one read, sing, and play with children everyday in order to help their brains develop properly.

Children are not adults, and it is foolish for educators to try and teach children as if they were. Children have their own unique way of learning, and educators need to know how best to address their learning processes (Taggart, 2003). When children are relaxed and engaged, they are able to learn in the most natural way (Yurko, 1992). Children become entirely absorbed during activities they consider 'fun,' but if the enjoyment element is taken away, the play they were previously absorbed in stops (Addison, 1991). Students who are enjoying themselves forget that the focus in the beginning was to learn. Personal experience and exploration through play should be the basis for learning, instead of adult imposed traditional perceptions (Berger & Cooper, 2003).

The National Association for the Education of Young Children promotes play and informal experiences for children in early childhood (Bredekamp & Copple, 1997). Play is a child's attempt to master their environment. When children play, they are intrinsically pulled into the joyful actions, for it is the process that is the focus, not the product (Berger & Cooper, 2003). Young children learn by doing, through activity, through play (Brophy, 1992). Children can be seen acting out the dramas of life while they play. A little girl might pretend she is cooking a meal for a host of stuffed animals. A little boy might fix a table using his plastic power tools. Addison (1991) states that

drama and stories are merely miniature enactments of real life, and those who participate, both the actors and the audience, all knowingly share in the illusion of reality.

Educators can glean insights into how a child is developing cognitively, socially, physically, and emotionally, just by watching him play (Taggart, 2003). Piaget agrees that play is an indicator of children's cognitive development and is a way for us to 'know' where they are developmentally (Piaget, 1962).

So what exactly is play? The word 'play' has many different meanings. What one person considers play, another may not. Addison (1991) lists eight different "Properties of Play" to help distinguish play from other behaviors.

1. People work at play, some harder than others.
2. People put immense effort into play, play is usually treated seriously.
3. People like to play. It is what makes life worth living.
4. Play is self-contained. It is intrinsically interesting.
5. Play is voluntary.
6. Play makes people concentrate; it absorbs people when they play.
7. Play is in the control of the players involved.
8. Play is symbolic; it is not real life.

Frost (1998) supports these properties of play when he says that, play is more than a frivolous activity; there is something deeper in play than what first meets the eye. Playful activities in which children engage serve to provide them with more than just enjoyment, but also provide them practice for acquiring both physical and social skills that they will use later in life (Brophy, 1992). Children rarely sit still, for play is their naturally active

mode of living. Teachers should not try and stop these playful activities, but rather, give children the freedom to play; play is the most natural way for them to learn (Addison, 1991). Play should serve as a core, rather than a fringe in early education. Educators need to set up environments that enhance play and then guide children to learning through the experience themselves (Taggart, 2003).

One of the first educators to recognize play as a valuable teaching tool was Friedrich Froebel (Brophy, 1992). He considered play to be central in the development of children (Berger & Cooper, 2003). Froebel's learning philosophy was that children should be active learners. On that principle, he founded the first kindergarten, meaning children's garden, in 1837 after tutoring children in a garden and watching them learn through action. Before Froebel's kindergarten, there was no school for children under seven years of age. People of that time believed that children could not develop cognitive or emotional skills so early in life. Froebel believed that children were capable of these things and should follow their own interests and explore them through what he called 'self-activity.' The role of the teacher was to be a guide in 'self-activity' (*"Friedrich Froebel: Founder,"* 2000). The following were Froebel's kindergarten goals: "physical activity, development of sensory awareness and physical dexterity, creative expression, exploration of ideas and concepts, the pleasure of singing, the experience of living among others, and satisfaction of the soul" (p. 63). All of these occur in and through play.

Play verses Work

Work is a purposeful, directed activity aimed at achieving a predetermined goal (Brophy, 1992). Most people would be able to identify the difference between work and

play if they saw it, but when describing it, have difficulties distinguishing play from non-play (Van Der Linde, 1999). Sometimes the line between work and play is somewhat blurred. What some consider work, others consider play, and vise versa. Play cannot be distinguished by where it takes place or for whom it is done (Kratus, 1997). Children do not distinguish clearly between work and play. They are learning life's necessities through play (Addison, 1991). Often the words 'work' and 'play' can be used interchangeably, making what is work and what is play confusing, for these words seem to suggest such polar extremes; yet, they can be used to refer to the same phenomenon (Kratus, 1997). When a child must concentrate fully on the activity at hand, the concept, learning, understanding, and retention naturally fall into place in the child's mind, making the distinction a non-issue (Hotchkiss & Athey, 1978).

