THE MUSICAL DEVELOPMENT

OF CHILDREN AGED

SEVEN TO ELEVEN

THESIS

submitted for the
Degree of Doctor of Philosophy
in the University of Southampton

by

SAM TAYLOR

April 1969

ABSTRACT

FACULTY OF EDUCATION

EDUCATION

Doctor of Philosophy

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The Melodic, rhythmic and harmonic aspects of musical ability were selected for study, together with certain aspects of the formation of musical taste. Several trends were investigated, including development with age, differences between boys and girls, relationship to verbal reasoning, and the influence of instrumental and special choral experience.

Three short tests were constructed and tape-recorded for the study. The Music Responsiveness Test consisted of a battery of three subtests, melody, rhythm and harmony, and measured simple sensory discrimination in a musical setting. The Music Discrimination Test measured ability to discriminate between correct and distorted versions in a complex musical setting, an ability related to music appreciation. The Music Preference Test examined children's relative preferences for the musical idiom of six stylistic periods. Over 3000 children were tested and the tests proved reliable and valid for the purpose of the study.

Results revealed that those aspects of musical ability tested developed with age, and that girls were superior to boys where the musical setting was simple,

as in the Music Responsiveness Test. For the majority of children there was strong harmonic development around the age of nine.

In a complex musical setting like the Music Discrimination Test, boys scored as well as did girls. There was only a moderately low correlation between the aspects of musical ability tested and verbal reasoning. Instrumental experience was beneficial to all aspects of musical ability tested. Choral experience led to enhanced development of the melodic aspect of musical ability.

Stronger musical preferences emerged with increasing age. Boys and girls had widely differing musical tastes. The preferences of the instrumentalist category were much stronger than those of non-players. Musical development seemed to be related to the quality of early musical experience, particularly to instrumental experience.

ACKNOWLEDGEMENTS

The writer would like to express his gratitude to Professor P.A. Evans for early encouragement, to Mr. S.F. Goodyear whose work provided much food for thought, to Mr. D.C. Brown of the Department of Music, University of Southampton, who has given sterling help and advice at all stages in this research, and to Professor J. Wrigley whose constructive suggestions and practical guidance have been of great value.

He wishes to thank members of the audio-visual centres of Dorset County and the College of Education, Weymouth, for making their resources available to him.

Thanks are due to the heads, staffs and children of the many Dorset schools for their friendly cooperation in the testing programmes, and also to the head and boys of St. Paul's Cathedral Choir School, London, for their help with test validation.

The writer is deeply indebted to Miss. E.M. Nicholas, Mr. J. Fell, Dr. J.S. Pyett, Mr. A.L. Flay and Messrs. M.A. and N.V. Taylor who gave their time and musical expertise to the preparation of test material.
Sincere thanks are also due to Mr. M.A. Taylor whose help with work on statistical analysis and the preparation of graphs lightened the writer's burden.

Finally, the writer would like to acknowledge his debt to his wife, whose patience, understanding and hard work behind the scenes greatly facilitated the carrying through of this research.

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A Master Tape containing all three tests will be found in the back pocket of this Thesis, together with samples of test leaflets.

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CHAPTER 1

INTRODUCTION

For our Western culture, the transformation from being a static-minded society into one that accepts change as the norm has been a long and painful process. Yet such a change of heart has been forced on the Western world by technological advances which have brought in their train higher standards of living and the introduction, in quick succession, of a flood of inventions; these have revolutionised our way of living, and are continuing to do so.

Musical resources have been enormously extended, creating a situation which is fraught with exciting new possibilities for the fuller achievement of children's musical development. The place of music in our Western community is assured as one of the major cultural activities permeating and influencing life at every point. Today all sorts of children are playing all sorts of musical instruments in schools. Progress is uneven and there continue to be schools where the musical education of children is appallingly poor. Yet, where progress has been made, there is the danger of our becoming conditioned to accepting change uncritically, without ensuring the safeguards of adequate research so necessary as a guarantee of the educational value of each proposed innovation.

The problem today is to select those forms of music education which will lead to the most comprehensive musical development of the children in our schools. To understand the present position better, we should first glance back through the last century or two to survey children's musical opportunities in the English schools of a very differently-structured society.

Music Education in the Past

A small minority of scholars has, for more than 200 years, been privileged by circumstances to learn the piano and other musical instruments, thereby gaining some familiarity with the wide field of instrumental and orchestral music, but the great majority has not been so favoured. During the eighteenth century the custom of singing oratorios, particularly in the new industrial districts of the north of England, had led to some instruction in music (singing) being included in the curricula of many schools, for the poorer as well as for the wealthier classes.

By the mid-nineteenth century, the tonic solfa system had ushered in a new era of musical progress, and many schools were using this method which aimed at producing a modest level of musical literacy for the ordinary child of the poorer classes, not favoured by circumstances to have access to instrumental resources. This was a method which involved minimum cost and the minimum of apparatus. Inevitably, elementary schools became preoccupied with the challenge of musical literacy to the point at which interest, and indeed musicianship, flew out of the window to be replaced by arid theory and soulless exercises, with a consequent narrowing of the music curriculum.

Seeds of Progress - Instrumental Music in Schools

Right at the end of the nineteenth century, limited numbers of toy percussion instruments were made available to maintained schools in a few favoured areas, and selected children were drilled orally to form percussion bands. However, it was not until the nineteen-twenties that better percussion instruments were introduced into schools; this innovation was allied to rhythm part-reading, and constituted an accompaniment to the finest music. In this respect we are indebted to Ernest Read and Stephen Moore for their pioneering work, and particularly for their emphasis on reading music in parts as an essential aspect of group playing.

With older pupils there was an attempt to select 'gifted' or 'talented' children for special instrumental tuition. Because of this need , there arose a demand for some kind of test which would be capable of predicting musical talent accurately so that unmusical children could be weeded out and the musical given the special training they deserved.

For the majority of children, school music meant singing in large groups with virtually no attempt at inculcation of musical literacy, with no pupil choice and little pupil responsibility. These large groups of children were entirely directed by the teacher, rarely was music provided, and sometimes not even the words were made available.

Here, then, was a choice of two methods of teaching music: (a) to the individual child via private vocal or instrumental tuition, and (b) to the school class, double class, or even larger group - hymn practice with the whole school is still by no means uncommon - where drilling by mechanical rote methods is the rule. A very occasional school might be the proud possessor of a small orchestra during the nineteen-thirties, but this was exceptional in the English elementary school system.

There were, however, the seeds of progress discernible in a series of events during the late nineteen-thirties. Arnold Dolmetsch had begun manufacturing recorders of fine quality. Edgar Hunt had already started the pioneering work that was to lead to the widespread acceptance of the recorder as a school instrument, and Edmund Priestley had produced a recorder tutor which made it possible for a teacher to direct instrumental groups in a progressive scheme aimed at stimulating the average child.

The Development Approach[1]

In recent years, many English schools have been developing a new approach to music education, making use of a variety of musical instruments and giving more choice and responsibility to individuals. Included in this new approach was the opportunity to combine in groups of various sizes, leading to a more flexible approach.

Freda Dinn, Doris Gould, Margaret Murray, Avril Dankworth and many others have popularised the making of homemade tuned and untuned percussion instruments in schools, and this has led in many instances to a more creative approach to school music with younger children. The introduction of chime bars in the past twenty years led to further possibilities for variety in music making, showed future potential uses for pitched percussion in schools.

There had been inadequate toy glockenspiels on the market for many years, but it needed the inspired work of Carl Orff to secure the introduction of authentic, high-quality instruments into schools, together with a well-graded system for combining a variety of instrumental resources in a new creative approach to music making in schools. Today there are such glockenspiels and xylophones in many primary schools, and the only limiting factor is the considerable cost of such fine instruments.

A second type of pitched percussion is that where strings replace the resonating bars. The Ronald Roberts Exeter-designed instruments, ranging from string bass to chordal dulcimer, and based on medieval models, are particularly useful for adding further variety to music making. They are also very straight-forward to construct

1. See definition on page 20

on a 'do-it-yourself' basis. With many of these string percussion instruments there is the choice of plucking or striking with felt-headed hammers.

The tuning process itself is excellent pitch training for children. To the foregoing types of pitched percussion could well be added the guitar, whose portability makes it an admirable alternative to the much less movable piano for many purposes. The guitar is quite suitable for use with all types of percussion, recorders and voices, and lends itself readily to informal methods of music making. The writer has seen the guitar used most successfully in the contexts just mentioned, by many students and younger teachers. It fits very effectively into the developmental pattern of approach to school music making. (see page 20)

Pre-1939, there had been a vigorous bamboo pipe movement in many schools. The excitement of making one's own instrument tended to be offset by the length of time this process took, and by the immense difficulties of tuning during the hole-boring part of the operations, and this so often led to frustration and disappointment.

In the immediate post-1945 period, several varieties of cheap descant recorders, many of very poor quality, flooded the market, and were introduced into schools by, on the whole, badly trained teachers. This led to early enthusiasm for mass playing; however, inadequate teaching methods with unsatisfactory instruments inevitably precipitated a negative reaction and a consequent, but only temporary, decline in interest in this method of music making.

More recently, the introduction of better instruments and the ready availability of the larger sizes of recorders, trebles, tenors and basses, has given a new lease of life to the recorder movement in schools.

Better and more flexible methods of teaching have led, in many instances, to the introduction of playing in parts, using both the small and the large group form of organisation. With a wider range of more suitable music available, though this is still pitifully inadequate, young children of widely varied experience and ability are happily making music together, playing in two, three four and even five parts.

Schools Broadcasts

One of the original aims of music broadcasts to schools was the provision of some form of musical experience for children whose teachers felt unable to provide this experience directly themselves because of their lack of musical expertise. Once started, many of these broadcast series proved immensely popular. There has been an extension and broadening of the aims of existing series, and new programmes have been introduced specifically to develop instrumental ensemble playing, to provide added variety within the classroom situation and to give opportunities for improvisation.

Many teachers felt competent enough to follow up these broadcasts, even though lacking the confidence to initiate such work themselves. So, the radio or television teacher, armed with all the resources that broadcasting is able to provide, has been able to supplement the classroom teacher's limited ability, and has brought the possibility of modern techniques of music teaching with the added spur of high motivation into a very large proportion, perhaps even the majority of our schools.

What justification can there be for the tacit assumption in so many earlier research workers' minds that instrumental music is the exclusive province of the 'musically-gifted' child? Can such an assumption any longer be tenable in the face of such developments as have just been outlined? Instrumental music has not just been introduced to children whose ability approximates to the average; such methods of music making are becoming increasingly common amongst children of deprived home environment and limited intellectual ability also - delinquent boys in Approved Schools, with very limited attainment, children on the fringe of educationally-subnormal classification, and children who could be classed as 'monotones' are all succeeding, where opportunities are being provided, with instrumental work.

What does this mean in terms of children's musical development? Do such methods really lead to what J.L. Mursell (1948) calls [1]'developing a better and better grasp of the inner living essence of music'? Do they lead to enhanced development of responsiveness to the tonal and rhythmic pattern - to a finer and more discriminating appreciation of the beauty of music? Surely the answer is 'yes' and it would seem that the business of music education should be first and foremost to develop these qualities.

Musical Literacy

All analogies are imperfect to some extent, but it is worthwhile examining the analogy to language development. Here, the continuing growth of reading ability, the progressive mastery of literacy occupies a central place in the development of the thinking process and the growth of the ability to reason verbally. Growth of verbal concepts, development of verbal ability in its four broad aspects of listening and speaking, reading and writing is a prerequisite for the optimum development of intelligent thought.

Writing and even copying music, but in particular

1. Education for Musical Growth-1948-J.L.Mursell-page 5

attempting simple composition, form an important kinaesthetic mode of learning to read staff notation. This makes a parallel with the kinaesthetic benefits to mastery of reading literacy which are derived from writing, both copying and free original composition.

We have another parallel in the definition of writing as coding speech, and reading as forming the decoding process; this applies equally in the field of musical sounds which can be coded in the form of staff notation, and then decoded on performance.

The analogy can be carried a stage further when thinking of the need for transition from the 'look and say' method of reading in the early days of learning to read, on to some other method enabling independent analysis of the anatomy of a word, some form of phonic approach which enables the child to begin word learning without having t0 be told the sound which the written form represents. There comes a stage in learning instrumental music when the child begins to analyse the music in front of him, and from that point onwards in a child's musical progress, there are visual cues which more and more begin to supplement his memory.

It would seem then that, as with reading words, and attaining fluency with his own language, growth in musical literacy could be the key to continuity of development in many fields of music. The probable chances are that, without the ability to supplement memory with the visual cues of staff notation symbols, growth of responsiveness, discrimination and appreciation would be subject to frustrating handicaps - would in fact be subject to the limitations of memorisation, in the same way as with a person unable to read his own native language.

The ability to read music reasonably fluently, and perhaps even write it, are beneficial to the understanding of its literature. Moreover, it is increasingly being recognised that the best approach to musical appreciation in schools is through the child's activities as a music maker or performer. This does not detract from the importance of the more passive approach where the child's role is that of listener. He needs to have frequent experience of listening to, and perhaps seeing, the finest performances, in and out of school.

Musical Appreciation

For an overwhelming percentage of mankind, the enjoyment of music is an integral part of life. We grew up in a cultural environment which subjects us to a variety of musical experiences. We develop musical tastes and preferences. We grew in our ability to discriminate and appreciate musically. Do variations in the pattern of our musical activities, within this culturally-determined environment, have any effect on our musical preferences? How far does increasing participation in music making as a member of an instrumental group, with its implied growth towards increasing mastery of staff notation reading - towards musical literacy - affect a pupil's ability to discriminate and hence appreciate music?

Let us return to the point made at the beginning of the chapter about the new challenging situation in schools today. Let us look especially at the position in primary schools where an enrichment of the musical environment has been brought about in many instances through the provision of a wide variety of musical instruments.

There have been recent demands from conferences of music teachers in many countries for a reappraisal of the whole concept of music teaching in schools. For example, the Music Supervisors' National Conference in the U.S.A. has produced a 'Child's Bill of Rights in Music'. This includes the graphic phrase [1]'Every child has the right to

1. Quoted from 'The Psychology of Musical Ability' Rosamund Shuter - Methuen 1968 page 247

make music through being guided and instructed in singing, in playing an instrument, and, as far as his powers and interests permit, in composing'.

Such demands have been linked with claims that not enough progress is being made, and where there is progress, this tends to be very uneven. A great deal more could be done to stimulate and develop sensitivity, appreciation and performance amongst the great bulk of the population. Three commonly expressed queries are summarised below;

(a) How far does instrumental experience lead to enhanced responsiveness to music?

(b) What influence does musical experience have on a pupil's ability to discriminate between different qualities of musical performance?

(c) To what extent does musical experience affect the pattern of an individual's musical preferences?

Aims of the Research

It seemed necessary at the outset to limit the aims of the projected investigation, both as regards the age range to be tested, and as regards the number of aspects of musical development to be studied. There was no intention to make this a predictive study; the thesis was to concentrate on assessment of present musical ability in a specified age range of children - in other words, a cross-sectional study was the aim. From the test data obtained it was hoped to elicit certain trends where the variables would be age, sex, intellectual ability, and instrumental and choral experience.

The writer concluded that it was advisable to leave out of his categories for testing by hypothesis certain specified types of instrumental experience. During extended periods of supervision of students in a very wide range of schools, he found that certain types of musical instruments, eg percussion and pitched percussion, were, when purchased by a school, made available to all children, in rotation, in the classes where they were used. So, because all children had access to these percussion instruments, it was not possible to separate out categories of instrumentalists and non-players in the classes involved for these particular types of instruments.

A further reason for the omission of pitched percussion experience from the defined category of instrumentalists was that such experience need not lead on necessarily to the mastery of staff notation, to musical literacy, at any rate not without some other kind of instrumental experience.

However, for the young pianist, recorder player, string, woodwind or brass player, a very different picture presented itself. Here was the specific lesson situation, organised on a systematic and progressive basis. There was also the purposeful and continuing development of instrumental techniques. Above all there was the definite beginning to the reading of staff notation - the problems of musical literacy began to be progressively mastered.

C.W. Valentine (1962) stated: [1]'No appreciable preference for concords before discords is discernible before the (average) age of nine, but at this age a marked advance takes place'. This is an age in which this study will take a great deal of interest. The implications of the quotation for harmonic development were also of great interest to the writer.

A further quotation from R.G. Petzold (1966) was of particular interest also: [2]'The differences between boys and girls in terms of the auditory perception of musical

1. 'The Experimental Psychology of Beauty'
   C.W. Valentine - 1962 p.217
2. 'Auditory Perception of Musical Sounds by Children in the first six Grades' R.G. Petzöld, University of Wisconsin - 1966 Page 253

sounds, appears to be related to the nature of the task'. Petzold went on to outline the musical tasks where girls showed superiority and those in which his research revealed approximate equality of boys' and girls' scores. He also demonstrated how, for the first group of musical tasks, the superiority of girls increased through the grades tested.

So, having decided upon the early and crucial issues - which age groups should be tested, and which musical tasks to select, it now remained to formulate a series of questions in such a way as to make them capable of conversion into hypotheses for statistical purposes. It followed that some tests would be needed, and these would either have to be obtained in a ready standardised form or else devised especially for the purposes of the research. It was also apparent that these tests must be capable of supplying the data from the chosen sample population in a form suitable for statistical analysis, and enabling the eliciting of significant trends.

This is a field of investigation that has, as yet, been little explored. Most researchers had previously concerned themselves with older pupils and had been prognostic in aim, dealing mostly with the selection of students whose revealed musical ability would ensure that they were capable of profiting from advanced musical studies.

The present study does not claim to be exhaustive in content, not to survey the whole field of children's musical development. The age range from seven to eleven years was selected for the testing programmes, and the following groups of questions refer to this age range.

Questions to which this Study seeks Answers

Group A

1. What is the rate of development of the melodic,

rhythmic and harmonic aspects of musical ability through the chosen age range?

2. Is there any significant difference between boys and girls in the development of these aspects of musical ability?

3. Is there any significant association between these aspects of musical ability and verbal reasoning ability?

4. Is there any significant intercorrelation between the melodic, rhythmic and harmonic aspects of musical ability?

5. Does instrumental experience have any significant effect on the development of these aspects of musical ability?

6. Does special choral experience have any significant effect on the development of these aspects of musical ability?

Group B

7. How far does ability to discriminate between correct and incorrect versions of a piece of music develop through the chosen age range?

8. Is there any significant difference between boys and girls in their ability to discriminate between correct and defective versions of a piece of music?

9. Is verbal reasoning ability significantly associated with the ability to discriminate between correct and defective versions of a piece of music?

10. Does instrumental experience exercise a significant influence on the ability to discriminate musically?

11. Does special choral experience exercise a significant influence on the ability to discriminate musically?

Group C

12. How do children's musical preferences change with age through the chosen age group?

13. Is there any significant difference between girls' and boys' musical preferences?

14. Do children's musical preferences bear any relation to their verbal reasoning ability?

15. When comparing the musical preferences of children who have had instrumental experience with those who have not, do any significant differences emerge?

16. When comparing the musical preferences of children who have had special choral experience with those who have not, do any significant differences emerge?

The first group of questions, Group A, was framed to enable investigation of the first, more sensory-based part of the research. These questions were concerned with responsiveness to the melodic, rhythmic and harmonic aspects of musical ability, perception of differences in a musical setting, and a simple choice based on their ability to discriminate musically. A battery of three 15-item subtests was developed to produce data from a large representative test sample.

For the second group of questions, Group B, a test was needed which would examine a child's ability to discriminate between correct versions of a short piece of music and versions into which errors of pitch, melody, rhythm and harmony had been selectively introduced. Thus, a much more complex musical situation was created than that required for Group A, where ability to discriminate was confined to one aspect of musical ability at a time, in separate subtests.

This second part of the research was envisaged partly as a follow up to the work on music responsiveness, and partly as the beginning of an investigation into aesthetic development in young children. The greater complexity of the twelve-item test devised for this second group of questions was due to several factors: (a) errors of pitch or melody, rhythm and harmony were introduced into every item, not divided off into separate subtests for analysis;

(b) the testee's task was not only to indicate the correct version, but also to indicate which versions he definitely knew contained errors - the defective versions; (c) where there was doubt in the pupil's mind, he was advised to make no mark in the test leaflet as wrong answers would be penalised. From this it can clearly be seen that complex sensory analysis and a longer memory span were involved in this task.

Measurement of some sort seemed possible for the purpose of finding answers to the third group of questions, Group C. Eventually, a test was developed to examine these trends in children's musical preferences; this test consisted of thirty short excerpts of music from composers belonging to six well-defined stylistic periods, presented in pairings; pupils were required to indicate which excerpt was preferred from each pair presented.

In all these test construction activities, the writer was able to draw substantially upon the experience of previous investigators, even though their aims and the age range of their test samples had differed widely from those of the present research. There were three linked testing programmes, each using one of the three tape-recorded tests developed by the writer specifically for his study, and with large representative test samples of children aged from seven to eleven years.

Definitions

This section deals with several expressions which occur repeatedly, with variations, throughout the study, viz - musical ability, aesthetic appreciation of music, creative ability in music, and development and maturation. The writer's use of these expressions may differ somewhat from the definitions laid down by other research workers, so it is proposed to examine in some detail the interpretation to be placed upon them in their context in this thesis.

Musical Ability

Such a wide variety of phrases have been employed in previous researches which have meanings somewhat similar to musical ability, that it seemed necessary to stick to the use of this phrase throughout, and give some explanation why it has been used in place of other variants. Aptitude, capacity and talent are expressions in common use in many earlier studies; these are words which, in the view of the writer, give undue emphasis to innate factors.

Where a study is concerned with prediction and the possibility of measuring this with some degree of accuracy, such phrases may be in order. However, this study is concerned with present assessment. It has a cross-sectional, rather than longitudinal design, and its aims are to draw implications from broad trends revealed by statistical analysis of data, and the data are obtained from testing large samples.

Musical ability then, seemed the right term to use in this type of study. However, to define this expression is by no means easy. Some research workers have defined it as though it were a unitary ability; amongst those who support such an 'essential oneness' are [1]Wing (1947), [2]McLeish (1950) and [3]Shuter (1964). Other research workers consider that we should be thinking in terms of musical abilities, and reasons for such views differ widely from one individual to another. For instance, [4]Seashore (1938) divides musical ability into several

1. Standardised Tests of Musical Intelligence.HD.Wing 1947
2. 'The Validation of Seashore's Measures of Musical Talent by Factorial Methods' Brit. J. Psychol. J.McLeish 1950
3. 'An Investigation of Hereditary and Environmental Factors in Musical Ability' PhD Thesis R.P.G.Shuter 1964
4. Psychology of Music C.E. Seashore 1938

sharply defined talents, whereas [1]Bentley (1966) speaks of its separate elements.

Such is the complexity of even one element, eg the melodic, that when we speak of musical ability we are referring to something of immense complexity. The writer views musical ability as one very complex ability, some of whose various aspects may be employed at any one time in any given musical task or behaviour. Though stages in the perception of music and its integration in the brain can be distinguished, each part seems to be intimately interconnected with the others, and thus any division seems arbitrary.

[2]Shuter (1968) presents an impressive body of evidence showing the importance of inherited factors in setting limits to the development of an individual's sensitivity for, and response to musical stimuli. Wide individual differences amongst children from similar environments lends support to this evidence.

However, we must not underestimate the predominant role of environment as a stimulant, as a means of developing sensitivity, in gaining a mastery of certain specific musical skills. There is no intention to start the 'nature-nurture controversy' hare; given the child in school, there is little we can do about nature, but there is much we can do to influence nurture through a deliberate structuring of the environment, so as to promote the best development of musical ability.

It is of practical importance to try to reach some estimate of how much musical ability can be improved by a favourable environment and efficient teaching. Policy decisions have to be made on how far music lessons should

1. Musical Ability in Children and its Measurement - A. Bentley - 1966
2. The Psychology of Musical Ability - R.Shuter - 1968

be available to every child, whatever his musical ability. If, as has been argued, musical ability (talent is the word often used) is largely innate, then it is not worthwhile spending too much time on the average and the ungifted. Perhaps as techniques for studying personality improve, we may better understand the connection between musical ability and other personality factors.

Aesthetic Appreciation of Music

It is stated by Shuter (1968) that [1]'a high degree of musical ability is no guarantee of a high degree of aesthetic appreciation'. From this it would appear that it is necessary to draw a distinction between these two - the extent of one's musical ability and the extent of one's ability to enjoy music aesthetically. From this we may presume to draw the conclusion that individuals not possessing even average musical ability may still enjoy a deep and sincere aesthetic experience when listening to music.

There is more than perception, understanding and technique involved - there is also emotional response to be considered. If there is no emotional response, the music is dead; there ought to be, particularly for young children, a feeling of pleasurable expectation, of challenging and worthwhile exploration and interpretation.

This does not mean that younger children, because of their more limited cognitive development, should not enjoy genuine aesthetic experience; they are also sensitive to the artistic quality of a piece of music. Aesthetic response involves some degree of perception of the music's qualities, its melody, rhythm, harmony or all three combined. Without some degree of perception of these qualities, aesthetic response would be diminished.

1. The Psychology of Musical Ability - Rosamund Shuter - 1968 - Page 224

One part of this study is concerned with finding the aesthetic response of children at different ages; another part is concerned with whether the responses of boys and girls differ in any significant degree. It also remains to be found out how far individual differences exist for aesthetic values in the same way as for other values.

Indications of emotional response to music may also be physiological, affecting heart beat, pulse rate, breathing, etc. Quite obviously, aesthetic response to a piece of music is largely conditioned by previous cultural experience. It follows therefore that it is an acquired response, and is a product of learning.

Creative Ability in Music

There is no evidence at the moment to show any relation between aesthetic appreciation and creative ability, but it is possible that such a relationship exists and may even be a close one. Also included under the umbrella heading of creative ability for the purposes of this study is interpretative ability where an individual or a group re-interpret a composer's intentions. To the writer this constitutes an important aspect of creative music making, perhaps even more important than some aspects of creative work in music which are being stressed at the present through television and other media; many of these latter aspects of creative music making seem to lead to no progressive mastery either of instrumental techniques or of musical literacy.

Artistic and sensitive re-interpretation of the finest music of our cultural heritage should surely rank as an important form of creative music making, and such work should not be sacrificed altogether on the altar of the kind of creativity which lacks continuity, and in fact may lead nowhere.

Maturation and Development

[1]Lundin (1967) stresses the importance of the rate of maturation in the growth of musical ability, and points out that this is a hereditary function. The present writer prefers the term 'development' to maturation, when it is growth of musical ability that is under examination. Development implies that the educator is active, is doing something - structuring the situation, enriching the musical environment, creating opportunities and providing incentives to stimulate learning.

Maturation has, in the writer's mind, an implicit meaning of 'wait until the child is ready', whereupon the educator decides to start the child upon a certain course of training, or moves the child on to a fresh stage. The more positive approach of actively stimulating development seems preferable when dealing with children's musical education.

1. An Objective Psychology of Music R.W. Lundin - revised 1967 Page 222

CHAPTER 2

REVIEW OF LITERATURE

This chapter concerns itself with a number of tests of musical ability constructed during the past 50 years which have a direct bearing on the aims of this research, and the techniques employed. It will examine the theories of the test constructors, and will also review critically literature relevant to these tests. Our starting point will be one hundred years ago - Germany in 1863 - to trace the origins of tests of musical ability.

Psycho-physical Experiments

Scientific interest in problems of auditory perception was enormously stimulated as a result of the researches of Hermann von Helmholtz (1821-94). Following a monumental study of optics, he turned his attention to acoustics. Working as a physiologist in Heidelberg he became interested in the mechanisms of hearing - in the essential sensory processes on which we depend for our auditory perceptual experiences. But he also made noteworthy contributions to the psychology of musical perception. He postulated that it is only as a result of our experiences - our interactions with the environment via our perceptions - that we build up musical concepts.

The originality of Helmholtz shows in his work on three specific problems of auditory perception - (a) experimental determination of the highest and lowest tones a person can discriminate, (b) the discovery that every note is associated with overtones which determine that note's quality and timbre, (c) his studies on the phenomena of 'discord' and 'harmony'. His work laid the foundations for nearly all future physiological and psychological research into the sensory processes and perceptual organisation.

The psychological workshop of Wilhelm Wundt (1832-1920) in Leipzig continued some of the work of Helmholtz, developing psycho-physical studies of hearing and attracting researchers of outstanding quality over many decades. But it was Karl Bühler of the Würzburg school of psychology whose writings emphasised the non-sensory character of many items involved in the performance of cognitive tasks. He laid stress on 'thought elements' which Wundt and Helmholtz had failed to take into account.

Charles Darwin (1809-1882) strongly influenced the future direction of musical ability testing by his emphasis on the dominating role of heredity. We are still today asking how much of our behaviour is organised by genetic and constitutional factors and how much of it is the result of learning, training and other environmental factors. Darwin believed that both are important, but that the psychologists of his day tended to neglect hereditary factors.

It was however Francis Galton[1] (1822-1911), Darwin's half-cousin, whose basic researches into individual differences made possible more precise evaluation of the results of musical ability testing. He singled out 'ability' as a subject for possible study, laying the foundations for psychometrics by his application of statistics to the measurement of human individual differences, and by looking for meanings behind behavioural variables. He demonstrated how psychometric techniques could be used in the construction and validation of psychological tests. Unfortunately,

1. Hereditary Genius - Francis Galton - 1869

Galton assumed a type of neurological mechanism which transmitted outstanding ability to future generations, and this led him to overemphasise hereditary factors and undervalue possible environmental factors in the development of abilities. His methods of systematising ranking through the use of the median and quartiles down to the finer grading of percentiles are the basis of a great deal of our descriptive statistical techniques today.

William James (1842-1910) made an important contribution to our present-day techniques of testing hypotheses.[1] Working in Harvard on the functioning of the nervous system as the basis of behaviour, he argued that cognitive functions are a refinement of the perceptual organisation of sensory stimulation. His rigorous techniques for handling empirical data, and his critical approach to classification and hypothesising helped to shape the future course of mental testing.

Our focus of attention has moved from Germany, via Britain, to the United States. J.M. Cattell (1860-1944) forms a link between these countries. His early training was with Wundt; later he moved to England as assistant to Galton; when he eventually took up residence at Columbia University, he devoted his career to investigating the possibility of constructing [2]'mental tests'. He was not concerned with theory but with basic skills and capacities. An administrator of outstanding qualities, he was able to build American psychology into a strong, well-organised integrated discipline.

1. The Principles of Psychology - William James - 1890
2. Mental Tests and Measurements - J.M.Cattell - 1890

J.M. Baldwin (1861-1934) was a colleague of Cattell. He investigated affective states and the role of emotion, a study important to the further development of the aesthetic aspects of musical ability.

In 1892 E.W. Scripture [1.] (1864-1945) took charge of the psychological laboratory at Yale. He also had worked with Wundt, and as a consequence his studies were weighted heavily in the direction of psycho-physical measurement. His researches in 'sensations of tone' were continued by his pupil C.E. Seashore whose work will be discussed in detail later in this chapter.

Gestalt Theories

Early in the present century a group of German psychologists working in Berlin were creating a Gestalt school of psychology. They developed the theory that the basic data of consciousness are structured at once by the human organism into dynamic 'wholes'. [2] Wolfgang Köhler (1887-1967) examined the perception of a melody. He stated that when we hear a melody we grasp a melodic form - a whole - which is much more than a sum of the constituent tones. The unitary character of the tune that we hear is not weakened by changes of key; nor is it destroyed by changes of tempo, rhythm or stress. This idea of perceptual 'wholes' being more than the mere sum of their parts was opposed to earlier psychological schools of thinking which had analysed experience into sensory elements connected by laws of association.

1. New Psychology - E.W. Scripture - 1898
2. Psychologische Forschung - Berlin - 1921

The older German psychologists of the Wundt period had restricted themselves to psycho-physical methods which usually involved measuring the degree of sensory elements such as pitch or intensity. The Gestalt school whilst maintaining the tradition of carefully controlled and measurable environmental variables, were interested in the totality of perceptual experience, for instance the 'whole' melody as a form or shape. This involved the study of response using new experimental designs and techniques. One widely-accepted generalisation emerging from Gestalt theory is concerned with remembering.

[1]'Remembering cannot be a simple isolated function of the brain. Like perceiving, learning and thinking, it is an abstracted aspect of a complex and dynamic activity involving the whole personality'.

In view of the fact that music is an activity occurring in and through time and involving memory at all stages, this statement is especially significant in that it emphasises the importance of Gestalt theory particularly where problem-solving, thought-provoking situations are concerned, as is the case in the test situation. Most test constructors subscribe to certain Gestalt principles.

Abilities and Factors

Charles Spearman (1863-1945) after earlier studies in Würzburg, Berlin and Leipzig, made the University of London a centre for psychological research in the early years of this century. His interests were varied, but included experiments with Primary School children - the five to eleven years age range - finding very high correlations between their marks in school subjects and

1. Pelican History of Psychology - Robert Thomson - 1968. Page 318

their sensory discrimination scores. Based on this finding he concluded that the significance of the correlation depended upon the weighting of a general factor common to all abilities. He postulated that each tested ability combined two factors, one being specific to that particular ability and the other being general, ie common to all abilities. From this basis he developed his two-factor theory, which he later modified to allow for group factors.

Spearman devised a type of mental test which necessitated very little writing, but consisted mostly of scoring by crossing out or underlining the correct answer from several alternatives.

Cyril Burt (1883 -) was a contemporary of Spearman and a critic of his two-factor theory. Burt did not subscribe to the theory that test scores measured a 'general factor disturbed by specific factors'. He regarded human ability as functioning at different levels - sensory-motor, perceptual, associative and relational.

[1,2.] Another determined critic of Spearman was L.L. Thurstone (1887-1955) of Chicago who introduced factor analysis into mental testing research. Early users of factor analysis claimed that they were isolating basic powers of the mind - that they were analysing primary source traits.

This view did not go unchallenged. Godfrey Thomson[3] argued that psychological laws were not involved but that the laws of chance enabled testers to analyse

1. The Measurement of Intelligence - L.L.Thurstone- 1925
2. Multiple Factor Analysis - L.L. Thurstone - 1947
3. Factorial Analysis of Human Ability - Godfrey Thomson - 1939

ability into a few common factors. In spite of doubts thrown on the validity of arbitrarily selecting a limited sample of ability tests and then making over-generalised claims for the discovery of factors by means of factor analysis of this limited sample, factor analysis has nevertheless continued to the present day as a method of supporting theories about the basic structure of abilities.

It might be useful at this point to examine one or two modern views on factors and factor analysis. Paul Farnsworth writes -

[1]'Certain of the statistically minded have attempted to answer the question of the generality of ability through recourse to tables of intercorrelations and the findings of factor analysis. They point out that most music tests now at hand intercorrelate very poorly indeed. Hence if it can be assumed that the tests are valid measures of musical capabilities, this evidence tells against the notion of a single musical ability'.

Farnsworth follows this up by looking at the limitations of factor analysis.

[2]'The factor analysts have tried to probe more deeply into the problem. Unfortunately the different methods of factor analysis now available are based on somewhat dissimilar philosophies and therefore do not always lead to identical conclusions. It is hardly an exaggeration to say that the English who are prone to believe in the existence of general factors tend to find them in almost every set of test intercorrelations, whilst the Americans with their different theories more commonly find several group factors but no general one'.

1. Social Psychology of Music - P.R. Farnsworth, N.Y. 1958 - Page 179
2. Page 180

Farnsworth sums up -

[1]'The reader will probably agree that conclusions based on factor analysis must be quite tentative. Factors are obviously products of the tests used. Therefore if there is no test covering some important area of musical activity, the picture disclosed by the factor analysis will reflect this imbalance. For after all factorial analysis is only a way of describing with some economy a matrix of correlations. Since the factors depend on the measures used they will be meaningful only as the tests are meaningful. With present-day tests in such a primitive state, it follows that factor analysis can yield no definite answers.'

These comments are a very clear exposition of Farnsworth's views on the role of factor analysis as an explanation of the data obtained from musical ability testing. They express very generally held views amongst present-day researchers into musical ability testing.

During the last half century research has broadened its approach to ability testing. Since the early work by Burt, Binet, Yerkes and others on measuring intelligence by mental tests, psychologists have moved on to assessing a wide variety of human traits, characteristics and abilities. However natural it seemed that psychometric techniques should be extended in this way, there were psychologists who warned of the limits to the process of breaking down aspects of personality into a number of factors for measurement.

C.L. Hull [2]of Yale developed, as a result of his learning theory researches, a 'paired-comparison'

1 Social Psychology of Music - P.R. Farnsworth - 1958 - page 181

2 Aptitude Testing - C.L. Hull - 1928

technique where the testee is asked to judge which of each of a variety of pairs is the higher in a specific trait. This technique has proved useful in many fields of ability testing.

More recent researchers into auditory responses, in perception studies, have shown that such responses are much more complexly determined than was thought by the majority of pre-1914 perception researchers, eg Helmholtz and Scripture. Following Galton's precept, the construction and application of tests to isolate and measure individual differences, and the subjecting of the resultant data to statistical analysis has proceeded apace. Galton's emphasis on discovering correlations between overt, determinable variables without undue involvement with 'intervening variables' or hypothetical constructs has proved a practical approach well suited to modern psychological techniques.

There seems recently to have been a reaction against theory construction, indeed against all generalised theorising. Most music research workers today design their researches with a view to investigating comparatively restricted problems. Techniques have been developed to deal successfully with relatively small samples under classroom conditions, away from the 'rarefied' laboratory atmosphere.

Now the time has come to look closely and critically at some of the tests of musical ability which have been constructed during the past half century, starting appropriately enough with the work of Scripture's best-known student, Carl Seashore. From 1919 onwards, musical ability tests, whatever their imperfections, formed a sound basis on which later test constructors could build. To quote Jacob Kwalwasser writing in 1927 -

[1]'Today there is a deeper insight into both the potentials and limitations of music testing'.

Tests of Musical Ability

The earlier part of this chapter has been devoted to building up the background against which the earliest tests of musical ability were to be set. The writer is using the term 'musical ability' although the test constructors themselves have made use of terms such as 'musical talent', 'musicality', 'musical intelligence', 'music achievement', and 'musical aptitude profile'. The titles themselves give some clue to the theoretical standpoints of the test constructors. For the purpose of this research it is their use as means of measuring musical ability which is of significance. This may not be an absolutely fair judgment as tests are valid only insofar as they are used for the purpose for which they were designed, and in most cases this was predictive. However as this study is concerned primarily with assessment of present musical ability in children at varying stages of development, the term 'musical ability' seems most apt.

Other qualities have been assigned to these tests besides their basic predictive purpose. Some of them are claimed by their constructors to be 'training-resistant', 'experience-resistant' or 'culture-free'. Such claims will be countered later in this chapter by critics representing a variety of schools of thought, as a result of their own researches.

It is proposed to examine in detail only a small selection of the multitude of music tests produced during the past four decades.

1. Quoted from Tests and Measurements in Music - Paul R. Lehman Prentice-Hall - 1968 p. ix

The names Seashore, Kwalwasser and Wing merit our attention as creators of tests which stand out from the rest in several important respects. To these names may be added those of Gordon, Colwell and Bentley, whose recent test batteries also deserve our close crutiny. Other tests will be referred to in the course of this research, but this is the selection most directly relevant to the purposes of this study.

Measures of Musical Talent Carl Seashore (1919)

Seashore has already been mentioned as an associate of E.W. Scripture of Yale. Scripture himself had worked in the Wundt psychological workshop in Leipzig, and Yale soon established a strong tradition of psycho-physical research using refined sensory-acoustic techniques. Seashore must have a strong claim to the title of foremost pioneer worker in the field of musical ability test construction. His conception of musical talent is based upon structural ideas - what has become known as the 'law of specifics' - the idea of separate musical talents. Nearly twenty years work preceded publication of the 'Measures'. Seashore's emphasis is on purely sensory factors and this is revealed in his choice of test content.

The original Seashore battery consisted of five tests (a) pitch, (b) intensity, (c) time, (d) consonance, and (e) tonal memory. To these were added (f) rhythm in 1925, and in the 1939 revision (g) a timbre test in place of the omitted consonance test. During the course of revision (b) intensity was redesignated 'loudness'.

For the test to have achieved a vigorous and contested twenty years of existence, and yet to remain sufficiently popular to stand a further drastic revision is in itself remarkable and a tribute to the needs it so obviously satisfied. Yet the weaknesses inherent in its conception and construction need to be rigorously be examined. In fact a host of critics have probed these weaknesses with relentless persistence.

