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PREVIEW

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**The role of music aptitude, fine motor skills, coding ability,
behavioral characteristics and academic achievement in
predicting achievement in instrumental music**

Stancarone, Michael, Psy.D.

Pace University, 1992

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PREVIEW

**THE ROLE OF MUSIC APTITUDE, FINE MOTOR SKILLS,
CODING ABILITY, BEHAVIORAL CHARACTERISTICS AND
ACADEMIC ACHIEVEMENT IN PREDICTING ACHIEVEMENT IN
INSTRUMENTAL MUSIC**

by

Michael Stancarone

**A Doctoral Project Submitted in Partial Fulfillment of
the Requirements for the Degree of Doctor of Psychology
in the Department of Psychology at Pace University**

NEW YORK

1992

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PREVIEW



PSYCHOLOGY DEPARTMENT
PSY.D. PROJECT
FINAL APPROVAL FORM

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Coding Ability, Behavioral Characteristics
and Academic Achievement in Predicting
Achievement in Instrumental Music

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ABSTRACT

The purpose of this research was to investigate the efficacy of selecting students for participation in string instrument instruction based on their performance on three categories (sets) of variables, i.e., aptitudes, behavioral/attitudinal characteristics and academic achievement.

The 114 participants, from three public elementary schools, were string players who had from one to four years experience playing their instruments (violin, viola, cello). The aptitudes measured skills that were directly related to playing a musical instrument. This set consisted of a music aptitude test (Measures of Musical Abilities), a visual-motor test (Coding, from the Wechsler Intelligence Scale for Children), and four fine motor tests (Fist/Edge/Palm, Placing Pennies in Box with Preferred Hand, Tapping Board and Finger Tapper). A second set of predictors consisted of the Motivational Characteristics subscale, from Scales for Rating the Behavioral Characteristics of Superior Students, and a report card grade of conduct. The third set consisted of a standardized academic achievement test (SRA) and a report card grade of academic achievement.

The results of correlating these 10 predictors

with string playing ability were that the academic achievement test and music aptitude predicted best ($\underline{r} = .47$ and $\underline{r} = .46$ respectively). Of the three sets, the aptitude set predicted best ($\underline{R} = .59$). The combination of the aptitude and academic sets yielded the highest overall prediction ($\underline{R} = .67$). The behavioral/attitudinal set made no contribution to the prediction. The most parsimonious set (music aptitude, Coding, Finger Tapper, achievement test, report grade of achievement) predicted as well as the 10 variables combined. This set improved prediction 76% when compared to the informal criteria in use in the schools prior to this study. Cross-validation procedures suggest that the results may be generalizable to other samples.

The value of this research is in the improved selection of students for the study of a string instrument. When the selection process is based on those characteristics that enable a student to sustain musical growth--and thus sustain commitment and motivation--then that process is likely to be objective and equitable. This would increase the likelihood that valuable educational resources are made available to the children who are entitled to them, and, who would benefit most from them.

CHAPTER 1

Introduction

Overview

The selection of students for participation in instrumental music has always been a problem for teachers. The techniques used have run the gamut from "raise-your-hand-if-you-want-to-play" to standardized tests and multiple regression procedures. Yet, in spite of over 60 years of research into the question, the drop-out rate is estimated to be 55% for band instrumentalists and 80% for string instrumentalists (Colwell, 1986). A percentage this high suggests not only that children without musical giftedness (i.e., low performance potentiality in the area of music) have been selected for participation in programs requiring giftedness, but that there are many children who might have negative feelings about themselves and their musicality as a result of being unsuccessful in the study of music. And when non-gifted children are selected for participation in instrumental music, it may be at the expense of the genuinely gifted, some of whom will be deprived of the only opportunity in their lives to explore their musical endowment. Current estimates indicate that 40% of all the gifted--not just

the musically gifted--are not identified and are never given the appropriate education to which they are entitled, and which, for some children, is so essential for the development of their self-esteem.