Kratus (1997) identifies some similarities and differences between work and play. Both work and play are intentional and purposeful activities. Work is an activity to achieve a particular outcome and has real world ramifications. Play is an activity that sparks imagination in which reality is somewhat suspended. One will choose to play or work for entirely different reasons. People may play for the experience or work for the sense of accomplishment. People have many biases when it comes to work and play. Many times work is viewed as something bad, yet productive, whereas play is viewed as something good and enjoyable, yet unproductive (Kratus, 1997). When the qualities of work and play are meshed, one often finds activities that are inexpressibly satisfying (Csikszentmihalyi, 2000).

When one looks at the things that give people the most satisfaction and worth, he finds aspects of both work and play. So, it seems logical that music education can be

most effective and beneficial when music educators combine aspects of work and play. Teachers should strive to combine the elements of work and play in the classroom to achieve a higher level of musical growth (Kratus, 1997). Music instruction should include interesting objects, ideas, and activities that possess the qualities of both work and play. When teachers have achieved this, they will no longer have to try to get children to learn or to practice; children will want to naturally (Addison, 1991).

Music and Play

Play is the true origin of all of the arts that we enjoy today (Brophy, 1992). Plato stated in 300 BC that the most powerful educational aid was music (Van Der Linde, 1999). Music is a form of play (Addison, 1991). It is natural for a child to sing and play; it is vital to their development. Young children find music and play to be inseparable activities. Berger & Cooper (2003) state that it is natural for children to respond to music while playing. When young children play, they often tend to sing or hum spontaneously (Van Der Linde, 1999). Movement can also be seen accompanied with vocal sounds or music for children, as children have not yet acquired the ability to sit still when meaningful music is being experienced (Addison, 1991).

Children should participate in musical play, because it facilitates their musical growth (Berger & Cooper, 2003). Children learn music in much the same way as they learn language. As children are bathed in a verbally-rich environment in which they learn to master language, so should they be bathed in a music-rich environment, with plenty of musical 'toys' to play with and manipulate. It is through this musical play environment that children begin to impose order to and gain understanding of the sounds

around them (Taggart, 2003). Musical play allows children the freedom to explore, improvise, and create (Berger & Cooper, 2003). Frost (1998) states that long–term changes in neural structures effecting thinking and reasoning abilities can be linked to play, art, and music.

Many parents do not sing and move with their children. Music educators need to step in and provide playful and child-centered music environments in addition to formal music training. Music educators need to allow children time to explore and play in their own way, while encouraging them in their play. A child's music development can be hindered by adults expecting traditionally 'correct' music responses too early (Taggart, 2003). Berger & Cooper (2003) agree; a child's version of musical play is often not what adults would consider music making. Musical play is enhanced when adults refrain from correcting children in their method of free musical play. Adults can enhance musical play further by encouraging all music exploration. This encouragement can be both verbal and non-verbal. Adults can encourage a child's musical response through positive eye contact, echoing musical utterance, and extended musical dialogue that is child-initiated and child-directed (Taggart, 2003).

Feierabend has based much of his curriculum at The National Center for Music and Movement in the Early Years at the Hartt School of the University of Hartford on musical play. The music and movement classes consist of fifteen minutes of 'free musical play,' followed by twenty to thirty minutes of circle time. The aim for the children is development of comfortable and accurate singing skills, comfortable and accurate moving skills with beat in duple and triple meters, and expressive sensitivity. All of this is achieved through some form of musical play (Feierabend, 1998).

Berger & Cooper (2003) identified Three Themes of musical play. The first theme was Unfinished Play. Unfinished Play is when free musical play is interrupted, yet the children express the desire to continue playing. The second theme was Extinguishing Play. Extinguishing Play is when adults or another child did something that stopped the child's free musical play completely. The final theme that they identified was Enhancing Play. Enhancing Play is when adults encouraged children's free musical play and further musical growth was seen. If a child is left alone to organize his own free musical play, it helps him progress from the free musical play to higher discerning musical skills. Berger & Cooper also found that, given the opportunity, many children will engage in free musical play even if there are other, more structured musical activities going on around them.

While free musical play is said to enhance musical growth, Taggart (2003) warns, it is not enough to provide children with music centers filled with percussion instruments if the children do not have the tonal and rhythmic vocabulary to apply to their play, making it a meaningful experience. Teachers need to know where students are developmentally musically to best serve them.

Young people want to learn, to improve in skill, and to grow. They become absorbed in an activity and will put a lot of effort into the activity if the play is attractive enough (Addison, 1991). Musicians talk about how they 'play' an instrument, but it is many times the hard 'work' they put in on learning an instrument that allows them to 'play' well (Kratus, 1997). Brophy (1992) states that young children want to gain power over their world, and, in doing so, they naturally delight in finding sounds and mastering

them. Mastery of sound in music can be worked toward through singing activities and games, all of which can be a part of musical play.

