

# Brief Description of Measure of Creative Thinking in Music II

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## Description of the Measure

### Equipment and Setting

The *Measure of Creative Thinking in Music* (MCTM) uses three sets of instruments: (1) a round "sponge" ball of about 4" in diameter that is used to play tone clusters on a piano (either in a rolled fashion or as individual clusters), (2) a microphone that is suspended in front of the piano and is attached to an amplifier and speaker, and (3) a set of five, wooden resonator blocks (temple blocks) that produce different pitches when struck by a mallet. The instruments are all in easy reach and can be played easily by children who have had no musical training. There is a brief warm up period that is not scored and is designed to familiarize the children with the simple techniques necessary to play the instruments. All activity takes place in a private room with only the child and the administrator. All tasks are video taped unobtrusively and scored at a later time. It requires about 20 to 25 minutes to administer per child.

Additional equipment required includes: (1) a set of line drawings depicting space travel (included in these materials), (2) three pieces of blank paper, (3) (optional) an audio cassette player and blank cassette tape (re-usable for each child), and (4) a video camera and recorder with blank video tape in quantities suitable for the number of children to be tested.

Diagrammed on the following page is a suggested arrangement of the instruments and camera (seen from above). Other arrangements are possible as well.

### Content

The measure consists of a series of 10 scored tasks, divided into three parts: exploration, application, and synthesis. The tasks begin very simply and progress to higher levels of difficulty in terms of divergent behavior. The atmosphere is game-like in nature, with no indication that there are any right or wrong answers expected. The text used by the administrator is standardized for all children and few models of performance behavior are given.

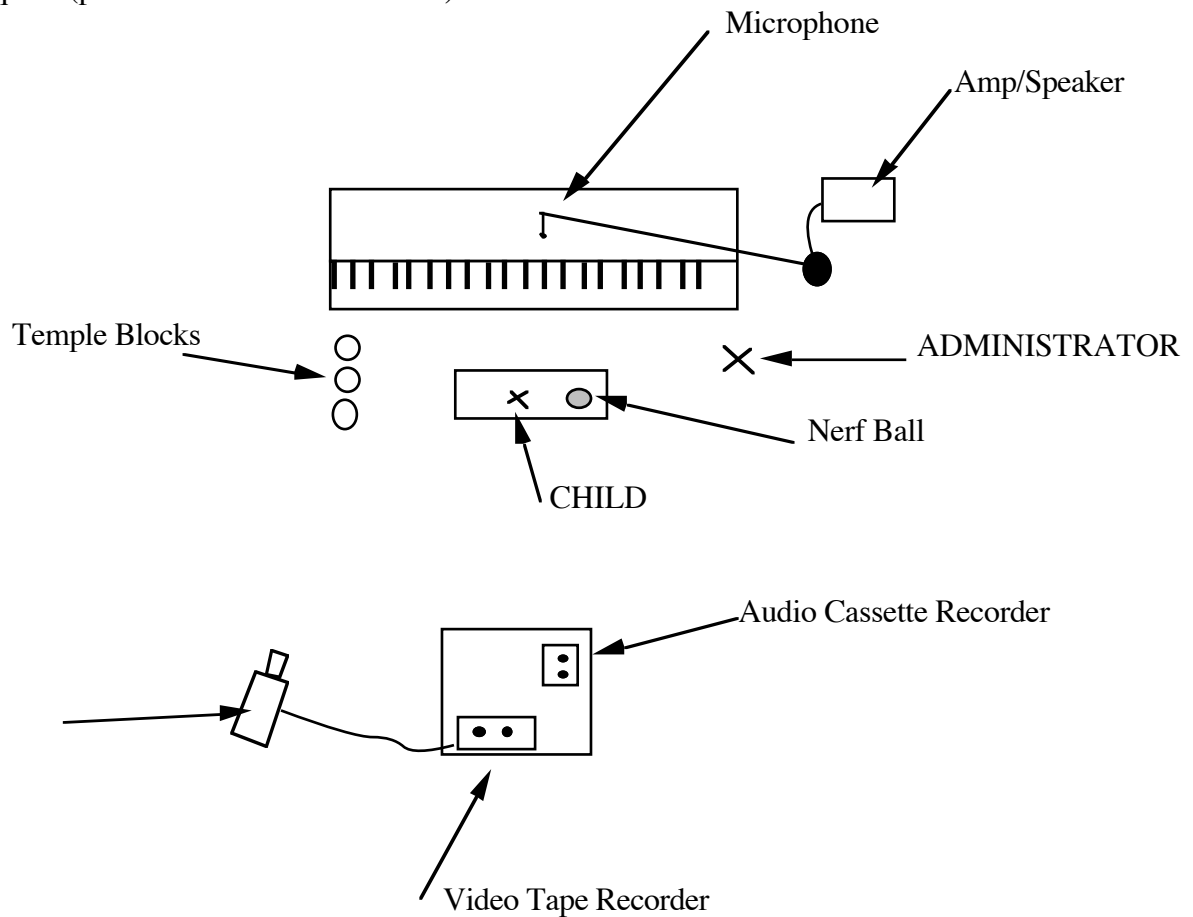
The exploration section is designed to help the children become familiar with the instruments used and how they are arranged. The musical parameters of "high/low", "fast/slow", and "loud/soft" are explored in this section, as well as throughout the measure. The way the children manipulate these parameters is, in turn, used as one of the bases for scoring. Tasks in this section involve images of rain in a water bucket, magical elevators, and the sounds of trucks.