The United States Office of Education is a strong advocate of programs for the gifted, and recognizes these children as members of a minority group that needs--and is entitled to--special help. Thus, the term "special needs" is not limited to the domain of the learning disabled or emotionally handicapped (as it is frequently applied), but rather, is intended to include the gifted. This position represents the first step in educating the gifted, i.e., acknowledging that they do indeed have special needs.

The second step in providing appropriate education for these special students is to identify them. This process of identification has been more successful in targeting children with educational deficiencies than with the gifted. The problem takes on particular significance with regard to the minorities who are, typically, underrepresented in gifted programs, in spite of the fact that giftedness distributes itself similarly in all groups regardless of ethnicity, socioeconomic status and other background factors. One reason for the failure to identify the gifted has to do

with a selection process that is usually based on IQ and academic achievement tests. Unfortunately, these measures cannot detect giftedness in the areas of the fine arts, creativity and leadership. They are particularly biased against the gifted who are poor, underachieving or of minority status, since these children traditionally do not do as well on such tests as their peers.

The purpose of this research was to investigate the efficacy of selecting students for participation in string instrument instruction based on their performance on three categories of criterion measures. The first category consists of three aptitudes that are directly related to instrumental music-making:

(1) music aptitude--the capacity for achievement in music that is dependent on the "ability to structure acoustic material" (Karma, 1983); (2) fine motor ability--those skills involving the small muscle systems of the fingers, hands and arms (McCarron, 1982), and which are necessary for the physical manipulation of a string instrument; and (3) coding ability--the capacity to learn combinations of symbols and shapes and to translate the symbols into motor activity (Sattler, 1982), a task essentially similar to music reading. The second category of predictors

consists of two behavioral/attitudinal variables: achievement motivation and classroom conduct. The third category of predictors is academic achievement and consists of a report card grade and performance on a standardized achievement test.

Literature Review

Identification of the Gifted

There are many definitions of giftedness. The one presented here is used in P.L. 97-35, the Education Consolidation and Improvement Act, passed by Congress in 1981.

Gifted and talented children are now referred to as, "children who give evidence of high performance capability in areas such as intellectual, creative, artistic, leadership capacity or specific academic fields, and who require services or activities not ordinarily provided by the school in order to fully develop such capabilities," (Sec. 582)

Each of the individual states also has a definition of giftedness which, more or less, incorporates the main components of the federal definition. For example, New York's definition adds that the gifted should be identified by a professionally qualified person, that the gifted should be helped to realize their contribution to self and society, and that the ability in the specific talent area may be either demonstrated and observable, or a

potentiality (Clendening, 1980). Many of these regional definitions limit giftedness to children who are in the top 5% on some standardized measure, although a range from 1% to 20% is common.

These various definitions of giftedness contribute to some of the confusion in the field regarding who is entitled to services. From the early 1900's, terms such as "gifted", "prodigious child", "supernormal", "creative", "bright", and "genius" were used interchangeably. The confusion continues to this day since there isn't even agreement on the definition of the terms "talented" and "gifted", although many use them synonymously. For example, Rickert's (1982) examination of the literature identified a variety of distinctions in the use of these two terms:

- (a) "talent" is a lesser form of giftedness, i.e. not quite gifted;
- (b) "giftedness" refers to superior ability already manifested, whereas, "talent" is the potential for superior ability;
- (c) "giftedness" is applied only to general intellectual ability (as measured by an IQ test) and "talent" refers to all the other specific talents.

Henson (1976) used the terms in yet another way: "gifted" indicated above-average performance in many areas; but "talented" was limited

to above-average performance in a one specific area, while other areas might be average or below-average.

Regardless of which term is used, there is, for the most part, some agreement on the specific areas or categories of giftedness/talent. They are (a) general intellectual ability, (b) specific academic ability, (c) creativity, (d) leadership, (e) and visual and performing arts. Clark (1983) stated that creativity is not synonymous with giftedness, as is commonly believed, but rather, is the highest expression of giftedness. She further stated that tests that measure creativity are not valid measures of artistic and musical talent thus suggesting that a talent in the visual and performing arts can exist without a specific creative ability. Renzulli (1978), however, viewed creativity not as a specific area of giftedness, i.e., a subcategory of giftedness, but as a necessary component of giftedness.