Games

Hotchkiss & Athey (1978) describe a game as "...any structured activity in which there is an element of suspense and challenge and in which the participants enjoy themselves" (p. 48). Math and reading have been using games for many years to teach concepts (Hotchkiss & Athey). In childhood, children begin to organize and systemize the objects around them (Piaget, 1962). The ordering of games with rules begins at approximately the same time. Games are a child's natural way of thinking. As a child works to complete the steps needed to reach the end of a game, he is developing both mentally and physically in ways that he is not often aware (Hotchkiss &Athey, 1978).

Games fall in the hazy area between work and play. In a classroom, a child often does not distinguish that they are working to learn a new concept when engrossed in a game; they view the activity as play. When comparing games and play, it is easy for adults to see the difference between the rigidity of games and the flexibility of unstructured play (Prim, 1995). Games give a perimeter in which to work and learn new concepts. Play is more spontaneous and creative (Dalby, 1992). A child who 'plays' too much in music will not achieve anything meaningful (Kratus, 1997). This is when the teacher should step in and give some boundaries and structure to stay within and a destination to work toward, for the children will still view it as play. Games that offer variety and excitement are one of the most effective teaching methods for developing musicianship (Dalby, 1992). Frost (1998) agrees that teachers need to initiate children to

play, giving the play structure and purpose with games. Activities such as singing, dancing, and acting are considered games, because they are organized play (Prim, 1995).

Prim (1995) states that children become interested in games that involve music and movement as early as ages three or four. Children enjoy playing games that they associate with music (Van Der Linde, 1999). In music class, games are engaging activities that help children build musical and social skills. They can be used to help improve listening skills and help children learn to sing melodies (Howle, 1997). Games equip children with skills that they will need later in life and enable them to practice those skills in a non-threatening environment (Frost, 1998). Games can uncover concepts that students do not understand. In a game, students are less concerned about making a mistake, and they can help the teacher diagnose learning strengths and weakness (Hotchkiss & Athey, 1978). In games, age, gender, or class are not barriers to participation; games break down these barriers (Howle, 1997). Hotchkiss & Athey (1978) agree that games can dissolve barriers, allowing children to be themselves. When games are played in a circle, no one predominates (Howle, 1997). Games provide non-risk situations in which children can 'try themselves out.' Games enable children, as a part of their natural development, to find out what they are good at and to improve those skills in a non-threatening environment. (Addison, 1991). Children who at first are too shy to participate will soon be unable to resist the enjoyment and excitement of a game and join in enthusiastically (Howle, 1997). Gange (1997) agrees that children, who are often reluctant to participate in rote singing, will gladly join into the activity when playing a game.

Many well-known methods of teaching music have included games in their philosophy of teaching (Hotchkiss & Athey, 1978). Montessori schools incorporate games in their teaching (Beaven, 2000). Teachers that use the Orff method in their classrooms use games to build rhythmic unity and prompt body movement (Shamrock, 1997). Kodaly also supported the use of games ("About Kodaly," 2004). Prim (1995) identifies six elements that can be taught through musical games:

1. The difference between speaking and singing.
2. Songs with three, four, five and more different notes.
3. Songs with larger or lesser range.
4. Songs with binary or ternary meter.
5. Complex and simple rhythms.
6. Song forms such as A, AB, ABA...

Obviously, this is not an exhaustive list. Most musical concepts can be approached through games.

Singing Games

"Because play is satisfying in itself and seems to have no consequences, the learner is freed to experiment and explore without fear. Young children are assumed not to identify the musical activity being engaged in as anything but a game, and are therefore psychologically released to participate in relatively uninhibited play for which the trained specialist has one goal and the children another. Singing games are particularly useful for ear-training activities, solo singing, and beginning vocal improvisations..." (Brophy, 1992, p. 12). Mitchell (1991) agrees that songs, games, and

activities are valuable practice for developing accurate singing. There are many benefits to singing games, one of which is that children love to play singing games and are upset if they do not get a chance to have a turn (Gagne, 1997).

Mitchell (1991) states that, when games have a purpose, children can improve their singing skills in a positive environment. Singing games have helped countless children sing in tune. They help the non-singer to become singers and the singers to become more accurate in their singing abilities. Gagne (1997) agrees that games help non-singers perfect their sense of pitch and goes further to remind us that it helps their cognitive development as well.

Feierabend's (2000) research on young children's musical development prompted him to develop a curriculum based on singing games and activities. His quest began with a strong belief that adults should be able to dance, sing, and express themselves through music. He believes that many do not, due to insufficient musical experiences during childhood, which is when music activity should begin and be nourished. Imbedding music in people's lives should be a natural cycle, according to Feierabend. Children should become fluent in music so that they can grow up and, in turn, teach their children music. Historically, families passed on rich musical activities to the generations that followed in this natural cycle of musical learning. Feierabend explains this decline of family musical heritage as a shift in community. No longer does one see large families living within a mile of each other. Families are smaller and spread across the globe, succumbing to the 'ear-candy' of the current culture. Feierabend's approach to music curriculum is to recover folk songs and games of old and teach them in a playful environment (Feierabend, 1996).