Any pioneering work is bound to suffer this kind of treatment. Let us proceed to the details of the tests to see how far criticism may be justified -

(a) The pitch test presents the problem of deciding whether the second of two musical sounds is higher or lower than the first. The tones are produced from a set of tuning forks, one standard fork at 435 cps - international 'A' - plus ten additional forks varying from the standard by increments ranging down to tiny micro intervals.

It can be seen that pitch discrimination is carried down to a very fine threshold by means of these laboratory-designed forks. (replaced by oscillators in 1957 version)

(b) Loudness (intensity) is scored by indicating whether the second of two tones is weaker or stronger than the first. The pairs of tones are at a pitch of 440 cps and the difference in loudness varies from 4 db to 0.5 db.

(c) In the time test the examinee is asked to say whether the second of two tones is longer or shorter in duration than the first. The fifty pairs of tones are at 440 cps and the difference in duration ranges from 0.3 to 0.05 seconds.

(d) Little need be said about the consonance test which proved so low in reliability; correlations on re-test were as low as 0.26.[1]

(e) In the tonal memory test, a series of three, four or five tones is repeated and on the second playing one tone is changed; the testee is required to mark which tone of the sequence changes. The thirty pairs of tone sequences are recorded from an electronic organ.

1. Studies in the Psychology of Music Vol. II
H.M. Stanton University of Iowa - 1935

(f) An evaluation is asked in the rhythm test of the similarity or difference of thirty pairs of five, six or seven note patterns. In the 1939 revision tone was substituted for the clicks used earlier.

(g) The timbre test asks whether the tonal quality of the second of a pair of tones is like or different from the first. In the fifty pairs of tones, six partials of varying intensity are added to the fundamental.

Each of the six tests of the 1939 revision occupies an entire side of a twelve inch gramophone record.[3] The whole battery takes an hour to administer. Practice items are given before each test proper begins. The scores of each test are placed alongside each other to make a personal profile for the examinee, comparing the relative strengths and weaknesses of his separate musical talents.

Seashore directs that the scores of the separate tests shall not be added to give a total or composite score. This follows logically from his 'atomistic' interpretation of musical ability. However Larson[1] (1949) considers that a general classification based on composite scores is quite satisfactory. Wing[2] also (1953) recommends the use of such a total score on the grounds that the statistical reliability of each separate test is relatively low, whereas the battery score has a much higher reliability.

In spite of the length of the 'Measures' and the rather low reliabilities and validities of some of the tests, this battery has enjoyed widespread popularity and extensive use throughout the United States and other countries during the past forty years. The Seashore 'Measures' were administered to over ten thousand individuals.

One of the most thorough predictive studies using the

1. Buros - 1949
2. Buros - 1953

3. 1957 version is on one $33\frac{1}{3}$ R.P.M. disc.

Seashore battery is that of H.M. Stanton[1] known as the 'Eastman Experiment'. Stanton graded students entering the Eastman School of Music on their Seashore scores and correlated these with the students' degree of success in their college music studies. This longitudinal study concluded that students scoring high in the tests also did relatively better in their music courses. Terms such as 'doubtful' and 'discouraged' were used to indicate students whose scores were in the lowest grades. N.M. Downie (1958) comments -

[2]'As a result of this study .... the faculty of the Eastman School of Music decided to admit only these whose musical talent warrants some continuity of musical training'.

J.C. Nunnally (1964) casting a statistician's eye over the Seashore Measures of Musical Talent says -

[3]'Scores are affected very little by age - similar norms for elementary school, high school and adults. Modest to small correlations with grades in music classes and teachers' ratings'.

W.S. Larsen[4] reports correlations with music class ratings from 0.10 to 0.46 for grade five (children aged 10-11 years).

These finds are very significant. Developmentally speaking, we should expect increases in scores with increase in age, at least in the eight to fourteen age range. We might also expect such a long test, presented at laboratory perfectionist standards, to correlate more closely with class music grades and with teachers' ratings if these were representative of pupils' real musical achievements at school.

1. Studies in the Psychology of Music Vol.II.
   H.M. Stanton - 1935
2. Fundamentals of Measurement - N.M. Downie -
   O.U.P. 1958 - Page 265
3. Educational Measurement and Evaluation - J.C. Nunnally
   McGraw-Hill - 1964 P. 296
4. Studies on Seashore's Measures of Musical Talent.
   W.S. Larsen - 1930

The Seashore Measures have been administered in the main to older pupils and to college students. There are difficulties attached to using the tests with younger pupils, particularly those under eleven years; apart from its undue length, one specific difficulty is that the tests' validities as predictive measures are not known for this younger age group.

Larsen's conclusions after re-testing several classes in the 10 - 14 age range after a six months interval may be summarised thus -[1] only the pitch and tonal memory tests rank high enough to be satisfactory pre-adolescence predictors of later musical success. It is interesting to note that these are the two aspects of musical ability which receive most attention from later test constructors, to the complete exclusion of many that Seashore considered fundamental musical talents.

One theory of Seashore that aroused lively controversy was his 'theory of specifics' - that each test was a separate entity measuring a single musical talent. It illustrates his view of musical talents as groups of separate abilities. He also maintained that these separate talents are innate - entirely due to heredity. On this idea of independent talents Seashore is very forthright, as in this passage -

[2] 'On the sensory side we have recognised four branches of talent content as heard, namely pitch, time, intensity and timbre, each forming a main division of the approach to musicianship. Each one of these capacities runs as an independent branch, not only in sensation but through memory, imagination, thought, feeling and action. Each branch of this family tree throws out similar branches of capacities'.

1. Studies on Seashore's Measures of Musical Talent - W.S. Larsen - 1930.
2. Psychology of Music - C.E. Seashore N.Y. 1938 - McGraw-Hill p.332

Seashore worked on the assumption that anyone able to discriminate small differences in pitch, time, intensity and timbre must be musically superior. He admits that there are probably other talents as yet unmeasured, but goes on to say -

[1]'On the basis of our experiments in measuring these sensory capacities, we find that the basic capacities are elemental, by which we mean that they are largely inborn and function from early childhood. After a comparatively early age they do not vary with intelligence, with training or with increasing age, except as the exhibition of these capacities is limited by the child's ability to understand or apply himself to the task'.

Many researchers have condemned this atomistic and psycho-physical rather than musical orientation of Seashore's test philosophy, particularly during the last three decades. Two questions at least arise out of these quotations. The first concerns Seashore's assumption about the musical nature of early childhood, when his tests have been administered in the main to older pupils and students. Where is the research evidence behind these assumptions? Secondly the tests' validities are in question by the use of the adjective 'musical' in the title of the battery. Most of the tests are certainly not in a musical context. These tests may measure psychological differences (louder/softer, longer/shorter, etc.); are these also necessarily musical differences, in the sense that ability to perform these tasks gives an accurate indication of a child's ability to discriminate in a musical setting?

1. Psychology of Music - C.E. Seashore N.Y. 1938
   McGraw-Hill p.3

J.L. Mursell[1] (1937) sets up an 'omnibus' theory - that musical ability is one single complex ability - this is directly opposed to Seashore's 'theory of specifics'. Mursell criticises Seashore's tests on the grounds that they purport to measure 'the response of the ear as a receptor to certain differences in the sound wave'. Mursell continues - [2]' ... music depends upon our perception of the dynamic relatedness of tone'.

Developing this theme that regards musical ability as a combination of certain mental processes, Mursell specifies two in particular - (a) affective response to tonal and rhythmic patterns and (b) perceptual awareness of tonal relationships and rhythmic groupings. This is a viewpoint closely related to Gestalt theories. His continued emphasis on the 'musical mind' has led to certain of his critics branding his theories as 'mentalistic'.

Let Mursell summarise his own philosophy of musical ability in this brief passage -

[3]'Music depends essentially not on the stimuli which reach the outer ear, not on the response of the inner ear, but on the organising and transforming operation of the mind'.

This idea of music as a activity of the mind is also stressed by other writers, including Wing (1948) -

[4]'Clearly both musical ability and musical appreciation are qualities of the whole mind; though they involve auditory discrimination they do not depend solely on the ear'.

1. The psychology of Music - J.L. Mursell N.Y. 1937
2. - do -
3. Quoted from 'Musicality and Prognosis' L - G Holmström - Sweden - 1963 p. 30
4. Tests of Musical Ability and Appreciation Brit. J. Psych. - H.D. Wing - Mon. Supp.XXVII - C.U.P. 1948

Perhaps Mursell's 'mentalistic' emphasis ought not to be dismissed out of hand. His philosophy that musical ability does not depend directly on sensory ability represents a vigorous reaction against the Seashore theories - the philosophy current in American musical research in the nineteen thirties.

Lundin (1967) puts this point very succinctly -
[1]'If Mursell's theory were not so completely packed with mentalism (musical mind) it would be an improvement over Seashore's. Its advantage lies in the author's recognition that musicality is more than a sum of special sensory abilities'.

R.W. Lundin (1953)

Lundin criticises Seashore from the behaviourist school of psychological theory, with particular reference to one test -
[2]'Even though the test of memory was more complex and less sensory than the others, he (Seashore) felt this to be an important part of the 'musical mind'. He hoped to eliminate any effects of previous learning and training by presenting the tones isolated from any rhythmic or melodic configuration'.

Lundin had devoted a considerable amount of thought to the question of tonal memory in an earlier chapter -
[3]'We should recognise the importance of tonal memory, but not rate it so high as to exclude those whose ability is poor'.

Again Lundin questions the predictive value of tonal memory tests -

1. An Objective Psychology of Music - R.W. Lundin - 1953 (revised 1967) p. 212
2. An Objective Psychology of Music - R.W. Lundin - 1953 (revised 1967) Page 208
3. - do - Page 126

[1]'If tonal memory as measured is such an important aspect of musical ability, why does it not correlate with actual success?'

Lundin makes reference to an earlier critic of Seashore, Henlein (1928) who suggests that when we alter one tone of a melodic sequence the whole is changed - a typically Gestalt viewpoint. Lundin, referring again to tonal memory, says -

[2]'The Seashore test used a series of unrelated notes on his fundamental assumption that since musical talent is an inherited trait, it must as such be measured without the influence of training. By using such a presentation he believes he eliminates any effect of previous training. In doing so he forgets that music is not merely a series of unrelated tones, but a 'configuration of interrelated tonal patterns'.

One reason for spending so long on this discussion of tonal memory is that this type of testing has become a feature of nearly all subsequent tests of musical ability. In spite of the many criticisms directed towards Seashore's own tonal memory test, it is by far the most reliable and useful of all the tests included in the 'Measures'. Here is a quotation from Lovell (1958) to round off this discussion -

[3]'It is often suggested that memory is at its best during the Primary School period (5 to 11 years). Actually there is little evidence of a special memory ability of much consequence in school work. Logical memory increases as general intelligence increases and is likely to reach a maximum at around fifteen years for most children'.

1. An Objective Psychology of Music - R.W.Lundin - 1953 (revised 1967) Ronald Press Co. - Page 127
2. - do - Page 127
3. Educational Psychology and Children - K. Lovell - 1958 Page 200

The Kwalwasser-Dykema Music Tests (1927)

Before continuing our discussion of points arising from the Seashore theories, it will be useful to examine some other tests which have also been standardised and widely used. The Kwalwasser-Dykema Tests (K-D seems to be a much-employed and reasonably authentic abbreviation) are recorded on five gramophone records. Whilst several of the tests in this battery measure the same basic things as the Seashore Measures, some additional tests have been included, designed to measure other aspects of musicality.

This makes for a very long and complicated testing procedure as the K-D battery actually contains ten tests - (a) tonal memory, (b) quality discrimination, (c) intensity discrimination, (d) tonal movement, (e) time discrimination, (f) rhythm discrimination, (g) pitch discrimination, (h) melodic taste, (i) pitch imagery and (j) rhythm imagery. Each of these tests is of the two alternative answers type. For instance in (a) and (b) the examinee must write S or D (same or different), whilst in (c) scoring is W or S (weaker or stronger) and in (d) U or D (up or down).

For the final two tests (i) and (j) staff notation symbols are printed on the test leaflet and the examinee must compare this visual evidence with the recorded sound and indicate W or R (wrong or right) for pitch imagery, and S or D (same or different) for rhythm imagery. The tests are based therefore on the presupposition that the examinee possesses a knowledge of staff notation. This obviously restricts the use of the K-D battery to a limited section of the population.

It also represents a departure from the purely aural test principle as visual judgment is required. A further point for comment is the relative weighting given to the various tests of the battery - 25 items in (a), 30 items in (b), (c) and (d), 25 for (e) and (f), 40 for (g), 20 for (h) and 25 each for (i) and (j). So 'melodic taste' joins the battery as rather a 'poor relation' whilst 'pitch discrimination' is favoured by the heaviest weighting.

Much of Kwalwasser's philosophy is revealed in such statements as -

[1]'We have been taught that man is the product of his environment, but studies in genetics tend to emphasise the more commanding position of heredity'.

He later states -

'There can be no achievement in music without talent. Yet there can be talent without achievement'.

Then as a summing up he says -

'While one's achievement may vary with environmental factors such as the influence of training, motivation and work habits, little change in one's talent make-up is likely after maturation. Under normal conditions it is probable that one's achievement and one's talent are comparable, bearing more or less a one-to-one relationship'.

In spite of this hereditarian-based support for Seashore so firmly expressed by Kwalwasser, we need only look at the content of the K-D test battery to note strong differences in their respective theoretical standpoints. Most of the tests in the K-D battery have a decidedly more musical setting than their equivalents in the Seashore Measures, in the sense that there are recognisable melodies and musical phrases.

Then there is the K-D 'musical taste' test which represents a small but significant broadening in the

1. Exploring The Musical Mind - J.Kwalwasser - 1955 Page 4

attitude to what kind of tests can be legitimately included as part of musical ability tests. With the introduction of his test of melodic taste Kwalwasser decisively broke the monopoly of sensory discrimination items in the realm of musical ability testing.

(d) tonal movement, one of the best tests of the battery from a statistical point of view, might also be regarded as having to do with musical taste, and hence concerned with more than just sensory discrimination. Each pattern consists of four tones and is musically incomplete. The listener must mentally supply a fifth tone reporting whether it is above the fourth tone or below (U or D). A musical judgment is called for.

It might be profitable to indicate briefly some points which give the K-D battery an advantage over the Seashore battery - (i) the individual items are shorter, (ii) it measures a wider range of traits, (iii) it is a more interesting series of tests, (iv) the test settings themselves are more musical (Seashore deliberately avoids using recognisably melodic phrases), (v) Kwalwasser considers his composite total to be a significant score for the purposes of prediction.

It may be noted that most of these advantages are gained at the expense of reliability. The majority of the tests in the K-D battery yield reliability figures around [1]0.4 to 0.5 which is decidedly on the low side if accuracy of ranking for purposes of prognosis is the aim of testing.

Paul Lehman[2] (1968) considers 0.85 to be a generally satisfactory reliability and puts length of test at the head of the factors that go to make up a reliable test.

1. An Objective Psychology of Music - R.W. Lundin - 1953 - Page 246
2. Tests and Measurements in Music - P.R. Lehman - 1968 p. 13

As a comparison Stanton[1] quotes 0.26 for the Seashore consonance test, but gives 0.80 and 0.83 for tonal memory. Larsen[2] also reports 0.84, 0.87 and 0.90 for the Seashore tonal memory test. Few of the other Seashore tests come near these respectably high reliability figures, but on the whole they fare well in comparison with the modest showing of the K-D tests.

Music Talent Test Kwalwasser (1953)

This test takes only ten minutes to administer; however, if a very short test is required for the specific needs of the researcher, it seems less useful, with its low reliabilities (R.R. Bentley[3] reports 0.59 (1955) using the Kuder-Richardson formula), than the first three tests of the Wing battery (12 minutes) which will be described next.

Standardised Tests of Musical Intelligence H.D.Wing (1941)

With this carefully-designed series of tests, Dr. Wing continued the extension of musical ability testing into the area of music aesthetics. The last four tests in his battery call for aesthetic judgment. They exercise the examinee's powers of discrimination and appreciation of musical performance. The original version was made on gramophone records, but it is possible now to obtain a 'tape' version at speeds of 7½ ips and 3¾ ips.

There are seven tests in all - (a) chord analysis, (b) pitch change, (c) memory, (d) rhythmic accent, (e) harmony (f) intensity, and (g) phrasing.

Each item in the chord analysis test sets the task of detecting the number of notes in a chord. The pitch change test involves detecting the alteration of one note

1. Studies in the Psychology of Music Vol II - H.M. Stanton - 1935
2. Studies on Seashore's Measures of Musical Talent W.S. Larson - 1930
3. A Critical Comparison of Certain Music Aptitude Tests R.R. Bentley - 1955 - Univ. of Southern Cal.

when a chord is repeated. There are three alternatives in scoring, S if the chord remains the same, U if the changed note rises, and D if it falls in pitch. In the memory test the examinee has to detect which note is altered when a short melody is played a second time. The melodies vary in length from three to ten note tunes. This gives a substantial number of alternatives over the test as a whole.

(d) is the first of the tests involving aesthetic judgment. The task is to choose the better rhythmic accent of two performances. The alternatives are A (first performance), B (second) or S (neither one preferred before the other). In test (e) one is required to judge the more appropriate of two harmonisations. Again there are the alternatives A B or S.

(f) We have to judge which is the more appropriate mode of varying loudness in two performances of the same melody. A B or S are offered as alternatives once more. In (g) we have to judge the more appropriate phrasing of two performances with the alternatives A B or S. The writer will comment later on the validity of tests involving subjective judgments, and the questionable practice of labelling today's aesthetic yardsticks as correct when tomorrow's may differ.

In Wing's later revisions of the battery, the last four tests have been reduced to 14 items each. Once more the weighting is significant. The chord analysis test contains 20 items, pitch change 30 items and the memory test also 30 items. All through the series the instructions include advice to guess when in doubt. Practice items precede each test proper. The instrument used throughout the battery is the piano, and Dr. Wing's recorded voice gives the instructions.

As was the case with Seashore and K-D, the full Wing battery takes a considerable time to administer - over one hour. To this time must be added the time needed to fill in details on the front page of the test leaflet. The layout is planned so as to obtain information which will supplement test scores.

In view of the lengthy nature of the testing procedure, when it is intended for use with children under the age of eleven Dr. Wing has recommended that the first three tests only should be used. This reduces playing time to twelve minutes.

Wing's position on the 'atomistic-omnibus' axis may be gauged approximately from the following -

[1]'If musical capacity were to consist of a number of isolated factors, then the procedure of reducing the tests from 24 to the comparatively small number of seven might be open to criticism on the ground that tests for certain of these factors had been removed in deriving the short battery. However very high correlations have been obtained between the original 24 tests, the 13 intermediate ones and the final seven .... My own personal opinion is that although musical capacity may be complex, there is nevertheless a strong general factor underlying ability to perform a wide variety of music tests'.

It is clear from this passage that Wing does not subscribe to the Seashore theory of specifics. Indeed his test battery is, by implication, a fairly comprehensive one. It is noticeable how he stresses the high correlation between his original 28 tests and the final seven of the standardised battery. Wing elaborates on this further -

[2]'One aim of this work has to devise a series of tests

1. Tests of Musical Ability and Appreciation - H.D.Wing
   Mon. Supp. XXVII C.U.P. 1948 - Page 49
2. - do - Page 42

which would estimate musical ability and appreciation within a reasonable examination time. This was considered to be one of about 80 minutes'.

Like Seashore and Kwalwasser before him, Wing asserts that his tests have a selective aim -

[1]'It has been stated by Seashore that my tests are efficient tests of attainment, rather than aptitude ... it is never wise to make any fine degrees of grading within a highly gifted group such as the National Youth Orchestra. Indeed the tests were not designed for this purpose, but to select bright children from an average group in order that they should receive opportunities to develop their special aptitudes'.

It would appear that communications between test constructors do not always exhibit such solidarity of opinion as was reflected in Kwalwasser's 'Exploring the Musical Mind' when he wrote supporting Seashore (quoted earlier in this chapter). It will be remembered too that Seashore firmly defined musical talents as being essentially independent of age, and any increase in score was put down to increased understanding and increased ability to apply oneself to a task. Seashore states that talents are inborn and function from early childhood. Now compare Wing on this point -

[2]'The figures so far published show that with increase in age, up to about seventeen years, there is an increase in the average total score obtained from my tests'.

So Wing explicitly contradicts Seashore's dictum. In other ways too Wing seems much closer to Mursell than to Seashore; his interpretation of the high correlations between the original 24 tests and eventual seven which

1. Some Applications of Test Results to Education in Music. H.D. Wing - Brit.J.Ed.Psych. XXIV 1954 Page 166
2. - do - Page 167

comprise the standardised battery is that he is covering the field of musical ability adequately. He also sees the 'summed score' of all the tests as the important musical and statistical figure. Here is Nunnally (1964) on this point -

[1]'The first three subtests measure complex sensory abilities. The other four concern the aesthetic value of different compositions. The subtest scores are added to form one general measure of musical aptitude'.

Wing places reliability and validity high on his list of priorities. He stresses the favourable statistical findings arising from his chosen test design. Nunnally goes on to say -

[2]'It has received favourable response from teachers of music who feel that the tests cover many of the skills important in musical training. The author reports correlations of 0.60 and above between the tests and teachers' ratings in three small groups'.

Wing himself reports reliability coefficients higher than 0.9 with boys aged fifteen. Before leaving these tests of another generation and looking at a group of tests constructed in the last few years we will look briefly at two other tests of approximate Wing vintage.

<u>Test of Musicality 4th Ed.</u> <u>E Thayer Gaston 1942/58</u>

In this 1958 edition the whole test is contained on a single long-playing disc. There are 40 items; the first eighteen form a kind of musical interest questionnaire including such questions as 'Do you have a piano in your home?' The final section - the tonal portion of the test - includes (a) five items to discover the testee's ability to find a given tone in a chordal complex, (b) five sight-

1. Educational Measurement and Evaluation - J.C.Nunnally - 1964 Page 296
2. - do -

reading items where possible note and rhythm changes have to be detected, (c) five K-D type tonal movement phrases in need of resolution and (d) seven items where a short melody is repeated several times with a variety of different note or rhythm patterns which have to be detected.

On the final page there is room for data on physical and personality characteristics. Reliability seems quite good and the test is standardised separately for boys and girls from 9 to 18 years. Reliabilities of 0.88 are reported; these are high especially in view of the brevity of the tonal section of the test (22 items).

Gaston's philosophy is close to Wing's and Mursell's rather than Seashore's. In fact the test is not based on sensory perception but on perception in a musical setting. P.R. Farnsworth comments -

[1]'In the introduction of his manual Gaston agrees to a need for the so-called sensory tests of an earlier day. But in this present test he checks rather on the pupil's perceptual abilities - what results in considerable part from musical training'.

A footnote by Farnsworth gives us an insight into the progress made in testing techniques -

'The directions are easily comprehended, not at all like those of the older Seashore sense of consonance measure, where those taking the test were invariably so confused that they identified consonance with preference'.

In spite of cautious praise and congratulatory references, this test has had little or no impact in this country. The sight reading items limit its usefulness when testing younger children.

<u>Music Aptitude Tests</u>   <u>Raleigh M. Drake (1954)</u>

From a group of his earlier tests Drake chose two -

1. 5th Mental Measurements Yearbook - 1959

musical memory and rhythm - and standardised each of these in 1954 in two parallel forms, A and B. Drake used specially composed melodies for the memory test; these melodies were either repeated exactly or else with a change of note, time or key. Each of the twelve different melodies was repeated from two to seven times to make a total of 54 items.

For the rhythm test, the examinee was required to continue beating time after the cessation of the metronome until ordered to stop, and then to score the number of beats during the silence. This was a 50 item test. Both tests yield high validity and reliability figures. Perhaps the relatively large number of items per test helped reliability.

Drake[1] (1957) states that his tests measure aptitude and are not influenced to any appreciable extent by training or musical experience. Differences between boys and girls are also held to be negligible.

Recent Tests of Musical Ability

It is now proposed to examine three tests of musical ability constructed in the last few years. Again we find a variety of titles which must to some extent reflect the underlying philosophy of each test constructor. Examination of each test battery reveals how much the particular test constructor has learned from previous work done in his field. Reliabilities and presentation show what great care has been applied to producing the best possible test design.

The first two tests to be described have been published in the United States of America at a time when Paul Lehman (1968) reports -

1. R.M. Drake 1957 'Manual for the Drake Musical Aptitude Tests' Chicago

[1]'declining interest in aptitude testing. Fewer aptitude tests are being published than in former years and there seems to be relatively little experimental work going on in the field of aptitude testing'.

Yet, paradoxically, Lehman also reports that sales of existing aptitude tests are currently increasing. There seems to be a variety of reasons for this decline in interest. Reasons appear to range from a questioning of the validity of such tests, a questioning of their underlying assumptions as part of a general reaction against standardised testing, to the high cost of producing standardised published tests and a belief that aptitude and achievement are very closely related. Nevertheless in the middle of this reaction, we have the phenomenon of a high quality aptitude test being published.

<u>Musical Aptitude Profile</u> [2]<u>Edwin Gordon (1965)</u>

There are three tests each subdivided into parts. The whole is recorded on tape; playing time is 150 minutes. Either violin or violin and 'cello in combination are used in all tests. Quality of presentation throughout is excellent.

Test T, Part I (melody) consists of a violin melody repeated; scoring is L (like), D (different), or ? (not sure). There are 20 items. Test T Part II (harmony) has a violin melody with an accompaniment in the form of a counter melody on 'cello. When repeated, the 'cello may add passing notes; the task of the listener is to decide whether in spite of these extra passing notes the essential harmony is the same or different. Again the scoring alternatives are L, D or ?. There are 20 items.

1. Paper to International Seminar on Experimental Research in Music Education - R.R.Lehman - Reading July 1968
2. Music Aptitude Profile - E. Gordon - 1965 - Boston Mass.

The next test, R (Rhythm Imagery), is also subdivided into two parts, Part I is entitled 'Tempo'. A tune is played on the violin and on repetition the testee has to decide whether there is a variation in tempo, whether it has the same or a different tempo from the first playing. Scoring is S, D, ?. Part II (Meter-metre) - on repetition the melody may have a variation in rhythm; again the scoring is S, D or ?. There are 20 items in each part.

The final test - Test S - is called 'Musical Sensitivity'. It is divided into three parts each of 30 items. Part I - 'Phrasing' - calls for a value judgment as to which of two similar tunes is phrased better. Scoring is 1, 2 or ?. Part II, 'Balance', again calls for judgment as to which of the two is the better balanced piece. Scoring is again 1, 2 or ?. Part III, 'Style' asks for judgment as to which of the similar tunes has the better style. Scoring is 1, 2 or ?.

The string playing throughout the entire battery is exquisite as might be expected from outstanding performers, whose fees must have added to the high cost of producing this test. There are one or two points of interest about the answer sheets. Pupils are told that their scores are 'to provide information that will help you and your teacher better understand your musical abilities'.

Practice items precede each subtest; these are called practice 'songs' - a curious title for instrumental pieces. Scoring consists of filling in little ovals, a thoughtful procedure which reduces the possibility of error when using a scoring stencil. The recorded voice giving test instructions is obviously that of a professional announcer. His standard American accent might present some difficulties to young English listeners.

Gordon's idea of making his tests up into a profile takes us right back to Seashore modes of thinking. After a quarter of a century during which there has been wide acceptance of the idea of a composite, total or battery score as the most significant figure for the purposes of a test battery, we find ourselves committed by a test constructor to thinking in terms of separate musical abilities, and examining them side by side in profile presentation.

Yet the test sets out to be interesting - the aim of Kwalwasser. It is in a musical setting. It calls for aesthetic judgment - an aim very similar to that of Wing in his final four tests, though the writer must stress again his reservations about the validity of subjective judgments. Test reliabilities (at least 0.90 for all grades) live up to the standards of Drake. There is the impression that most fundamental aspects of music - melody, harmony, tempo, rhythm, phrasing and style - are analysed in this battery. The total standardisation sample covers from grade four (age nine) to adult level, a very comprehensive sample indeed.

As the test becomes better known, perhaps other strengths and weaknesses will become apparent. A final comment on this otherwise admirable test battery is that it needs a playing time of 150 minutes - truly a gargantuan task for ten year olds, even if spread over a week.

<u>Elementary Music Achievement Test</u> [1]<u>Richard Colwell 1967</u>

This is recorded by Columbia at $33\frac{1}{3}$ rpm. The piano is used for recording all musical items. The recorded voice of a woman announcer gives us all the rather complicated instructions. Her preliminary remarks include the aim of the test - 'how well you can hear or identify musical patterns'. There are sample questions before each section of the test.

1. R.Colwell 1967 Chicago Illinois Follett Publishing Co.

It begins with a'pitch' test which measures 'ability to identify higher or lower sounds'. There are 15 items in this section. After listening to two tones, the examinee is required to mark H, L or S according to whether he judges the second tone to be higher, lower or at the same pitch as the first tone.

The second pitch section contains nine items, in three tone patterns. The testee has to mark 1, 2 or 3 according to which of the three tones he considers lowest in pitch. Extensive use is made of the piano's range of notes.

The next section, 'Intervals', contains 28 items and is designed to find our whether the examinee can discriminate between consecutive tones next to each other, (scalewise), and tones farther apart, (skips or leaps). Very easy samples of the task are played first; each test is preceded by a realistic example, or samples, to ensure understanding. Some of the items are quite lengthy. Scoring is by marking S or L (scale or leap).

Next comes a 'Meter' (metre) test of 15 items, in which we are required to distinguish between measures (bars) having two beats and measures having three beats. When the writer's teenage sons heard this instruction they turned to him with the query as to whether the announcer's term 'measure' meant the same as 'bar' - a typical example of difficulties created by the differing transatlantic terminologies. The examinee must score 2, 3 or ?. These items include a number of well-known tunes, eg the British National Anthem.

Then follow two auditory-visual type tests, similar to the final two K-D tests. The first is concerned with pitch; the task of the examinee is to compare the notation on the test leaflet with the sounds heard. Where there are mistakes in pitch in a particular bar, there is a space where that bar can be marked wrong. There may be more than one pitch error in any item. This section contains 12 items.

The second auditory-visual test is concerned with rhythm. There are again 12 items and the task is similar to that in the preceding sub-test; each bar containing a rhythmic error must be indicated, and once again, some items may contain more than one incorrect bar.

The next section is entitled 'feeling for tonal center'. There are ten items in each of which a cadential phrase is followed by three successive notes, one of which is the 'home tone' or 'doh'. Scoring is 1, 2, 3 or 0 depending on which of the three notes is the 'tonal center' or 'home tone', 0 being marked if none of the three notes appear correct.

Then comes another 'feeling for tonal center' section in which a short melody is followed by three tones from which the testee must select the key tone. There are 10 items.

The final sections are concerned with major and minor chords and phrases. First comes the 'chord' test of 15 items in which the task is to listen to two chords, and then to decide whether these are either both major, both minor, or whether they represent a change from one mode to the other. Scoring is M for major, m for minor or C for change.

In the last section, 'major-minor phrases', the task is to identify whether the phrase remains in the major (M), or in the minor (m) mode, or whether it shows a change from one mode to the other (C). There are 13 items.

One instruction of some significance is - ' ... if difficult or too fast, guess and go on'. Reference has already been made to the rather lengthy and involved instructions, which do not appear immediately clear and obvious to the listener. A perfectionist might also query the quality of the recorded piano tone.

A more serious flaw from a British listener's point of view is the need to interpret transatlantic terms into expressions which English children will find no difficulty in understanding. With the wide variety of items it contains, this is of course, another lengthy test.

Much space has been devoted to these two recent American tests for several reasons, some already mentioned. They both aim at comprehensive content, and this naturally has a considerable effect upon both length and cost. They each contain many points illustrating how present-day test constructors have derived benefit from the experience and errors of their predecessors.

Yet they contain extraordinary differences in philosophy. One has of course a very different purpose from the other - 'Achievement' and 'Aptitude' point this most succinctly - but even so there exists a fair degree of overlap between them.

Let us examine the weighting of items. Gordon gives a fairly consistent weighting per section - 20, 20, 20, 20, 30, 30, 30 - whilst Colwell seems remarkably unorthodox in this respect - 15, 9, 28, 15, 12, 12, 10, 10, 15, 13. It might be interesting to know how far these latter item totals represent expediency and how far there is a definite statistical or musical policy underlying the decision to settle for these particular weightings.

Gordon devotes 90 of his 170 items to 'musical sensitivity', where there can be no purely objective answers, but where nine-tenths of a panel of musicians agreed on the arbitrary decision as to which of the two versions represented the better phrasing, balance or style.

The Colwell test, on the other hand, is completely objective; there is only one possible answer to any particular item.

Gordon opts for the best string playing available -

quality is very high on his list of priorities. Colwell settles for piano and for something rather less than perfection in recording quality. Gordon is looking for high potential in several well-differentiated musical ability fields in order to apply these finer aptitudes to the most profitable course of music training. Colwell is obviously looking at present achievement in the elementary grades, but presupposes some degree of musical literacy, which is nowhere demanded by Gordon.

We are conditioned to regarding aptitude tests as being perhaps more concerned with elemental sensory discrimination, training resistant, and testing as nearly as possible 'pure innate capacity'. Equally we tend to regard achievement tests as being possibly less objective, but sticking closer to the aims of school courses. There are, naturally, many tendencies in the individual sections which indicate that the above mentioned points are the intention of the test constructors; nevertheless, when comparing the design of the tests as a whole, we cannot escape the feeling that, in some respects, the aims of the tests could well be exchanged (Colwell auditory-visual sections excepted).

It would be very interesting to learn the reasons for the choice of those particular musical instruments for recording the items.

<u>Measures of Musical Abilities.</u> [1]<u>Arnold Bentley (1966)</u>

The battery contains four tests (a) pitch discrimination, (b) tonal memory, (c) chord analysis and (d) rhythmic memory. It is intentionally very short with the purpose of administration to children as young as seven years old. This restriction to a total of 60 items represents a compromise between the concentration span of young children

1. Harrap London

and what would be statistically more desirable - a longer test. The playing time is 21 minutes. Instructions and examples are recorded along with the tests themselves.

(a) Pitch discrimination - there are 20 items. Pairs of sounds are played consecutively with a pitch interval varying from a semitone down to 1/9 of a semitone difference. Sine wave pure tones are used, and the duration of each note is one second. The examinee has to state whether the second note is higher, lower or the same in pitch as the first. Scoring is S (same), U (up) or D (down).

(b) Tonal memory - a five note tune is repeated with one note changed. A pipe organ is used; all notes are of the same length and dynamic accents are avoided. There are 10 items. Scoring is S (same), 1, 2, 3, 4, or 5.

(c) Chord analysis - a pipe organ is again used. For each of the 20 items, a chord is sustained for a duration of three seconds. The testee is required to say how many sounds comprise each chord. The test contains 10 two-note chords, 8 three-note chords and 2 four-note chords.

(d) Rhythmic memory - each of the 10 items consists of a pair of four-pulse rhythmic patterns. There is no pitch change within a test item; one of the rhythmic pulses has its pattern altered on repetition. Scoring is S (same), 1, 2, 3, or 4. In tests (b), (c) and (d), items are not graded in strict order of difficulty. Titles of the tests on the answer forms are simplified to 'pitch', 'tunes', 'chords' and 'rhythm'. Care has been taken to ensure that the instructions are as clear as it is possible for recorded instructions to be; carefully presented examples eliminate any possibility of misunderstanding.

One method of checking the validity of the battery was by comparing the subjective ratings of teachers for their classes, using a four point scale; when the test scores were compared with these assessments by chi-squared, there was a significant association at the 1% level.

Another method of checking validity was by giving the tests to highly skilled musicians; the logic behind this was that musically - skilled individuals ought to score high, and thus their high scores would provide further evidence of the validity of these tests.

Reliability was determined by retesting 90 boys and girls in the 9 to 11 age range, giving r = 0.84. Bentley states -

[1]'This may be regarded as satisfactory'.

Lehman reports -

[2]'A reliability of 0.85 is generally considered satisfactory'.

So by Lehman's standards, Bentley's test is eminently satisfactory, particularly as it contains only 60 items.

Dr. Bentley's philosophy may perhaps be summarised by a short sequence of quotations -

[3]'In our attempts to discover and measure the musical abilities of young children, we must constantly keep in mind that they are relatively inexperienced, and for the most part untrained musically. The abilities with which we shall be concerned are such as the child may have inherited, and/or acquired in the main incidentally, and not through specific musical training. Therefore such abilities as are measured must be basic and elemental'.

We read a little later -

1. Musical Ability in Children and its Measurement - A. Bentley 1966 - Harrap London p.89
2. Tests and Measurements in Music - P.R.Lehman 1968. Page 13
3. Musical Ability in Children A Bentley 1966 - Ch. 1 ps. 19/20

[1]'Observation of the abilities that are developing spontaneously will give some indication as to what are the basic elemental abilities in music'.

[2]'The process (of musical development) seems to be one of continually increasing clarification'.

In the foregoing quotation we observe a typical Mursell phrase.

[3]However the process of clarification that has already begun must proceed further if the child is to make music for himself. Given the opportunity and simple instruments he will do this'.

Noone could disagree with this most laudable aim; in fact, many progressive primary schools are giving their children precisely such opportunities.

'For the most part untrained musically', the phrase just quoted, is less true today than when Dr. Bentley wrote it, and even in 1966 a large percentage of children between the ages of seven and eleven were deriving benefit from good instrumental tuition in schools.

[4]'All subjects must be able clearly to understand from the recorded instructions without further explanation what they are required to do'.

As a result of his work with various musical ability tests, the writer considers that even the most clearly recorded, most suitably phrased instructions on tape or disc will present difficulties for children aged seven and eight, unless unobtrusively supplemented by the class teacher, or an adult who understands the children well. Perhaps this is doing less than justice to Dr. Bentley's tests. Indeed the writer has only used the Bentley

1. Musical Ability in Children - A.Bentley 1966 Page 20
2. - do - " 22
3. - do - " 23
4. - do - " 31

tests with this age group on a strictly limited number of occasions, but his experience has been, on these few occasions, that even with children who were accustomed to group test situations it was noticeable that the class teacher tactfully supplemented the recorded instructions.

[1]'Pitch discrimination ... How finely is it necessary to be able to discriminate in pitch in order to take an effective part in music making?'

Again, though Dr. Bentley goes on to say that there is no specific answer, his test construction demonstrates his own views clearly enough. He expects that a finely discriminating pupil will be able to differentiate 1/9 of a semitone successfully. This is desirable of course, but whether it is essential for a child to possess a threshold of pitch discrimination as fine as this to take 'an effective part in music making' depends of course on the standards of the group, and his role as participant. The writer thinks it more important that he should derive the benefit of participation, in the expectation that pitch concepts will develop more effectively as a result. It might be useful to quote Dr. Bentley himself on this point -

[2]'He lays his own foundations of experience on which to base concepts that he will learn later'.

To what limits is it practical to go in measuring children's ability to discriminate differences in pitch? Quoting from Dr. Bentley's thesis (1963) on the subject of his own pitch discrimination test -

[3]'It thus appears that this test would have been improved by avoiding the 2 and 1 c/s differences and by introducing 4 and 5 c/s differences'.

1. Musical Ability in Children A Bentley 1966 Page 35
2. Background Paper A.Bentley International Seminar on Experimental Research in Music Education Reading July - 1968
3. Ph.D. Thesis 1963 Page 159

Bentley's philosophy on young children and their musical ability has been quoted in some detail on page 58 (quotation 3). The key words are 'inherited' and/or 'acquired in the main incidentally', and later, 'such abilities as are measured must be basic and elemental'.

Now for a brief look at what Dr. Bentley says about his chord analysis test -

[1]'Much experiment was necessary before a satisfactory version was achieved.'

[2]'Theoretical guessing score = 7. Only eleven and twelve year olds achieved a higher mean than this.'

Now for a summing up -

[3]'The very low mean scores of the younger age group prompt us to ask if this test is suitable or too difficult for use as a group test with these younger children.'

Here is a final frank query from Dr. Bentley who, after looking at wide individual differences at each age level concludes that -

[4]'... ability to analyse chords develops more slowly than the other aspects of musical ability measured by the battery, and that the majority of children are not likely to be ready for work involving chord analysis before the age of eleven years.'

The writer's only query is why, after the extensive and painstaking preparatory and pilot work carried out by Dr. Bentley before publishing his tests, he still (a) felt the need to include the test in its present form for seven to eleven year olds and (b) felt that chord analysis merited a weighting of 20 marks, equal to 'pitch' and double that of 'tunes' and 'rhythm'.