The application tasks ask the children to do more challenging activities with the instruments and focus on the creation of music using each of the instruments singly. Requirements here ask that the children enter into a kind of musical question/answer dialogue with the mallet and temple blocks and the creation of songs with the round ball and the piano and with the voice and the microphone. Images used include the concept of "frog" music (ball hopping and rolling on the piano) and of a robot singing in the shower (microphone and voice).

In the synthesis section, the children are encouraged to use multiple instruments in tasks whose settings are less structured. A space story is told in sounds, using line drawings as a visual

aid. The final task asks the children to create a composition that uses all the instruments and that has a beginning, a middle, and an end.

Specific text for the administrator and directions for administration is available upon request (pwebster@northwestern.edu).



## Scoring

### Individual Factors

The scoring of the video tapes involves both objective and subjective techniques. The scoring must be done by a professional who understands the factor meanings and can identify them in musical behavior. There are four factors used, each derived from theoretical literature and from content analysis sessions with a panel of experts from the fields of music composition, music education and psychology:

*Musical Extensiveness* -- the amount of clock time involved in the creative tasks

*Musical Flexibility* -- the extent to which the musical parameters of "high"/"low" (pitch); "fast"/"slow" (tempo) and "loud"/"soft" (dynamics) are manipulated

*Musical Originality* -- the extent to which the response is unusual or unique in musical terms and in the manner of performance

*Musical Syntax* -- the extent to which the response is inherently logical and makes "musical sense"

The factors of Musical Extensiveness (ME) and Musical Flexibility (MF) are measured objectively by either counting the actual seconds of time a child is involved in a task (ME) or by observing the manipulation of musical parameters (MF). This objective work can be done with a stop watch and direct observation of the video tape. In most cases, one observation is sufficient. However, if a response is a complex one, a second observation is sometimes necessary for proper scoring of MF.

Musical Originality (MO) and Musical Syntax (MS) should be evaluated by a panel of judges for best results, however one observer is certainly possible. Rating scales based on carefully developed criteria are used for these factors. Some practice is necessary at first to achieve a sense of the proper rating categories. Once this is achieved, the scoring process becomes straight forward. In most cases, a rating for MO and MS can be assigned after two viewings.

Inexperienced evaluators are urged to view a random sample of children's performances in order to achieve an overall sense of the behavior patterns. This is especially important for proper evaluation of MO and MS. A careful review of the scoring sheets themselves will also help to direct the evaluator to key points of observation.

For new evaluators, the scoring time necessary for one student performance might be as much as a full hour. However, with experience, forty to forty-five minutes is often the norm. Of course this time varies greatly with the length of the child's performance and the particular equipment used for playback.

One technique that seems to work well is to first score all children for the objective factors (ME and MF). This will take one complete observation of the tape(s). During this scoring, also note the point on the tape where the rating tasks occur. Re-wind the tape(s) and view only those tasks that require the ratings and score those sections.

### Scoring Summaries

The SUMMARY SCORING SHEET (displayed at the end of this document) indicates which tasks are scored for which factors. The user simply adds the scores in the factor columns for the total factor scores. These individual factor scores can be compared to normative tables which can be developed locally.