The practicing music teacher should have a repertoire of purposeful music games that promote both group and solo singing in the classroom to enable children to feel safe when singing alone (Rutkowski, 1996). Play and its role in child development has received much attention and has been the focus of research (Brophy, 1992). Yet, there has been little research done specifically on the use of music games in the general music classroom (Hotchkiss & Athey, 1978). Prim (1995) remarks that "studies concerning singing games appears to have stopped..." (p. 149). However, could the strength of using singing games in the music classroom and the need for practical singing voice measures be combined?

Purpose

With the intent of providing a valid assessment tool for practicing elementary music teachers, the purpose of this research is to investigate the measurement of singing voice development through singing games.

Problem

The problem of this study is to determine the validity of using children's singing games as a context through which to measure singing voice development in young children, using the rating scale of Rutkowski's Singing Voice Development Measure.

CHAPTER TWO

RELATED RESEARCH

Singing Voice Development Measure

When Rutkowski began developing her Singing Voice Development Measure (SVDM), she was concerned with the many names and labels that have been given to children that cannot gain control of their singing voice: monotones, inaccurate singers, backward singers, non-singer, problem singer, and partial singer. These labels often point toward these children being hopeless cases, not possessing the ability to learn or to be taught how to gain use of their singing voices. So, when Rutkowski labeled her rating scale levels, she was careful to use labels that suggested that the process a child goes through, in the quest of becoming a full fledged 'singer,' is developmental. Rutkowski spoke with several child voice specialists after reviewing past scales that had attempted to rate singing voice. These scales did not separate the measurement of intonation from the measurement of singing voice development. Rutkowski (1990) found that these are separate constructs and therefore should be measured in isolation. Rutkowski articulated the following five levels of singing voice development and used them in her pilot study (Rutkowski, 1990).

1 Children who use only speaking-voice inflection but do not sustain tones

2 Children who exhibit use of melodic contour and sustained tones, but use speaking range or a very high range

3 Children who use a very limited singing range, usually D3 to F#3.

4 Children who use initial singing range, usually D3 to A3

5 Children who are able to sing over the register lift, F♭3 and above

Rutkowski conducted a pilot study to determine if the behaviors in her rating scale were valid. She used a song entitled "Bakerman," with which the children were familiar, because she believed that one should use songs familiar to children when measuring their singing voices. If the songs were unfamiliar, children may become insecure and not sing to their full potential, thus resulting in an inaccurate measurement of their singing voice development (Rutkowski, 1990).

The researcher tested students individually singing the familiar minor song. They were not given a tonality, starting pitch, or tempo before they were recorded. Rutkowski chose to test this way, because she believed it would result in a truer picture of the child's singing voice. Also, she believed that children who are secure with their singing voices will most often sing a familiar song in the same key in which they learned it. A few days later, the children were recorded a second time (Rutkowski, 1990).

Four raters who were familiar with young children's singing voices participated in the pilot study. Practice examples were provided for the raters at the beginning of the recordings to familiarize them with the rating scale. Interrater reliability ranged from .836 to .963. Rutkowski included a 'ready-sing' component before a few of the children to see how that affected the raters. Using the 'ready-sing' protocol, the reliability of the raters was .904. The intrajudge reliability was .918. The raters commented that the 'ready-sing' component helped them assess the children. Also, they admitted an inclination to listen for intonation rather than just singing voice (Rutkowski, 1990).

Rutkowski then proceeded to the main study. The main study was similar to the pilot study but used a larger and more heterogeneous subject group. However,

Rutkowski added tonal patterns to be echoed by the investigator and 'ready-sing' in the same mode and meter on the descending tonic chord of the song as a preparatory sequence. Patterns were first played on the tone bells, then sung by the investigator, then echoed by the child being tested (Rutkowski, 1990).

Prior to testing, Rutkowski visited the classroom to become acquainted with the children. She taught them "Bakerman" and reviewed the tonal patterns to be used with them as well. The children's music teacher reviewed the song with them each week for a month prior to the testing. The tonal patterns were reviewed with the children a second time the day they were to be tested (Rutkowski, 1990).

Two of the raters with the highest interrater reliability in the pilot study, ranging from .836 to .963, were chosen to rate the children in the main study. Rutkowski determined that SVDM was a reliable measure of the use of singing voice. Following the study, Rutkowski interviewed the raters to get their feedback concerning SVDM. They stated that, after they became more comfortable with the rating scale, they much preferred rating the tonal patterns over the song. Teaching the song takes more time than echoing patterns. Also, performing a song involves other things besides the singing voice, such as memorization of the text. As a result, the child may focus on one of the other components required to sing the song and not demonstrate his or her true level of singing voice development (Rutkowski, 1990).