1. Musical Ability in Children-A.Bentley 1966 Page 62
2. Ph.D.Thesis 1963 Page 167
3. Musical Ability in Children-A.Bentley 1966 Page 118
4. - do - - do - Page 119

Might it not have been possible to increase the number of items in the 'tunes' and 'rhythm' tests to 20 each without undue increase in the length of the battery? This would certainly have a marked effect on reliability figures for those particular tests; it would also give them a fairer weighting considering their relative importance alongside the other two tests.

Or, if 60 items were considered enough for the battery, might it not have been a more equitable procedure to have allowed 15 items for each of the four tests?

However, this is a splendid test, in spite of the minor criticisms just expressed. It has proved helpful in the later stages of this research, both from the point of view of direct validation, and indirectly as a guide to certain test construction techniques. Its brevity is one of its chief merits.

For the purpose of the present research most of the batteries looked at are far too long and involved; also a musical setting has been considered essential when aiming to test musical ability.

Therefore, when probing for suitable tests, the first three tests of the Wing battery were considered, but here a rhythm test was lacking. The Bentley battery was not available at the beginning of this research, when the emphasis was relatively more on sensory aspects of musical ability, hence suitable tests had to be devised by the writer specifically for the purposes of this research.

So before proceeding to chapters three to eight to consider each testing programme separately, it might be worthwhile summarising the writer's aims. These were:
1. The examination of broad trends (a) those to do with differences in musical development, through a specified age range, (b) those to do with differences between boys

and girls (c) those comparing scores from the tests with other ability fields, eg verbal reasoning, (d) those to do with possible differences as a result of two categories of musical experience, viz. special choral and instrumental experience.

2. The restricting of the study to certain aspects of musical development in children - (a) simple sensory discrimination in a musical context of the melodic, rhythmic and harmonic aspects of musical ability, each tested separately, (b) complex analysis of items where the distorted versions include errors of pitch and melody, rhythm and harmony, (c) children's musical preferences for certain stylistic periods.

3. The study is concerned chiefly with the age range from 7 to 11 years.

4. It looks at present ability to perform the tasks set by the tests; the data are not used for predictive purposes.

This chapter has traced the history of the development of musical ability testing; the writer has selected for more detailed scrutiny those aspects which have been of particular benefit to him in devising his own programme of testing.

CHAPTER 3

THE MUSIC RESPONSIVENESS TEST BATTERY 1965

There are certain phrases that crop up repeatedly in the literature dealing with studies of musical ability. For instance, phrases like 'musical growth'[1] and 'musical responsiveness'[2] are used time and time again by J.L. Mursell (1937) in his exposition on development theories applied to music.

This study is concerned with the musical development of young children; responsiveness or sensitivity to musical stimuli is a measurable activity which depends largely on our perception of the 'dynamic relatedness of tone', to use a phrase of Mursell's quoted earlier. So we are not setting out with the aim of measuring the response of the ear as a receptor to certain differences in the sound wave, but with the aim of measuring perception and discrimination in a musical setting.

Construction of the Test

The three aspects of responsiveness that this part of the research attempts to isolate and measure are those of melody, rhythm and harmony; all these feature in the Responsiveness Test battery. There are fifteen items in each test, giving a total of 45 items. Use is made of a variety of musical instruments (a) to give variety to the tests which helps to sustain motivation at a high level, and (b) to find whether the use of different timbres and different pitch ranges leads to any significant variation in test scores.

1. 'Education for Musical Growth' James L.Mursell 1948 pages 5, 50, 56, 61, 73, 82, 101, 112, 127, 183.
2. - do - pages 15, 24, 40, 56, 63, 77, 91, 187.

The musical instruments employed are the piano, clarinet and a variety of recorders - tenor, treble, descant and sopranino - both separately and in combination. The whole test battery is tape recorded at a speed of $7\frac{1}{2}$ ips and has a playing time of 20 minutes. Instructions are not given on the tape but are given 'live' in standardised form, and they can be paced to suit the ages of the children being tested. For a similar reason, the pause control on the tape recorder can be used to regulate the interval between items when testing younger age groups; there should be no sense of hurry over decision making.

The front of the small, simply designed test leaflet asks for only a minimum of information - name, age, boy or girl, and brief details about instrumental competence or membership of a choir. The three subtests are printed on the other three sides of the folded test leaflet in order to make the group testing procedure as clear and uncomplicated as possible.

Melody Subtest

Ideas for this part of the battery were culled from many sources. Several of the older test batteries contained 'tonal memory' or 'memory' tests. The intention in the present test was to try out adaptations of the best of these ideas, always bearing in mind the requirement of a musical setting, in order that the test should be as valid as possible. Various preliminary versions were tried out on pilot groups of children until a final version was finally arrived at in which the majority of items were highly discriminatory for those particular age groups which were to make up the test sample population.

This melody test is organised into three sections, each containing five items. Every item consists of a short tune, rhythmically stressed, but composed of notes of equal duration. The shortest item is a three note tune, and the longest contains nine notes.

Each tune is played twice, the second time with one note changed. The task of the testee is to detect which note is altered by counting along the line of figures provided, and then to record his score by marking with a cross the number corresponding to the changed note.

For these very young children the writer felt that this visual support on the test leaflet would assist the memory and facilitate maximum concentration on the task of perceptual analysis. This method follows the practice of Wing, but with modifications in the lengths of melodies to suit the ages of the children in the sample.

Items one to five are played on a descant recorder and contain 3, 4, 5, 6, and 7 notes respectively. All these items are pitched in the higher range of the treble voice.

Items six to ten are played on the piano and are all within the normal singing range of the treble voice. These items contain 4, 5, 6, 7 and 8 notes respectively.

The third section containing items 11 to 15 is played on the clarinet in its lower register - down to the D below middle C - and the range is limited to the normal compass of the alto and tenor voices. These last five tunes contain 5, 6, 7, 8 and 9 notes respectively.

There is no strict difficulty grading. Obviously the shorter items tend to be easier to analyse, but some occasional chromatic progressions in the mainly diatonic tunes make the task of detecting the changed note more difficult, particularly when the change occurs on a less prominent, relatively unstressed note in the middle of the melody.

Two practice items are included before the start of the test proper to ensure complete understanding of the task.

Rhythm Subtest

None of the rhythm tests investigated seemed suitable for the purposes of this research. The Seashore rhythm test items merely asked whether the rhythm patterns were the same or different when repeated. It seemed to make little difference whether the patterns presented were a series of rhythmic clicks or played in tone at the same pitch level as in the revised edition. This Seashore test seemed too elemental; moreover it presented only two alternatives and was not in a recognisably musical setting.

The Wing Rhythmic Accent test is most certainly in a musical setting, but is really a question of taste rather than involving objective sensory discrimination. In fact, many pilot versions were tried out before what appeared a satisfactory version was achieved.

In each item of the final version of the test a rhythm pattern is tapped twice; then follow three rhythmic variations of a tune, one of which is rhythmically identical with the tapped pattern. The task of the testee is to mark A, B or C to indicate which of the three tunes has the same rhythm as the tapped pattern.

It will be observed that the testee has a 'one in three' chance of obtaining a correct score. The present composition of the test represents a compromise between what suits the memory span of very young children and the greater number of alternatives which would be statistically more desirable. Items were chosen for their suitability for the 7 to 11 age range where the discriminatory effect is highest. There is no exact difficulty grading. A practice item precedes the test proper.

Variety is introduced into this rhythm test by varying the musical stimulus. This subtest is organised into three sections each containing five items.

In the first section, the three rhythmic presentations of the tune - A, B and C - are played as strongly accented, unharmonised melodies on the piano. Items 6 to 10 are played by a selection of recorders including descant, tenor treble and high sopranino, giving a range of notes from middle C to the C three octaves above. In the last section, items 11 to 15 are played on the piano and are presented as harmonised versions of a tune, with varying harmonic texture.

Item difficulty depends in part upon the closeness of the rhythmic variations in A, B and C to the original tapped pattern, and in part on the order of presentation. In the final harmonised section, the rhythmic pattern is not duplicated in all parts of the harmony, but sometimes in two parts only, sometimes in the treble part only, and, in one item, in the bass part only. Again, there is intentional variation in the compass and range of notes and chords presented. Each item consists of a short one, or two bar rhythmic pattern.

Harmony Test

The justification for including such a test lies in the fact that so many children in the 7 to 11 age range are enjoying the experience of participating in music making in instrumental groups, playing in two, three, four or even five parts, whilst other children, perhaps in the same class, are still restricted to a diet of rote unison singing. This harmony test represents an attempt to measure the extent of the child's harmonic responsiveness - his perceptual discrimination.

More or less well-known tunes have been chosen, mainly diatonic in character. As in the previous test concerned with rhythmic responsiveness, the testee is not asked to analyse each item and then pinpoint any changes from the original. Its construction derives more from Gestalt theories, making it possible to use a musical setting without any restrictions, one of the aims of this battery.

This less analytical, more Gestalt type of construction also differentiates this harmony test from the chord analysis type of test which is more analytical in character and deals with a more directly sensory aspect of perception, which minimises the need for a musical setting.

In each item, the final phrase of a tune is played twice, then three versions of the tune - A, B and C - are played, one only of which has the correctly harmonised cadence, thus allowing three alternative answers. Again, ideally, it would have been more desirable statistically to have a greater number of alternatives, but the musical memory span of the eight year old is limited, and therefore this was the compromise adopted.

This test follows the organisational pattern of the rest of the battery; it is in three sections, each of which contains five items. The first five are played on the piano, the next five are played by a recorder trio, and the final five have a fuller and more complex piano harmony. Both major and minor modes are employed, including one or two of the older modal variations, in order to provide variety for the listener, and to enable wide analysis of the test data.

In the earlier items of the test some of the incorrect harmonic variations end on strong discords. The more difficult items include versions with endings very similar to the correct final cadence. Much pilot experimentation preceded the adoption of this final form which the test has taken. An example is played before the test proper begins to ensure complete understanding of the task.

All items, including examples, are taped but the instructions before and during the test battery are given by the tester directly, with due regard for the tender age and lack of test sophistication of the children. The tester needs to gauge carefully the rate at which the beginning of the test in particular should proceed, and how long pauses should be, with judicious use of the pause control. This procedure needs considerable skill and experience on the part of the tester; alternatively he will need to know something of the individuals composing the class being tested. Such young children can quickly lose confidence if there is any suggestion of hurry, or if there is undue stress present at the beginning of the testing procedure, and this could result in a disturbing emotional upset.

Children comprising the Sample

The great majority of children to whom the Music Responsiveness Test was administered were in the seven to eleven age range. More than 1000 children in these age groups were tested over a period of eighteen months.

An infant class (aged 6 - 7 years) from a large urban Primary school was included in the sample, plus two 'A-stream' classes from a large urban Secondary Modern school (aged 11 - 12 and 12 - 13 respectively). This addition to the sample enabled the study of age groups on the fringe of the chosen age range, to examine how far there were continuing trends. For the same reason, a large group of student-teachers from a college of education were also tested. These were mostly in the age range 18 - 20, but included a small number of mature students.

Finally, for purposes of validation, choristers aged 8 - 13 from one of the largest Cathedral Choir schools in the country were tested.

Schools in the Sample

Seventeen schools were selected, one Secondary Modern and sixteen Primary. Eight of the Primary schools had Infant and Junior Departments covering the whole age range from five to eleven years. The other eight were Junior schools catering for the 7 - 11 age range. Twelve of the Primary schools could be classified as urban, and the remaining four as rural schools.

Eleven of the sixteen Primary schools were big enough to have one or more separate classroom units for each year group; the other five schools were relatively small and had two or more age groups in each classroom. One of the schools was quite tiny with only two teachers; here the Head taught all the children in the 7 - 11 age range.

Nine of the Primary schools were either housed in modern buildings or else had had recent extensions giving them good facilities from the point of view of present-day educational needs. On the other hand, six schools were in old, inconveniently-sited premises where facilities were far from ideal.

Looking from a social and economic point of view, there was also a wide variation between the catchment areas of the selected schools. Six of the Primary schools were situated in predominantly affluent catchment areas where professional people formed a substantial proportion of the population. Five schools drew their pupils from very mixed socio-economic areas, and the remaining five were, on the whole, situated in much less favourable catchment areas.

Only three of the schools visited practised class 'streaming' on grounds of ability.

Musical Activities in the Selected Schools

Apart from the attempt to achieve some sort of balance between rural and urban communities, and a reasonable cross section of school buildings, plus variety of catchment areas, viewed socio-economically, another reason for the selection of this particular group of schools was because of the sort of musical experience available to the children attending them. During periodic visits as supervisor of student teaching practices, the writer was able to find out something about the musical life of many schools in Dorset and the surrounding areas.

Nearly every school had its special choir which met regularly to rehearse for special festive occasions in the life of the school. Usually the best voices were selected by some sort of auditioning process, and the children involved received the benefit of extra musical experience through these frequent rehearsals and the enjoyment of songs needing more thorough preparation than was usual for the normal class music lesson. These specially prepared songs were usually for voices in unison, but one or two of the schools had a tradition of two-part singing.

Every school in the sample possessed its quota of young instrumentalists, and at least one teacher who was particularly interested in instrumental techniques and reasonably equipped to give tuition to larger or smaller groups as occasion demanded. The recorder group was in evidence in every school, and played its special role in the musical life of the school.

It was possible, from the information on the front page of the pupils' Responsiveness Test leaflets, to enumerate the various categories of instrumentalists, which were :-

392	recorder players	115	pianists
22	violinists	4	flautists
3	clarinettists	3	cornet players
1	organist	1	tenor horn player

The above instrumentalists were all within the 7 - 11 age range sample. Several children were learning to play more than one of these instruments.

All the recorder players, flautists and clarinettists were receiving tuition at school, as also were approximately half of those learning the violin. The remainder were either junior members of the Salvation Army or were receiving private lessons. The pianists in the sample all came into the latter category of course.

Collation of Data

It can be seen that a variety of information is available from the test leaflet, and it is important that the best use be made of the data gathered. For each child, we now know (a) his school, its size and location; (b) his class, its size and composition; whether it is ability streamed; whether it combines several age groups; (c) the name, sex and age of that child; (d) whether the child receives lessons on a musical instrument and what this instrument is; whether the child is having tuition on more than one instrument; (e) whether the child is having special choral experience as a member of a school or church choir; (f) his scores in the melody, rhythm and harmony tests which compose the battery; and (g) his battery score which will be treated as a meaningful figure for certain statistical purposes connected with the hypotheses to be tested.

In addition to this extensive information, knowledge is also available (h) about the organisation of choral and instrumental groupings in each school, and their functioning in the life of that school; (i) teachers' ratings from several schools classifying children into broad divisions according to their musical ability; although this is admittedly a rough and ready, subjective type of rating, the ranking has proved useful for certain methods of test validation; (j) from certain schools, confidential information has been made available giving indications of nonverbal and verbal reasoning test scores; this will be useful when correlating Responsiveness Test scores with other ability scores.

The above data has been collected together into a series of class lists, allocating rankings in terms of the battery score, and recording the data when testing was carried out. This system of classification has simplified the problem of treating the data. The next step is to select the appropriate statistical method for the purpose of testing the various hypotheses.

Testing Conditions

At this point perhaps some comment should be made on conditions in the classrooms whilst administering the tests, and also perhaps a brief reference to the reaction of the children to the test situation.

The problem of classroom acoustics cropped up early. Conditions have not always been ideal in this respect, and care has needed to be taken over the placing of the tape recorder. However, the class teacher's experience of using a speaker for schools broadcasts, and the gramophone also, has usually helped solve this problem.

The result is that no child has been handicapped by inability to hear the 'taped' tests sufficiently distinctly. Occasionally, one or two classes have been tested in the school hall, and here a different kind of acoustical problem has had to be faced; in all cases this was satisfactorily overcome.

By arrangement with the heads, interruptions caused by people coming into the classroom during the testing procedure were extremely rare. The blackboard proved very useful to supplement test instructions and to give visual support and guidance, particularly for younger children.

For the youngest age groups, the procedure has usually been adopted of giving the first two subtests prior to a recreational break, and the final subtest, harmony, which takes slightly longer, after the break; this split up the testing process into shorter periods of sustained concentration.

Interest and motivation have invariably been high. Good relations with the children and a friendly, relaxed atmosphere are important when testing such young children. Each change of instrumental stimulus during the tests led to an obvious renewed interest on the part of the children. Attempts to cheat were almost nil and cases of misunderstanding were very rare indeed, even when the children in the Infant class, aged 6 - 7 years, were tested.

In the rhythm test a fair amount of quiet humour was evident when a familiar rhythm was tapped out; item 8 is a typical instance. A kinaesthetic urge to move pencils in the air whilst following the rhythm items was another noticeable feature of this subtest.

Following the harmony subtest, it became the usual practice to have a short discussion with the children. Many interesting points were raised, including recognition of hymns and songs. The nature of cadential errors excited great curiosity and interest.

The use of introductory phrases including 'We are going to play a musical game' led to the right kind of atmosphere, increasing motivation and reducing excessive anxiety. The examples used before each test played a vital role in cutting down the possibility of misunderstanding to negligible proportions. Less than half a dozen test leaflets out of more than a thousand had to be scrapped.

Test items on the whole proved neither ridiculously easy, nor insuperably difficult for the great majority of children in the 7 - 11 age range. The lowest battery score, 3/45, came from a six year old, and the highest score, 41/45, was achieved by an eleven year old.

<u>Hypotheses related to the Responsiveness Test</u>

These have been stated in their null form for statistical analysis. We expect to disprove some of these null hypotheses by obtaining significant differences :-

1. There is no significant growth in the melodic,

rhythmic and harmonic aspects of musical ability as measured by the test through the seven to eleven years age range.

2. There is no significant difference between the scores of girls and boys in the age range under review.

3. There is no significant association between intelligence quotients an the scores obtained in the Responsiveness Test in the age range under review.

4. There is no significant intercorrelation between the melodic, rhythmic and harmonic aspects of musical ability as measured by the tests in this chosen age range.

5. Instrumental experience has no significant effect on these aspects of musical ability as measured by the tests.

6. Choral experience has no significant effect on these aspects of musical ability as measured by the tests.

Apart from the testing of these hypotheses, statistical analysis has been employed to examine the reliability and validity of the tests, and a certain amount of item analysis has been undertaken.

Findings will be detailed in the next chapter which will deal with statistical treatment of data.

Test instructions and the musical score will be found in Appendices B and C at the end of this thesis. There is also a master tape of the Music Responsiveness Test in the pocket at the back.

CHAPTER 4

ANALYSIS OF MUSIC RESPONSIVENESS TEST DATA

This chapter deals with the statistical treatment of the data whose collation was described in detail in the previous chapter. Treatment of the data required certain straightforward statistical techniques to test the particular hypotheses concerned with this portion of the research. The group of hypotheses is investigated in the earlier part of the chapter; reliability, validity and item analysis for the test are dealt with in the latter part of the chapter.

With the relatively large samples, distributions were regular and normal, and product-moment correlation could be employed. (Figure 1 and table 1 show frequency distributions of the test population's scores.) Both for the larger and smaller samples selected for testing the various hypotheses, the t-test proved a useful method for estimating the significance of certain differences in mean scores. Where ranking by discrete classes was necessary, as in the estimates provided by teachers in the form of A, B and C ratings, or where selection for Grammar School or Secondary Modern School was the classification adopted, chi-squared was used as the most appropriate way of testing the significance of the association of these classifications and test scores.

The various formulae and tables employed with these statistical techniques were drawn mainly from two sources, Garrett [1](1946) and Wrigley [2](1965) Examples of statistical analysis will be found in Appendix A.

1. Statistics in Psychology and Education-H.E.Garrett-Longmans, Green - 1946
2. Course Notes - Professor J.Wrigley. Institute of Education Statistical Workshop-Southampton Unv.1965/6

Hypotheses concerned with Age

Data for testing these three hypotheses came from classes tested during 1966. This sample of nearly 800 children was almost equally divided between the four Junior school years (7 - 11). As they were all tested within the space of a few weeks, it seemed a valid procedure to compare age means within this 1966 sample.

Year mean scores for each of the three tests, and also for the battery, are shown in table 2. It is interesting to note in the sample tested, and for the tests used, that there is a relatively small yearly increment in the rhythm means; the melody mean scores increase with age as consistently as do the rhythm mean scores, but the rate of increase is greater.

Another interesting phenomenon resulting from an analysis of mean scores for each age group is the sharp rise between the harmony mean scores of the 8 - 9 and the 9 - 10 year groups. These findings are of particular importance to music educators; it is clear that, for the type of harmonic discrimination being tested, there occurs a significant increase in children's ability around the age of nine.

When the mean scores for each subtest of the 6 - 7 year old sample and the 12 - 13 year old sample were compared with those for the 7 - 11 age groups, the same continuing trends were observed, even though the test battery is not intended to be equally valid for ages outside 7 - 11. These trends are displayed in figures 2 and 3. For purposes of comparison, these have been grouped first by age mean scores and secondly by subtest mean scores to highlight any variations in the rate of increase.

Table 2 also gives significance figures for mean score increases, both at the one year and at the two year interval. This enables us to examine the first three hypotheses.

FIGURE 1 MUSIC RESPONSIVENESS TEST

DISTRIBUTION OF SCORES N = 985 7 - 11 yrs.

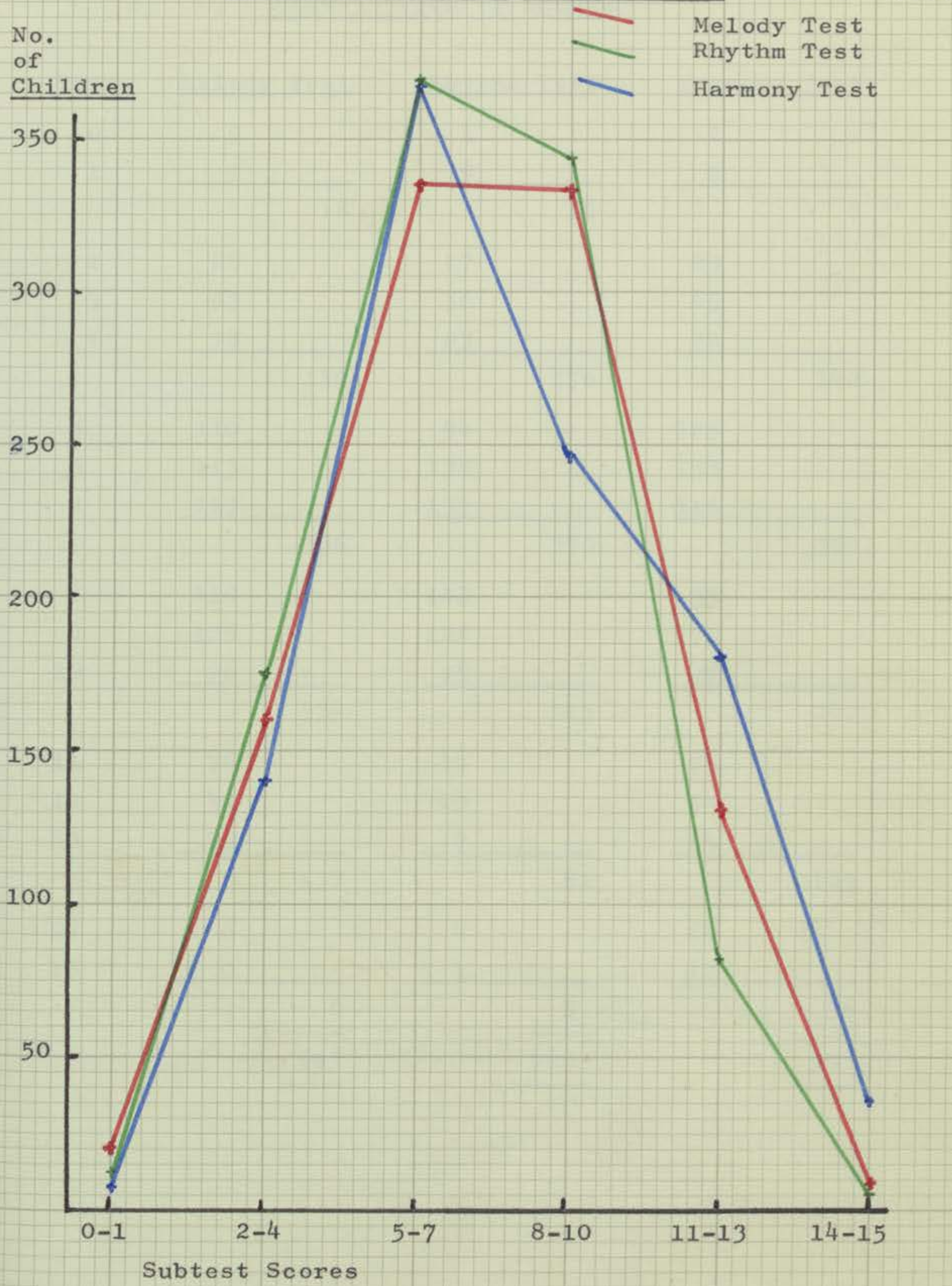


TABLE 1

MUSIC RESPONSIVENESS TEST 7 - 11

DISTRIBUTION OF SCORES

Score	Melody Test		Rhythm Test		Harmony Test	
0	9		1		2	
1	9		9		6	
		18		10		8
2	28		27		25	
3	53		56		45	
4	78		93		72	
		159		176		142
5	110		94		125	
6	113		138		128	
7	113		138		116	
		336		370		369
8	110		142		95	
9	128		126		75	
10	96		75		77	
		334		343		247
11	76		49		75	
12	40		23		54	
13	16		9		54	
		132		81		183
14	6		4		24	
15	0		1		12	
		6		5		36
		985		985		985

Melodic Aspect of Musical Ability

Hypothesis 1. (a) There is no significant growth in the melodic aspect of musical ability as measured by the test through the 7 - 11 age range.

This was conclusively disproved at all age levels in the sample. As the figures in table 2 indicate, there was a difference in mean scores, significant at the 1% level, between the 7 - 8 and 8 - 9 age groups; the same significant difference, also at the 1% level occurred between the 8 - 9 and 9 - 10 age groups. When comparing the 9 - 10 with the 10 - 11 age groups, there was a significant increase at the 5% level.

When comparisons were made at the two year interval, the null hypothesis was again conclusively disproved at the 1% level both between the 7 - 8 and 9 - 10 age groups and between the 8 - 9 and 10 - 11 age groups. The ranges of Melody Test scores and standard deviations are listed below -

AGE GROUP	MELODY SCORE RANGE	STANDARD DEVIATIONS
6 - 7	0 - 11	2.75
7 - 8	0 - 13	1.82 to 2.83
8 - 9	1 - 14	2.28 to 2.67
9 - 10	2 - 14	2.18 to 2.94
10 - 11	1 - 14	1.81 to 2.44
11 - 13	2 - 15	2.10
18 - 20	9 - 14	1.16

(The range of S.D.s in the different classes constituting the 7 - 11 sample is shown.)

Rhythmic Aspect of Musical Ability

Hypothesis 1.(b) There is no significant growth in the rhythmic aspect of musical ability as measured by the test through the 7 - 11 age range.

No significant differences were found when comparing the

TABLE 2 MUSIC RESPONSIVENESS TEST

Means of Tests for Various Age Groups

Age Group		Melody	Rhythm	Harmony	Battery
6-7	N = 43	5.05	5.23	5.77	16.05
7-8	N = 190	6.44	6.25	6.68	19.37
8-9	N = 191	7.41	7.07	7.05	21.53
9-10	N = 190	8.36	7.58	9.08	25.02
10-11	N = 198	8.95	7.87	9.81	26.63
12-13	N = 33	10.12	10.06	11.18	31.30
18-20 (College Students)	N = 32	11.34	11.97	13.44	36.72

Significance of Increase in Age Means - One Year Interval

7-8 to 8-9	t = 3.66	Melody	Significant at the 1% level
	3.20	Rhythm	" " " " "
	1.33	Harmony	Not significant
8-9 to 9-10	t = 3.52	Melody	Significant at the 1% level
	1.98	Rhythm	" " " 5% "
	6.55	Harmony	" " " 1% "
9-10 to 10-11	t = 2.02	Melody	Significant at the 5% level
	1.08	Rhythm	Not significant
	2.27	Harmony	Significant at the 5% level

Two Year Interval

7-8 to 9-10	t = 7.14	Melody	Significant at the 1% level
	5.12	Rhythm	" " " " "
	7.88	Harmony	" " " " "
8-9 to 10-11	t = 6.06	Melody	Significant at the 1% level
	3.01	Rhythm	" " " " "
	9.20	Harmony	" " " " "

FIGURE 2 MUSIC RESPONSIVENESS TEST

COMPARISON BETWEEN THE THREE SUBTESTS AND THEIR MEAN SCORES AT VARIOUS AGES

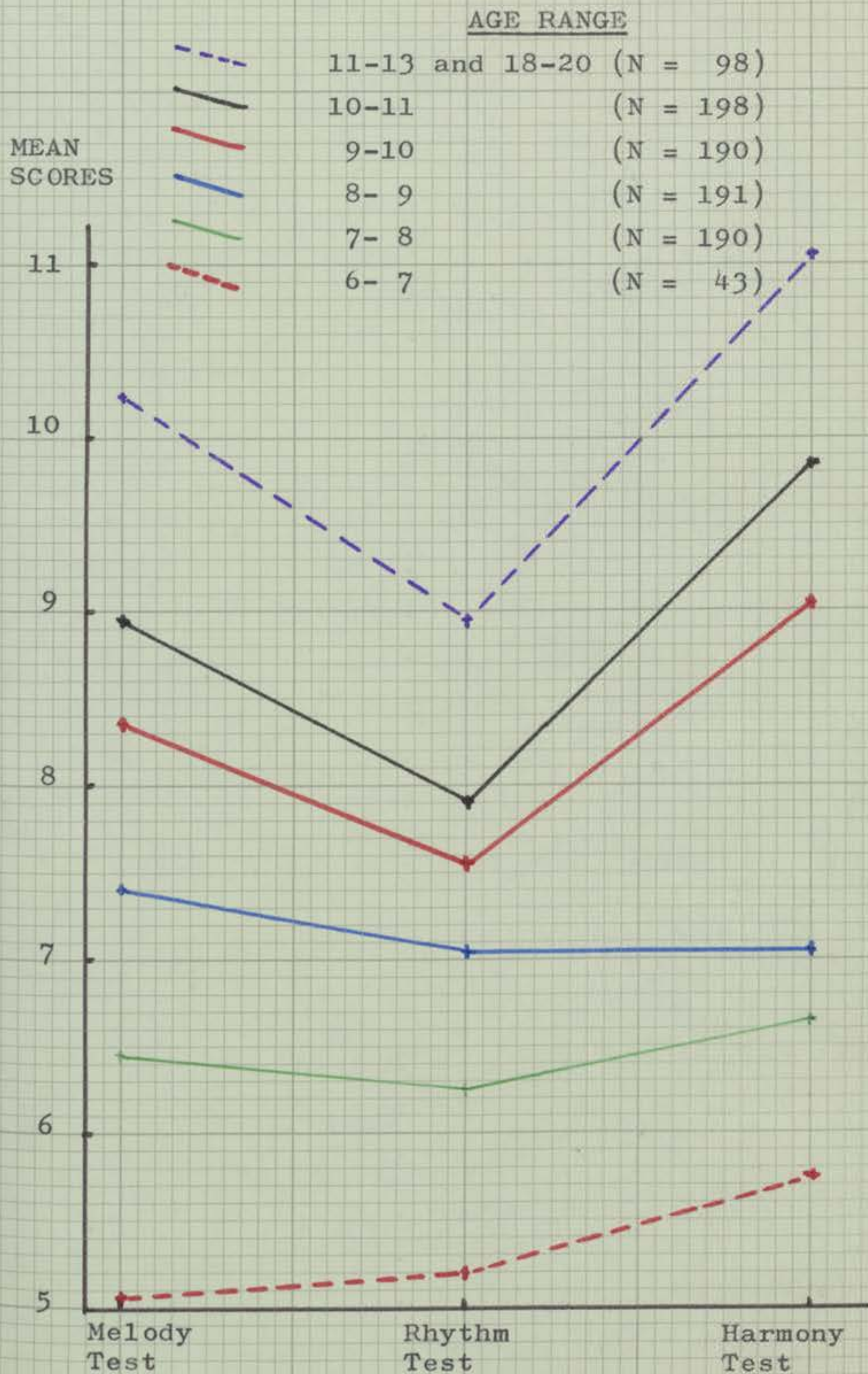
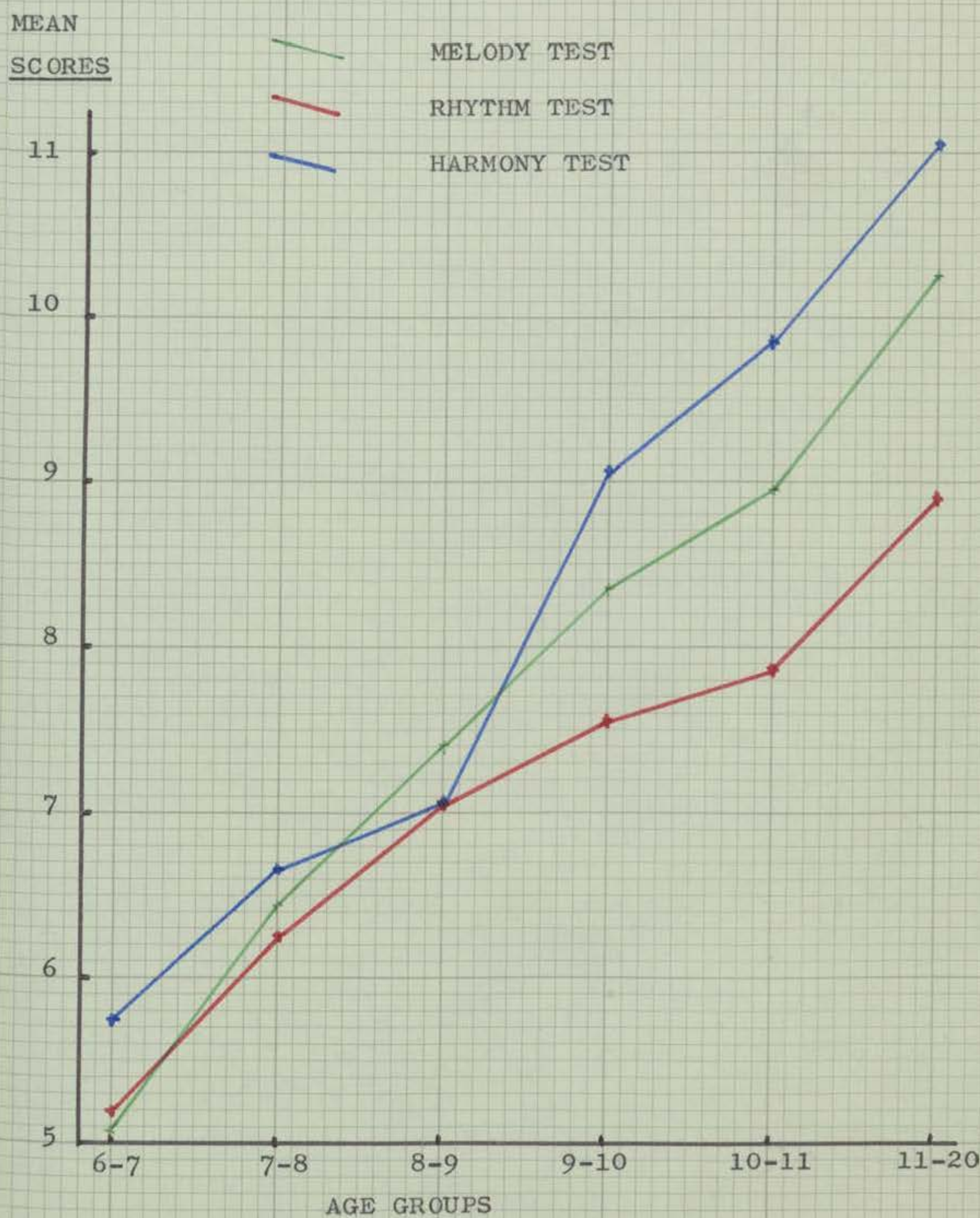


FIGURE 3 MUSIC RESPONSIVENESS TEST

COMPARISON BETWEEN THE VARIOUS AGE GROUPS AND THEIR MEAN SCORES FOR THE THREE SUBTESTS



year interval between the 9 - 10 and 10 - 11 age groups. The hypothesis was however disproved at the 1% level between the 7 - 8 and 8 - 9 age groups, and at the 5% level between the 8 - 9 and 9 - 10 groups. (Table 2)

When comparing rhythm mean scores at the two-year interval, the hypothesis was disproved in both cases at the 1% level, although the t-test figures were not as high as was the case with melody mean scores. The ranges of rhythm test scores and standard deviations are displayed below -

Age Group	Rhythm Score Range	Standard Deviations
6-7	1 - 10	2.45
7-8	1 - 13	1.84 to 2.50
8 -9	1 - 13	2.25 to 2.69
9 -10	0 - 14	1.88 to 2.80
10-11	1 - 15	2.39 to 3.00
11-13	4 - 14	1.89
18-20	8 - 15	1.61

(The range of S.D.s in the different classes constituting the 7-11 sample is shown.)

Harmonic Aspect of Musical Ability

Hypothesis 1. (c) There is no significant growth in the harmonic aspect of musical ability as measured by the test through the 7 - 11 age range.

There are no significant differences when comparing the mean scores of the 7 - 8 and 8 - 9 year groups. The hypothesis is disproved at the 1% level however for the 8 - 9 and 9 - 10 year groups, and at the 5% level for the 9 - 10 and 10 - 11 year groups. Table 2 also shows that the hypothesis is disproved at the 1% level when comparing year groups at the two-year interval, both for the 7 - 8 and 9 - 10 groups and for the 8 - 9 and 10 - 11 groups.

At the two-year interval, significance figures are very high, higher in fact than the equivalent figures for the melody and rhythm subtests. The range of harmony test scores and standard deviations is given below -

Age Group	Harmony Score Range	Standard Deviations
6-7	1 - 14	2.90
7-8	1 - 13	1.95 to 2.74
8-9	1 - 14	2.35 to 3.11
9-10	0 - 15	2.40 to 3.17
10-11	2 - 15	2.43 to 3.05
11-13	4 - 15	2.32
18-20	7 - 15	1.56

Scores of Boys and Girls

Comparison of the musical ability of boys and girls has been the subject of several researches in various fields of music. Gilbert [1] (1942) using the K-D test battery found significant sex differences, favouring girls; he ascribed this superiority to the fact that the girl students in his sample had received more training in music, thus gaining the benefit of extra musical experience.

Kwalwasser [2] (1955) puts down the superior test performances of girls to the comparative lack of interest shown by boys in school music. Horner [3] quotes Petzold (1960) as finding no significant difference in music-reading ability between the performances of boys and girls. Drake [4] (1957) also reports no significant differences in the scores obtained by boys and girls for his tests.

In this country, research workers report no significant difference between the sexes in musical ability. This is interesting in view of Kwalwasser's account of the difference in ability of boys and girls in a variety of European

1. 'Sex Differences in Musical Aptitude and Training' G.M. Gilbert - J. Gen. Psychol. - 1942
2. Kwalwasser J - Exploring the Musical Mind 1955-Page 74
3. 'The Perception of Music Symbols in Music Reading by Normal Children and by Children Gifted Musically' R.G.Petzold - J.Exp.Educ. - 1960
4. Manual for the Drake Music Aptitude Tests-Chicago-1957

countries, including Ireland, England and Scotland. Kwalwasser reports boys' superiority in Scotland, and dwells on the magnitude of the superiority of girls' musical ability in England and Ireland.

In contrast to these findings, Wing[1] (1948) reports no significant sex difference in musical ability, as measured by his tests, at least until the age of 14. Bentley[2] (1963) also fails to find any significant differences between the scores of the sample of boys and girls to whom he administered his tests. There is an implied criticism of these findings in the conclusion to Shuter's psychological thesis (1964) in which she states - [3]'It is difficult to understand how a sex-linked genetic mechanism could be involved in the transmission of musical aptitude when boys and girls make roughly equal scores in musical ability tests.'

This leads us back to the consideration of the dominating influence of environment in the development of musical ability. Shuter is reporting a variety of tests, most of which claim no significant difference between the scores of boys and girls. What are the factors at work behind this inconsistency of findings?

A recent research programme by Petzold[4] (1966) which reports on the findings from a variety of tests gives the following figures -

(a) Longitudinal study, 45 item test - significant superiority of girls at the 1% level.