Clark (1983) was concerned with whether or not the tests and procedures to identify gifted children were valid measures of the skills being tested. Maker (1983) also questioned the validity of some of the tests and stated that they should be standardized on populations that are representative of the economic, racial, and cultural groups being tested. This would

insure that these groups will not be underrepresented in gifted programs. Reis (1989, p.403), in her review of the literature, was critical of some of the methods used to identify gifted children, stating that "many are ineffective, incorrect and downright ridiculous."

Rickert (1982, p.181) warned that "the danger in using any single approach is always in reducing giftedness to what one instrument or procedure can measure." School psychologists surveyed by Klausmeier (1987) reported on the inadequacy of relying on IQ and academic achievement to identify giftedness and recommended the use of non-academic measures. Early researchers have also encouraged the use of non-test means in the identification process (Torrance, 1962). Sprecher (1963) suggested looking beyond traditional tests and advocated an assessment of the work habits of the child. Renzulli (1976) believed that certain behavioral characteristics of the child might be indicators of giftedness. He developed an observer-rating instrument which included an assessment of a child's achievement motivation, a frequently observed behavioral characteristic of the gifted child. Reis (1989) also shared Renzulli's concern for the inclusion of a measure of achievement potential in any test battery attempting to identify giftedness. She stated

that an identification process that only assessed actual achievement, and excluded potential achievement, was a distortion of the federal definition of giftedness.

Prediction of Achievement in Music

Rubenzer (1979) suggested a multi-modal identification model consisting of teacher and peer recommendations, past performance, observations, and standardized tests in each of the talent areas. In the talent area of music, the standardized test that was almost exclusively recommended was a measure of music aptitude. Karma (1982, p.24) stated that a good test of music aptitude should correlate with music achievement at around .70, thus, "...in a nonselected sample, approximately half of the progress in music studies can be attributed to musical aptitude." His subsequent explanation for music aptitude being only a minor factor in the prediction of music achievement in several studies is due to the restricted range of the subjects since most are music students, and "when the variance of a variable is diminished, for instance by selection, its correlation with other variables becomes smaller" (Karma, 1983).

In spite of the disagreement about the relative merits of various measures to predict music

achievement, most music researchers (e.g., Manor 1950, Rainbow 1965, Whellams 1970, Young 1971, Hufstader 1974, Webber 1976, Radocy 1979, Hedden 1982) recommended non-musical variables in conjunction with a music aptitude test. They have suggested various combinations of the following variables to predict music achievement: intelligence, academic achievement, socioeconomic background, home environment and experience, interest in music, resourcefulness, self-discipline, personality, motivation, industry, perseverance, and motor abilities.

Karma (1983), although acknowledging the importance of non-musical variables in music achievement, did not value them as part of the selection process because of their psychometric inadequacy. This absence of valid and reliable measures of the non-musical predictor variables can readily be seen in the area of motor testing. Although many studies consider motor skills an important predictor, there is little or no information on how to measure them, even in current books on measurement in music. For example, Boyle (1987, p.142) stated that "physical coordination obviously is relevant to playing certain instruments, but motor skill assessment is beyond the scope of this text." And Pizer (1987), in

his "how to" book on assessment in music, recommended that prospective music students be tested on specific motor tasks, yet he did not give detailed administration information, or feel that the use of norms was important, nor did he indicate where the suggested apparatus could be purchased.

Measurement of Music Achievement

In contrast to a music aptitude test which measures learning potential, a music achievement test measures how much has actually been learned. Any blurring of this distinction between aptitude and achievement will result in a measure without validity. Gordon (1987) states that most persons are unable to distinguish between music aptitude and music achievement. Karma (1982) feels that even some standardized tests reflect the confusion between aptitude and achievement, especially aptitude tests which inadvertently measure achievement. These tests produce high validity coefficients because "achievement is predicted with achievement."

One type of music achievement measure is the standardized test, designed to assess the direct results of classroom teaching (Warnick, 1985). Although such tests are based on the objectives of the curriculum found in a non-instrumental, general music