Other studies using SVDM

In 1996, Rutkowski conducted another study using SVDM in an attempt to identify better ways to teach singing voice and develop music aptitude. The purpose of

her study was to compare the effect of large-group versa individual/small group singing activities on singing voice development, to monitor singing voice development over a time period to see change, and to monitor change in developmental music aptitude over time. She measured singing voice development using SVDM, as it had been previously proven to be a valid measure of young children's use of their singing voice (Rutkowski, 1996).

The subjects were students in intact kindergarten classes that were randomly assigned to control or treatments groups. All children received the same songs, activities, and games incorporating singing and movement. In addition, the treatment group had small-group and individual participation in singing activities. Primary Measures of Music Aptitude (PMMA) and SVDM were given at the beginning and end of the year, with PMMA given mid-year as well (Rutkowski, 1996).

The agreement between raters was .90 and .99 for SVDM. Both treatment groups had higher tonal aptitude at the end of the treatment, but there was no significant difference between groups on tonal aptitude. However, there was a significant difference between the groups on the posttest for the SVDM, showing that the small group and individual instruction had made a positive difference in the children's use of singing voice. Rutkowski also found a weak relationship between singing voice achievement and tonal aptitude. This points to an even greater need to help children find their singing voice. Some above-average musical aptitude students may be considered by music teachers and others to be tonally weak, just because they do not know how to use their singing voices. The raters in Rutkowski's 1996 study stated that many children were inconsistent in use of their singing voice. Children also hovered between two stages of

SVDM. As a result of their feedback, Rutkowski expanded her original five-level scale to include children who do not consistently perform at one level. Instead of adding more numbers to the scale, she added halves to make it easier for the practicing music teacher to internalize (Rutkowski, 1996). Her revised SVDM is as follows:

1.0 "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).

2.0 "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).

3.0 "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).

4.0 "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: B♭3 and above).

5.0 "Singer" exhibits use of extended singing range (sings beyond the register lift: B♭3 and above).

Rutkowski conducted a longitudinal study of elementary school children's singing voices with teacher/ researcher Miller using SVDM (Rutkowski & Miller, 2003). Twenty-five children participated in this study throughout their first, third, and fifth grade years. SVDM was administered at the end of first, third, and fifth grades. In this study, the tonal patterns used were sung on the syllable 'bum' as well as with text. The responses of the children were tape-recorded, and the same raters rated the responses using SVDM after each testing in this longitudinal study. The rater agreement ranged from .738 to .956. Statistical analysis determined if gains in singing voice were achieved in each grade. A significant difference was found; children's singing voice development increased with age (Rutkowski & Miller, 2003).

SVDM tested in a practical environment

SVDM has proven to be a valid measure of singing voice achievement. Yet, testing is often time consuming and tedious (Rutkowski, 1996). Because measurement should be a key component in every music program, a practical assessment tool needs to be available so that a general music teacher can use it on a regular basis in the general music classroom (Levinowitz et al., 1998). SVDM was created to provide a consistent means of identifying and measuring the stages of children's singing voice development. Seeing worth in the stages of SVDM, Levinowitz et al. wanted to see if music teachers could use SVDM in the music classroom, using solo songs instead of tonal patterns, and across a wide variety of ages and backgrounds (Levinowitz et al., 1998).

One-hundred seventy-five students from five elementary schools participated in this study. One month prior to testing, the students were introduced to the two songs by rote that were to be used for the testing. The two songs were a minor song entitled "In the Sea" and a major song entitled "Row, Row, Row Your Boat." These songs were chosen because of their familiarity across a wide range of ages; also, both songs covered an octave range from D to D, and one was short while the other was longer to provide children the opportunity to audiate at a deeper level. The children were taped individually during the music class in front of classmates by his or her practicing music teacher. The tonality was established by the music teacher prior to singing by playing I-V-I chords on the guitar or piano. Then the teacher sang 'ready-sing' on the starting pitch of the song (Levinowitz et al., 1998).

The performances were rated using SVDM by the six co-investigators, all of whom were practicing music teachers. They found that SVDM is a valid measure for kindergarten through fifth grade children. The co-researchers of this study recommend the use of SVDM in assessing singing voice achievement, specifically when students sing a short, familiar, major song, based on the interrater reliability (Levinowitz et al., 1998).

Although Levinowitz et al. used SVDM in the classroom setting, the children were taken out of their natural environment of play and learning. When children got up to sing, they knew they were being tested on how well they sung in front of their peers. This may have affected their performances, thus not giving the music teacher a true assessment of the child's singing voice development. Music teachers must know their students' levels of singing voice development so that they can help them achieve even higher levels of singing voice use. When children abandon themselves in a singing game,

they are not concerned with anything but enjoyment. As a result, their singing maybe more reflective of their singing voice use in natural settings. General music teachers need a reliable and practical tool to assess singing voice development that can be successfully used in their classroom. This study is contributing toward that goal.