(b) Timbre study - significant superiority of girls at the 1% level.

1. Tests of Musical Ability and Appreciation - H.D.Wing Brit. J. Psychol. Monogr. Suppl. - 1948
2. Ph.D.Thesis - Reading 1963 - A.Bentley - page 136
3. Ph.D.Thesis - London 1964 - R.P.G.Shuter - page 409
4. 'Auditory Perception of Musical Sounds by Children in the first 6 Grades ' University of Wisconsin' Cooperative Research Project 1966 - R.G. Petzold

(c) Harmony study - significant superiority of girls at the 5% level.

(d) Rhythm study - no significant difference.

Farnsworth (1958) sums up this confused situation rather neatly -

[1]'Far more basic data must be gathered before sex differences can be properly explained. Unfortunately these cannot be gathered until there emerges a culture in which the two sexes have equal opportunity and equal motivation to achieve in the arts.'

The present study, like that of Petzold's (1966) will be reporting a variety of findings on this question of whether or not girls show significantly superior test scores to boys. In the schools visited during this testing programme, there were opportunities for musical experience for both boys and girls. Where these were made available to seven year olds, boys seized such opportunities almost as avidly as girls. This appears to stand in contrast to many earlier studies which attributed girls' superior scores to their greater interest and participation in musical activities. However, where the initial presenting of such musical opportunities was to ten year olds, the writer's observation was that girls responded far more than boys.

Music Responsiveness Test Scores of Boys and Girls

Hypothesis 2. There is no significant difference between the scores of girls and boys in the age range under review.

This part of the research was investigated in two ways (a) by looking at the total sample of boys and girls in the chosen age range and (b) by taking a pair of classes in each age group for purposes of sex comparison.

Method (a) The sample consisted of 375 boys and 406 girls. The t-test was the method chosen even though quite a large sample was involved.

1. The Social Psychology of Music - P.R. Farnsworth N.Y. 1958 - page 189

Boys' mean melody score = 7.31

Girls' mean melody score = 7.90

This difference in mean scores ($t = 2.95$) is significant at the 1% level.

Boys' mean rhythm score = 6.75

Girls' mean rhythm score = 7.39

This difference in rhythm mean scores ($t = 3.31$) is significant at the 1% level.

Boys' mean harmony score = 7.63

Girls' mean harmony score = 8.39

This difference in harmony mean scores ($t = 3.28$) is significant at the 1% level.

Method (b) When hypothesis 2 was tested by this method, the results were far less consistent. The four Primary schools used for the experiment had two-form entry, so the whole of that particular age group for the four schools was tested.

7 - 8 year group ($N = 59$)

The difference between boys' and girls' melody mean scores was not significant ($t = 1.55$).

The difference between boys' and girls' rhythm mean scores was not significant ($t = 0.93$).

Nor was the difference between boys' and girls' harmony mean scores significant ($t = 1.02$).

When the difference in total mean scores of boys and girls was examined for these two classes, this was also not significant ($t = 0.60$).

8 - 9 year group ($N = 54$)

Boys and girls - difference in melody mean scores not significant ($t = 0.62$).

Nor was the difference in rhythm and harmony mean scores significant ($t = 1.04$ and 1.06 respectively).

When the difference in total score means was examined, this was not significant either ($t = 1.31$).

9 - 10 year group (N = 54)

Melody mean scores - difference just significant at the 5% level (t = 2.00).

Rhythm mean scores - difference almost significant at the 5% level (t = 1.99).

Harmony mean scores - difference between boys and girls significant at the 1% level (t = 3.57).

The difference between the total mean scores of boys and girls was also found to be significant at the 1% level (t = 3.44).

10 - 11 year group (N = 71)

Difference between melody mean scores of boys and girls is not significant (t = 0.77).

Rhythm mean scores - difference not significant (t = 1.54).

Harmony mean scores - difference not significant (t = 1.05).

The difference in the total means of boys and girls was only just significant at the 10% level (t = 1.72).

The only consistent point emerging from these findings, using this small sample testing technique, is that around the age of nine years girls seem to draw ahead of boys in some of the aspects of musical ability being examined by these tests. Figures 5, 6, 7 and 8 together with associated table 3, show how the rates of increase in mean scores vary for the samples of boys and girls tested.

There appears to be insufficient evidence in this study to state categorically that girls are superior to boys over the whole field of musical ability in the age range 7 - 11.

Music Responsiveness Test Scores and Standardised Tests of Verbal Reasoning

Hypothesis 3. There is no significant association between intelligence quotients and the scores obtained in the Music Responsiveness Test for the age group under

FIGURE 4 MUSIC RESPONSIVENESS TEST

COMPARISON BETWEEN THE MEAN SCORES OF BOYS AND GIRLS FOR THE FOUR AGE GROUPS

MELODY

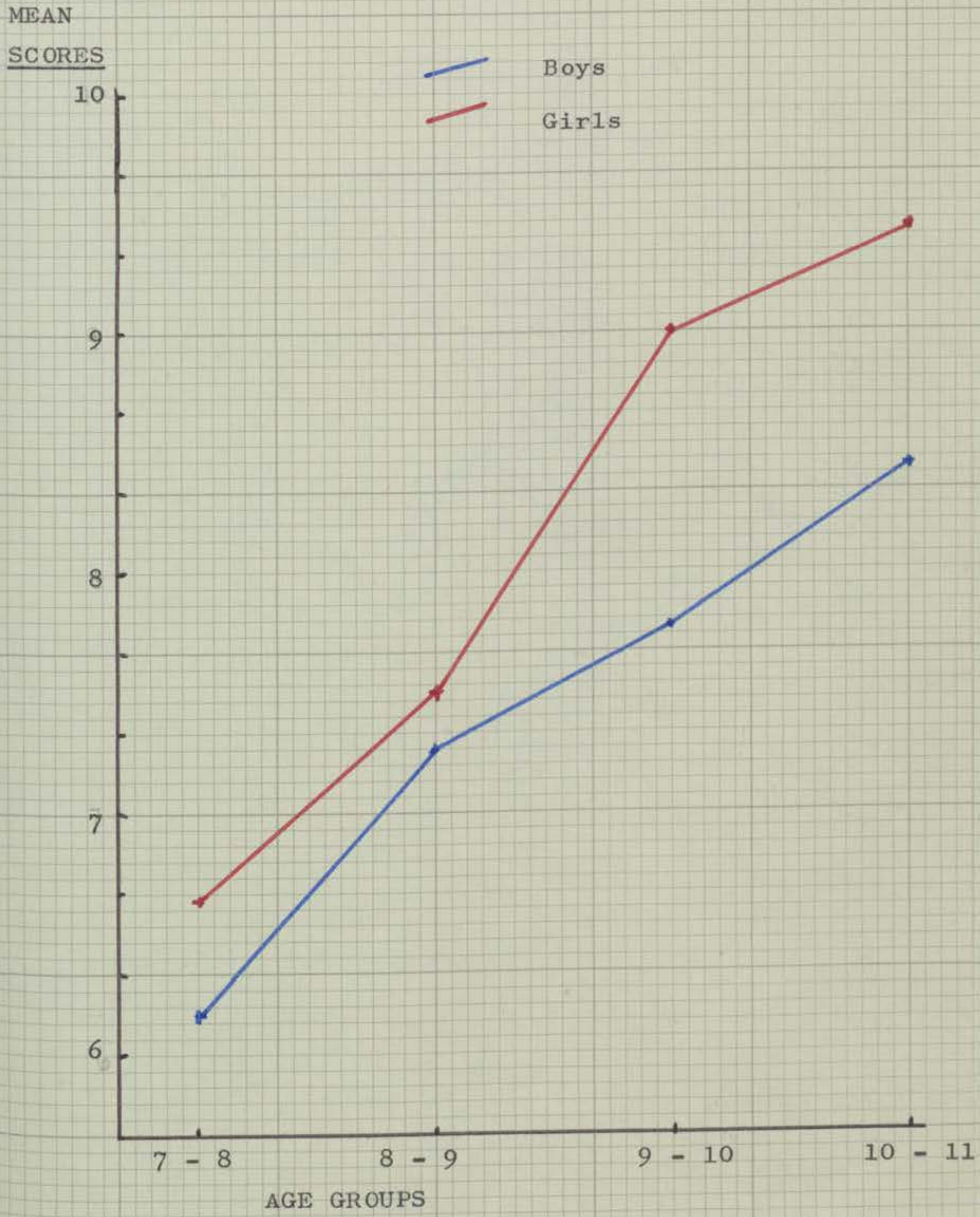


FIGURE 5 MUSIC RESPONSIVENESS TEST

RHYTHM

COMPARISON BETWEEN THE MEAN SCORES OF BOYS AND GIRLS FOR THE FOUR AGE GROUPS

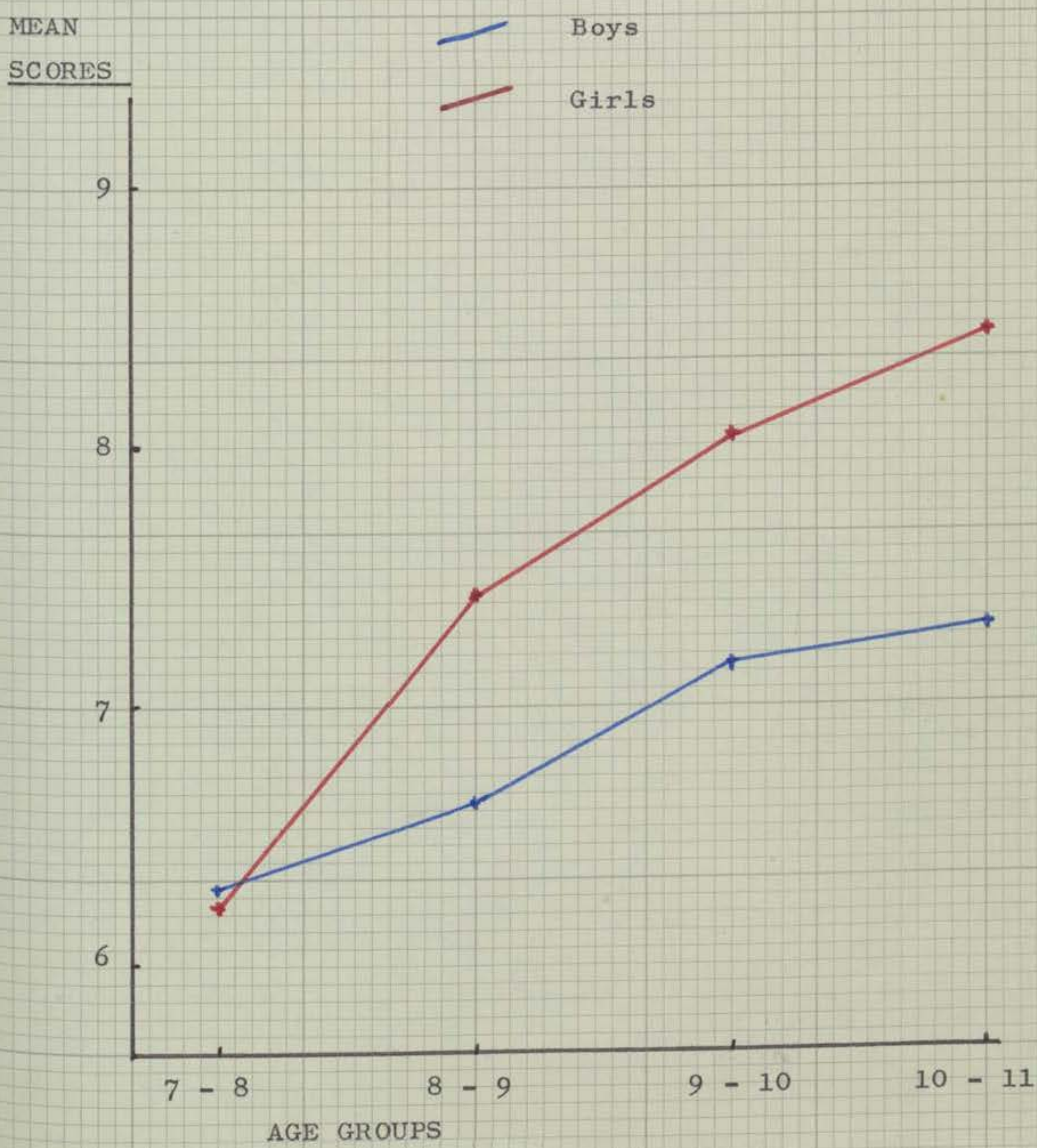


FIGURE 6 MUSIC RESPONSIVENESS TEST

HARMONY

COMPARISON BETWEEN THE MEAN SCORES OF BOYS AND GIRLS FOR THE FOUR AGE GROUPS

FIGURE 7 MUSIC RESPONSIVENESS TEST

BOYS AND GIRLS

COMPARISON OF MEAN SCORES FOR THE FOUR AGE GROUPS

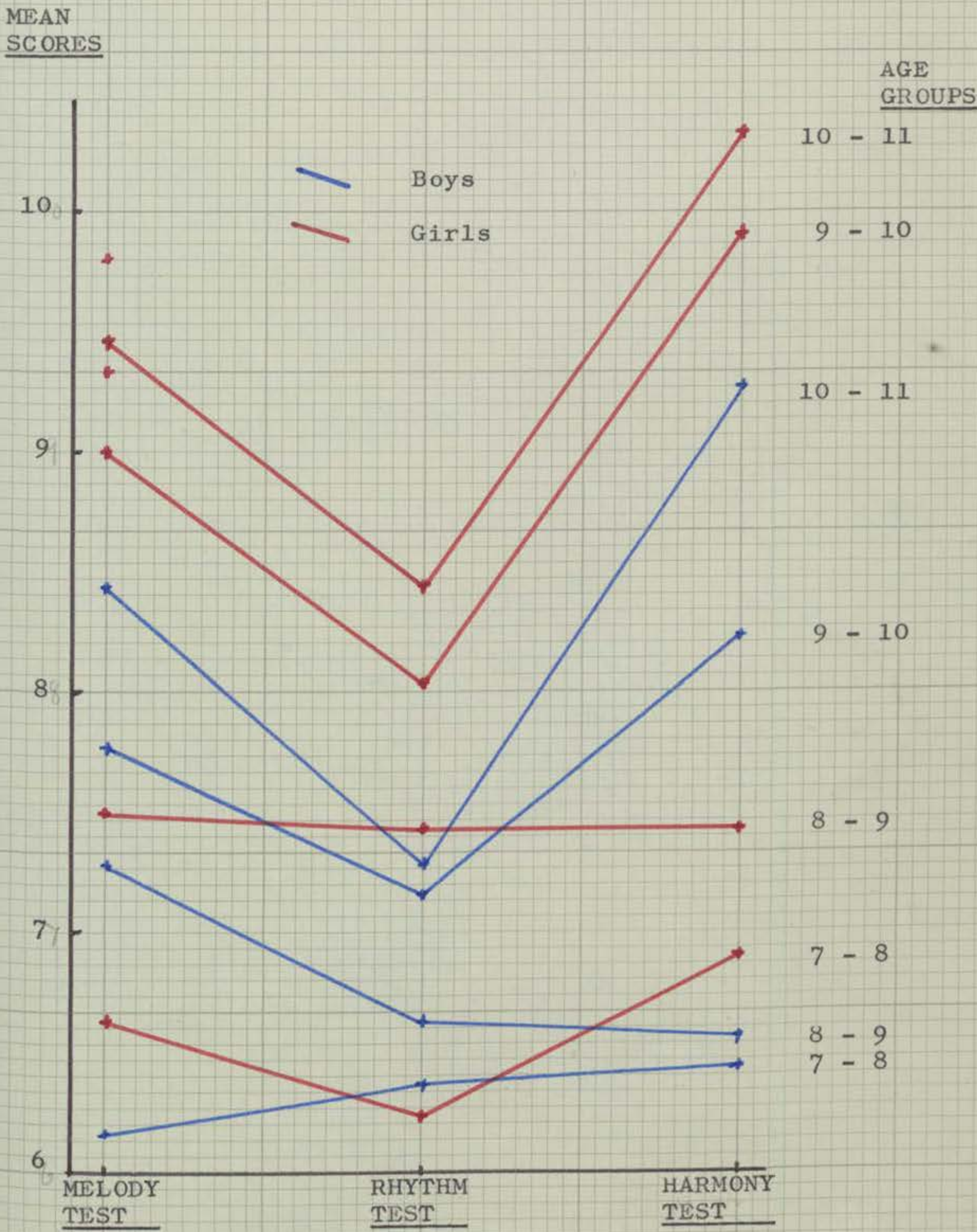


TABLE 3

MUSIC RESPONSIVENESS TEST

BOYS AND GIRLS

MEAN SCORES FOR THE FOUR AGE GROUPS

YEAR GROUP	TEST	BOYS		GIRLS	
7 - 8	Melody	N = 85	M = 6.19	N = 105	M = 6.64
	Rhythm		6.29		6.22
	Harmony		6.44		6.89
8 - 9	Melody	N = 85	M = 7.28	N = 106	M = 7.51
	Rhythm		6.62		7.42
	Harmony		6.55		6.45
9 - 10	Melody	N = 98	M = 7.78	N = 92	M = 9.00
	Rhythm		7.16		8.01
	Harmony		8.25		9.89
10 - 11	Melody	N = 99	M = 8.43	N = 99	M = 9.46
	Rhythm		7.30		8.43
	Harmony		9.28		10.33

review,

It seemed desirable to examine this relationship as part of the process of child development. Previous studies concerning themselves with intelligence and musical ability had revealed a fair measure of consistency in their findings.

Bentley (1963) reports -

[1]'The influence of intelligence on the ability to do these tests is at the most only slight. All correlation coefficients in this study are lower than r = o.4.'

This further comment of Bentley helps to clarify his view -

[2]'Scientifically-proved conclusions are elusive when dealing with the complex pattern of behaviour that comprises musical ability and with the equally complex patterns of what is commonly known as intelligence.'

Bentley concludes -

[3]'Thus musical ability tests have a separate function from tests of intelligence.'

Shuter (1964) reports in the same vein -

[4]'Most of the correlations (between musical ability and general intelligence) are positive but low. Wing and Kwalwasser refer to 0.30 as being the approximate correlation for normal subjects.'

In conclusion Shuter writes -

[5]... there appears little ground for thinking that the better standardised tests are unduly affected by intelligence, although no doubt further research is needed.'

1. Thesis 1963 - A Bentley - Page 148
2. - do - Page 149
3. - do - Page 150
4. Ph.D. Thesis - London 1964 - R.P.G.Shuter - Page 107
5. - do - Page 116

and finally -

[1]'The coefficients ... are to some extent doubtless a function of the particular intelligence test used.'

All the evidence accumulated for this portion of the study derives from the secondary selection procedures extant in the county of Dorset in 1966 and 1967, when the whole of the 10-11 year group in the county's schools are tested. The main selection test used in those years was the [2]Moray House Verbal Reasoning Test from which the teachers involved were required to calculate standardised quotients.

Five schools gave the writer access to their selection lists showing which pupils went to Grammar and which to Secondary Modern schools. One school allowed the use of confidential figures - the children's standardised quotients - so that the writer was able to calculate product-moment correlations between these verbal reasoning quotients and the subtest scores of the Music Responsiveness Test for a sample of seventy children aged 10-11.

For this sample of 70, the following correlation coefficents were obtained -

Melody Test	score/Verbal	Reasoning	quotient	-		$r = 0.40$
Rhythm	"	"	"	"	"	$r = 0.37$
Harmony	"	"	"	"	"	$r = 0.58$

All these correlations are significant at the 1% level.

The harmony curve of distribution of scores fpr this 10 - 11 year group was somewhat negatively skewed, so this last coefficient may not be quite accurate as product-moment correlations imply reasonably regular distributions. For this relatively small sample, however, it can be seen that the coefficients are rather higher

1. Ph.D. Thesis - London 1964-R.P.G.Shuter - Page 117
2. Secondary Selection Verbal Reasoning Tests -County of Dorset 1966, 1967.

TABLE 4

MUSIC RESPONSIVENESS TEST

CHI-SQUARED TEST OF SIGNIFICANCE OF ASSOCIATION BETWEEN TEST SCORES AND VERBAL REASONING QUOTIENTS (MORAY HOUSE).

		Two-fold Classification
SCHOOL I N = 29		
Melody Test	Chi-squared =	2.55 not significant
Rhythm "	"	2.78 "
Harmony "	"	9.85 significant at 1% level
Battery	"	8.67 " " 2% "
SCHOOL 2 N = 54		
Melody Test	Chi-squared =	3.68 not significant
Rhythm "	"	2.60 "
Harmony "	"	4.61 "
Battery	"	8.18 significant at 2% level
SCHOOL 3 N = 42		
Melody Test	Chi-squared =	8.41 significant at 2% level
Rhythm "	"	1.86 not significant
Harmony "	"	9.96 significant at 1% level
Battery	"	5.06 10% level only
SCHOOL 4 N = 61		
Melody Test	Chi-squared =	10.02 significant at 1% level
Rhythm "	"	11.07 " " 1% "
Harmony "	"	0.88 not significant
Battery	"	8.33 significant at 2% level
SCHOOL 5 N = 40		
Melody Test	Chi-squared =	1.95 not significant
Rhythm "	"	0.68 " "
Harmony "	"	5.93 10% level only
Battery	"	3.13 not significant

than those quoted earlier from the studies of other researchers, and this is especially so in the case of the harmony subtest. However the correlations are still fairly low, which gives credence to Bentley's statement that musical ability tests have a 'separate function' from tests of intelligence (or verbal reasoning).

Table 4 shows the chi-squared figures obtained from a comparison of Grammar/Secondary Modern selection with Music Responsiveness Test scores for the five schools from whom data came. It can be seen that ten out of the fifteen subtests fail to achieve a significant association with the two-fold classification at the 5% level. It might be inferred from these findings that intelligence, as measured by Verbal Reasoning tests exercises a relatively minor influence on musical ability as measured by the Music Responsiveness Test.

Intercorrelations between Subtest Scores

Hypothesis 4. There is no significant intercorrelation between the melodic, rhythmic and harmonic aspects of musical ability as measured by the tests in this chosen age range.

This hypothesis was examined for each year group within the 7 - 11 year sample. Again, schools with a two-form entry were chosen. Table 5 gives a comparison of correlation coefficients between the subtests. Reasonably regular normal score distributions enabled the use of the product-moment correlation.

Examination of table 5 shows clearly that there is a relatively higher correlation throughout the entire sample between melody and harmony scores than occurs between rhythm scores and those of the other two subtests. Since the various age samples are rather small, it would perhaps be inadvisable to make dogmatic assertions as to how separate are these various aspects of musical ability.

TABLE 5

MUSIC RESPONSIVENESS TEST

INTERCORRELATIONS BETWEEN SUBTEST SCORES

SCHOOL 1	10 - 11 age group	(N = 70)
	Melody/Rhythm	r = 0.18
	Melody/Harmony	0.62
	Rhythm/Harmony	0.25
SCHOOL 2	9 - 10 age group	(N = 56)
	Melody/Rhythm	r = 0.26
	Melody/Harmony	0.57
	Rhythm/Harmony	0.34
SCHOOL 3	8 - 9 age group	(N = 54)
	Melody/Rhythm	r = 0.15
	Melody/Harmony	0.31
	Rhythm/Harmony	0.17
SCHOOL 4	7 - 8 age group	(N = 59)
	Melody/Rhythm	r = 0.42
	Melody/Harmony	0.48
	Rhythm/Harmony	0.29

However the view might be hazarded that since correlations are relatively low it has been a worthwhile procedure to separate out these three aspects of melody, rhythm and harmony for independent analysis.

Shuter's comments on this point are significant -

[1]'A separate factor of rhythm seems to lurk in the shadows of several studies where tests of pitch and memory have been highlighted.'

and later

'An appreciation of rhythm should be connected with dynamic changes,with harmonic progression and with phrasing, as well as with perception of time and pitch differences.'

Further explanation is forthcoming in Shuter's thesis (1964) -

[2]'Part of the correlation may be due to general intelligence.'

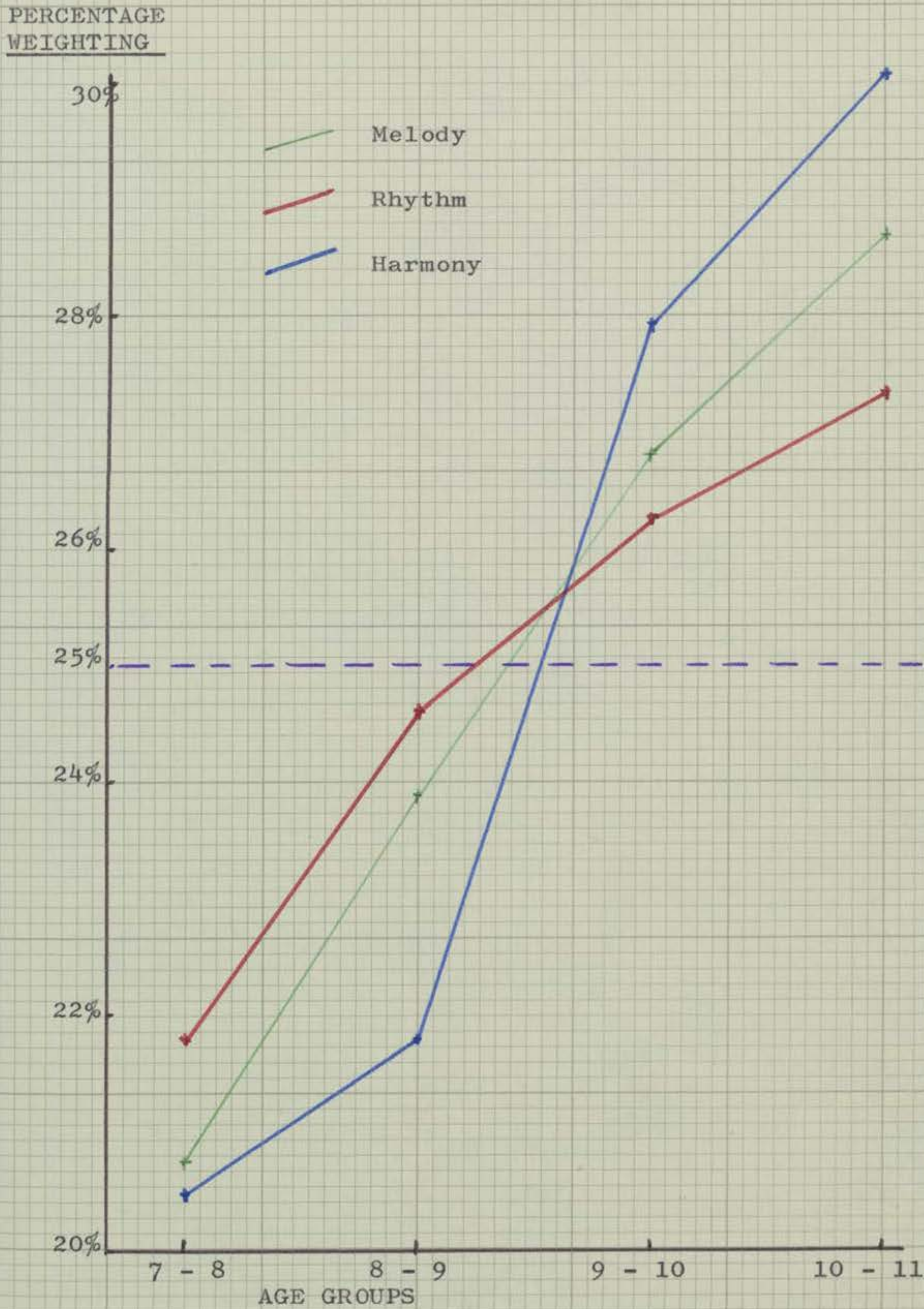
Whether or not we go along with Wing and Drake in explaining such correlations by the idea of a 'common factor', we must recognise that in this complex pattern that comprises musical behaviour there will be interaction at all levels between the various aspects of musical ability. The important genetic component, itself immensely complex, that underlies all musical development would appear to separate off rhythmic development into a more independent position from melodic and harmonic development which appear to be rather more closely related, but still relatively independent.

Figure 8 shows how the three aspects of musical ability measured by this test interchange in their relative development through childhood to adulthood. It is

1. The Psychology of Musical Ability - Rosamund Shuter - 1968 - Pages 189 and 191
2. PH.D. Thesis - Shuter - 1964 - Page 69

FIGURE 8 MUSIC RESPONSIVENESS TEST

RELATIVE WEIGHTING OF EACH ASPECT OF MUSICAL ABILITY FOR THE FOUR AGE GROUPS



interesting to note rhythm's more important position in earlier years. We are of course qualifying rhythm as that measured in this test. The same sharp rise in harmonic development is again evident around the age of 10, whilst melodic development is relatively steady and consistent in its rate of increase.

Instrumental Experience and Musical Ability

One of the main objectives of this research is to examine the effect of instrumental experience on the development of children's musical ability. It has proved possible to select schools in such a way as to constitute a sample in which single variable situations can be examined.

In the case of the present sample, it has proved possible to keep all conditions of education constant, that is in the classroom situation, except that of instrumental experience. Some children from each class were learning to play a musical instrument; this was on a basis of regular lessons in school and was a complete musical experience in the sense that children learned to read staff notation through their instrumental experience, and many, in fact the majority enjoyed the experience of playing in parts - involving the aspect of harmonic development.

The possibility of some form of pre-selection or self-selection for instrumental tuition will be discussed more fully in the later stages of this thesis.

The question was, did such experience in the age range 7 - 11 have any favourable effect upon their musical development as measured by the test? This was put in null hypothesis form:

Hypothesis 5. Instrumental experience has no significant effect on the aspects of musical ability measured by the test.

Literature dealing with the effect of instrumental experience reports contradictory findings. Kwalwasser (1955) grouped the scores of 4200 children aged 10 - 19, using the K-D test on the basis of instrumental training and no training. Investigation of the scores of these two groups led Kwalwasser to the following unequivocal conclusions -

[1]'On every test the trained are superior to the untrained!

He reports the largest differences in mean scores in the tonal memory and tonal movement tests of the K-D battery. Against this may be set a portion of Wing's conclusions (1954) -

[2]'If a child has extra music lessons over his school fellows because he is learning a musical instrument, they do not appear to increase his ability to do the tests.'

These two quotations are representative of two opposing groups of researchers whose findings are anything but consistent. It is true that the K-D and the Wing tests are not similar either in construction or in function, but the statements of Wing and Kwalwasser allow of no compromise on the effect of instrumental experience.

The findings of the present study come down strongly against the findings of Dr. Wing. Summaries of t-tests are reported below, showing the influence of instrumental experience in 13 schools.

Melody Test Mean Scores

In 20 classes involving over six hundred children aged 7 - 11, six sets of results revealed no significant

1. Exploring the Musical Mind - J.Kwalwasser - 1955 Page 86
2. 'Some applications of Test Results to Education in Music' Brit. J. Ed. Psych. XXIV - 1954 - Page 167

superiority for instrumentalists, two classes showed significant superiority for instrumentalists at the 5% level, and 12 classes at the 1% level of significance.

Rhythm Test Mean Scores

For the same sample, 15 classes showed no significant difference, the results of 3 classes favoured instrumentalists at the 2% level of significance, and 2 classes at the 1% level.

Harmony Test Mean Scores

Three classes revealed no significant differences, two classes favoured instrumentalists at the 10% level of significance, three at the 5% level, and no less than 11 classes were significantly differentiated at the 1% level.

When comparing these three aspects of musical ability, it will be noticed that the superiority of instrumentalists in the melody test and particularly in the harmony test is very marked indeed, but that this superiority is less pronounced in the case of the rhythm test.

Total Mean Scores

Only one class out of the 20 tested failed to reveal a significant difference in battery mean scores. One class showed the superiority of instrumentalists at the 10% level of significance, 3 classes at the 5% level, two at the 2% level and 14 registered a difference significant at the 1% level.

Another way of examining hypothesis 5 is by looking at each year group within the sample in turn. Table 6 shows details of the sample grouped in this way; t-tests show a clear-cut superiority of instrumentalists' mean scores.

The rhythmic aspect of musical ability as measured by this test seems to be less influenced by instrumental experience than that of melody and harmony; even with rhythm however there was shown a significant superiority

TABLE 6. MUSIC RESPONSIVENESS TEST t-test

COMPARISON OF MEAN SCORES OF INSTRUMENTALISTS AND NON-INSTRUMENTALISTS FOR EACH AGE GROUP

7 - 8 AGE GROUP	$N = 220$		
Melody Test	$t = 4.72$	significant at the 1% level	
Rhythm Test	$t = 2.39$	" " " 2%	
Harmony Test	$t = 4.30$	" " " 1% "	
8 - 9 AGE GROUP	$N = 262$		
Melody Test	$t = 6.00$	significant at the 1% level	
Rhythm Test	$t = 3.35$	" " " 1% "	
Harmony Test	$t = 4.82$	" " " 1% "	
9 - 10 AGE GROUP	$N = 215$		
Melody Test	$t = 6.05$	significant at the 1% level	
Rhythm Test	$t = 3.10$	" " " 1% "	
Harmony Test	$t = 5.09$	" " " 1% "	
10 - 11 AGE GROUP	$N = 208$		
Melody Test	$t = 2.88$	significant at the 1% level	
Rhythm Test	$t = 2.21$	" " " 5% "	
Harmony Test	$t = 3.92$	" " " 1% "	

for those children receiving instrumental tuition. It would appear that there is very strong evidence of the benefit derived from early instrumental experience, at least for these three chosen aspects of musical ability.

It is particularly interesting to note the early development possible in the field of harmonic development, although it has to be remembered that the harmony subtest does not call for the type of analysis needed to deal with the chord analysis tests in the Wing and Bentley batteries.

When the total mean scores of instrumentalists (N = 456) are compared with those of children who do not play a musical instrument (N = 527), a highly significant superiority for the former category is displayed (t = 8.66).

It remains now to examine in a little more detail the instrumentalist category. For convenience, children with instrumental experience are classified into three groups - (a) 392 recorder players
(b) 115 pianists
(c) 34 others, of which 22 are violinists
and the remainder a variety of wind instrumentalists.

These groups were not mutually exclusive. In group (c) for example, only 11 children did not also play the recorder, whilst in group (b) only 27 did not also play another instrument.

Recorder players

These children almost without exception received lessons in groups at school. Most of them had experience of playing ensemble music in parts even in the relatively early stages of learning their instrument. Opportunities appeared to be readily available for them to use their instrumental expertise, eg in morning assembly, in class-room music making sessions, and for the more advanced, the miscellany of concerts and social events which form part of school life. Such targets seemed one of the main ingredients in the high motivation sustaining these groups in nearly all the schools visited.

t-tests revealed that the battery mean scores of children playing the recorder were significantly superior at the 1% level over all other children in the sample, including some who played the piano, violin, etc. The figures given below therefore are not merely a comparison of scores of instrumentalists and non-instrumentalists -

7 - 8 year group	t = 4.7
8 - 9 " "	t = 8.1
9 - 10 " "	t = 6.04
10 - 11 " "	t = 5.65
7 - 11 " "	t = 8.1

Figure 9 shows graphically the superiority of the battery scores of the recorder-playing group.

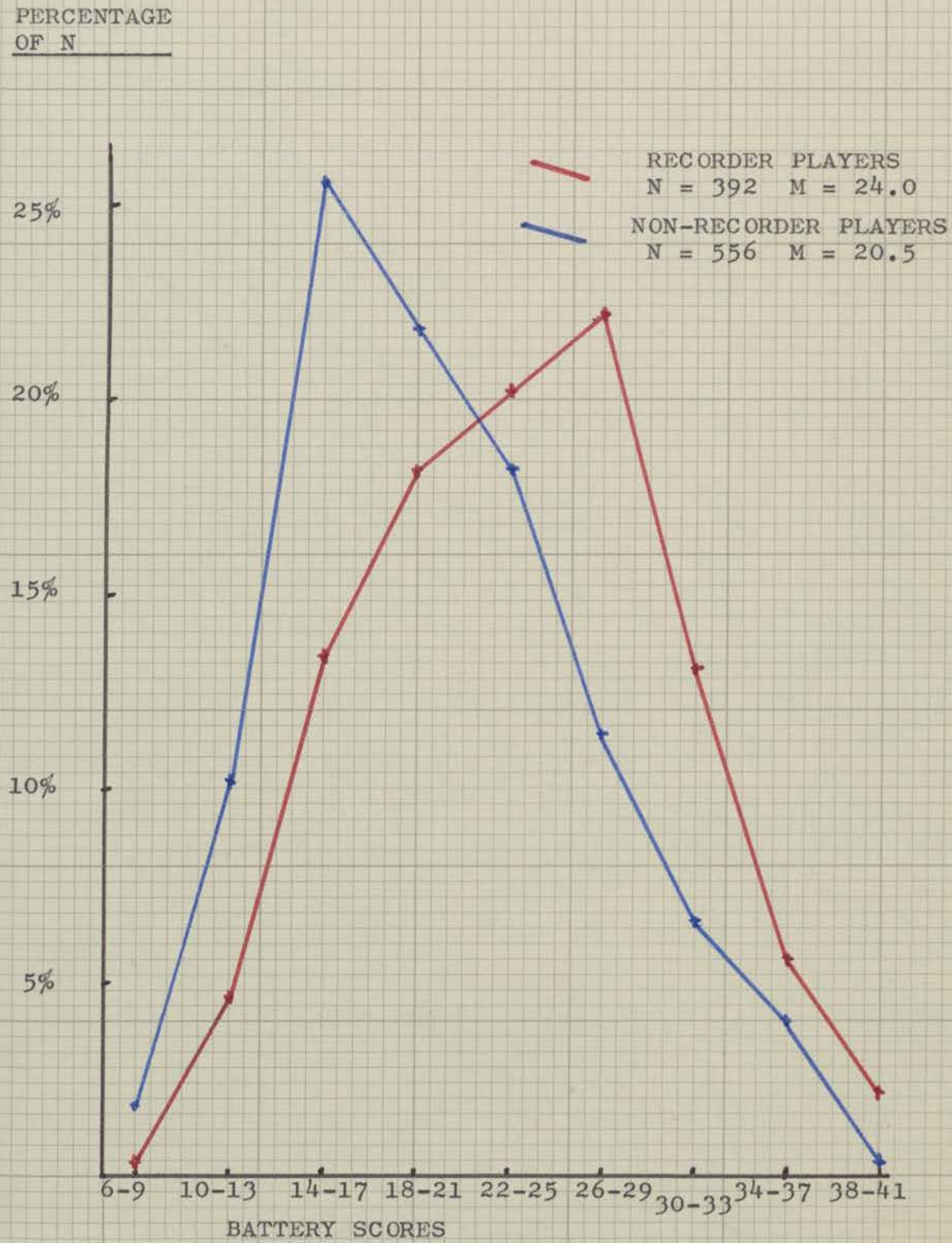
Pianists

It would be expected that relatively few of the 7 - 8 age group would be learning an instrument with such a complex technique as the piano, and this was proved so for this sample, where only 12 children were having piano lessons. In the 8 - 9 group 46 children were learning to play the piano, and for the 9 - 10 and 10 - 11 groups the numbers were 36 and 21 respectively. With such a limited sample it is obviously not possible to draw hard and fast conclusions from the gradual drop in the three upper age groups of children having piano lessons. But one cannot help speculating on the number who abandon their studies after a relatively short period of tuition, and what percentage of children continue their lessons into the post-adolescence phase.

Significance figures were difficult to obtain with such a small sample, but as most of the pianists were also in

FIGURE 9 MUSIC RESPONSIVENESS TEST

COMPARISON OF THE SCORES OF CHILDREN AGED 7 TO 11 WHO PLAY THE RECORDER AND THOSE WHO DO NOT



the recorder-playing category, pianists in the sample share in the same superiority of mean scores over non-players.

Choral experience and musical ability

All children in the sample had of course had the experience of singing as part of class and school groups in normal music lessons and in morning assembly. However some of the children in the 9 - 11 age range had special choral experience as members of their school choir, which rehearsed towards a higher standard than at the class group level; a minority were also members of church choirs.

This additional musical experience seemed worth investigating, and indeed the brief questionnaire on the front of the test leaflet included a request for such information. Membership of such choirs was restricted almost entirely to the older children in the sample with very few children under the age of nine gaining the benefit of such extra experience. In fact the vast majority of children with choral experience of this kind came within the 10 - 11 year group of the sample.

Using t-test techniques 3 schools were selected to examine if such experience resulted in significant superiority of test mean scores. For the purposes of analysis the null form of hypothesis was adopted.