The measure is design to yield a set of scores -- a profile that can be used in identifying strengths and weaknesses. A total score is possible, however the user must convert each total factor score to a standard score and compute an average standard score across the four factors.

## Reliability and Validity

Reliability and validity data have been collected in a number of studies (Webster 1983, 1987, 1988, 1990 and Swanner, 1985). MCTM has also been used in a study of cognitive style by Schmidt and Sinor (1986). In terms of inter-scorer reliability for the factors of MO and MS, coefficients range from .53 to .78 with an average of .70. Internal reliability, measured in the form of Cronbach Alpha coefficients range from .45 to .80 with an average of .65 (.69 for the most recent version). Test-Re-test reliability indicates a range between .56 and .79 with an average of .76.

Content validity was established with a panel composed of music educators, composers, and psychologists which met on four different occasions to review the measure, audit pilot tapes, critique scoring procedures, and offer suggestions for improvement. To help establish construct validity, the scoring factors from the first administration of the measure in 1980 (Webster, 1983) were studied to determine feasibility of factor reduction. Factor analysis showed each factor significantly contributed to two global factors which represented the theoretical existence of convergent and divergent thinking. Continued study of the factor structure is represented by work by Baltzer, 1990 and by Webster, 1990. Some empirical validity exists in the form of significant correlations between music teacher ratings of divergent thinking and scores on the MCTM, although this has not been investigated extensively. All of the studies have shown a lack of correlation between measures of music aptitude and the MCTM, thus establishing a certain inverse validity.

## References

- Baltzer, S. (1988) A validation study of a measure of musical creativity. *Journal of Research in Music Education*. 36 (4), 232-249.
- Baltzer, S. (1990) A factor analytic study of musical creativity in children in the primary grades. *Dissertation Abstracts International*. 51 (07), 2306. (University Microfilms No. 90-29114 ).
- Schmidt, C. & Sinor, J. (1986). "An Investigation of the relationships among music audiation, musical creativity, and cognitive style," *Journal of Research in Music Education*. 34 (3), 160-173.
- Swanner, D. (1985). Relationships between musical creativity and selected factors including personality, motivation, musical aptitude and cognitive intelligence as measured in third grade children. *Dissertations Abstracts International*. 46 (12), 3646. (University Microfilms No. 86-01941)
- Webster, P. (1983) An assessment of musical imagination in young children. In Tallarico, P. (Ed.) *Contributions to Symposium/83: The Bowling Green State University Symposium on Music Teaching & Learning*. (pp. 100-123). Bowling Green, Ohio: Bowling Green State University.
- Webster, P. (1987) Refinement of a measure of creative thinking in music. In C. Madsen and C. Prickett (Eds.), *Applications of Research in Music Behavior* (pp. 257-271). Tuscaloosa, Alabama: The University of Alabama Press.
- Webster, P., Yale, C. & Haefner, M. (1988) Test-retest reliability of *Measures of Creative Thinking in Music* (MCTM) for children with formal music training. Unpublished paper presented at the MENC National Conference, Indianapolis, Indiana.
- Webster, P. (1990) Study of internal reliability for the *Measure of Creative Thinking in Music* (MCTM). Unpublished paper presented at the MENC National Conference, Washington, D.C.

(more recent studies from other researchers available on request)

SCORING GUIDELINES PARTS I AND II  
*Measure of Creative Thinking in Music*

SUMMARY SCORING SHEET

TASK	Musical Extensiveness (ME)	Musical Flexibility (MF)	Musical Originality* (MO)	Musical Syntax* (MS)
1 Rain Bucket		_____		
2 Elevator		_____		
3 Truck		_____		
4 Robot Song	_____	_____	_____	
5 Talking Blocks (Responses)	_____	_____	_____	
6 Talking Blocks (Stimuli)	_____	_____	_____	
7 Frog Music	_____	_____	_____	_____
8 Space Pictures	_____	_____		
9 Space Voyage	_____	_____	_____	_____
10 Free Composition	_____	_____	_____	_____
<b>Raw Totals</b>	_____	_____	_____	_____
Standard Score	_____	_____	_____	_____
	Standard Score Average _____			

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\*If more than one judge is used, enter average rating for each task