Validity

In order for the results of research to be considered valid, the criterion test must be accepted as meaningful and important (Cronbach, 1970). In Rutkowski's studies, she based her test's validity on the judges reliability. The reliability ranged from .836 to .963 (Rutkowski, 1990), .77 to .99 (Rutkowski, 1996), and .738 to .956 (Rutkowski &Miller, 2003). She also worked toward subjective validity by talking with child voice experts when developing her scale to be certain that her levels accurately reflected the stages of vocal development. A test that is valid for one situation may not be valid for another. Levenowitz et al. (1998) determined that Rutkowski's measure was valid for use in their settings as well.

A correlation coefficient, the relationship between two variables, can be used to answer the question: 'Do these two tests measure the same thing?' If one looks at the relationship between sets of data from two different measures that were designed to measure the same thing and they have a strong relationship, the researcher can have greater faith in the validity of the measures. In establishing concurrent validity, the scores from a test that has already been proven useful and valid, but for one reason or another it is considered to be too cumbersome, are correlated with the scores from another less cumbersome test whose validity is not yet established. The subjects are

given both measures in close proximity. In this study, the concurrent validity of using singing games as a context for measuring singing voice development will be established by using Rutkowski's SVDM, a measure already shown to be valid by multiple researchers.

CHAPTER THREE

METHOD

Subjects

Four classes of third grade students (n=78), 37 girls and 41 boys, at a West Michigan elementary school participated in this study. They are of diverse socio-economic backgrounds as well as ethnic origins. Each class meets for music class twice a week for half an hour each time with a trained music specialist, who is also the researcher. The students are familiar with various singing games and are accustomed to singing by themselves. Most of the students have a positive attitude toward singing.

Design and Procedures

The study was designed as follows. Students' vocal performances were rated using Rutkowski's Singing Voice Development Measure (SVDM). This portion of the investigation was modeled after Rutkowski's (1996) study. During two of the children's music classes, students learned and practiced the patterns used in SVDM. The music specialist taught the patterns according to Rutkowski's Procedures for Test Administrator. The procedure follows.

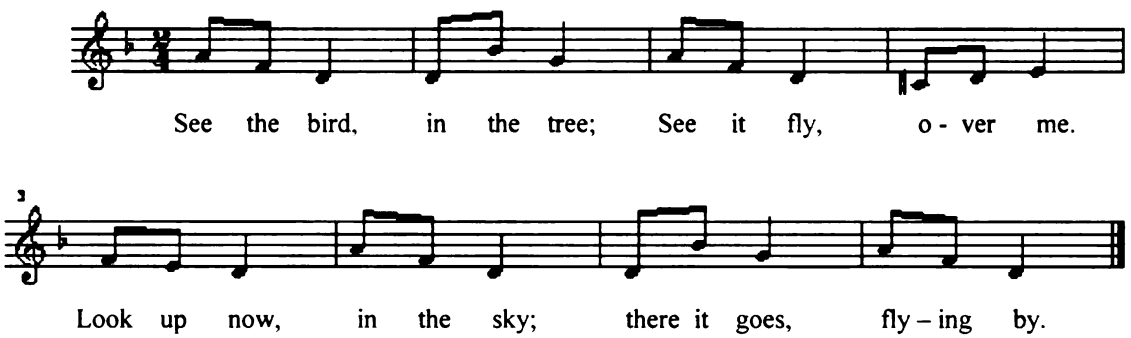
SVDM: Procedures for Test Administrator

1. Play the first pattern (measure) on the tone bells or piano (example: "see the bird").
2. Sing the first pattern for the children with the text or neutral syllable, "bum". Do not use any accompaniment.
3. Have the children echo. Again, do not use any accompaniment.
4. Repeat steps 1-3 with each pattern (1 measure equals one pattern).
5. Do not pause in between any of the above steps.
6. For half of the group of children, perform steps 1-5 on text first then on the neutral syllable "bum"; for the other half perform steps 1-5 on the neutral

syllable "bum" first then on text.

Following in Figure 1 are the tonal patterns used for Rutkowski's SVDM.

Figure 1 – Rutkowski's Tonal Patterns



After the two class periods, during which students had the opportunity to practice the patterns, the students were brought individually into a familiar, private room. Each student's performance was audio-recorded as they vocally echoed the music teacher playing the patterns they learned in class on the piano and then singing them. A Shure SM58 was used to record the student's performance. All performances were recorded into Digidesing Mbox with the ProTools Software and burned onto a cd. Later, their performances were rated using Rutkowski's SVDM rating scale by two independent judges who are experienced with children's voices, as well as by the researcher to allow for more meaningful interpretation of the results. Rutkowski's scale follows.