Hypothesis 6. Special choral experience has no significant effect on the aspects of musical ability measured by the test.

Significance figures for the three schools are laid out in table 7. The rhythmic and harmonic aspects of musical ability, as measured by this test, nowhere approach significance at the 5% level, but for two of the schools the melody mean scores of choir members show significant superiority at the 1% level.

As good intonation and phrasing are a vital part of high calibre unison singing, we might expect that melodic development would be stimulated, and this is what findings in this study reveal; however, for the other aspects of musical ability measured there would appear to be little corresponding 'training effect'.

When comparing these significance figures with those for instrumentalists in the same sample, three points emerge - (a) Both instrumental and choral experience give rise to a superiority of mean scores in this test for the melodic aspect of musical ability over those not having such experience - in all cases at the 1% level of significance. (b) This extra musical experience fails to reveal any significant superiority in rhythm test mean scores. (c) Choral experience leads to no significant superiority of harmony test mean scores, whereas instrumental experience emphatically does, either at the 1% or at the 2% level.

Perhaps the reason for this strong contrast shown in (c) lies in the fact that playing in parts is more effective in stimulating harmonic development than unison singing, no matter how high the vocal standards attained.

This increased harmonic awareness that comes from playing in parts, this increased development of harmonic concepts is not only a benefit for those children playing the lower parts, but also for those playing the melodic line as they learn to face intonation problems, particularly in the small group situation.

Reliability

Even though this test was kept deliberately short - 15 items for each of three subtests is quite long enough for children aged seven - it was hoped that reliability coefficients would stand up under scrutiny. Since opportunities for re-testing were very restricted, the technique used for determining reliability was the Kuder-Richardson[1] formula.

The scores of 16 classes in ten schools were analysed by this method, yielding reliability coefficients ranging from 0.69 to 0.89. In view of the limitation on test length due to the extreme youth of the sample, these figures seem very satisfactory for the purposes of the test - the examination of the influence of certain variables, including instrumental experience, on the development of the chosen aspects of musical ability.

In the case of the one school where re-test was possible, the correlation coefficient was 0.87. Table 8 shows the reliability coefficients for these 16 classes.

Validity

Once reliability of the test was established, it seemed important to examine its validity in as many ways as possible, particularly as it is a new test constructed specifically for the purposes of this research. Was it a valid measure of certain aspects of musical ability? Four criteria were applied -

(a) Comparison of test scores with established practical musical examinations -

An experimental instrumental group which had been meeting at the writer's home for some months was given the Responsiveness Test shortly after taking a London College of Music practical musical examination. Coefficients were obtained as follows - (N = 35)

L.C.M Preliminary Grade/Melody Test		r = 0.68
" " "	/Rhythm Test	r = 0.37
" " "	/Harmony Test	r = 0.41
" " "	/test battery	r = 0.71

1. Statistics in Psychology and Education - H.E.Garrett - 1946 - pages 383/6

TABLE 7. MUSIC RESPONSIVENESS TEST

CHORAL EXPERIENCE

COMPARISON OF MEAN SCORES OF CHOIR MEMBERS AND NON-MEMBERS.

SCHOOL 1. 10 - 11 age group N = 71

Melody scores	t = 0.65	not significant
Rhythm scores	t = 0.64	" "
Harmony scores	t = 0.94	" "

SCHOOL 2. 10 - 11 age group N = 61

Melody scores	t = 2.71	significant at the 1% level
Rhythm scores	t = 1.92	not significant
Harmony scroes	t = 1.83	" "

SCHOOL 3. 10 - 11 age group N = 29

Melody scores	t = 2.94	significant at the 1% level
Rhythm scores	t = 0.71	not significant
Harmony scores	t = 1.75	" "

TABLE 8 MUSIC RESPONSIVENESS TEST

RELIABILITY

TEST/RE-TEST

SCHOOL 1	N = 13	r = 0.87

KUDER-RICHARDSON

SCHOOL 2	N = 59	r = 0.73
" 3	54	0.69
" 4	50	0.79
" 5	21	0.89
" 6	42	0.76
" 7	61	0.69
" 8	71	0.80
" 9	33	0.74
" 10	38	0.82
" 11	22	0.77

This was encouraging - practical instrumental performance of superior quality must rank as valid proof of musical ability.

(b) Comparison of test scores with a sample whose proved musical ability is high -

The next step was to find a group of children whose musical excellence was not in any doubt. As the test was intended primarily for children in the 7 - 11 age range, it was decided not to use adult musicians as the criterion, but to test very musically-able children instead, whose high scores would furnish additional evidence of the validity of the test.

One of the largest choir schools in the country was chosen, and 38 cathedral choristers aged 8 - 13 were tested.

		Choir	8-9	12-13[1]
Melody mean score	=	11.26	7.41	10.12
Rhythm " "	=	11.26	7.07	10.06
Harmony " "	=	13.11	7.05	11.18
Battery " "	=	35.63	21.53	31.30

These high mean scores were achieved in spite of the fact that two young probationer choristers, just admitted to the choir school, scored barely more than the average for their ages. All these boys were competent instrumentalists in addition to their vocal excellence, and some near-perfect scores were reported.

(c) Comparison of test scores with teachers' ratings -

Although teachers' ratings form only a rough subjective estimate of their pupils' musical ability, it seemed another way of proving the test's validity. Four schools cooperated in this, three teachers contributing ABC ratings and a fourth ABCDE ratings both for instrumental and vocal ability. The analysis of this data, employing chi-squared techniques for these discontinuous rankings,

1. Mean scores show the marked superiority of the choristers.

is shown in table 9.

Findings show how closely test scores correspond to the teachers' ratings of their pupils' musical ability, as revealed by their musical behaviour (singing and instrumental performance). Not only the total score figures but also those for the melody subtest reveal this close association; chi-squared figures for rhythm, and to a lesser degree harmony, do not correspond so closely. This provides further proof of the validity of the test.

(d) Comparison of test scores with those obtained from a test battery already proved and established -

The final validation procedure consisted in administering the Bentley Measures of Musical Abilities to a school group which had already taken the Responsiveness Test several months before. Using normal correlation techniques, the results obtained were quite striking -

Bentley Tunes/Responsiveness		Melody	r = 0.81
Bentley Rhythm/	"	Rhythm	r = 0.53
Bentley Chords/	"	Harmony	r = 0.66
Bentley battery/	"	battery	r = 0.80

In view of the fact that these tests were designed for such different purposes, one for general probing of children's abilities, and the other to test certain specific hypotheses, it is very gratifying to have this further confirmation of the validity of the Music Responsiveness Test. This is particularly heartening when one considers the careful standardisation and reliability procedures used by Dr. Bentley in finalising his Measures of Musical Abilities.

Item Analysis

In constructing a test of musical ability, it is important to check the relative discriminatory function of

TABLE 9. MUSIC RESPONSIVENESS TEST

CHI-SQUARED COMPARISON OF TEST SCORES WITH TEACHERS' RATINGS

SCHOOL 1. 7-8 age group N = 57 ABC ratings

Melody test	chi-squared	= 24.48	significant 1% level
Rhythm "	"	= 10.25	" 5% "
Harmony "	"	= 10.20	" 5% "
Battery "	"	= 19.04	" 1% "

SCHOOL 2. 9-10 age group N = 56 ABC ratings

Melody test	chi-squared	= 17.07	significant 1% level
Rhythm "	"	= 4.70	not significant
Harmony "	"	= 14.73	significant 1% level
Battery "	"	= 17.40	" 1% "

SCHOOL 3. 7-9 age group N = 67 ABC ratings

Melody test	chi-squared	= 13.15	significant 2% level
Rhythm "	"	= 4.93	not significant
Harmony "	"	= 8.19	significant 10% level
Battery "	"	= 10.57	" 5% "

SCHOOL 4. 7-11 age group N = 21 ABCDE ratings

(i) Instrumental ability ratings

Melody test	chi-squared	= 18.17	significant 2% level
Rhythm "	"	= 17.33	" 5% "
Harmony "	"	= 8.95	not significant
Battery "	"	= 17.93	significant 2% level

(ii) Vocal ability ratings

Battery test chi-squared= 18.89 significant 2% level each individual item. This will be attempted briefly as a conclusion to a chapter which has concerned itself in the main with analysis techniques and the treatment of data.

For a sample of 1003 children aged 6 - 11, the percentage of errors for all 45 items in the 3 subtests was calculated. This is shown in table 10. One or two items are worth commenting on. It will be seen that item 1 in the Melody Test is by far the easiest in the battery (8.2% error). On the other hand item 9 in the same test is the most difficult (88.1% error). These extremes of error were not repeated in the data from the other two subtests. The range was from 25.9% to 78.0% error for the Rhythm Test, and from 38.2% to 67.7% error in the Harmony Test.

It has to be borne in mind that the average number of alternatives per item in the Melody Test is 6 as opposed to 3 for the Rhythm and Harmony Tests, but that the first melody item is a 3-note tune which makes analysis easier for the testee. On the whole, increasing the number of notes per item in the Melody Test increased the difficulty of the testee's task.

Another way of examining an item's difficulty is by probing how far change of instrument or pitch or of complexity of musical setting affected the percentage error. Each subtest was subdivided into three 5-item sections. A change of instrumental stimulus was made from section to section in each subtest to give variety and maintain interest.

The first section of the Melody Test had items ranging from 3 to 7 notes in length; these items were played by a descant recorder and there was an average percentage error of 36.7 for this section. The second section, range 4 - 8 notes, was played on the piano and contained an average percentage error of 50.6. The final section,

TABLE 10 MUSIC RESPONSIVENESS TEST

PERCENTAGE ERROR IN TEST ITEMS FOR AGE SAMPLE 6 - 11

(N = 1003)

ITEM	MELODY TEST	RHYTHM TEST	HARMONY TEST
1	8.2	51.7	41.2
2	18.5	27.9	44.8
3	28.6	25.9	46.1
4	75.7	46.0	38.2
5	52.7	44.9	46.2
6	13.9	33.2	47.5
7	29.8	78.0	58.7
8	70.0	64.0	45.9
9	88.1	67.3	67.7
10	51.2	56.4	47.2
11	64.4	72.4	56.7
12	53.9	72.1	58.6
13	72.4	60.7	52.8
14	79.4	58.9	44.4
15	82.3	52.8	46.2

5 - 9 notes, featured the clarinet in its lower register and average item error was 70.48. Here is an ascending order of difficulty which would normally be associated with increasing length of items.

The recorder items were played at a pitch between one and two octaves above middle C, the piano items from middle C to an octave and a half above, whilst the pitch of the clarinet items ranged from the D below middle C to the G above middle C. This variation in pitches seemed to give the children no undue difficulties, although a small minority appeared to find the very lowest range of the clarinet difficult to discriminate.

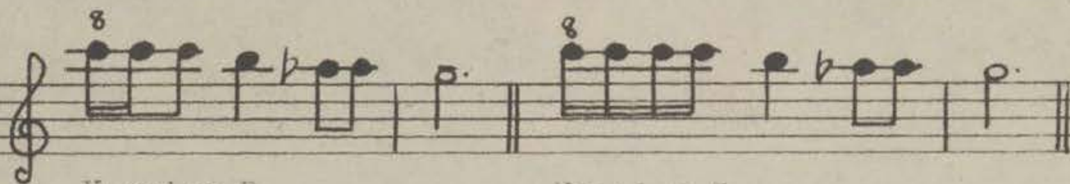
One generalisation emerges from this item analysis of the Melody Test - since nearly all changed notes were in the middle of tunes, they seemed most difficult to pick out where the contour or shape of the tune was least affected by the change.

The first section of the Rhythm Test was played on the piano, after the tapped pattern, as an unaccompanied melody. The average percentage item error for these five items was 39.3. Section two, played by a variety of recorders at different pitches, ranged from middle C to the C three octaves above. Item 10 was played on a sopranino recorder at this highest pitch, and seemed to present less difficulty than many items in the normal treble voice singing range.

Average percentage item error for the final section of the Rhythm Test was 63.4. Here the rhythm pattern was presented in piano harmony of widely varying texture and at various pitches. Item 14, in low-pitched harmony, presented no more difficulty than rhythm patterns closer to the normal treble singing range. Item 15, where the rhythm pattern occurred in the left hand part only, proved the easiest of all items in this section.

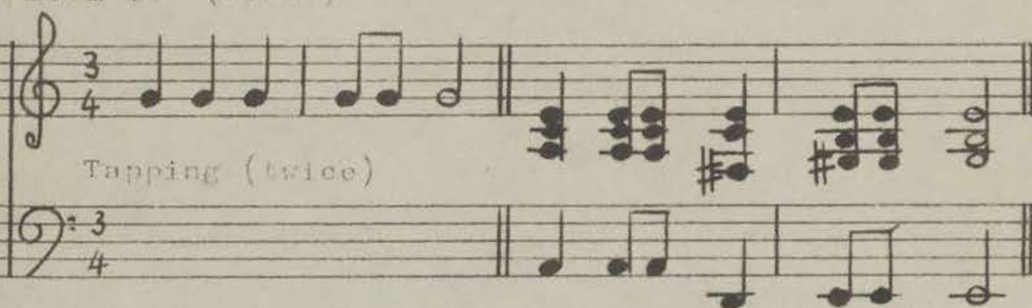
Item 10 (Sopranino)

Tapping (twice) Version A

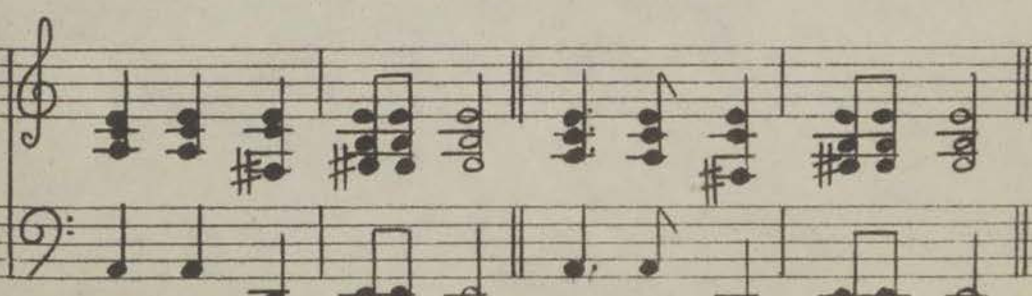


Version B Version C

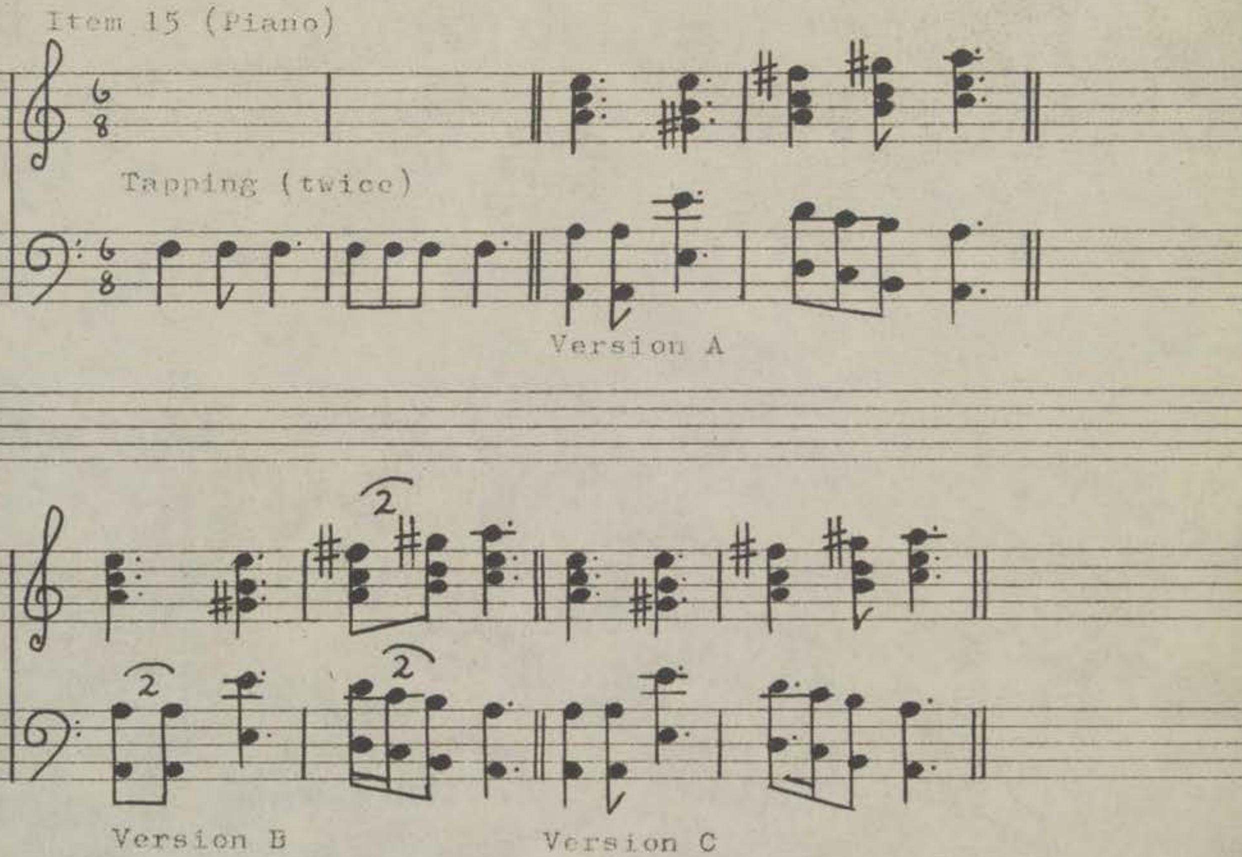
Item 14 (Piano)



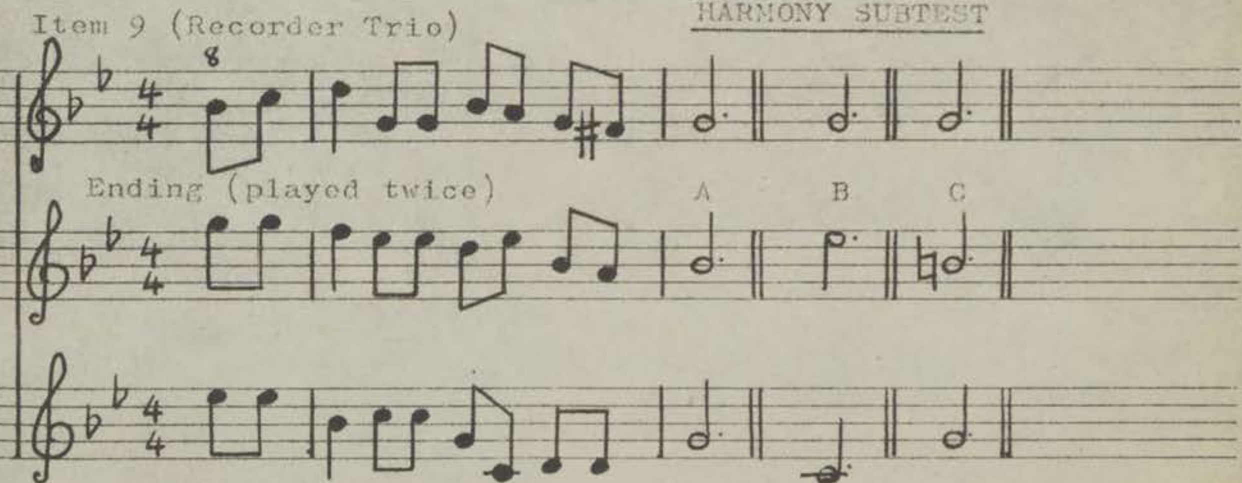
Version A



Version B Version C



HARMONY SUBTEST



Only the cadences of the alternative versions have been shown.

Error was greater where items presented alternatives closer to the original; this appeared to be true regardless of timbre or pitch of the instrumental stimulus; it also appeared to hold good regardless of the addition of varied harmonic texture to the musical setting of the rhythm pattern presentation.

For the three sections of the Harmony Test there were average percentage item errors of 43.3, 53.4 and 51.7 respectively. The first section consisted of five lightly-harmonised piano items, the second section was played by a recorder trio, and the final five piano items of the last section were of thicker, more complex harmonic structure.

Item difficulty appeared to depend mainly on the closeness of the alternative cadential progressions to the original ending. Where there were strong discords this helped the task of analysis by effectively reducing the number of alternatives from which to select.

It was clear however that the less familiar combination of descant, treble and tenor recorders in the middle section caused some children considerable difficulty. Interrupted cadences and slight variations on modal and minor endings constituted the chief pitfalls, for instance in item 9 (final phrase of Old King Cole) plausible cadences were presented as alternatives to G minor, and the tierce de Picardie and C minor were both accepted by a large minority of the sample.

Thickness and complexity of harmonic texture seemed less important as factors giving rise to difficulty of analysis.

A second method of analysing item error is to see what changes occur at different ages. This is demonstrated in tables 11 to 13. It can be seen that Melody Test items 6 (easy) 9, and 14 (difficult) were the least discriminating between different age groups of the sample, whereas items 3, 5, 10 and 12 showed up a wide spread of percentage error as between the various age groups.

Rhythm Test items 7 (difficult) revealed very little difference in percentage error between the various age groups composing the sample, whilst items 3, 5 and 6 were widely differentiated. The Harmony Test included items with the same wide spacing as regards difficulty, eg items 2, 4, 10, 12 and 14, but there were no close groupings here as in the other two subtests. Figures 10 to 12 illustrate visually the degree of item difficulty at the various ages tested.

TABLE 11 MUSIC RESPONSIVENESS TEST

MELODY TEST

PERCENTAGE ERROR FOR THE VARIOUS AGE GROUPS

ITEM	7 - 8 Yrs.	8 - 9 Yrs.	9 - 10 Yrs.	10 - 11 Yrs.
1	11.4	7.0	3.8	0
2	16.3	17.6	11.8	5.5
3	37.9	26.7	15.6	11.0
4	77.7	74.3	66.7	73.0
5	58.7	48.1	39.8	31.9
6	13.6	12.9	10.2	7.4
7	34.2	24.6	19.3	11.7
8	77.7	73.8	56.5	47.8
9	90.2	88.8	84.5	85.3
10	65.7	47.1	39.8	28.8
11	76.1	57.8	53.8	47.8
12	60.3	50.8	44.1	30.1
13	64.7	71.1	72.5	66.3
14	78.3	75.9	80.7	74.2
15	87.5	85.0	73.7	72.4

TABLE 12 MUSIC RESPONSIVENESS TEST

RHYTHM TEST

PERCENTAGE ERROR FOR THE VARIOUS AGE GROUPS

ITEM	7 - 8 Yrs.	8 - 9 Yrs.	9 - 10 Yrs.	10 - 11 Yrs.
1	53.8	54.0	45.2	42.3
2	37.5	25.7	18.9	19.6
3	31.5	24.1	18.9	16.0
4	48.8	46.5	38.2	33.1
5	56.0	48.7	33.3	32.6
6	44.6	26.2	19.9	22.7
7	76.1	77.5	78.5	77.9
8	64.1	63.7	62.9	57.7
9	65.8	66.8	61.3	71.8
10	60.3	56.7	59.1	40.5
11	76.1	74.3	66.1	64.4
12	75.0	68.1	72.0	71.8
13	59.8	59.3	67.7	60.1
14	56.5	62.0	60.2	57.7
15	65.2	44.4	43.0	40.5

TABLE 13 MUSIC RESPONSIVENESS TEST

HARMONY TEST

PERCENTAGE ERROR FOR THE VARIOUS AGE GROUPS

ITEM	7 - 8 Yrs.	8 - 9 Yrs.	9 - 10 Yrs.	10 - 11 Yrs.
1	45.7	44.9	24.7	23.3
2	51.1	49.7	29.0	23.3
3	49.5	52.9	30.1	28.8
4	45.1	40.6	28.5	19.0
5	51.1	51.9	37.1	30.1
6	53.3	48.1	32.8	36.2
7	64.1	62.6	55.9	51.5
8	52.7	48.1	41.4	31.9
9	72.3	71.1	64.0	47.9
10	51.1	57.2	34.9	26.4
11	58.2	55.1	55.9	47.2
12	62.5	67.4	41.9	36.8
13	52.7	51.9	50.0	40.5
14	51.1	42.8	34.4	20.3
15	48.9	52.4	37.6	33.2

FIGURE 10

MUSIC RESPONSIVENESS TEST

MELODY

RANGE OF PERCENTAGE ITEM ERROR OVER THE FOUR AGE GROUPS

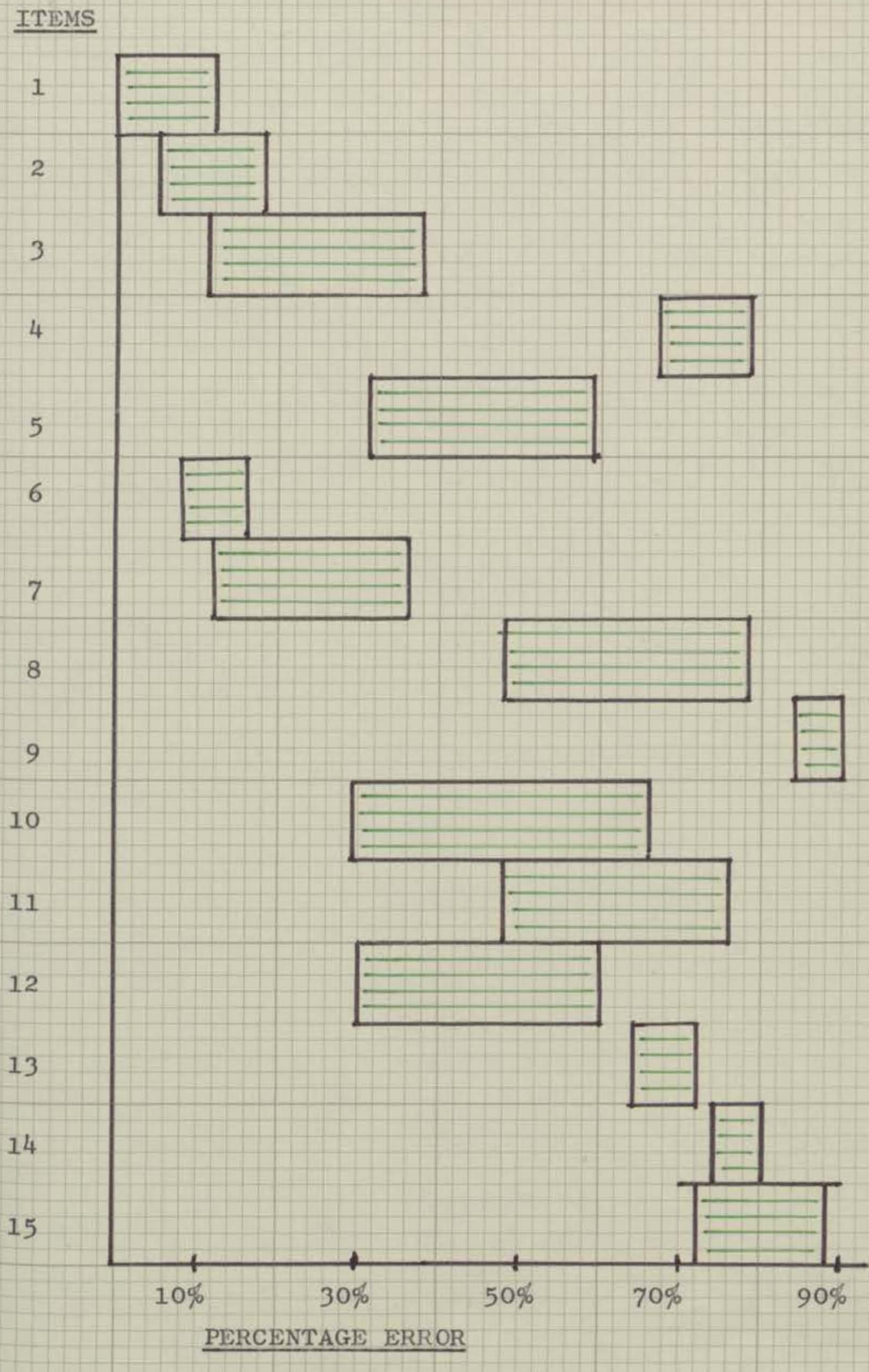


FIGURE 11 MUSIC RESPONSIVENESS TEST

RHYTHM

RANGE OF PERCENTAGE ITEM ERROR OVER THE FOUR AGE GROUPS

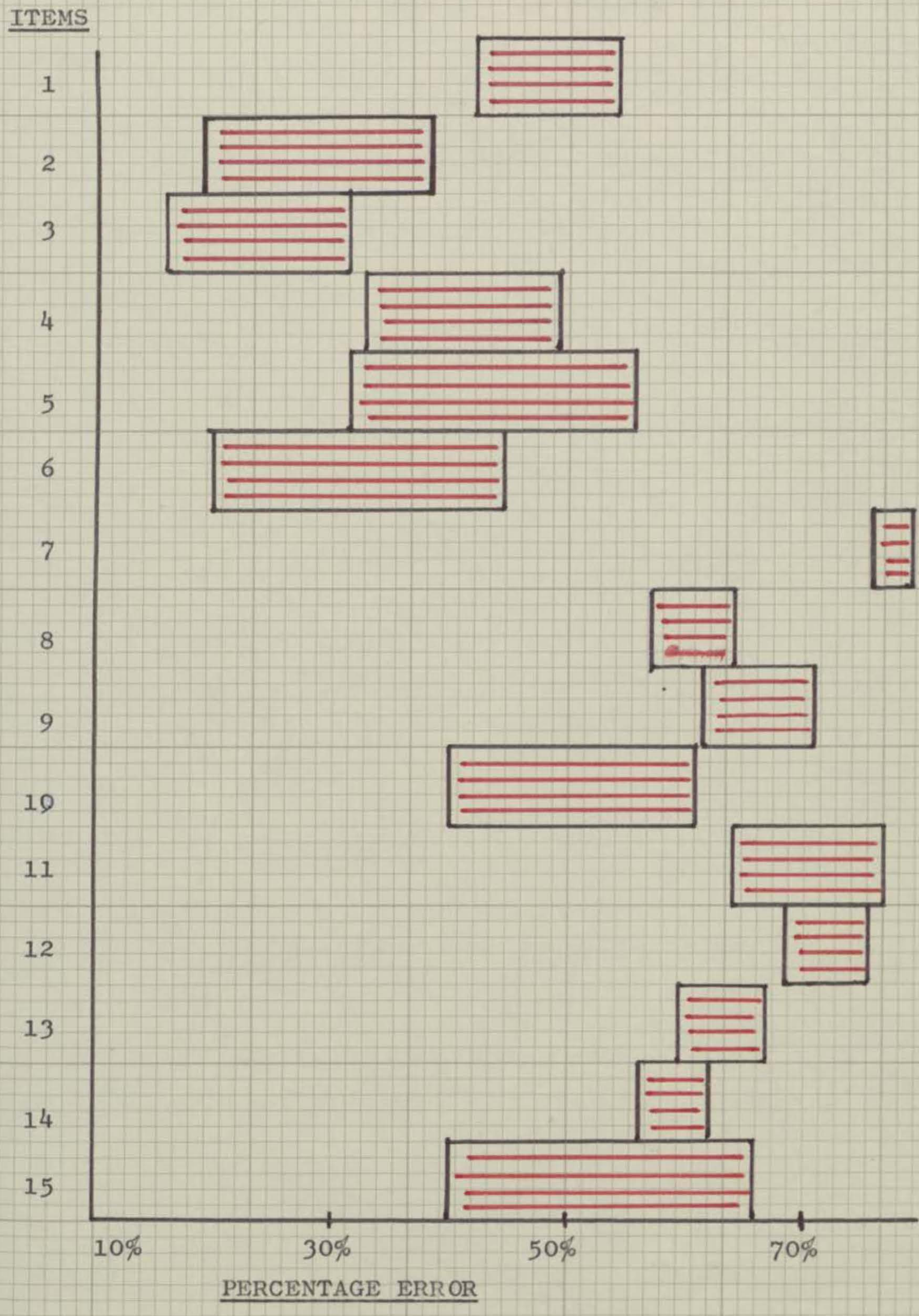
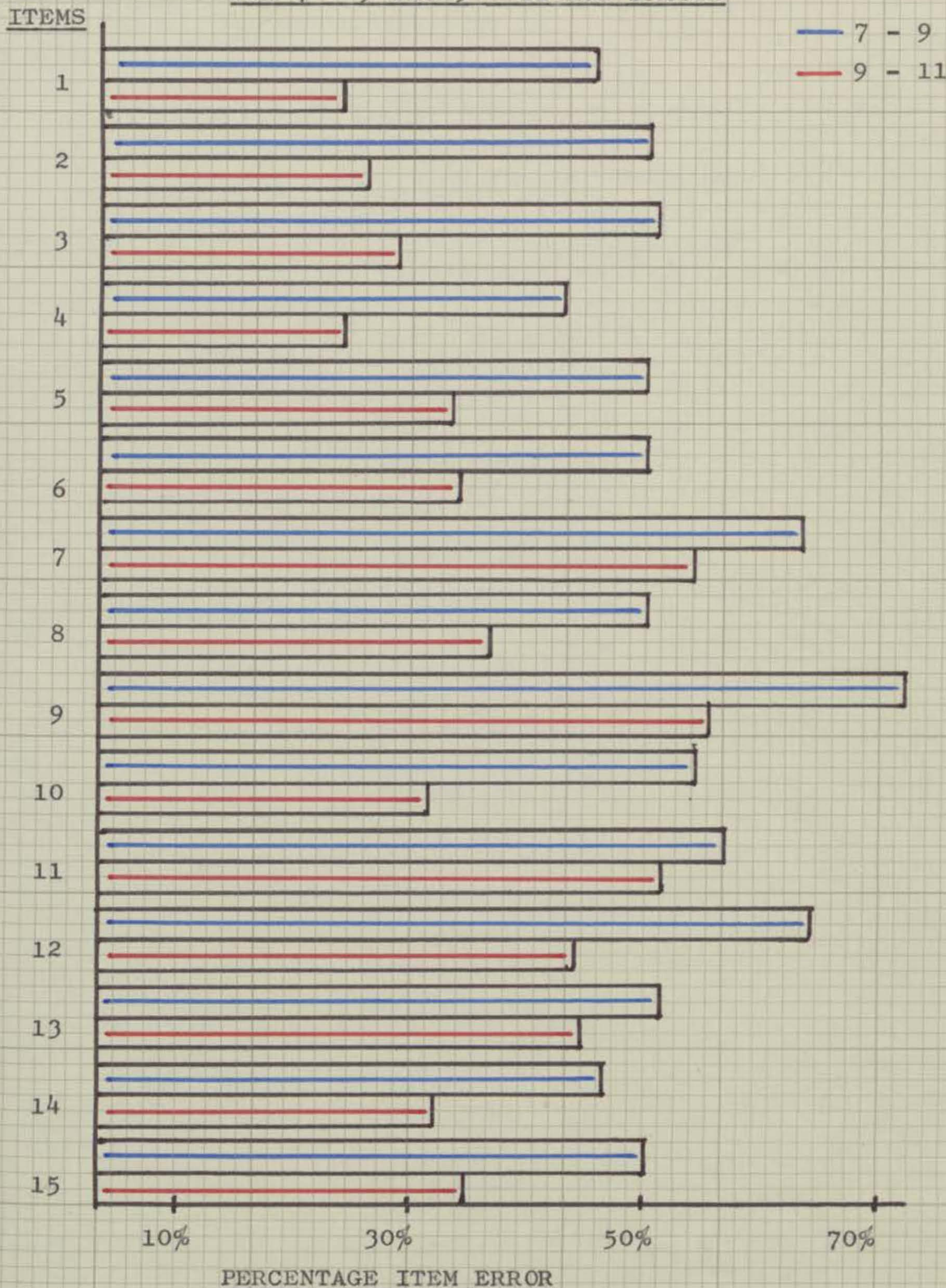


FIGURE 12 MUSIC RESPONSIVENESS TEST

HARMONY

COMPARISON OF PERCENTAGE ITEM ERROR

FOR 7 - 9 and 9 - 11 AGE GROUPS



CHAPTER 5

MUSIC DISCRIMINATION TEST

The work done with the Music Responsiveness Test led the writer to a growing realisation of the importance of examining also aesthetic aspects of musical ability. The ability to discriminate between stylistically correct and inferior versions of a piece of music forms an essential part of musical appreciation, and a new test on these lines was considered.

Whilst the Music Responsiveness Test had been examining a certain type of analytical and discriminatory ability, the various aspects of musical ability under review - melody, rhythm and harmony - had been separated out into three subtests; this had resulted in the traditional battery of tests in which each individual test had its own specific, analytical function as a way of probing one particular aspect of musical ability. The writer had, in constructing his Responsiveness Test, been following the precedent set by most of the earlier test constructors, such as [1]Seashore, Kwalwasser and Wing, who had familiarised us with the idea of a battery of tests to determine musical aptitude as comprehensively as possible.

Recent test constructors, [2]Gordon, Colwell and Bentley, have also adopted this battery design. The concept seems to have stemmed from Carl Seashore's early pioneering work at the beginning of this century, and from his stress on the division of musical capacity into a number of sharply defined talents which are unrelated.

1 and 2 - See Chapter Two

However, the more the present study proceeded, the more was the writer drawn to the conclusion that musical ability was a unitary, albeit complex, functioning of the human organism which therefore ought to be analysed from its usual, more or less complex musical setting. It seemed logical that if a musical setting were to be employed, we were working in a situation different from that described by Bentley (as measuring);

[1]'... such abilities as are measured must be basic and elemental.'

Discrimination and Musical Taste

The possibility of constructing one complex test in an authentic musical setting was explored. The intention was to examine, if possible, the ability of children to discriminate between a short piece of music (the stylistically correct version) and versions into which errors of pitch, melody, rhythm and harmony had been introduced. Thus in one complex test, various ways of analysing the frequency of certain errors could be attempted, and the resultant data related to hypotheses concerned with age, sex, intelligence and musical experience.

Moreover, were such a test practicable, it could also yield valuable evidence about aesthetic aspects of the musical ability of children. Kwalwasser, Wing and Gordon included in their batteries a series of tests which examined children's musical tastes, but none of these seemed suitable for using in the present study. Apart from the question of length, these aesthetic tests required subjective answers and the present writer was concerned to devise an objective type of test.

Another possible approach was that used by Kate Hevner in the [2]Oregon Music Discrimination Tests which employed

1. Musical Ability in Children - A Bentley - 1966 - Page 20
2. Oregon Music Dsicrimination Tests - K.Hevner - 1930

musical material by accepted composers. The original 1930 edition presented four versions of a piece of music, one of which was the authentic music and the others distorted versions in which the rhythm, harmony or melody had been mutilated. The form in which this was presented proved too difficult for general use, and a modified verson was brought out in 1935 in which the authentic version of the piece of music was compared directly with one distorted version only. After stating which of the two versions he preferred, the testee was required to say which element, melody, rhythm or harmony had been distorted in the alternative version.

Here was a test, then, designed for older students, but containing many ideas relevant to the aims of the present study. Hevner's tests are really measures of musical appreciation, as discrimination necessarily ranks as a vital element in the development of musical taste. Shuter (1968) describes the Oregon Tests as -

[1]'... tests of taste and appreciation, as distinguished from ear acuity tests. However ability to perceive the differences between the accepted and distorted versions is obviously required.'

Shuter also reports on a variety of tests being developed in America in more recent years which involve discrimination and appreciation. Some aspects of tests being developed by [2]Mueller (1956), Kyme (1956) and Hoffren (1964) appear to be on similar lines to the Oregon Tests, but again they are designed for and carried out with older students.

<u>The Rationale Behind the Writer's Test Construction</u>

Several points seemed to the writer to be essential to this type of testing :

1. The Psychology of Musical Ability - 1968 - R.P.G.Shuter Page 33
2. - do - pages 40/42

(a) The test must be in a musical setting.

(b) There must be an original version - the authentic version so that this should be an objective test, not merely subjective.

(c) A choice of versions must be presented following the original version.

(d) A re-tape of the original version must be included, placed at random amongst the other alternatives, in order that the 'correct' version should be identical with the original presentation.

(e) The other versions must contain errors of one kind only.

(f) A reasonably wide variety of alternatives must be given.

(g) The total number of items should be sufficient to ensure the reliability of the test as an efficient measuring instrument.

(h) 20 to 25 minutes seemed the maximum permissible duration for a test of this nature.

If the test being constructed was to abide by the above conditions, either the individual items must be very short, or there must be a comparatively small number of items. The final four tests of the Wing battery, the ones dealing with musical taste, required the testee to choose which of two alternatives he considered to be the better version. This was a subjective judgment, even though the better version had the authority of a panel of experts.

It is possible to argue along with [1]Farnsworth (1958) that tastes may change from generation to generation, and that what is considered bad taste and unacceptable to one generation may be accepted as good by another generation.

1. Social Psychology of Music - P.R.Farnsworth - 1958 - pages 56 and 142

Indeed, the history of music is full of such instances. The same criticism may also be levelled against those sections of Gordon's battery which are concerned with musical taste.

Partly for this reason, and partly as a result of advice from [1]Dr. Wing in a private communication to the effect that the final four tests of his battery should be omitted when testing the young children comprising the writer's sample, it was decided to develop a different, more objective approach for the purposes of this study. A second difficulty occured as a consequence of the need for brevity. There must be short extracts as test items and these must be strictly limited in number to ensure that young children should be able to complete their task at the flood of their interest, without loss of motivation or understanding.

There have been precedents for using one's own compositions. [2]Gordon, amongst others, had composed his own test items. The advantage of this method lies in the complete freedom of the test constructor to mutilate or distort to his heart's content. Another advantage conferred is that all items will be equally unfamiliar to the testee.

Test Construction

Following this chain of reasoning, the decision was made to employ only the writer's own short musical compositions, suitably adapted or arranged instrumentally to suit the pre-determined age sample of children. Twelve items, plus a preliminary practice item, were considered sufficient to give adequate reliability. Four alternative versions were to follow the initial presentation of

1. Letter from Dr. Wing 27.12.1963
2. See Chapter 2

the stylistically correct version. By this means, provided that the extract was not too long, even children of seven years of age would be able to remember well enough to discriminate in accordance with their ability to perform this kind of musical analysis.

As a consequence of trying out various pilot testings on small groups of children, a system of scoring was adopted which eased the task of remembering. On the test leaflet, opposite each item number, were printed the letters A, B, C and D, each letter representing one of the alternative versions. The instructions given were to cross out the letter if the testee was sure that version was incorrect, to put a ring round a letter if he was sure that the version was the same as the original, and to leave the letter unmarked if in doubt.

By this method, the testee had to make an objective decision for each version in turn. The system was successful even with the youngest children in the sample. Even though mistakes were made, no undue strain or distress resulted. In a sample of over 1000 children tested, there were no cases of emotional upset, and practically none of misunderstanding.

Suitable variation in the combinations of instruments employed from one item to the next was considered an important ingredient in test procedure. Instrumentation was as follows :

Practice Item	Treble recorder, piano and drum
Item 1	Treble, tenor and bass recorders
" 2	Church organ
" 3	Tenor recorder and guitar
" 4	Piano
" 5	Descant, treble, tenor and bass recorders
" 6	Clarinet, piano and drum
" 7	Descant, treble and tenor recorders with cymbal

Item 8 Bassoon and piano
" 9 Church organ
" 10 Piano
" 11 Clarinet and recorder trio
" 12 Treble recorder, piano and tambourine

As can be seen from the foregoing list, considerable care was taken over order of presentation of items and alternation of tone colours and timbres. In the pieces themselves the attempt was made to give variety of pitch and tempo. The other variables lay in the order and extent of errors in the four alternative versions.

Test Procedure

The entire test was taped, except for the instructions which were given 'live'. Playing time was just over 20 minutes; there were questions on the front of the test leaflet to elicit the name, age, sex and brief details of the instrumental and choral experience of the testee.

The system by which children marked in their decisions on the test leaflet has already been described. Two marks were given where the circle was placed round the correct version, and one mark was awarded for each defective version crossed out, giving a maximum score of five marks per item and of 60 marks for the entire test. The children were told not to guess, as wrong crossing out could lose marks. This warning was not always effective. There were children in every age group who took a chance and circled and crossed every item from some kind of gambling instinct. But in most cases, children taking the test were discriminating effectively. Even where a minority of children lost marks in this way, they showed a satisfactory ability to discriminate with understanding in a good proportion of the items.

The practice item was made very easy. Gross errors were introduced into the defective versions and class and this certainly helped to ensure understanding of the task, and built up confidence before the test proper started. The writer made a practice of using the blackboard to illustrate this practice item, and continued this visual support through the test by writing up item numbers and letters as the test proceded, thus ensuring that no child lost his place.

The pace of the test was not so great that the younger children were forced to hurry over decision making. In fact, a class of 6 - 7 year olds took the test in their stride, although obviously getting lower scores than the children who constituted the main sample.

There was no strict ascending order of item difficulty. The whole testing procedure proved an enjoyable experience for children and writer alike, and some subdued merriment ensued on the occasion of the grosser errors.

Errors of melody and pitch

In the melodically-distorted version of the practice item, the leading note was consistently flattened to weaken the tonality of the recorder melody. In addition, two accented notes and one unaccented note were omitted to further weaken its shape.

Item 1 featured the treble recorder again as the solo melodic instrument, this time with tenor and bass recorders as accompaniment. The melodically-distorted version (a) changed the passing and auxiliary notes and (b) reversed the order of notes where the melodic progression was based on the notes of a chord - this latter modification on three occasions only. The melodic and harmonic foundations were little affected though many details in the melodic line were thus changed.

The second item was arranged for church organ, and the D minor tonality of the melodically-defective version was weakened by omitting to sharpen the leading note on three occasions. The final note of the right hand melody was changed from D to F without affecting the correctness of the cadential harmony.

In item 3 the tenor recorder melody line was flattened about a quarter of a tone. The fourth item, the piano solo, was presented with the melodic line in the bass. Two methods of weakening the melodic line were again employed (a) diatonic notes were substituted for the original chromatic progression at unaccented points and (b) in some of the running quaver passages the contours were smoothed out by raising or dropping the 3-note groups by a third.

The high descant line in the fifth item for recorder quartet was flattened by nearly a quarter of a tone. In item 6 the clarinet was also flattened drastically. This had the effect of causing the clarinet to cease 'speaking' for a very short interval in the melodically-distorted version when recording this item on tape. It was decided to retain this version, even though it was quite obvious to nearly all the children tested that it was incorrect, on the grounds that at this stage, in the middle of the test, a little quiet humour would not come amiss. Although this could hardly be classed as a good version as regards discrimination, the writer's aim succeeded, and the knowledge of one certain mark eased any slight tension that might be generated in the test situation.

The eight-bar phrase which constituted item 7 was the shortest in the whole test. In the melodically-altered version the solo descant recorder line was flattened about a fifth of a tone. Item 8 featured the bassoon as the solo instrument. In the melodically-distorted version, the contour of the melody was changed slightly, usually at unaccented points; however towards the end F was substituted for high A at the accented climax.

The ninth item, a canonic study for church organ was also weakened melodically in two ways, (a) by altering the contours of the right hand line to bring the canon into unison instead of being at the interval of one third and (b) by introducing accidentals into the final phrase to weaken the cadential resolution in C major.

Item 10 in the key of B flat major, arranged for piano, contained a flowing, chromatically-progressing melody in the right hand. In the melodically-mutilated version a whole bar of melody was raised one third, and the original melody placed in a lower part to maintain the harmonic structure of the piece intact. Also F, the fifth, was substituted for D as the final note.

The next to the last item contrasted the timbre of the clarinet in its lower register with the lighter texture of treble, tenor and bass recorders which formed a three-part harmony. In the defective version, the clarinet's melodic line was flattened about one quarter of a tone.

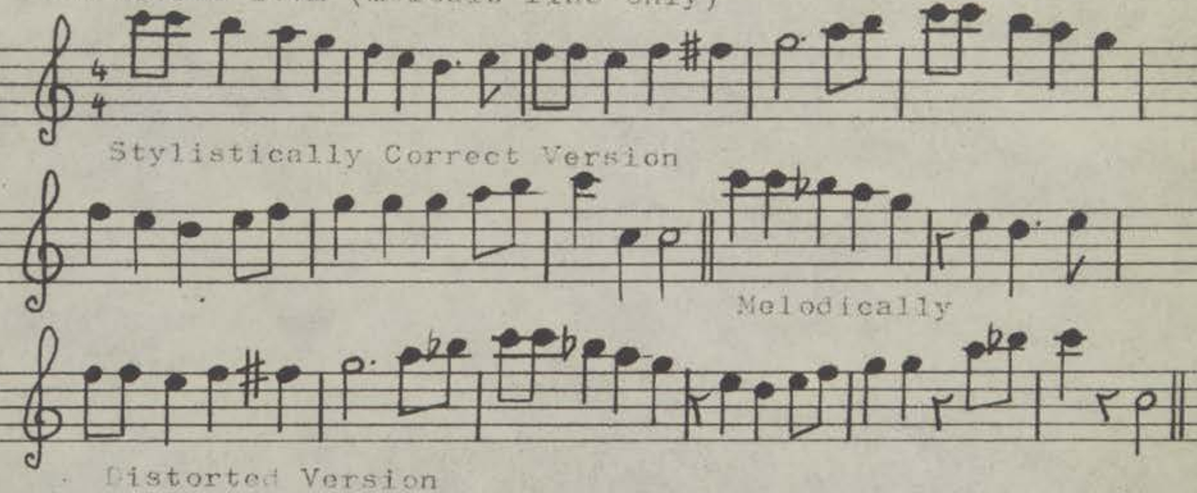
For the final item, the melodic line was weakened in three ways: (a) the three-quaver grouping in this piece of music in six-eight time was modified to crotchet-quaver grouping, by omitting an unessential note, (b) the long two-bar trill was omitted, and the note C held steady, (c) the last four notes were raised a third to give a final note on A in the key of F major.

Examples of stylistically correct and melodically distorted versions for the practice item and items 1, 8, 10 and 12 are shown on pages 141 and 142.

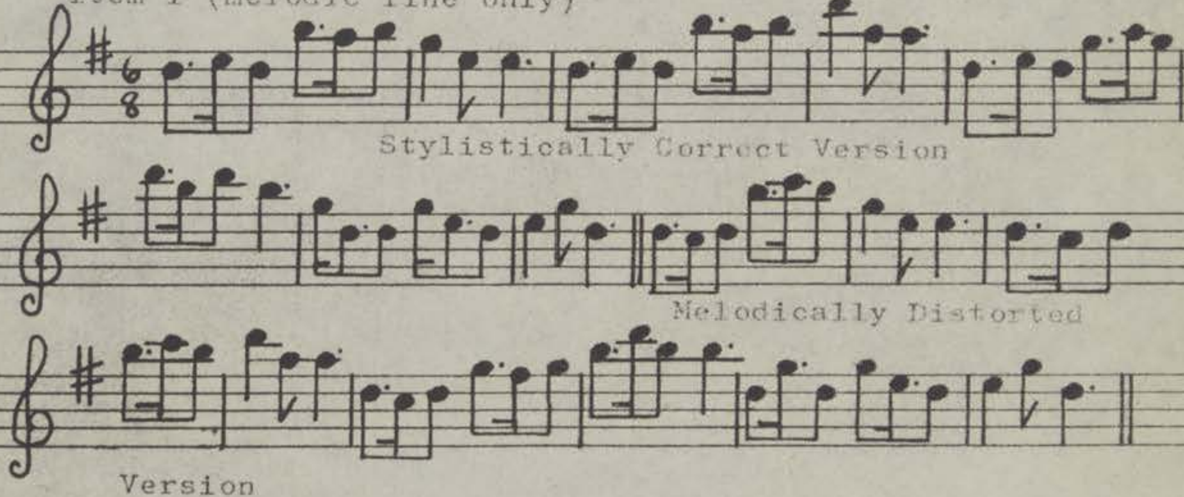
Rhythmic Errors

In its rhythmically-distorted versions, the practice item was varied by the use of accelerando and rallentando, with the effect of placing the recorder melody sometimes ahead of the piano accompaniment, and sometimes slightly

Practice item (melodic line only)

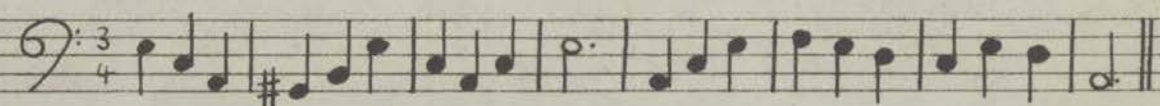


Item 1 (melodic line only)



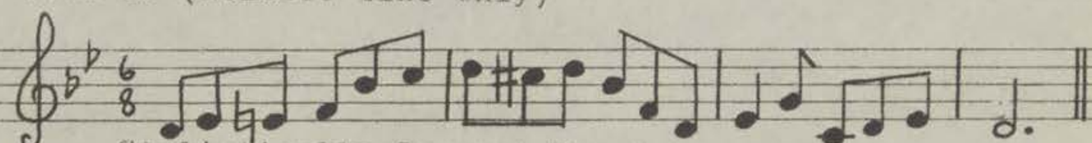
Item 8 (melodic line only)

Stylistically Correct Version



Melodically Distorted Version

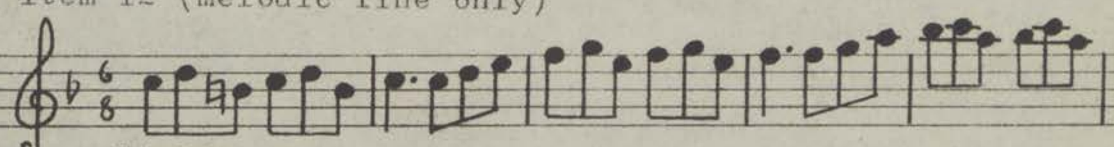
Item 10 (melodic line only)



Stylistically Correct Version

Melodically Distorted Version

Item 12 (melodic line only)



Stylistically Correct Version

Melodically Distorted Version

behind it. This was made particularly obvious at the end of the extract, where the recorder finished half a beat ahead of the piano and drum. In item 1 the dotted stress of the six-eight time quaver groups was changed throughout for all instruments. In the second item, the steady left hand beat which constituted the quadruple time rhythmic accompaniment to the right hand melody was changed to alternately dotted and syncopated beat. In item 3 the guitar maintained a steady tempo, whilst the tenor recorder melodic line pursued an irregular rhythmic course, in which accelerando sometimes took it ahead of its accompaniment and rallentando sometimes left it half a beat behind.

Item 4 is changed rhythmically by dotting the smooth quaver groups in the left hand melody. In the fifth item the rhythm is modified by changing from compound duple to simple duple time, destroying the triple quaver effect. In item 6 the three-four time rhythm is changed by introducing the left hand pedal part of the piano on the second beat instead of the first, and also by altering the syncopation of the arpeggio pattern of the right hand part in every bar.

The rhythmically-defective version of item 7 is in quadruple time as opposed to the triple time of the original version. The bassoon line of item 8 is rhythmically altered by changing the smooth triple rhythm into a dotted pattern, and also be introducing syncopation to anticipate two of the cadences. Accelerando and rallentando drastically modify the canonic effect of the organ entries in item 9.

Item 10 introduces a quadruple beat into the penultimate bar of a six-eight time piano item. The eleventh item changes the straightforward crotchet pattern to a dotted rhythm. Finally, the last test item makes use of accelerando and rallentando to dislocate the progression of the melodic line, whilst the piano and tambourine accompaniment maintain a steady tempo.

Examples of stylistically correct and rhythmically distorted versions for items 2 and 7 are shown on pages 145 and 146.

Harmonic Errors

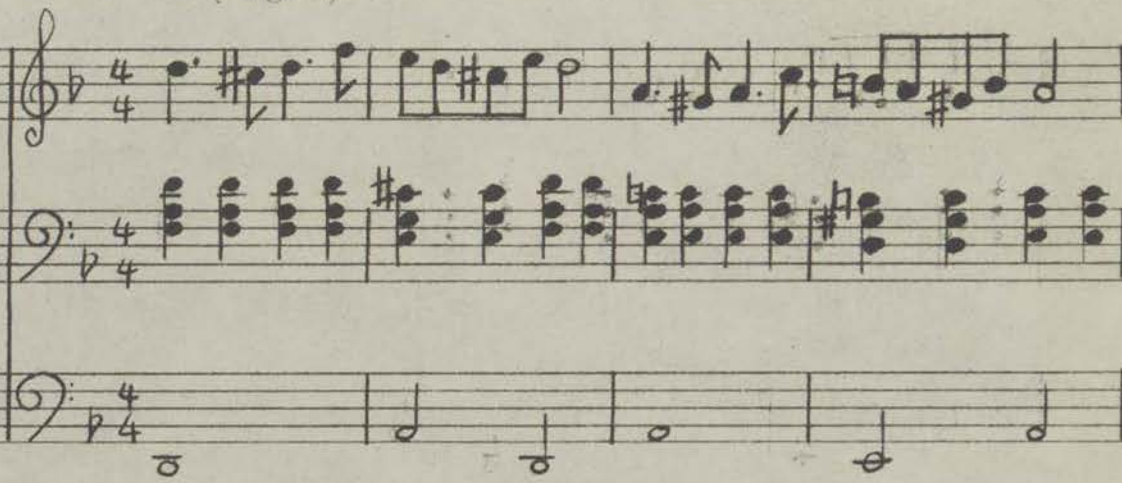
The practice item was varied harmonically by raising the left hand part of the piano accompaniment one tone so that the bass of the piece is effectively in the key of D whilst the rest is firmly in C major.

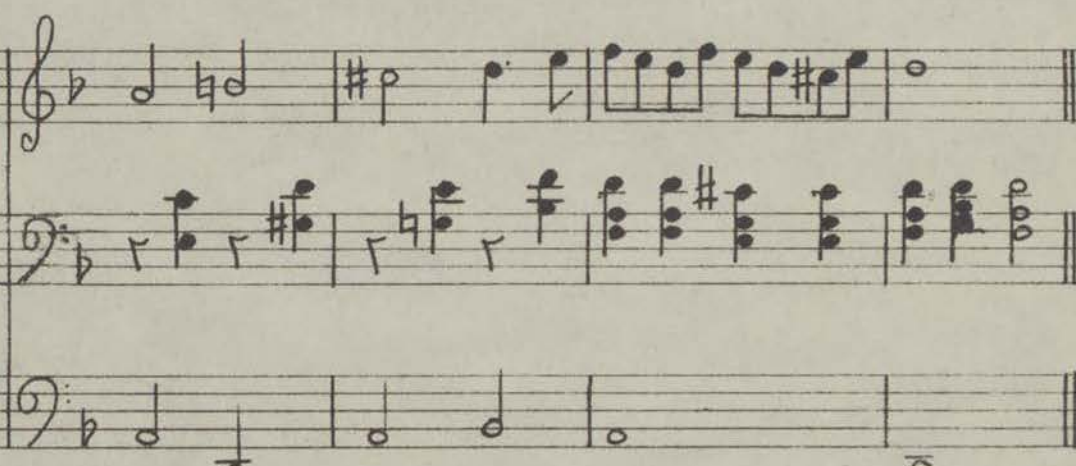
The same device is employed in item 1 where the two upper recorder parts are unaltered and the bass part is changed by raising every note one full tone. In item 2 for organ, the whole pedal part is lowered one semitone. Item 3 is distorted harmonically by the guitar maintaining an ostinate in G major below the original melodic part. In the fourth item, for piano, the harmony of the right hand chords is changed. All the flats in this C minor piece are 'naturalised'.

The fifth item relies for its harmonic distortion on the three lower parts of the recorder quartet omitting several of the essential accidentals; on the final chord, the third is sharpened to change the cadential tonality.

The left-hand part of the accompaniment to item 6 is lowered one tone in the harmonically defective version. Item 7 presents an ostinato chordal effect in the two lower parts below the descant recorder melody. The harmony of the arpeggio chords of the accompaniment in item 8 is completely changed in the defective version. In the ninth item accidentals have been inserted in the left hand and pedal parts of this arrangement for organ to distort all chordal effects.

For piano item 10 the tonic B flat bass is everywhere changed to B natural, including the final cadence, Item 2 (Organ)

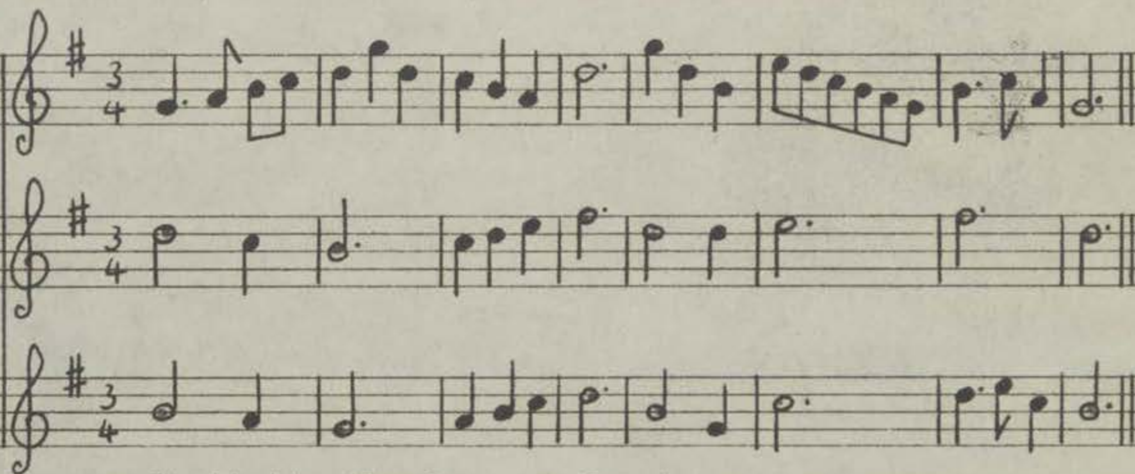




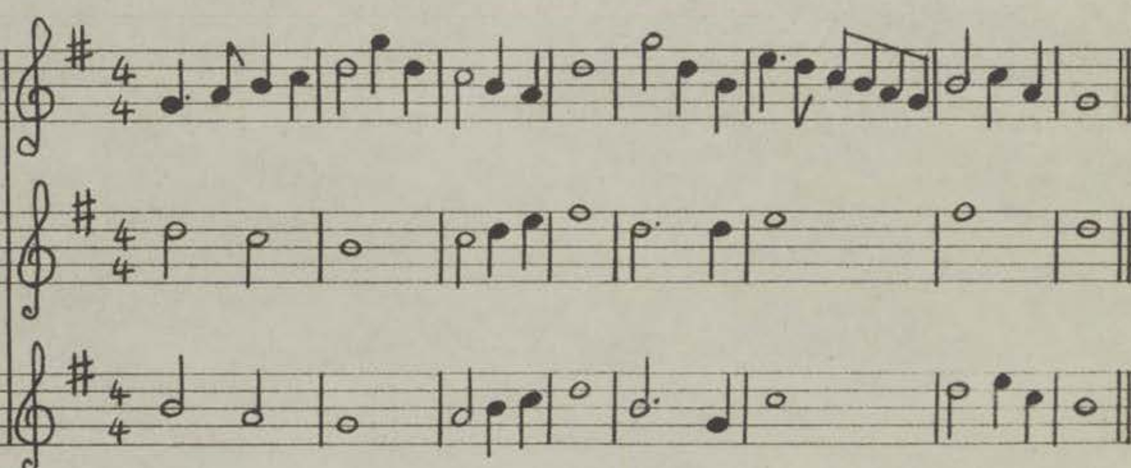
Stylistically Correct Version

Rhythmically Distorted Version (left hand only)

Item 7 (Recorder Trio)



Stylistically Correct Version



Rhythmically Distorted Version

altering the whole harmonic structure of the piece. In item 11 the bass part is actually omitted in the harmonically distorted version. The twelfth item is harmonincally altered in two ways, (a) by inserting accidentals in the bass part on alternate bars and (b) in the last cadence the lowest note of the bass downward run is altered from F to G, weakening the final chord.

Examples of stylistically correct and harmonically distorted versions for items 3 and 6 are shown on pages 148 and 149.

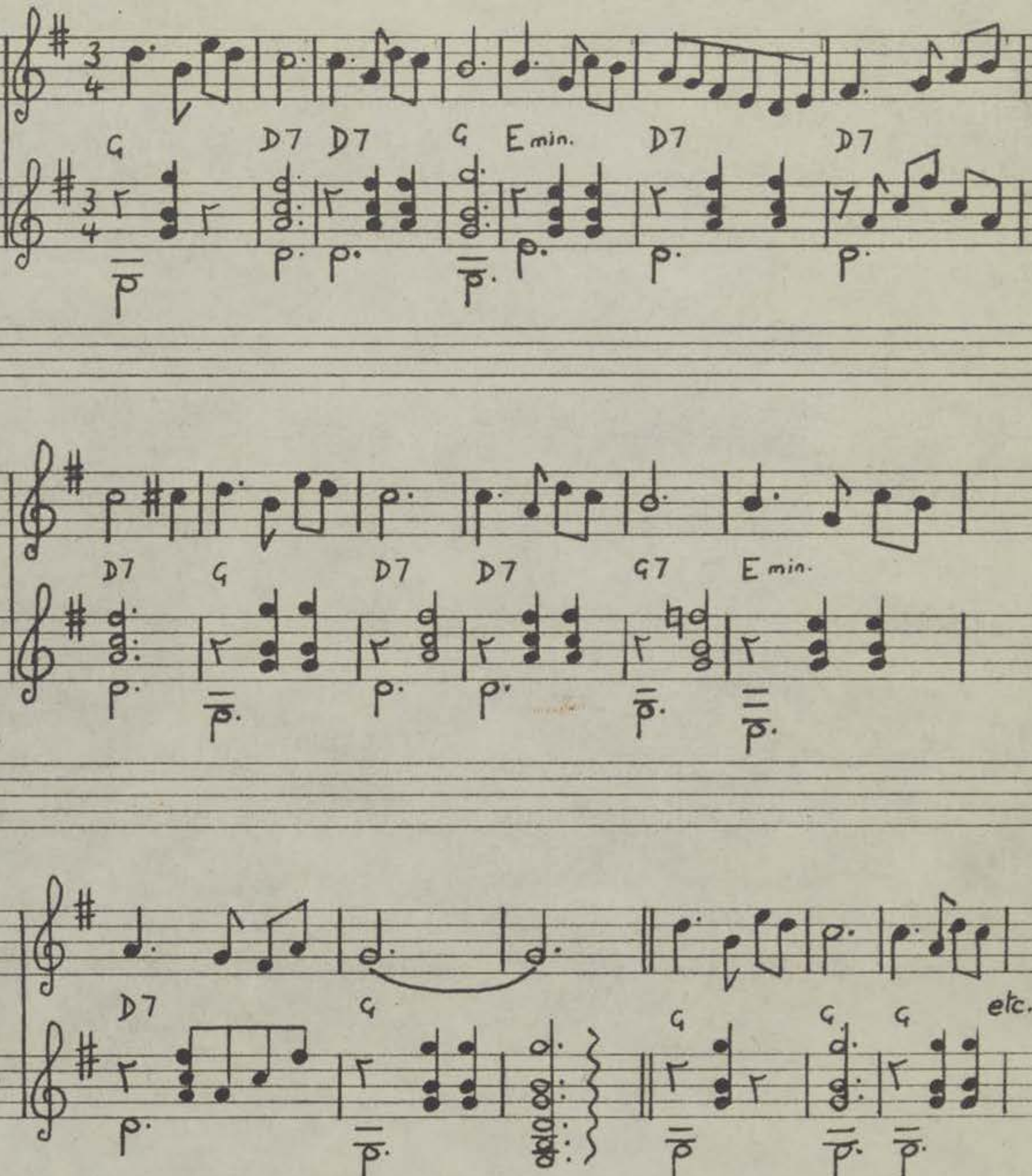
All these defective versions were tried out on pilot sample groups of children. Apart from the melodic error in item 6 none were so obvious to the children tested that the majority found it simple to detect the mistakes. It will be seen that the children are not asked to specify the type of error, or to indicate exactly where mistakes occur. A Gestalt-type response is required of them in most cases - a conviction that an item is defective without having to worry just why or how.

As a result of constructing the test in this way, it has been found possible to test out a group of hypotheses, and the statistical analysis of data will be described in the next chapter. Over 1000 children in the 7 - 11 age range have been tested, with the addition of 31 children aged 6 - 7 years, and 48 children aged 11 - 13 years.

Finally for the purposes of validating the test, 38 boys in a cathedral choir school were tested, and also a group of 27 college of education students aged 19 so that trends could be followed through from childhood to adulthood.

Thirteen primary and junior schools and one secondary school cooperated in this testing programme, giving a total of 38 classes tested. This cross-section included a variety of socio-economic backgrounds, from affluent urban to 'down-town' catchment areas, not forgetting some remote

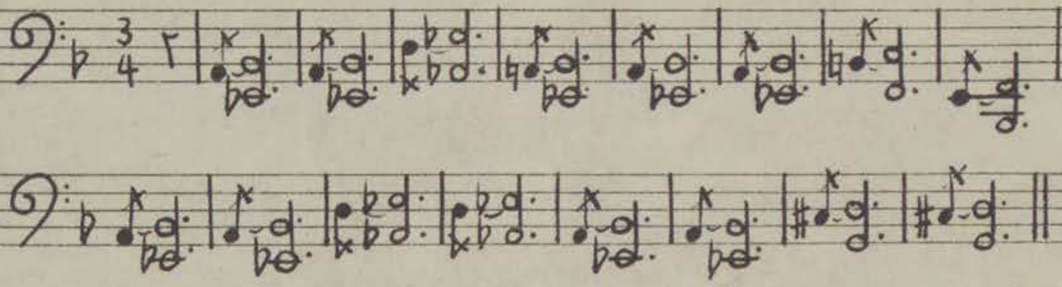
Item 3 (Tenor Recorder and Guitar)



Stylistically Correct Version. Harmonically Distorted Version

Item 6 (Clarinet and Piano - with Drum)

Stylistically Correct Version



Harmonically Distorted Version (piano score - left hand only) rural backgrounds.

All classes except one contained a number of instrumentalists. Once more the majority of these were recorder players who had group lessons in school. Again members of school and church choirs were drawn mainly from the 10 - 11 years group. No less than 471 children from this sample (nearly a half) were learning to play a musical instrument, and 178 children were members of church or school choirs.

In order that statistical treatment could be applied, the selected hypotheses were stated in their null form:

1. There is no significant increase in Music Discrimination Test mean scores through the age groups in the sample.

2. There is no significant difference between the scores of boys and girls in the age range under review.

3. There is no significant association between intelligence quotients and the scores obtained by the chosen age range.

4. Instrumental experience has no significant effect on those aspects of musical ability measured by the Music Discrimination Test.

5. Choral experience has no significant effect on those aspects of musical ability measured by the Music Discrimination Test.

CHAPTER 6

STATISTICAL ANALYSIS OF MUSIC DISCRIMINATION TEST DATA

This chapter is concerned with the testing of hypotheses which form a central part of the research design. These are to do with (a) age, (b) sex, (c) association with verbal ability, (d) the influence of instrumental experience and (e) the influence of choral experience. There will also be sections dealing with test reliability and methods of test validation, and finally there will be sections dealing with item analysis and version analysis in view of the fact that this is a new test, designed specifically for the purpose of examining the foregoing group of hypotheses.

The t-test will be employed to check significance when we are dealing with continuous data, and chi-squared will also be used to examine the significance of association of test scores with rankings or classifications. Figure 13 reveals a regular distribution of scores over the whole sample which gives a normal curve. So, in addition to small sample techniques of analysis, product-moment correlation coefficients can also be calculated. Mean scores and standard deviations for a variety of classifications will also be shown.

Comparison of Age Groups

Approximately equal numbers of children from each age group from 7 - 8 years to 10 - 11 years were tested; this enabled comparisons to be made of mean scores both at the one-year and at the two-year interval.

Hypothesis 1. There is no significant difference in Music Discrimination Test mean scores through the age groups in the sample.

This hypothesis was conclusively disproved both at the two-year and at the one-year interval. Table 14 displays the figures for the four age groups. Mean scores show a significant increase at the 1% level for all intervals except that between the 9 - 10 and 10 - 11 year age groups where the increase is significant only at the 10% level. The t-test figures are very high where comparison is made at the 2-year interval.

Another way of comparing year mean scores is to separate out scores for each of the four alternative versions for the test, and to compare each of these version mean scores at the four age levels in the sample. The total of each year group's mean score was calculated as a percentage of the total of the whole sample's scores for each of the four versions stylistically correct, melodically-distorted, rhythmically-distorted and harmonically distorted. The comparison of these percentages at all four age levels is shown in figure 14.

Examination of this graph shows the greater discriminatory ability of the older groups in the sample when trying to identify the correct version as compared with the younger age groups; the steeper slope of the correct version curve shows this quite clearly. Compare this with the flatter growth gradients of the distorted versions as we progress through the age groups. Some of the grosser errors in the distorted versions were easy for the younger children to detect, and correct scoring on the distorted versions constitutes a higher proportion of the younger children's score, whereas scoring in the correct version forms a higher proportion of the scores of the older age groups.

The only unusual factor in this graph is the sudden levelling off of mean scores when we come to the 10 - 11 year level. One explanation is of course that the

FIGURE 13 MUSIC DISCRIMINATION TEST

DISTRIBUTION OF SCORES IN THE 7 - 11 SAMPLE N = 1065

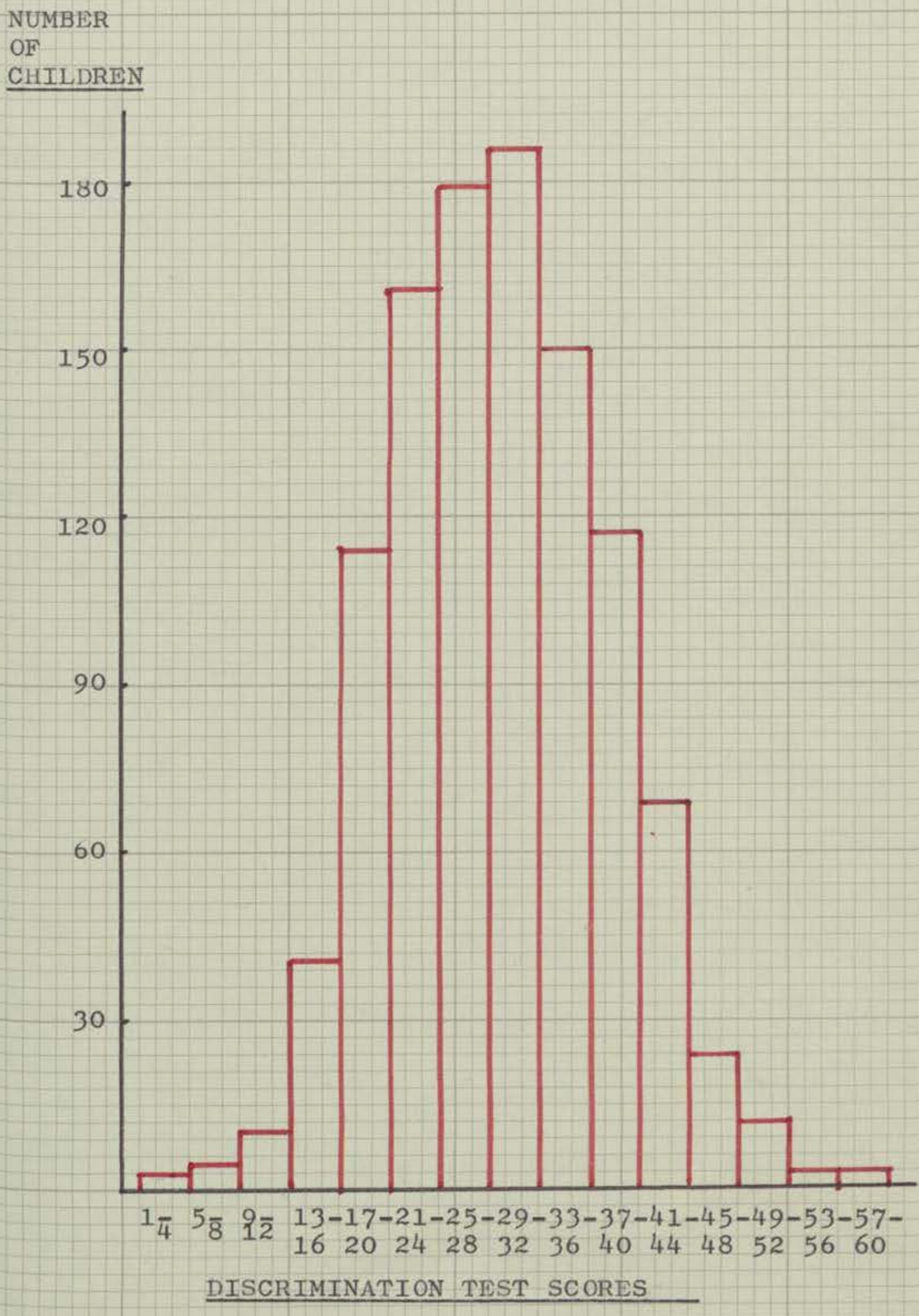


TABLE 14 MUSIC DISCRIMINATION TEST

MEAN SCORES FOR THE FOUR VERSIONS

AGE GROUP	N	MELODIC	RHYTHMIC	HARMONIC	CORRECT
7 - 8	256	8.33	8.80	8.07	3.93
8 - 9	272	8.95	8.82	8.28	4.43
9 - 10	260	9.60	9.72	8.76	5.35
10 - 11	277	9.75	9.76	8.71	5.66

t-test COMPARISON OF AGE GROUPS

One Year Interval

Age groups 7 - 8 and 8 - 9 years
Mean Scores 25.80 and 28.35 respectively
$t = 3.271$ d.f. = 525 Difference is significant at 1% level

Age groups 8 - 9 and 9 - 10 years
Mean Scores 28.35 and 32.45 respectively
$t = 5.912$ d.f. = 529 Difference is significant at 1% level

Age groups 9 - 10 and 10 - 11 years
Mean Scores 32.45 and 33.75 respectively
$t = 1.824$ d.f. = 533 Significant at 10% level only

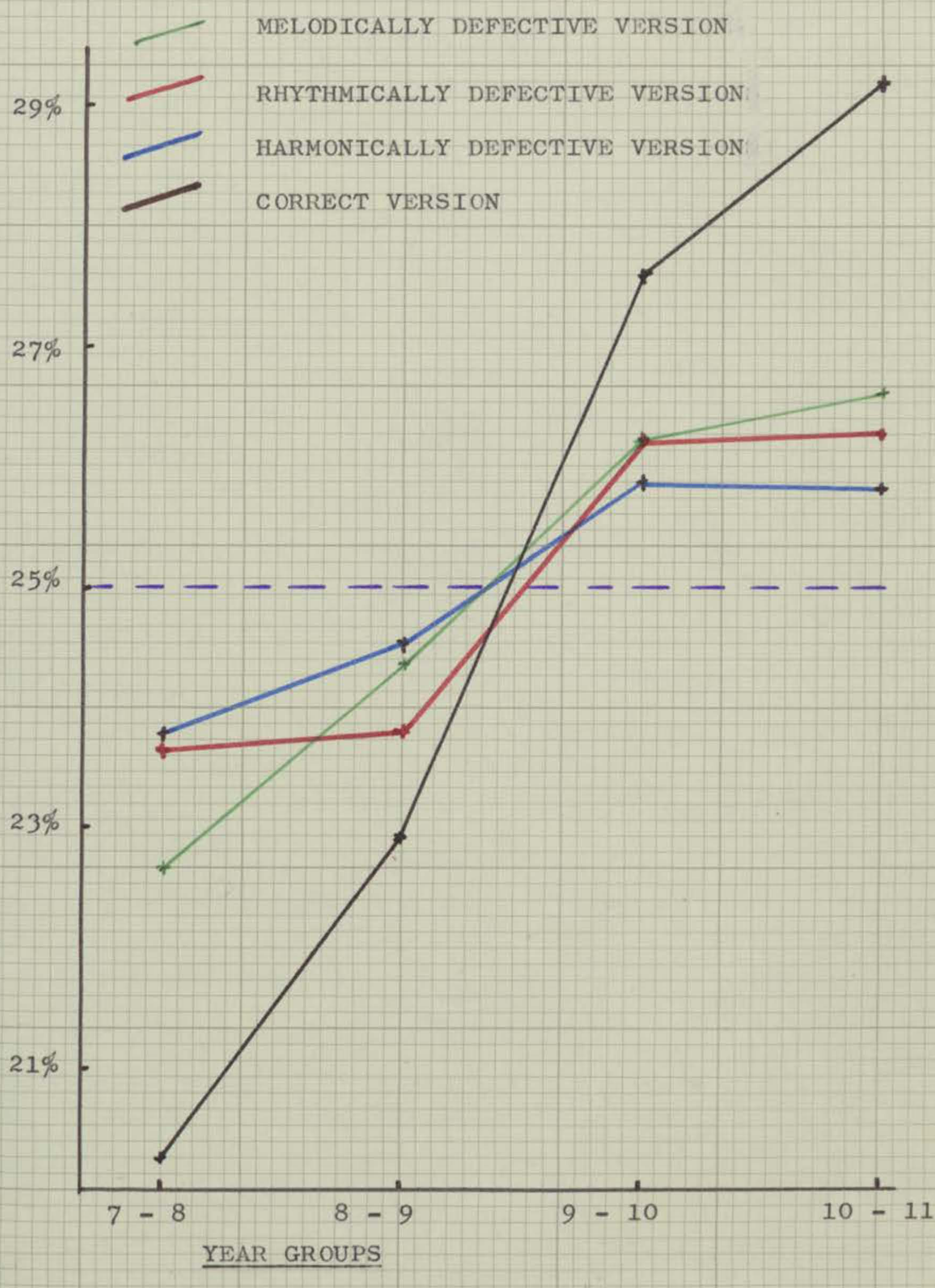
Two Year Interval

Age groups 7 - 8 and 9 - 10 years
Mean Scores 25.80 and 32.45 respectively
$t = 9.53$ d.f. = 512 Significant at 1% level - highly significant

Age groups 8 - 9 and 10 - 11 years
Mean Scores 28.35 and 33.75 respectively
$t = 7.626$ d.f. = 546 Significant at 1% level - highly significant.