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"*** wavers between speaking and singing

voice 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).

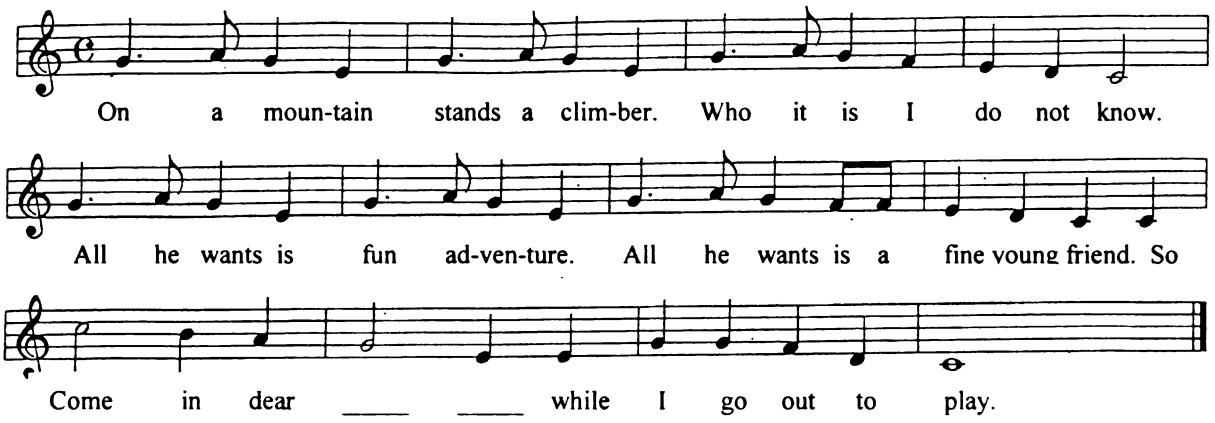
4.5 ***"Inconsistent Singer"*** sometimes only exhibits use of initial singing range, but other times exhibits use of extended singing range (sings beyond the register lift: B3-flat and above).

5 ***"Singer"*** exhibits use of consistent extended singing range (sings beyond the register lift: B3-flat and above).

During the same two class periods and for the class period that followed, the music teacher, who is also the researcher, taught the song for the singing game "On a Mountain Stands a Climber" by rote. Each class reviewed the song and played short rounds of the singing game to allow children to become familiar and confident with both the song used in the game as well as the procedures of the game. The microphone that would be used in recording the children's responses was used as part of the game during this class period in an effort to help the children become accustomed to it. There was no accompaniment used during the singing game. The music teacher demonstrated the starting pitch of "On a Mountain Stands a Climber" with a 'ready-sing' before the class began singing. The music teacher allowed the soloist to choose the next soloist after they had sung. Following in Figure 2 is the singing game used in this study. The class sings the beginning of the song together. While one child sings the solo by themselves,

inserting the name of the next child to sing the solo. Then, that same child "goes out to play" for the next round of the song with assorted toys in a toy box.

Figure 2 – On a Mountain Stands a Climber Traditional



Beginning in the third class period, the children were audio-recorded while playing the game during their regular music class. A Crown SASS-P stereo recording microphone was used to record the entire class while singing the song for the singing game. A Shure SM58 was used to record the individual voice of the student singing the solo. All performances were recorded into Digidesing Mbox with the ProTools Software and burned onto a cd. Later, the same judges rated the singing game recorded responses using the rating scale developed by Rutkowski as part of SVDM.

The judges received a packet of materials containing a copy each of Rutkowski's echo patterns, the Singing Game, the Singing Voice Development Measure rating scale, a recording of the performances of all seventy-eight children for both the echo patterns and the singing game, a score sheet for both the echo patterns and the singing game, and practice examples of performances for use in training the judges to use SVDM. The practice examples were heard first by the judges to help them become familiar with scoring using SVDM. Both judges were familiar with Rutkowski's measure but had

never used it in practice. After the judges were comfortable using the scale, they scored the recorded performances in one continuous sitting to avoid changes in scoring from one day to the next.

CHAPTER FOUR

RESULTS AND INTERPRETATIONS

Reliabilities

After all ratings had been collected, Pearson Product-moment correlations were performed to determine the inter-judge reliability between the two independent judges. Inter-judge reliability for Rutkowski's SVDM was .84, showing a strong agreement between the judges. Inter-judge reliability for the scores from the singing game was .90, also showing a strong agreement between the judges. The inter-judge reliability was higher for the singing game than for SVDM. The material performed by the child in the singing game was not as long and varied as the echo patterns used in SVDM. One might think that having more opportunity to assess a child's voice would result in greater agreement, but this was not the case in this study. A potential reason that the inter-judge reliability was higher for the singing game than for the echo patterns could be that the judges had more experience using the rating scale when rating singing game performances, which were rated second. Another reason could be judge fatigue. Even though the judges scored the singing game performances after the echo patterns, the time it took to score the singing game was considerably shorter than the time used in scoring the echo patterns.