FIGURE 14 MUSIC DISCRIMINATION TEST

PERCENTAGE OF WHOLE SAMPLE SCORE FOR EACH AGE GROUP



cross-section of classes in this 10 - 11 year group was not so representative of the total population of children of this age as were the test samples for the younger age groups. Another explanation could be that the test ceases to be so discriminating when we arrive at this age level. Yet a third explanation is that this ability begins to develop more slowly around this age.

Yet, when a sample of 48 children aged 11 - 13 years was tested, their mean score, 36.08, was significantly above the 10 - 11 year level, and this trend is continued when we inspect the mean score of a group of 19 year old college of education students (N = 27). This was 38.44, significantly above the mean score of the secondary school sample, although of course the age gap here was 6 years, and the sample numbers relatively small.

Some attempt will be made under the sections devoted to item and version analysis to compare scores for the Music Responsiveness and Music Discrimination Tests, even though the overlap between the sample populations for each test is very slight. One continuing trend will be noted here, as it concerns comparison of age groups. There is the same large gap between the two lower age groups' mean scores and those of the two upper age groups. This is clear from figure 14 but is particularly well portrayed in figure 15.

Comparison of Mean Scores of Boys and Girls

In view of the interesting though inconsistent findings from chapter four concerning the scores of boys and girls in the Music Responsiveness Test, there was much speculation in the writer's mind as to the outcome of the present analysis directed towards examining the respective abilities of boys and girls to cope with the Music Discrimination Test where a more complex type of discrimination is required. Again a null hypothesis is being examined.

FIGURE 15 MUSIC DISCRIMINATION TEST

COMPARISON OF MEAN SCORES FOR THE THREE VERSIONS IN EACH YEAR GROUP

Hypothesis 2. There is no significant difference between the Music Discrimination Test mean scores of boys and girls in the age range under review.

This hypothesis was examined first of all by comparing the whole sample population of boys (N = 515) with that of girls (N = 550). The t-test was employed to gauge the significance of any sex difference in the mean scores of these two large samples of 7 - 11 year olds. Their mean scores were 30.30 and 29.97 respectively.

This tiny superiority of 0.33 in favour of boys is, of course, not statistically significant, but it does represent an intriguing contrast to the tendency in the Music Responsiveness Test for girls to do rather better than boys, in some cases significantly better. This leads on to another question of how far the Music Discrimination Test is measuring different aspects of musical ability. Shuter[1] reports her own and Wing's research into this question of sex differences. Briefly this postulates that although boys do equally well with girls in ear acuity tests, girls tend to be more introverted and therefore make better listeners, and this is reflected in their slightly better scores where aspects of appreciation are being measured.

The present study has led to different findings, where the Responsiveness Test, which has a less complex construction, shows superior scores for the girls in the sample, whereas the Discrimination Test, designed deliberately to be more complex musically, shows roughly equal scores for girls and boys. It appears from this that boys fare at least as well as girls when a more complex musical task is presented, and in this case, one where aspects of musical appreciation are being measured.

1. The Psychology of Musical Ability - Rosamund Shuter - Butler and Tanner 1968. p.91

The standard deviations for these big samples of boys and girls are 8.72 and 8.73 respectively - an approximately equal scatter of scores on either side of closely corresponding mean scores.

A second method of examining hypothesis 2 consisted of looking at the mean scores of boys and girls for each age group in turn. The findings are laid out below:

AGE GROUPS	BOYS		GIRLS	
7 - 8	N = 133	M = 26.01	N = 123	M = 25.62
8 - 9	112	28.78	160	27.90
9 - 10	140	32.65	120	32.27
10 - 11	130	33.45	147	34.03

Two important points arise from inspecting the above table of sex and age group mean scores; (a) there are no significant differences between boys' and girls' mean scores in any age group and (b) the same characteristic sharp rise is again evident between the mean scores of the 8 - 9 and 9 - 10 age groups for both boys and girls. One further point emerges - this levelling-off effect at the top age group point appears to be more pronounced for the boys' sample and this point is effectively illustrated in figure 16.

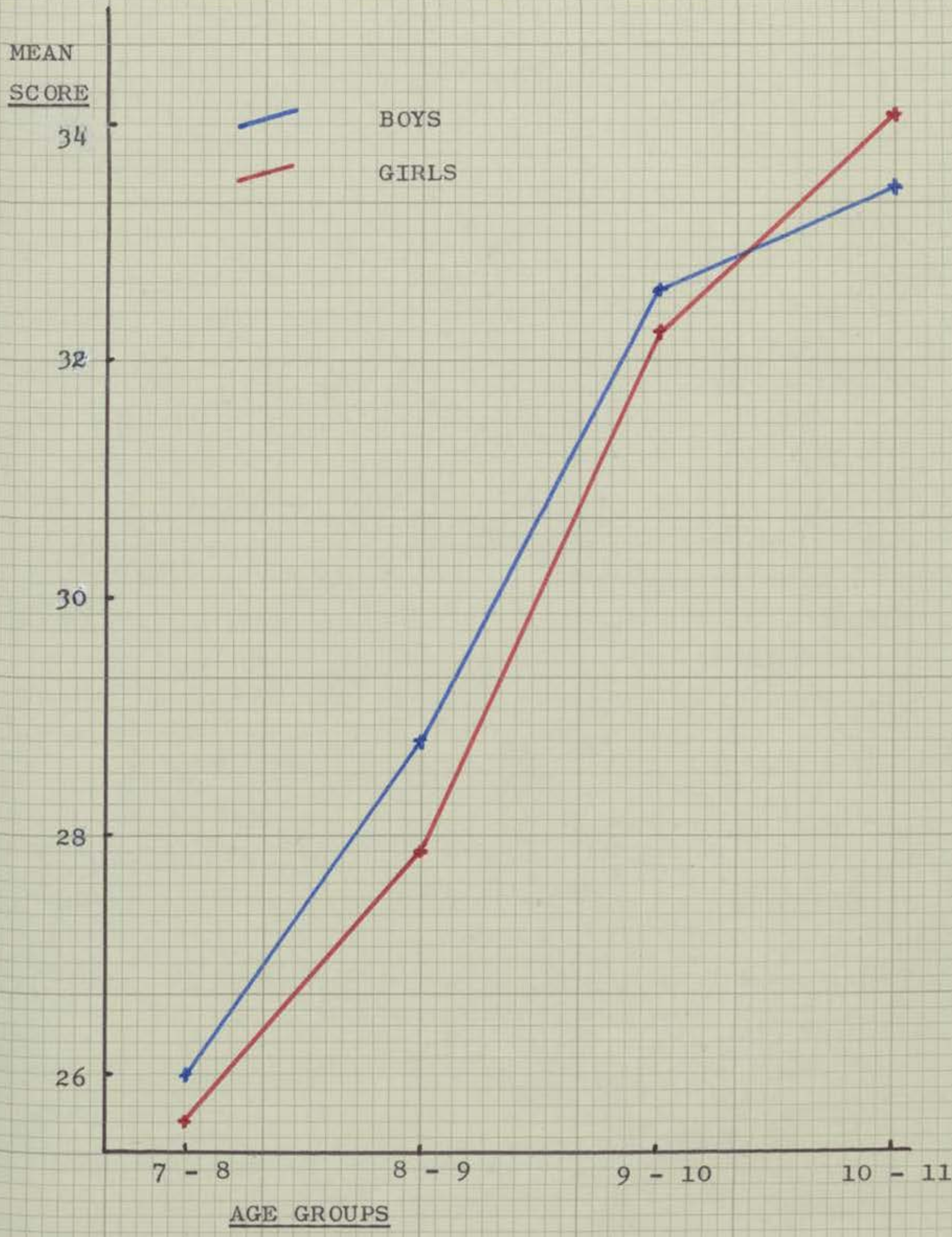
It is interesting and perhaps a little surprising that in a purposely-complex test such as this, in a fully-musical setting, the same kind of sex findings are reported as in ear acuity tests of the Seashore and Bentley type, whereas in the far less complex Responsiveness battery, closer to the Bentley battery, girls' mean scores tend to be superior at, or near, a level of significance.

<u>Comparison of Discrimination Test Scores with Verbal Quotients</u>

Hypothesis 3. There is no significant association between intelligence quotients and the Music Discrimination

FIGURE 16 MUSIC DISCRIMINATION TEST

COMPARISON OF MEAN SCORES OF BOYS AND GIRLS FOR 4 AGE GROUPS



Test scores obtained by the chosen age range.

As the sub-heading indicates, for the phrase 'intelligence quotients' comparison was actually made with verbal reasoning and reading age quotients. This does not alter the purpose of this section which concerns itself with comparing these music scores with scores in another ability, to see how significant is any overlap between the two chosen abilities as shown by children's performances in the tests selected.

Four schools cooperated in the testing of this hypothesis. As has been mentioned, a wide interpretation has been put on the term 'intelligence quotients' to cover [1]Moray House Verbal Reasoning quotients, [2]Maddox Verbal Reasoning quotients and the [3]Burt Revised Reading Test.

A class of 7 - 8 year olds who had taken the Burt Revised Reading Test a few weeks earlier was given the Music Discrimination Test. This class (N = 29) was not 'streamed' by ability and hence contained a very wide ability range. Reading ages ranged from one child with a reading age of over 10 down to one educationally subnormal child with a reading age of 4 years. The correlation coefficient (0.61) revealed moderate correlation between the children's Discrimination Test scores and their reading ages.

In another school, a class of 9 - 10 year olds was given the Music Discrimination Test a few months after taking the Maddox Verbal Reasoning Test. A moderately low correlation coefficient (0.46) was obtained.

Three classes (N = 95) aged 10 - 11 years took the Music Discrimination Test within a few days of taking a

1. Moray House Univ. of Edinburgh Godfrey Thompson
2. Verbal Reasoning H.Maddox $9\frac{1}{2}$-$10\frac{1}{2}$ Oliver & Boyd 1960
3. Mental and Scholastic Tests C.Burt London

Moray House Verbal Reasoning Test as part of their Secondary School selection procedure. Product-moment correlation gave a coefficient of 0.47, again a moderately low correlation between the two sets of scores.

In another school a class of 9 - 10 year old children (N = 33) were given the Music Discrimination Test a few weeks after taking a Moray House Verbal Reasoning Test. On this occasion the correlation coefficient was 0.42, again moderately low.

<u>Hypothesis 3</u>   <u>Verbal Reasoning/Discrimination Test</u>

<u>Age Group</u>	
7 - 8	Burt Reading Age/Discrimination Test Score N = 29 r = 0.61 significant at 1% level
9 - 10	Maddox V.R.Score/Discrimination Test Score N = 22 r = 0.46 significant at 2% level
10 - 11	Moray House V.R.Quotient/Discrimination Test Score N = 95 r = 0.47 significant at 1% level
9 - 10	Moray House V.R.Quotient/Discrimination Test Score N = 33 r = 0.42 significant at 1% level

There is a certain consistency about these correlation coefficients, and they closely resemble those between verbal reasoning quotients and the various subtests of the Music Responsiveness Test battery where there is comparability. Correlation coefficients between the reading ages and Music Discrimination Test scores of the young age group is somewhat higher. However, whether Burt's Reading Test measures the same complex verbal ability as the well-standardised Moray House Tests is probably open to question.

So here we have a situation where rather higher correlations are found than has been reported by other test constructors when they were comparing the test scores of their batteries with intelligence quotients. The findings for the Discrimination Test confirm those for the Responsiveness Test, so perhaps it is the fact that testees are performing a task within a more musical setting that results in the closer relationship to verbal reasoning that is a consequence of these higher, though still moderately low correlations.

Comparison of Mean Discrimination Test Scores of Instrumentalists and Non-players

Hypothesis 4. Instrumental Experience has no significant effect on those aspects of musical ability measured by the Music Discrimination Test.

This hypothesis was tested directly, first of all, by comparing the mean scores of all children receiving instrumental tuition with the mean scores of non-players for the whole 7 - 11 year sample. The results of the t-test are shown below:

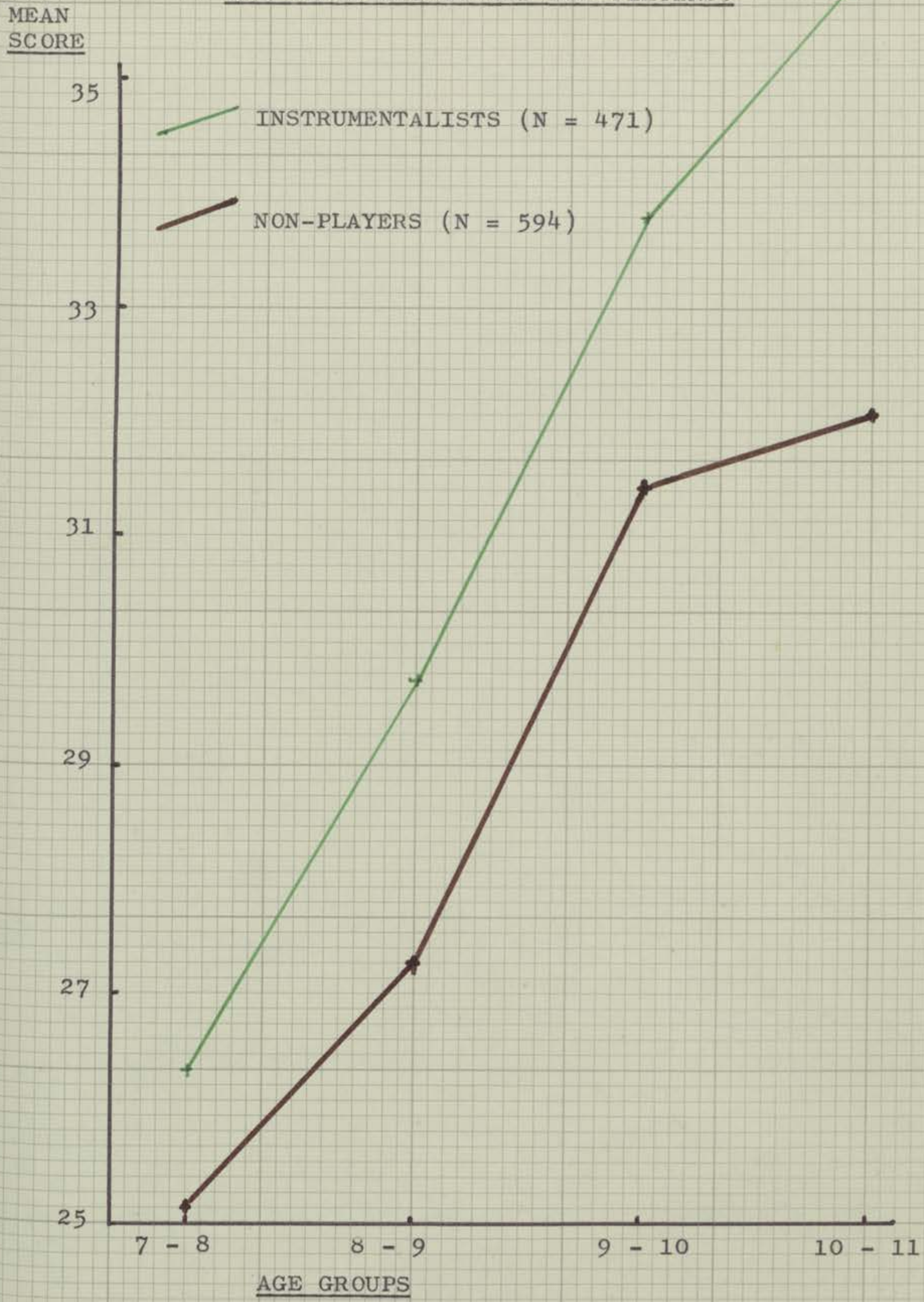
Instrumentalists	N = 471	Mean Score = 31.20	S.D. = 8.89
Non-players	594	29.32	8.49

t = 3.52 d.f. = 1063 This difference in means is significant at the 1% level - in fact it is a highly significant difference in statistical terms. Figure 17 shows how the gap between instrumentalists and non-players steadily widens through the age groups of the sample.

Another way of examining the differences between Discrimination Test scores of instrumentalists and non-instrumentalists was to apply t-test analysis to their scores for each of the 4 alternative versions in turn. A group of 86 children aged 9 - 11 years from 3 classes in two schools was chosen. There were approximately equal numbers of each of the two categories, instrumentalists

FIGURE 17 MUSIC DISCRIMINATION TEST

COMPARISON OF MEAN SCORES OF INSTRUMENTALISTS AND NON-PLAYERS.



and non-instrumentalists. The t figures are given below :

Melodically distorted version	t = 1.45	not significant
Rhythmically " "	t = 1.23	" "
Harmonically " "	t = 0.80	" "
Stylistically correct version	t = 2.53	significant at 2% level

For all versions the instrumentalists' mean scores were superior to those of non-instrumentalists. This superiority was at a significant level in the case of the correct version scores.

The next stage in examining hypothesis 4 was to compare several categories of instrumentalist with the non-players in turn. Since the most numerous class of instrumentalist was that of recorder players, this class was considered first (a) as recorder players as a whole, and (b) by looking only at those children who had graduated from the smaller descant size to the larger treble, tenor and bass recorders, and who spent a large part of their instrumental experience playing harmony parts which necessitated careful listening to the melody line above to obtain good intonation and rhythmic stress.

Since age and length of instruction has some bearing on mean scores, it was decided to examine each year group in turn.

Recorder Players

Table 15 demonstrates the changes in significance levels of the difference in means between recorder players and non-players through the age groups in the sample. Much of the testing was done quite early in the school year when recorder lessons in some 7 - 8 year classes had only been under way for a matter of weeks. In view of this it is hardly surprising that the superiority of test scores of the 7 - 8 year old recorder players only just approaches the 10% level of significance. However, each succeeding year

TABLE 15 MUSIC DISCRIMINATION TEST

t-test

SIGNIFICANCE OF DIFFERENCE IN MEANS BETWEEN RECORDER PLAYERS AND NON-INSTRUMENTALISTS 10-11 YEAR GROUP

Recorder players	N = 84	Mean score =	35.85
Non-instrumentalists	N = 165	" "	32.10
t = 3.41 d.f. = 247	Significant at the 1% level		

9-10 YEAR GROUP

Recorder players	N = 105	Mean score =	34.07
Non-instrumentalists	N = 148	" "	31.36
t = 2.72 d.f. = 251	Significant at the 1% level		

8-9 YEAR GROUP

Recorder players	N = 89	Mean score =	29.96
Non-instrumentalists	N = 171	" "	27.39
t = 2.404 d.f. = 258	Significant at the 2% level		

7-8 YEAR GROUP

Recorder players	N = 132	Mean Score =	26.74
Non-instrumentalists	N = 112	" "	25.11
t = 1.60 d.f. = 242	Not quite significant at the 10% level		

increases this superiority of mean scores.

This type of instrumental experience appears to exercise a cumulatively favourable effect on children's ability to perform tasks of musical analysis of the kind tested in the Music Discrimination Test. The smaller proportion of recorder players in the older groups within the sample is not due to lapsing and giving up lessons; it indicates rather the immense upsurge of interest in recorder playing in many Dorset schools, and particularly in consort playing in parts, the 7-8 group being the first to benefit.

Treble, Tenor and Bass Recorder Players

The mean scores of this category of players are shown in table 16 where they are compared with the mean scores of other categories of instrumentalist, and also with the mean scores of non-instrumentalists. As might be expected, the mean scores of this category for every age group, including the youngest, are higher than the mean scores of those children who play descant recorder only. Perhaps this represents the beneficial influence of the musically-broader experience where the deeper instruments of the recorder family are introduced.

In the 10 - 11 year group, t-test analysis yields a highly significant superiority of mean scores for these children receiving lessons on the treble, tenor and bass recorders. ($N = 33$, $t = 3.95$)

Pianists

There was a sufficiently large group of pianists in each year group of the sample to merit a separate classification. Their mean scores were compared with those of other categories of instrumentalist and also with those of non-players. Some rather interesting trends are displayed in table 16 and in the associated figure 18.

TABLE 16

MUSIC DISCRIMINATION TEST

YEAR MEAN SCORES FOR VARIOUS CATEGORIES OF INSTRUMENTALIST

Descant Recorder Players

7 - 8 year group	N = 132	mean score = 26.74
8 - 9	89	29.96
9 - 10	105	34.07
10 - 11	84	35.85

Treble, Tenor and Bass Recorder Players

7 - 8 year group	N = 11	mean score = 29.82
8 - 9	17	32.76
9 - 10	33	34.88
10 - 11	33	38.45

Pianists

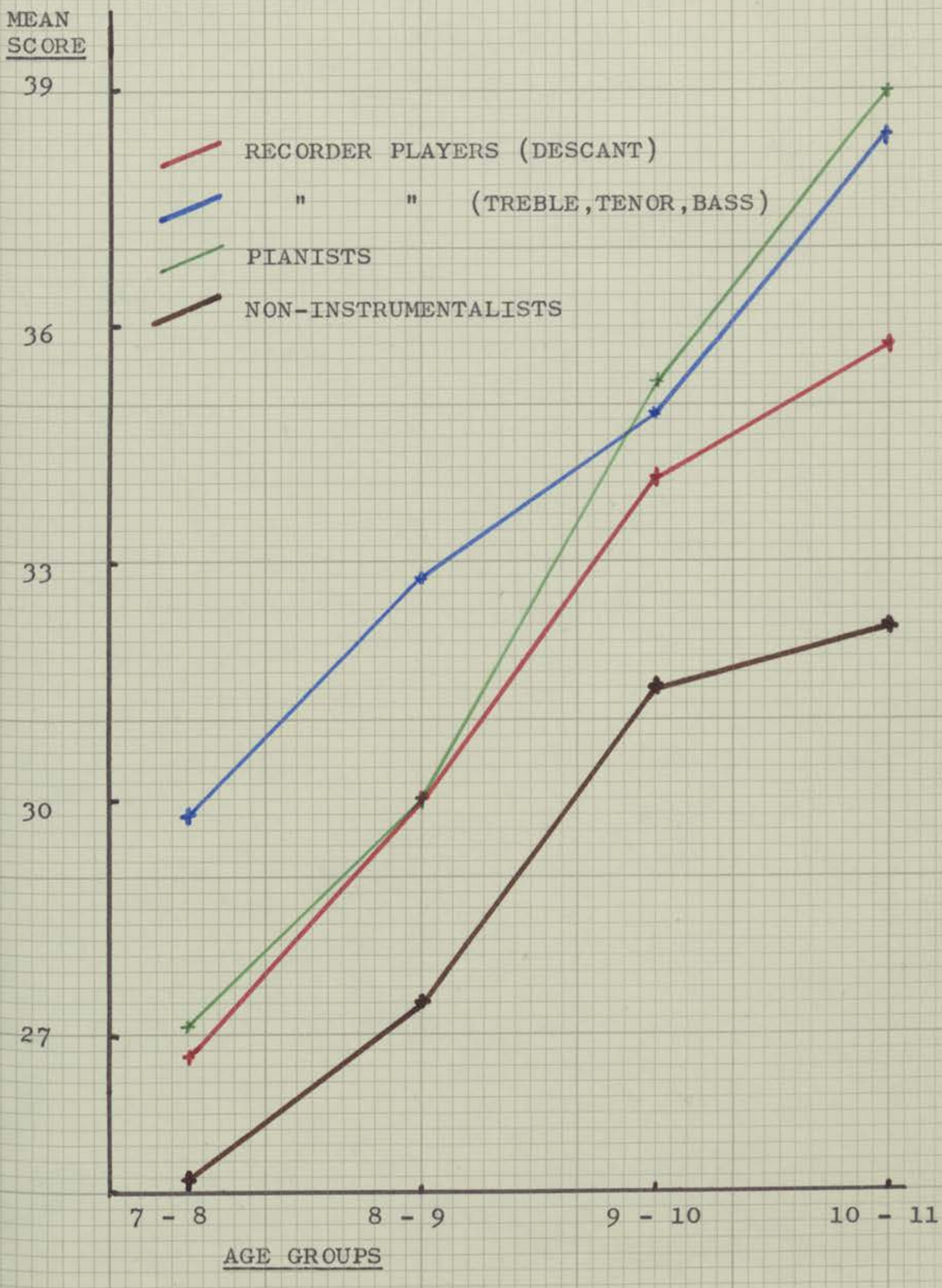
7 - 8 year group	N = 18	mean score = 27.11
8 - 9	26	29.96
9 - 10	27	35.29
10 - 11	27	39.07

Non-Instrumentalists

7 - 8 year group	N = 112	mean score = 25.11
8 - 9	171	27.39
9 - 10	148	31.36
10 - 11	164	32.16

FIGURE 18 MUSIC DISCRIMINATION TEST

MEAN SCORES FOR VARIOUS CATEGORIES OF INSTRUMENTAL EXPERIENCE FOR THE FOUR AGE GROUPS



Instrumental Development

The samples of descant recorder players and of non-instrumentalists in each year group are quite large, usually approaching or even over the 100 mark, and these categories give the most reliable and consistent trends. The samples of the players of the larger recorders and of the pianists are relatively smaller, ranging from a mere 11 in one year group up to 33, and we must place less reliance on trends concerning these categories.

Two points are worth noting, however; (a) the early introduction of the larger recorders has an almost immediately favourable effect on the musical ability of the children learning them, as displayed by their ability to perform the musical tasks set in the Music Discrimination Test; (b) those children who do stick to their piano lessons into their eleventh year then begin to demonstrate a marked superiority over most other categories of instrumentalist.

Other Instrumentalists

The figures laid out below show the relatively small number of players who enter into this final category - a necessarily heterogeneous company indeed - and for purposes of comparison, all types of instruments are indicated where music lessons are given on a regular basis.

	7 - 8	8 - 9	9 - 10	10 - 11
Descant Recorder	135	87	104	84
Treble "	11	13	24	23
Tenor "	0	6	14	12
Bass "	0	0	4	1
Pianp	17	25	27	26
Violin	0	5	3	8
Cornet/trumpet	0	0	1	3
Guitar	2	1	1	5

As can be seen, the last three categories are very small indeed, and cannot be grouped in any way as proved possible with treble, tenor and bass recorders which are played together in consort in school lessons. The writer checked that guitarists were receiving accredited music lessons, but this class of instrumentalist tended to appear in the lower ability half of their school class as ranked by their scores in the Music Discrimination Test. The same comment also applies to the cornet and trumpet players, but the violinists scored better, though not so well as the pianists in their year group.

In nearly all cases there was an overlap of instrumental experience, as the majority of pianists and violinists also were recorder players .

<u>Children in Choirs</u>

Hypothesis 5. Special choral experience has no significant effect on those aspects of musical ability measured by the Music Discrimination Test.

Very few children in the first two year groups of the sample were selected to sing in their school choirs. The vast majority were chosen from the 9 - 10 and 10 - 11 year groups. These choristers included the 'most promising voices' from the 9 - 10 year group and approximately two-fifths of the 10 - 11 year group. 'Most promising' was the phrase used by the teacher responsible for training the school choir at the school which had a fine tradition for unison singing, and variants on this phrase were used by teachers with similar responsibilities in other schools.

These school choirs contained twice as many girls as boys. However this position was reversed as regards church choristers. From the whole 7 - 11 sample, there were 22 boys and 14 girls in their local parish church choirs. These church choristers showed mean scores rather above the mean of their year groups except in the case of the 10 - 11 group where church choristers (N = 13) actually scored lower than their year mean. Since all these samples were quite small, few clear-cut conclusions arise.

The position is different as regards members of school choirs. Figures for mean scores and any significant differences are laid out below for the two upper year groups in the sample:

	9 - 10		10 - 11	
Choir members	N = 76	M = 35.84	N = 102	M = 35.18
Non-members	185	31.11	174	32.92

The difference in means in the 9 - 10 year group was significant at the 1% level; for the 10 - 11 group significance was at the 10% level only. Perhaps the fact that a smaller proportion of the 9 - 10 group was selected, and that these were an 'elite' sub-group, accounts for the higher mean score than was obtained by the 10 - 11 choir members group.

Hypothesis 5 then is conclusively disproved at the 9 - 10 age level, and less conclusively at the 10 - 11 level.

Reliability

Seventeen separate calculations were carried out to examine the reliability of the Music Discrimination Test. In the one case where it was possible, the test-retest method was employed, and in the remaining cases, the Kuder-Richardson formula was used to look at the internal consistency of the test - a recommended procedure where other methods are not available, even though coefficients tend to be slightly lower where this method is employed.

The figures obtained are shown in table 17. In the case of the moderately high test-retest coefficient, the

TABLE 17 MUSIC DISCRIMINATION TEST

RELIABILITY

TEST-RETEST METHOD

CALCULATION 1. r = 0.85 Moderately high correlation

KUDER-RICHARDSON FORMULA METHOD

CALCULATION 2	r = 0.84	Moderately high correlation
3	0.85	"
4	0.84	"
5	0.85	"
6	0.85	"
7	0.86	High correlation
8	0.84	Moderately high correlation
9	0.88	High correlation
10	0.77	Moderately high correlation
11	0.80	"
12	0.77	"
13	0.77	"
14	0.80	"
15	0.76	"
16	0.76	"
17	0.77	"

Range of size of classes tested from N = 20 to N = 91 interval between tests was two months. The Kuder-Richardson coefficients all come within the moderately high to high class of reliability coefficients. For such a short test, this would appear to furnish satisfactory proof of reliability.

Validity

The Music Discrimination Test was designed to examine a series of hypotheses concerned with broad classifications, within a large sample population. Its purpose was not primarily predictive; there was no intention to demonstrate which children should be selected for instrumental tuition and which should be discouraged. Moreover, the test is in a musical setting, where the ability of children to discriminate between different versions of a piece of real music is being examined. In spite of the safeguards contained in the above factors, it was decided to test validity in two ways.

The first method consisted of comparing test scores with teachers'ratings of their children's musical ability. Two schools cooperated in this (N = 88). In both cases, teachers were asked to give subjective estimates of the musical ability of their children in terms of A.B.C. ratings. Chi-squared was employed and in both schools association between teachers' ratings and test scores was at the 2% level of significance.

A second way of checking validity was by using the criterion of cathedral choristers' scores in the Music Discrimination Test. These selected boys lived in a richly musical environment and hence ought to score high in such a test. All of the 38 choristers were also competent instrumentalists. In fact, six choristers obtained the maximum score of 60, and the mean score for the choir school (boys aged 8 - 13) was 51.16. This provides an interesting comparison with an 11 - 12 year old class (M = 34.08), a 12 - 13 year old class (M = 38.08) and a group of 19 - 20 year old college of education students (M = 38.45) and gives further proof of the validity of the test.

Comparison of Scores for Music Discrimination and Responsiveness Tests.

It has been mentioned earlier in the chapter that there was little overlap in the sample populations tested with the Music Responsiveness Test and the Music Discrimination Test. Some reference has also been made to the different showings of boys and girls when performing the tasks set by these two tests. Another point, this time in common between the two tests, is the consistent superiority of instrumentalists' mean scores over those of non-players.

The purpose of this section is to examine what correlation there is where sample overlap has occurred. Since the two series of testings took place at an interval of two years, and young children go through a considerable amount of development in that time, such correlation was not expected to be high. Moreover, the design and purpose of the tests was not identical. Even so, this seemed to be a worthwhile exercise, and relevant to the design of the research.

This overlap group consisted of 48 children in one school. When they took the Music Responsiveness Test, they were in the 7 - 8 year group as members of two parallel unstreamed classes. At the time they took the Music Discrimination Test they were members of the 9 - 10 year group and the classes had been re-shuffled to a certain extent.

A moderately low product-moment correlation coefficient was obtained, (0.45) which was not unexpected. The two year interval and the relative smallness of the sample makes any precise conclusion impossible, but it would appear that the children are performing a rather different type of musical task, involving different aspects of musical ability to a certain degree.

Item Analysis

With this new test it seemed necessary to carry out a rigorous item analysis - to look closely at the relative difficulty of the 12 items, and to examine their differential effect at the various age levels within the sample. This topic has been touched upon briefly earlier in this chapter where reference was made (a) to the relative simplicity of the practice item at the beginning of the test which served chiefly as a guide to the understanding of the task to be performed, and (b) to the obviously changed character of the melodically-distorted version in item 6.

This section will compare the scores of the whole 7 - 11 age sample in each item (maximum item score = 5) and will then inspect the spread of scores between the higher and lower age groups to gauge the relative discriminatory effect of eadh item. The mean scores for each item (N = 1065) are as follows:

Item 1	M = 3.03	Item 2	M = 1.87	Item 3	M = 2.80
4	2.30	5	2.36	6	3.05
7	2.78	8	2.79	9	1.60
10	2.82	11	2.32	12	2.41

Over the whole age range of the sample therefore, item 9 and 2 prove the most difficult, and items 1 and 6 the easiest. The next stage is to break down these figures between the age groups within the sample to examine the discriminatory effect of each item at each end of the age range. Figure 19 shows the spread of mean scores through the age groups. Table 18 displays the mean item scores for each year group in the sample.

It will be observed that although items 2 and 9 are

FIGURE 19

MUSIC DISCRIMINATION TEST

ITEM ANALYSIS

COMPARISON OF MEAN SCORES FOR 7 - 8 and 10 - 11 YEAR GROUPS

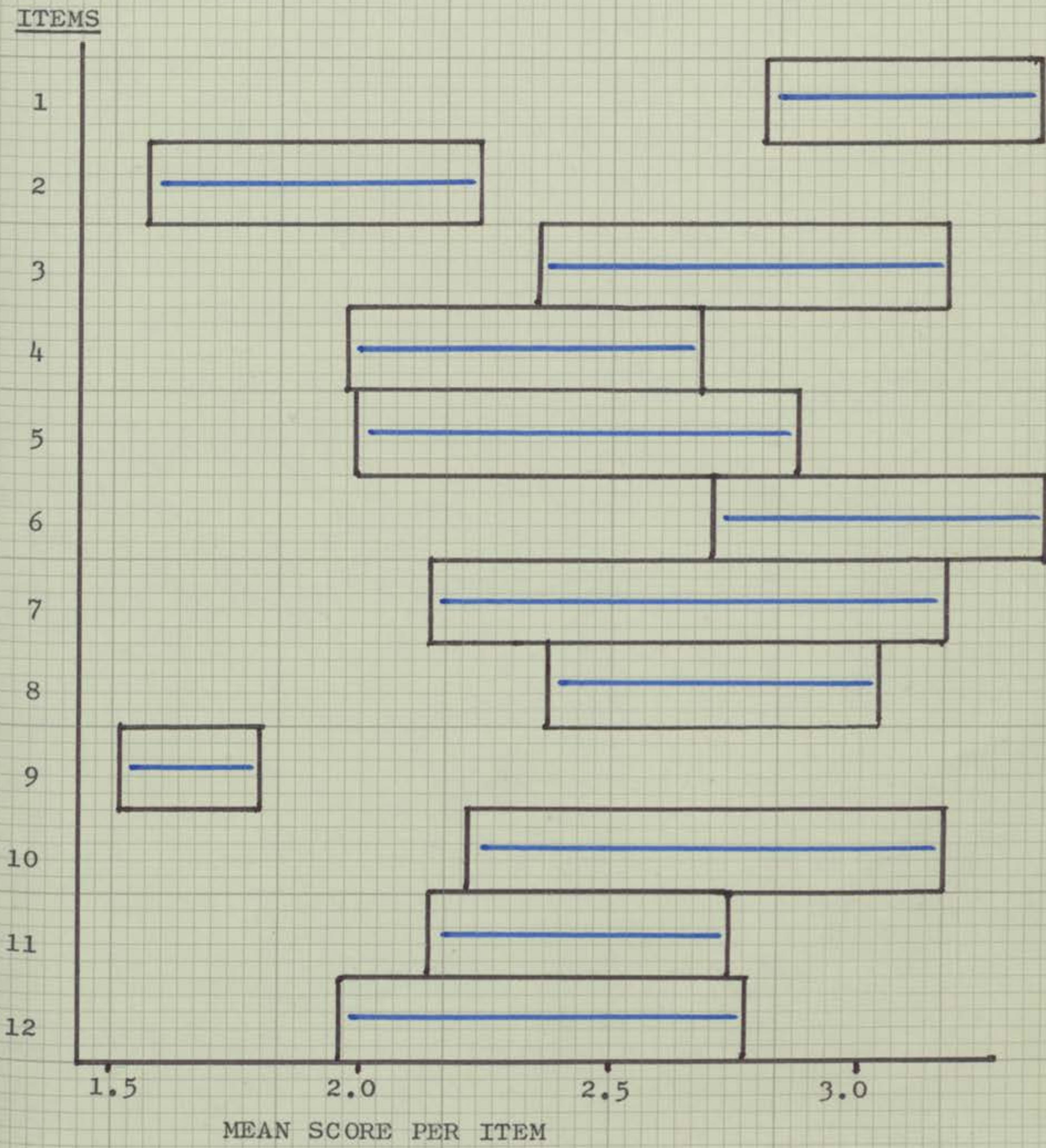


TABLE 18 MUSIC DISCRIMINATION TEST

ITEM ANALYSIS AND THE FOUR YEAR GROUPS

ITEM	7 - 8	8 - 9	9 - 10	10 - 11
1	2.80	2.94	3.02	3.35
2	1.57	1.81	1.81	2.24
3	2.35	2.58	3.17	3.10
4	2.02	1.97	2.53	2.68
5	2.03	1.98	2.86	2.59
6	2.69	2.94	3.37	3.18
7	2.13	2.62	3.17	3.16
8	2.36	2.75	3.02	3.02
9	1.53	1.58	1.51	1.78
10	2.22	2.69	3.18	3.15
11	2.12	2.16	2.25	2.72
12	1.95	2.15	2.77	2.76

both difficult relatively to the other items, there is a considerable difference in their discriminatory effect at different ages. To a lesser degree this is true also of the pairs of items 7 and 8, 12 and 11. Items 1 and 6, the easiest, also show a certain difference of spread between the ages. Items 7 and 10 have the highest discriminatory age effect and thus constitute the most efficient items in the test.

Version Analysis

In the melodically-distorted versions two types of alteration to the melody were made, (a) flattening slightly the pitch of the whole melody line, and (b) changing notes to alter the contour of the melody line. Analysis revealed a difference in the difficulty level for these two broad groups of melodically-defective versions.

The percentages correct for the four year groups are shown below:

(a) Flattened items - numbers 3, 5, 6, 7 and 11

	Mean Percentage Correct
7 - 8	77%
8 - 9	82%
9 - 10	88%
10 - 11	88%

(b) Melodically-altered items - numbers 1, 2, 4, 8, 9, 10 and 12.

7 - 8	64%
8 - 9	70%
9 - 10	74%
10 - 11	76%

Apart from the anticipated increase through the ages, we also see that the children in the sample found the flattened items easier to detect. An early study by [1]Brehmer (1925) was concerned with mistakes in scales played to children in the 6 - 13 age range, and their ability to detect these mistakes. He found that the majority of the younger children in his sample were unable to discriminate when the seventh was flattened. The present study finds that at least 64% of 7 - 8 year olds are able to discriminate successfully melodic changes of this degree.