Means and Standard Deviations

As seen in Table 1 below, Judge One had a mean score of 4.186 with a standard deviation of .944 for Rutkowski's echo patterns and a mean score of 4.071 with a standard deviation of 1.053 for the Singing Game. Judge Two had a mean score of 3.724 with a standard deviation of 1.175 for Rutkowski's echo patterns and a mean score of 3.769 with a standard deviation of 1.136 for the Singing Game. Both judges showed consistency from test to test in the scores they assigned the children's performances.

This suggests the validity of using this singing game when assessing young children's singing voice development.

Table 1 – Means and Standard Deviations

Judge	Mean	Standard Deviation
Judge One Echo Patterns	4.186	.944
Judge Two Echo Patterns	3.724	1.175
Judge One Singing Game	4.071	1.053
Judge Two Singing Game	3.769	1.136

Correlation as a Measure of Concurrent Validity

Next, a Pearson Product-moment correlation was performed between the scores of Rutkowski's SVDM and the scores of the singing game to see if there was a meaningful relationship between the two tests administered to assess singing voice development, thus establishing concurrent validity. The correlation was .74. This is moderately high. This singing game can be seen as a valid way to assess children's singing voice development, as demonstrated by the strong relationship between scores on SVDM and those of the singing game.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Purpose

With the intent of providing a valid assessment tool for practicing elementary music teachers, the purpose of this research was to investigate the measurement of singing voice development through singing games.

Problem

The problem of this study was to determine the validity of using children's singing games as a context through which to measure singing voice development in young children, using the rating scale of Rutkowski's Singing Voice Development Measure.

Summary

Rutkowski's Singing Voice Development Measure (SVDM) has proven to be a valid form of assessing young children's singing voice development (Rutkowski, 1990, 1996; Levinowitz et al, 1998; Rutkowski & Miller, 2003). While her measure is valid and useful to music education as a whole, it is not practical for the practicing general music teacher. It requires taking children out of class to test them individually. This is not practical when a music teacher has hundreds of children for which she is musically responsible.

Through play, children explore and learn best. In the natural environment of play, children are released from inhibitions. It was the hypothesis of the author that, by using a singing game as a context in which to assess children's singing voice development, one might get an accurate measure of a child's singing voice development.

The subjects were 78 third grade children from a suburban elementary school. The children met two times a week for half an hour each for two consecutive weeks with the music specialist at Lincoln Elementary School. The music specialist taught them

Rutkowski's echo patterns from SVDM as well as the singing game "On a Mountain Stands a Climber." In the beginning of the third week, the children's performances were recorded. First, children were administered SVDM, a standardized test of singing voice development. The children were taken out of class separately and tested in the music room with the music specialist. Then, they played a singing game in their music class that required the children to sing alone in the context of their regular music class. Their solo performances were recorded and scored by two independent judges.

Then, the scores from SVDM were correlated with the scores from the singing game to determine whether singing voice development could be measured with validity in a singing game context. Inter-judge reliability was high for both ratings from Rutkowski's echo patterns and ratings from the singing game. When scores from the two tests were correlated, a strong positive relationship was found. This provided evidence of the concurrent validity of using singing games as a context for measuring young children's singing voice development. This provides the practicing general music teacher a means of measuring children's singing voice development that is both practical and developmentally appropriate.

Future Research

Though this study provided evidence that singing games can serve as a valid context for measuring students' singing voice development, further research should be done on this subject to help support these results. Can other singing games be used for the same purpose? This study should be replicated using other singing games.

In addition, more research should be done on singing games in general. Most singing games today have a narrow melodic range due to the child's developing voice. While these singing games should be used and embraced by the practicing music teacher, there is a need for singing games that have a range that extends over the register lift so that the general music teacher can measure the full range of their students' singing voice

development. It is widely accepted that children learn best in their natural environment of play. Yet, only two studies exist to date that focus on singing games; Brophy's 1997 study and this one.

Rutkowski has contributed important research toward the understanding of singing voice development, but many need to join her in this endeavor. Although many researchers have studied intonation and other factors in singing, few have studied young child's singing voice development. Children must first find their singing voices before they can begin to work on other singing qualities, such as intonation. Further research in this area in crucial.

Teachers need useful and valuable tools to use in the general music classroom when measuring student learning. Teachers and researchers need to join forces to develop more practical tools to use in the classroom so that children can be taught to achieve their fullest musical potential.

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