When we turn to the rhythmically-distorted items, we find again that two main groups of rhythmic change can be distinguished; these concern (a) irregular tempo, where acceleration and slowing down is a feature of the defective version, and (b) where the rhythmic pattern is altered, for example by dotting a hitherto smooth rhythm. Again percentages of correct responses for each group of rhythmically-defective versions for the four year groups have been calculated:

Type of Rhythmic Change	7 - 8	8 - 9	9 - 10	10 - 11
Irregular tempo (items 3 9 12)	65%	68%	79%	80%
Altered rhythmic pattern (items 1 2 4 5 6 7 8 10 11)	73%	75%	82%	82%

The children in the sample found the irregular rhythms rather more difficult to detect. For these particular defective versions the same disparity to discriminate appears between the two younger and the two older year groups.

A further sub-division was made of the larger rhythmically- altered group (b) into (i) those in which all

1. 'Melodieauffassung und Melodische Begabung in Kindes' Z.Angew Psychol. Beihefte F. Brehmer 1925
Reported in the Psy.of Mus.Ability,R.Shuter 1968.pg.84

parts are altered, (ii) those in which the melody part only is changed and (iii) those in which the accompaniment only contains the rhythmic distortion. All age groups were pooled and the following percentages resulted:

(i)	All parts rhythmically altered (items 1 5 7 10 and 11)	78% correct
(ii)	Melody only altered (items 4 and 8)	82%
(iii)	Accompaniment only altered (items 2 and 6)	75%

One tentative conclusion emerges; it appears more difficult for children in this age range to discriminate rhythmic changes when these are confined to the accompaniment and are not repeated in the melody line as well.

The harmonically-distorted versions can also be split into groups, (a) those where only the bass part is altered and (b) those where all parts below the melodic line are harmonically changed. These two groups may be compared as percentages correct:

(a)	Bass changed	7 - 8	67%	8 - 9	68%
		9 - 10	71%	10 - 11	72%
(b)	All parts altered	7 - 8	68%	8 - 9	70%
		9 - 10	74%	10 - 11	73%

Again, as might be expected, it seems somewhat easier to discriminate the harmonically-defective version when all parts contain harmonic changes rather than when such changes are restricted to the bass line only. An early study by Rupp[1] (1915) had looked into the question of whether young children could discriminate between pieces of music where the bass part was played in a key

1. 'Uber Die Prüfung Musikalischer Fähigiceiten' (Teil I) Zsch. Ang Psychol. H. Rupp - 1915
Reported in the Psy. of Mus. Ability, R. Shuter. 1968. Pg. 84

different from that of the melodic line. His main conclusions were that young children could not discriminate except where strong discords were produced.

Of course Rupp was writing about the children of over 50 years ago when musical experiences were more restricted, and development correspondingly slower. The present study finds that 67% of the 7 - 8 year group can discriminate successfully where only the bass of the piece of music is changed.

A glance back to figure 14, page 155 at the beginning of this chapter demonstrates that although there is a growth gradient in the ability of children to discriminate defective versions, these yearly mean increases are slight in comparison with the large yearly increments in the mean scores of stylistically correct versions. Reduced to percentages of responses correct for each year group these are as follows :

Correct version - percentage correct -

7 - 8	33%	8 - 9	37%	9 - 10	45%	10 - 11	47%

Again, the big increase between the 8 - 9 and 9 - 10 year groups is in evidence.

Examination of Marks deducted for Year Groups

One more piece of analysis remains to complete the statistical examination of the Discrimination Test. Chapter five explained the method of scoring, and this included penalties for wrong guessing. Testees were told to leave the letters printed in their test leaflet unmarked if they were not sure whether they were correct or defective versions. It was also observed that a minority of children tested chose to 'gamble' on this penalty and risk losing marks.

The writer was concerned about how deducted marks were distributed through the year groups of the sample. For instance did the older children tend more to take this calculated risk? The results of analysis of marks deducted lead to the findings below :

Age Group	Mean score of marks forfeited
7 - 8	6.98
8 - 9	6.68
9 - 10	6.29
10 - 11	5.79

The trend is unmistakable; the younger the child, the more likely was he to forfeit marks in this way. The interesting point is that this does not appear to be directly connected with any question of misunderstanding. It may be that because the score from defective versions forms a larger proportion of the total score of the younger year groups in the sample, that losses due to forfeiture of marks also tend to be correspondingly greater.

Summary of Findings from Discrimination Test Data

Five hypotheses have been examined in this chapter. Results indicate that ability to discriminate between correct and defective versions of a piece of music increases with age but not, in the sample tested, at a consistent rate. Growth gradients tend to be irregular.

Little difference is revealed between the ability of boys and girls to perform the tasks of discrimination demanded in this test. Comparison with verbal ability produces moderately low correlations. When comparing those children who play a musical instrument with those who do not, the scores of the former tend to be significantly superior. To a lesser extent, this superiority is evident when comparing the scores of members of school or church choirs with those of non-members. These last findings were restricted to the 9 - 11 year group.

The test was found to be adequately reliable and valid for the purposes of this study. Item analysis showed that even the youngest members of the sample were able to discriminate to a certain extent between the stylistically correct versions of a piece of music and versions into which melodic, rhythmic and harmonic variations had been selectively introduced.

Perhaps, in conclusion, we may discuss a general statement by Dr. Shuter (1968):

[1]'It is generally held that most young children have no great appreciation of harmony, finding every harmonic accompaniment equally good, whether consonant or dissonant.'

If this statement is taken to refer to children in the 7 - 11 year range (most of Shuter's references appear to be taken from studies dealing with this age range) then the findings described in the present chapter run counter to those of much previous research. We are concerned with the ability to discriminate musically as an essential part of music appreciation, and the conclusion reached is that melodic, rhythmic and harmonic development is such in the 7 - 11 age group that musical taste is already forming. This gives us confidence to go ahead and examine the aesthetic side of young children's musical ability; it should be possible to probe into children's musical preferences, bearing in mind always that such preferences are largely determined by cultural influences - by the environment in which a child grows up.

1. 'The Psychology of Musical Ability' R. Shuter 1968 Page 83

CHAPTER 7

MUSIC PREFERENCE TEST

In this chapter the emphasis moves from an examination of children's ability to discriminate musically on to an investigation of children's musical preferences. It is proposed to present a wide range of musical styles from the music of the late Renaissance to examples of contemporary idiom. It was the writer's intention to develop a test of music preference which would yield data capable of being tested statistically; this would make possible an examination of the group of hypotheses with which this research is concerned - those related to age, sex, intelligence, and instrumental and choral experience.

Much has been written about the cultural and relative nature of musical taste, and many tests have been devised to examine it. Farnsworth[1] (1958) describes musical taste as 'the overall attitudinal set one has towards the phenomena which collectively comprise music.'

This very wide definition may be contrasted with that of Mueller (1951) whom Lundin (1967) reports as saying; [2]'One can only conclude that musical opinions and tastes, like political and economic preferences, are forged in a matrix of social and psychological forces, and at any given time represent a blend of both traditional factors and current experiences.'

These two quotations look at the question of what musical taste is from different angles, and one describing the individual's 'attitudinal set' and the other defining

1. The Social Psychology of Music N.Y. Paul R. Farnsworth 1958 - page 116
2. An Objective Psychology of Music 1967 - Robert W.Lundin reporting K.Hevner Mueller 'Studies in Music Appreciation' Page 189

the forces that mould one's preferences. The Standing Conference for Amateur Music (1966) pays tribute to the vital role of cultural influences on the formation of musical taste in that portion of one of its reports that states: [1]'No child should be allowed to go through his school life without coming into contact with the greatest musical works in our heritage.'

Lundin (1967) comments that: [2]' ... a large part of anyone's responses are culturally determined.' The same writer continues: 'Our musically discriminatory reactions are no exception.'

In a discussion of the cultural nature of musical responses, including individual preferences which may differ in varying degrees from the norms of the day, Lundin constantly stresses the point that those cultural influences which are exerted on the developing personality are far wider than one's intimate musical surroundings; in fact, in the case of a British child at least, these influences embrace the whole general Western musical culture, including family, school, church and other sources of musical stimulation.

The writer agrees with Farnsworth (1958) when he says: [3]'Music sensitivities are culturally but not racially bound.' The consensus of informed musical opinion seems to have accepted the truth of the view that musical taste is subjective and not an 'absolute', that although perception is via the channels of the physical organs of the body, musical taste itself depends predominantly on the cultural experience of the listener. Farnsworth continues: [4]'It is a subjective matter. After a time the Oriental can learn to share experiences with us'.

1. Standing Conference for Amateur Music - Music and the Newsom Report, London 1966.
2. Lundin (1967) page 98 3. Farnsworth (1958) page 45
4. Farnsworth (1958) page 45

The writer can illustrate from his own recent personal experience. Whilst he was conducting an impromptu musical evening at a residential adult education centre, a young Persian girl who was studying painting volunteered to give a rendering of a song from her country, following a selection of British, French, German, Italian and Dutch folk songs by other course members. This young student had learned to enjoy the songs of our Western culture, and when she sang for us we, in turn, were captivated in spite of the unfamiliar idiom of another musical culture, in what seemed a completely different tonal system containing far more fluid intervals. Once we had become in some degree acclimatised and she had overcome her initial nervousness, this meeting of contrasting cultures proved an enriching and mutually enjoyable experience.

<u>Tests of Musical Taste</u>

A number of interesting findings have resulted from the limited amount of research so far carried out into the formation of musical taste. [1]Henkin (1955) studied the musical preferences of a group of college students; he played them ten pieces of music representative of styles ranging from Baroque to modern, and from this research he identified two factors, one melodic and one rhythmic.

Much earlier, Valentine [2](1913), summing up the results of experiments with British children, had reported changes in preferences for intervals during adolescence; these changes appeared to bring musical tastes more into line with adult norms. Farnsworth [3](1958) also reports an experiment in which Beethoven's 5th Symphony and Stravinsky's 'L'Histoire du Soldat were presented

1. 'A Factorial Study of the Components of Music' 1955
   R.I. Henkin J. Psychol. 39
2. Farnsworth (1958) page 144 reporting Valentine (1913)
3. " " 148

successively to college students. Enjoyment ratings were very much affected by the order of presentation. Stravinsky, the less enjoyed, suffered an additional drop in popularity rating when following the Beethoven excerpt.

Farnsworth comments on the last four tests of the Wing battery, which also rank as tests of musical taste: [1]'It should be remembered that the criteria of the tests for 'correct' answers are based on social judgments. Naturally then, a fraction of the 'correct' answers of today will be 'incorrect' tomorrow.'

This must be the inevitable fate of many subjective judgments. The Oregon Music Discrimination Test [2](Hevner 1931), referred to earlier in this thesis, is also concerned with taste. Again, the materials of this test have been chosen from various styles and types of compositions by accredited composers.

As a result of questionnaires distributed to a large sample of high school students, Baumann[3](1960) related greater liking for classical music with higher socio-economic status. He stressed the point that both his higher and his lower status groups reported liking popular music.

Farnsworth[4](1958) reports on the Gernet Music Preference Test (1940), where the twenty selected works include both serious music and jazz. The items are arranged in pairs for simple preferences to be made as to which of the items in each pair is preferred.

Another attempt to measure musical taste is seen in the

1. Standardised Tests of Musical Intelligence - 1941 Herbert D. Wing.
2. 'A Study of Tests for Appreciation of Music' J.Appl. Psych. - 1931. Kate Hevner
3. 'Teenage Music Preverences' V.H. Baumann J Res.Mus.Ed 8
4. Farnsworth (1958) page 161

Adler Music Appreciation Tests [1] (1929) where compositions of Brahms, Chopin, Mozart, Rameau, Ravel and Wagner are recorded on player-piano rolls. With each authentic version, three distorted versions are presented; these are labelled 'sentimental' 'dull' and 'chaotic'. The testee has to indicate the versions he likes best and least, and also is required to guess the name of the composer of each piece.

Lundin [2] (1967) reports on a reaearch of Farnsworth (1950) into the subject of preferential response. Farnsworth sums up in the words: 'We agree on the composers we call eminent.' Beethoven and Bach head the list, with Brahms, Haydn, Mozart, Handel, Schubert, Wagner, Debussy and Monteverdi near the top.

The last instance of testing musical taste with which this section will deal is by Rogers [3] (1956). In this research 57 pairs of recorded excerpts of musical compositions were played to a large sample of children ranging in age from 10 to 18 (N = 635). Excerpts were of approximately 45 seconds duration ranging in style from 'highbrow' to 'popular' music. The testee simply had to express his preference for one of each pair. The result was an overwhelming victory for popular music; moreover this preference for popular music increased with the increase in age through Rogers' sample.

It will be seen that the first tests of taste reported are concerned with college students, and that by the method of reporting adopted in this section we arrive at a test which concerns itself with children as young as ten years of age. The task of the present writer was to design a test for children aged 7 to 11; for this,

1. 'Music Appreciation: An Experimental Approach to its Measurement' Mortimer J.Adler - Archives of Psychol.
2. Lundin (1967) reporting P.R.Farnsworth 'Musical Taste: Its Measurement and Cultural Nature' Stanford 1950 p.180
3. 'Children's Expressed Musical Preferences at Selected Grade Levels' V.R.Rogers - EdB Thesis Syracuse 1956

amongst other reasons, none of the tests reported was suitable for the purposes of this present study, though many good ideas were contained in them, which could be adapted for the present writer's needs.

Rationale underlying the Testing of Children's Taste

Both Farnsworth and Lundin constantly stress the role of training as one of the most important factors influencing the formation of musical taste. Lundin uses phrases such as [1]'the importance of early training and conditioning.' Farnsworth defines his viewpoint rather differently, [2]'Many, if not the majority of explanations necessary for understanding the phenomenon of music must be looked for in the habits of the listener, in what he has learned from his personal and cultural history.'

The present writer accepts the validity of both these views, expressed so clearly by Lundin, and particularly by Farnsworth. The next problem was a practical one - the construction of a preference test to investigate the development of children's musical tastes, particularly in the 7 - 11 age range. There seemed to be a need to avoid the dangers inherent in many previous tests where subjective responses were sought from the testee which were to be scored 'correct' or 'incorrect'. Farnsworth has shown how a fraction of those 'correct' responses could lose their validity, and 'Incorrect' responses come to be regarded through the pressure of social and cultural forces as 'correct' at some future time.

The solution to this conundrum, as regards the practical problem of devising a method of avoiding the need to label responses 'correct' or 'incorrect', lay in the cultural nature of musical taste. If stylistically-contrasted

1. Robert W. Lundin (1967) p. 187
2. Farnsworth (1958) p. 57

excerpts were to be presented in pairs, and the task of the examinee was restricted to selecting which of the pair he preferred, what need was there to decide that one or the other should be labelled 'cofrect' at all? Statistical analysis of preferences could be carried out without any need to think of 'correctness' of choice.

Another problem exercising the writer's mind at this stage of developing a preference test was whether to include items from 'popular' music. Its transient nature, and certain aspects of commercialism underlying its propagation led the writer finally to exclude this type of music from his test, in favour of what has been termed 'serious' music - in the writer's view an unsatisfactory definition.

The first task carried out was the presenting of a large number of excerpts from a wide variety of composers to small pilot groups of children. A relatively small proportion of the excerpts, favourably commented on by these children, was pre-1600 and post-1930. The music which received the most favourable comment lay within the 1600-1900 era. There seemed to be a tendency for these young children to show a preference for music of familiar idiom; pre-baroque and contemporary styles seemed relatively farther removed from the musical idiom and tonality which they had met during their limited years of listening.

PREFERENCE TEST CONSTRUCTION

Every item containing qualities that appealed to these pilot groups of children was examined, and the decision was made to pair up excerpts from six well-defined stylistic periods. Thirty items were chosen and 'taped' fading in and out at appropriate points so that no item was longer than about 20 seconds.

Table 19 indicates the sources of each excerpt. These

TABLE 19 MUSIC PREFERENCE TEST

Stylistic Period 1

Monteverdi	Sonata a 8 sopra Sancta Maria (Archiv Produktion) beginning of piece
Allison	Batchelars Delight - Julian Bream Consort (RCA Victor) beginning of piece
Dowland	Galliard 'Can She Excuse' (RCA Victor) beginning of piece
William Byrd	Mounsiers Almaine (RCA Victor) beginning of piece
Morley	Joyne Hands - Julian Bream Consort (RCA Victor) beginning of piece

Stylistic Period 2

Handel	Concerto Grosso in A Minor (Fontana - Handel Festival Orchestra, Halle) beginning of last movement
J.S. Bach	Brandenburg Concerto No. 5 in D Major (Decca) (Stuttgart Chamber Orchestra) beginning of first movement
J.S. Bach	Suite No. 2 in B Minor (Concert Hall - Symphony Orchestra of Radio Frankfurt) beginning of 5th movement
J.S. Bach	Brandenburg Concerto No. 4 in G. Major (Decca) Stuttgart Chamber Orchestra) beginning of first movement
J.S. Bach	Suite No. 3 in B Minor (Concert Hall) (Symphony Orchestra of Radio Frankfurt) beginning of 3rd movement

TABLE 19 CONTINUED — MUSIC PREFERENCE TEST

Stylistic Period 3

Haydn	Symphony No. 88 in G Major (The Record Society) (Lamoureux Concerts Orchestra) Beginning of last movement
Haydn	Symphony No. 73 in D Major (The Record Society) Lamoureux Concerts Orchestra) Beginning of last movement
Haydn	Symphony No. 83 in G Minor (Pye Golden Guinea) (The Little Orchestra of London) Beginning of 3rd movement
W.A. Mozart	Horn Concerto No. 1 in D Major (The Concert Hall)(Vienna State Symphony Orchestra) Beginning of 2nd movement
W.A. Mozart	Clarinet Concerto in A Major (Concert Hall) (Vienna State Symphony Orchestra) Beginning of last movement

Stylistic Period 4

Beethoven	Piano Concerto No. 2 in B flat (Concert Hall)(Radio Frankfurt Orchestra) near beginning of next to last piece - 2nd side
Beethoven	Symphony No. 3 in E flat major (Allegro) (Dresden State Symphony Orchestra) near beginning of last movement
Beethoven	Symphony No. 6 (Pastoral)(Concert Hall) (Orchestra National Paris) beginning of 3rd movement
Schubert	Symphony No. 9 in C major (SDR Symphony Orchestra)(Stuttgart) beginning of last movement
Schubert	Symphony No. 4(Tragic)(London Philharmonic Orchestra) (Concert Hall) beginning of last movement

TABLE 19 CONTINUED — MUSIC PREFERENCE TEST

Stylistic Period 5

Brahms	Academic Festival Overture (Concert Hall) (Zurich Tonhalle Orchestra) beginning of piece
Brahms	Hungarian Dance No. 5 (Concert Hall) (Orchestra of the Vienna State Opera) beginning of piece
Brahms	Hungarian Dance No. 3 (Concert Hall) (Vienna State Opera Orchestra) beginning of piece
Tchaikovsky	Capriccio Italien (RCA Victor Symphony Orchestra) halfway through the piece
Tehaikovsky	Symphony No. 6 in B Minor (Concert Hall) (Zurich Tonhalle Orchestra) beginning of last movement

Stylistic Period 6

Hindemith	Symphony in B Flat (EMI Records) (Eastman Wind Ensemble) past middle of 2nd movement
Hindemith	Symphonic Dances (Deutsche Grammaphon) (Berliner Philharmoniker) near beginning of 2nd movement
Hindemith	Mathis der Maler (Deutsche Grammaphon) (Berliner Philharmoniker) near middle of 2nd movement
Schoenberg	Theme and Variations Op.43A (EMI Records) (Eastman Wind Ensemble) beginning of piece
Stravinsky	Symphonies of Wind Instruments (EMI Records) (Eastman Wind Ensemble) part middle of piece

30 extracts are of course equally divided amongst the six stylistic periods. It can be seen that Farnsworth's 'eminent composers' are well represented in the test. The children in the pilot groups seemed to find the instrumental colour of the Julian Bream consort (period 1) quite attractive; in the Monteverdi recording, the unusual timbre of cornetts and trombones also excited interest.

In the second stylistic period, J.S. Bach provided four out of the five excerpts, whilst Haydn, Beethoven and Brahms provided three extracts each for stylistic periods 3, 4 and 5 respectively. No less than three of Hindemith's compositions proved popular enough to be included in the items used for period 6. Perhaps this was largely because of the exuberant nature of his rhythms, and possibly a further reason may have been that this particular music by Hindemith was perhaps not quite so 'avant-garde' as some other music presented to the pilot groups from this contemporary period. Nevertheless the writer feels strongly that the music included is really representative of music of the contemporary period.

At this stage, several crucial decisions had been taken:

(a) It had been decided that it would be possible to distinguish six well-defined stylistic periods of music, starting with the less familiar idiom of pre-Baroque and ending with contemporary styles.

(b) Only instrumental music was chosen for the test, no choral items were included because of the complicating factor of words.

(c) All excerpts were short, choice of length was considered important. Extracts must not be too long in view of the ages of the children to be tested, yet they must be sufficiently long to illustrate clearly the idiom of each particular stylistic period.

(d) When pairing items in the first half of the test, the attempt was made to match excerpts as regards tempo and tone colour. That this was only an approximate proceeding can be seen when looking at the first pair of items - Monteverdi with cornett and trombone timbre against Hindemith as recorded by the Eastman Wind Ensemble.

The urgent need was, in the short time available for testing, to make sure that only such excerpts were included as had some immediate appeal to the young listener, either through the melody, the rhythm or the tone colour of the excerpt presented. The relative difficulty in obtaining items for stylistic periods 1 and 6 is perhaps explained best in the words of Farnsworth (1958):

[1] 'The composer of recent years has not had the requisite time to become familiar to his listeners. His peer of many centuries ago is also at a disadvantage, for his works are too far removed stylistically from the contemporary scene. The most honoured then must be the between-groups, the composers of the eighteenth and nineteenth centuries.'

In the second half of the test, re-pairing was carried out first of all to give the children being tested the opportunity to hear the music twice and to observe their reactions, and in the second place to examine the differential effects on popularity ratings depending on whether the extract occurred first or second in order of presentation in the pair. As, in the second half re-pairing, each extract was put alongside a different extract, no direct differential effect could be calculated. This sacrifice had to be made in view of the need to restrict the test's length; however over the test as a whole calculations of this nature would be possible. No attempt at matching pairs as regards tempo and tone colour was made in the second half of the test. The various pairings are displayed in table 20.

TABLE 20 MUSIC PREFERENCE TEST

1A	Monteverdi
1B	Hindemith B flat
2A	Bach Brandenburg 5
2B	Brahms Academic
3A	Stravinsky
3B	Schubert Symphony 9
4A	Haydn Symphony 88
4B	Tchaikovsky Capriccio
5A	Schubert Symphony 4
5B	Handel
6A	Allison
6B	Mozart Horn Concerto
7A	Schoenberg
7B	Bach Suite 2
8A	Tchaikovsky Symphony 6
8B	Beethoven Piano Concerto 2
9A	Dowland
9B	Bach Brandenburg 4
10A	Hindemith Symphonic Dances
10B	Haydn Symphony 73
11A	Byrd
11B	Brahms Hungarian Dance 5
12A	Bach Suite 3
12B	Haydn Symphony 83
13A	Beethoven Symphony 3
13B	Morley
14A	Brahms Hungarian Dance 3
14B	Hindemith Mathis
15A	Mozart Clarinet Concerto
15B	Beethoven Symphony 6

TABLE 20 CONTINUED

MUSIC PREFERENCE TEST

16A	Hindemith Symphony B flat
16B	Byrd
17A	Brahms Academic
17B	Bach Suite 3
18A	Schubert Symphony 9
18B	Hindemith Symphonic Dances
19A	Tschaikovsky Capriccio
19B	Mozart Clarinet Concerto
20A	Handel
20B	Beethoven Symphony 3
21A	Mozart Horn Concerto
21B	Dowland
22A	Bach Suite 2
22B	Stravinsky
23A	Beethoven Piano Concerto 2
23B	Brahms Hungarian Dance 3
24A	Bach Brandenburg 4
24B	Monteverdi
25A	Haydn Symphony 73
25B	Schoenberg
26A	Brahms Hungarian Dance 5
26B	Allison
27A	Haydn Symphony 83
27B	Bach Brandenburg 5
28A	Morley
28B	Schubert Symphony 4
29A	Hindemith Mathis
29B	Tchaikovsky Symphony 6
30A	Beethoven Symphony 6
30B	Haydn Symphohy 88

Testing Procedure

The whole tape-recorded test had a playing time of 24 minutes. This was not considered too long in view of the strong intrinsic interest contained in this type of test, where children are faced with the stimulation of a varied selection of fine music. Events proved this view correct, and the administration of the test remained a pleasure to the writer throughout the whole testing programme, in spite of the fact that he heard each excerpt more than 200 times in the process.

The children were provided with simply designed test leaflets, the front page of which bore a strong resemblance to those of the Music Responsiveness and Music Discrimination Tests. Brief details of name, age, sex and instrumental and choral experience were requested for the purposes of the hypotheses to be subsequently tested (see chapter 8) The inside pages of the folded leaflet contained numbers 1 to 15 and 16 to 30 in four columns.

It was found convenient to include in the instructions given 'live' before testing started advice to cover preceding items with a second sheet of paper as the test proceeded, so that the testee was able to concentrate on the particular pair of extracts being played without being influenced by the scoring of items that had gone before. Without this precaution there was the possibility of the occasional child being tempted to create some kind of 'pattern', as evidenced on one occasion during the pilot testing. This device eliminated any such distracting effect, and served to keep each child at the right place on the test leaflet for the 40 seconds or so which represented the normal duration of each paired item.

Scoring consisted of circling A or B, depending on which excerpt of the pair was preferred. Testing procedure was so direct and straightforward that no practice item needed to be included. This test was not competitive in the sense that we were looking for children with high musical discriminatory ability. Nevertheless, individual differences in approach revealed themselves early in the testing procedure. Some children would always wait until the seoond excerpt in each pair was completed before recording their score. Others, once the test routine was under way, would make their decision quite early in the playing of the second extract, particularly when it came to items 16 to 30, where recognition was shown of certain items on their second appearance.

This aspect has not been explored fully, but individual questions to individual children after the test seemed to indicate that this phenomenon has some connection with the memory span of those children questioned. Invariably, after concentration for more than 20 minutes, the writer was bombarded with questions during the period when papers were being gathered in. Many interesting comments and questions were put to the writer, all of which confirmed how interested the children were in the music that had been played.

<u>Test Sample</u>

The great majority of children in the sample tested were in the 7 - 11 age range, on which the present enquiry is concentrating. However, as with the Music Responsiveness and Music Discrimination Tests, testing was carried out with younger children (aged 6 - 7), with older children (11 - 14) and with a variety of adults including musicians, teachers and students from a college of education.

Nearly 1000 were tested in the group situation; the size of group tested varied from less than a dozen to more than one hundred. 28 classes from ten primary and 2 secondary schools cooperated in this project. Nearly 40 teachers and students, and more than 100 musicians aged from 13 to over 21 were added to those classes tested in schools. The latter were members of a college vacation course held during the summer of 1968.

A cross-section of socio-economic backgrounds was attempted; although there was a preponderance of urban children in the sample, which reflected the position of the country as a whole, a representative number of children with a rural background was also included in the sample tested. Every age group within the 7 - 11 year sample contained a good proportion of instrumentalists (children receiving regular lessons on a musical instrument), and of choir members (members of school or church choirs). For instance, in the 10 - 11 year group there were approximately equal numbers of instrumentalists, non-instrumentalists, choir members and non-members, and in the 9 - 10 year group the proportions were roughly 2:3 and 2:5 respectively for the instrumentalists/non-instrumentalist and choir/non-choir categories.

Comments of 9 - 11 year olds on certain test items.

In order to obtain additional information about children's reactions to the music contained in the test, it was decided to play certain items in the test to two classes aged respectively 10 - 11 and 9 - 10 years, and to ask them to write their comments on what they felt about these individual items. The beginnings of four sentences were written on the blackboard for guidance:

(a) I like it because ....
(b) I dislike it because ....
(c) It sounds like ....
(d) It reminds me of ....

The children were told that they would hear each excerpt three times, during which time they could select one or more of the incomplete sentences to write about as they listened to the taped excerpts. Twelve items were played to the older class and ten items to the younger children.

Comments fell into two broad categories, those to do with the children's feelings, and those that revealed their associations. The comments of these children made such interesting reading that it is proposed to quote a selection of them in order to throw further light on this new test and its effect on young children listening to it.

There is nothing new in this technique of describing one's feelings and associations on hearing a piece of music. It has been an accepted practice for many years to present children with a musical stimulus from time to time and to ask them to put their thoughts and feelings into words. However, to ask them in this way to comment on as many as twelve items formed an unusual and untried experiment so far as these children were concerned.

It will be necessary to limit quotations to the briefest of selections in an attempt to summarise all the comments of all these children. The 10 - 11 year old children wrote more fully and fluently than did the 9 - 10 year olds as might be expected, and perhaps their comments were correspondingly more varied. The first list of comments is from the 10 - 11 year class:

MONTEVERDI

Feelings	happy, sweet, peaceful, merry, gay, jolly, comical.
Associations	old days, circus, carnival, bagpipes, farmyard, puppets, royalty, fun fair.

HINDEMITH SYMPHONY IN B FLAT

Feelings	exciting, strange, mysterious, ghostly, creepy, shivery, haunting, eery, sinister, spooky.

HINDEMITH SYMPHONY IN B FLAT

Associations	old castle, ghosts, coffins, tunnel, space, Martians, funny creatures, dungeon, animals in forest.

TCHAIKOVSKY CAPRICCIO ITALIEN

Feelings	sounds dangerous, makes you feel itchy, a bit unnerving in parts, jolly tune, it makes me feel awful, such a mess of notes, ugh! horn sounds out of tune.
Associations	Mexican bandit, Spanish scene, elephant charging, traffic jam, bullfight, guillotine in action, hunting party, cowboy film, half a lemon and half a sausage - don't go well together, tanks into battle over rough country, sinking of HMS Titanic

BACH BRANDENBURG 4

Feelings	active and speedy, light and jolly, peaceful tune, oldtime tune, music for dancing, nice soft tune, very bright, cheerful sound, feeling of freedom, blithe and springlike.
Associations	fairies elves and gnomes, swan flying, lambs frisking in fields, bird hopping around, stately home, book called Kenilworth, birds singing, small dragon flying over mountain, snow falling calmly on roofs, like opening the window to greet the spring, flowers in the field

A selection of comments from the younger group on three of the test items listened to is also summarised:

DOWLAND

Feelings	sweet tune, merry, tricky piece to play,

DOWLAND

Feelings (cont.)	jumps about, bad sort of tone, catches the ear, joyful tune, too fast, cheerful.
Associations	court ball in Queen Elizabeth Ist's time, sounds Spanish, Victorian music, country dance, Mexicans on their guitars, walking in a wood, reminds me of olden days, it ought to have castanets in it, foreign, lively and like a pop record.

SCHOENBERG

Feelings	happy, jerky at the end, want to get up and dance, cheerful noise, mysterious warm sound, makes me feel scared, smooth - I feel brave, bouncy at the end, sad, jumpy rhythm, makes me feel tired.
Associations	sad as if someone had died, ship tossing about in a storm, in an old creepy house, reminds me of the cavalry, like a murder film, a hard gale, walking through a haunted house, leading a battle, a storm at sea from the ballet Ondine, roaring sea.

HAYDN SYMPHONY 73

Feelings	jolly, violin makes me feel bright, happy people, I feel like beating time, nice rhythm, victorious feeling, makes me feel comfortable, I feel like leaping through the air, I wish I knew a dance that fits this music, a strong tune, has a good beat.
Associations	king goes hunting, dogs running fast, riding a horse, skating fast, carrying important mail by horse, chasing, charge of the Light Brigade, charging against the indians, reminds me of the music that

HAYDN SYMPHONY 73

Associations (cont.) starts the Panorama programme on TV, band marching, welcomed home from a long voyage, a parade in London, horse race.

Severely truncated though the children's remarks may be, their freshness and uninhibitedness is nevertheless patent and obvious. The writer's favourite is the one about half a lemon and half a sausage. New insights occur even after hearing an excerpt many times. These comments bear out how strongly feelings and imagery are involved when children listen to music of this calibre. The pity is that there is neither time nor room to quote in full, and that such severe compression of comment has been found necessary.

Formulation of Hypotheses

Mrs. Shuter, reporting Valentine (1962) writes: [1]'Have we not all wondered with Valentine whether the ability to follow and enjoy a Bach fugue is quite unconnected with general intellectual ability?'

Here, then, is another angle needing investigation - those broad classifications to do with intellectual or verbal ability and its relation to preferences for the various stylistic periods of the test. Foremost amongst the hypotheses to be formulated must be that concerned with age. Farnsworth (1958) has a word to say about this aspect: [2]'If taste is culturally derived rather than innate, one would expect to find the taste of the child approximating more and more closely to that of the adult as he grows older.'

The writer considers it necessary to delve into the

1. The Psychology of Musical Ability 1968 - Rosamund Shuter p.229
2. Farnsworth (1958) Page 144

question of whether or not the age trends indicated by Farnsworth are borne out by the data. Once more we turn to Farnsworth: [1]'We come to have several standards of taste; for the concert stage, for the dance hall, for church and for school ... Age, intelligence and special training are important variables in this process of taste formation.'

We have Farnsworth's sanction then for proceeding to the formulation of hypotheses similar to those that have formed the basis of investigations in the earlier parts of this research. These hypotheses that will be tested in chapter eight are listed below:

1. The musical preferences of children as measured by the Music Preference Test do not change with age.
2. There is no significant difference between the musical preferences of boys and girls in the sample tested.
3. There is no significant association between musical preferences of children and their revealed intellectual or verbal ability.
4. There are no differences between the musical preferences of children who have instrumental experience and those who have not.
5. There are no differences between the preferences of children who have special choral experience and those who have not.

Before moving to an examination of the data from the programme of testing, one final word needs to be said about the items making up this new test. The attempt was made to choose music by established composers of repute, but not their best-known music. For this reason music such as Tchaikovsky's 'Nutcracker Suite', Beethoven's Fifth Symphony, Schubert's 'Unfinished' and Dvorak's 'New World' Symphony were studiously omitted.

On the other hand, all music chosen needed to have some qualities which would give immediate appeal on the first

1. Farnsworth (1958) Page 151

hearing. In spite of the precautions listed above, there were occasional classes tested which rejoiced overtly when an excerpt they had listened to as part of their music lessons was included in the test.

Test scores and test instructions will be found in Appendices B and C.

CHAPTER 8

ANALYSIS OF MUSIC PREFERENCE TEST DATA

Perhaps to some readers it may seem rather inappropriate to attempt to apply methods of statistical analysis to the aesthetic response to music. It may even be queried whether it is possible to use statistical techniques for the purposes of examining children's musical appreciation. The writer's answer to such a query is an emphatic 'yes'. This Preference Test has been designed in such a way as to enable the analysis of certain broad trends in children's musical preferences, trends to do with age, sex and certain specified kinds of musical experience.

For each stylistic period presented in the test there is a possible preference score between 0 and 10. This provides a numerical basis for statistical treatment. Scores for the whole 7 - 11 years sample tested are displayed in table 21. It can be seen that mean scores for each stylistic period range from 3.988 for period 6 up to 5.636 for period 2.

Figures 20 and 21 demonstrate how regular are the normal curves for each stylistic period, (even with such a comparatively insubstantial sample as 671). Perhaps the curve for period 3 reveals a rather closer concentration of scores around the mean and period 5 shows a slightly wider scatter, but there is a marked similarity between the distribution of preference scores for all six stylistic periods.

Since each musical excerpt is severely limited in duration, with no excerpt exceeding a playing time of 20 seconds, and since each stylistic period is restricted to five excerpts, the test represents a very partial and incomplete picture of the whole scope of instrumental music from the past four centuries. Nevertheless, in

TABLE 21 MUSIC PREFERENCE TEST

DISTRIBUTION OF SCORES. 7 - 11

SCORE	PERIOD 1	PERIOD 2	PERIOD 3
10	0	8	2
9	10	26	26
8	27	60	39
7	68	120	110
6	129	145	184
5	161	136	160
4	129	102	100
3	84	51	36
2	46	15	14
1	15	7	0
0	2	1	0
	671 M = 4.823	671 M = 5.636	671 M = 5.613

SCORE	PERIOD 4	PERIOD 5	PERIOD 6
10	0	2	1
9	3	19	3
8	30	49	20
7	72	87	47
6	125	111	60
5	155	146	116
4	154	111	144
3	89	71	139
2	31	60	85
1	11	9	47
0	1	6	9
	671 M = 4.848	671 M = 5.028	671 M = 3.988

FIGURE 20 PREFERENCE TEST

DISTRIBUTION OF SCORES 7 - 11 YEARS

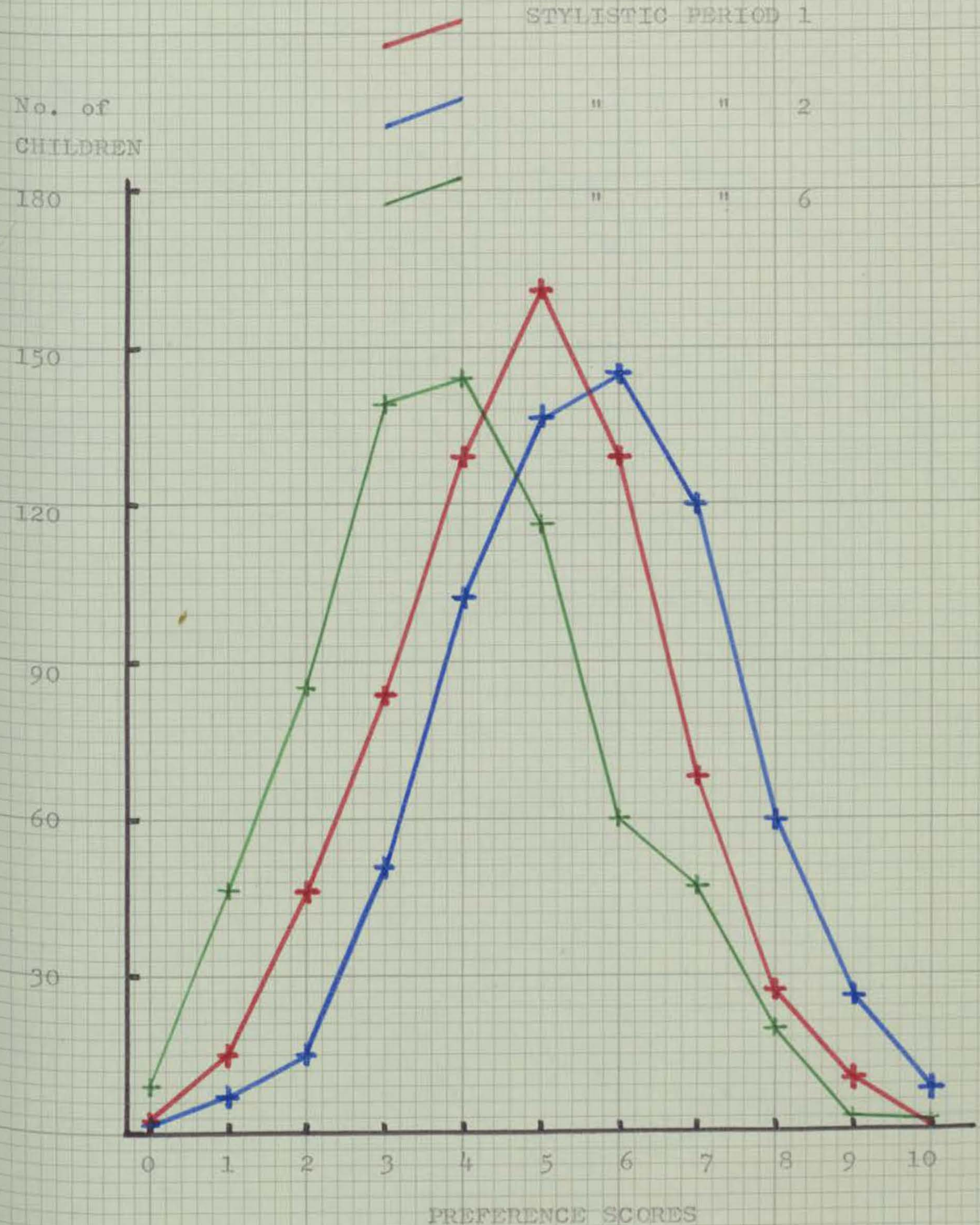
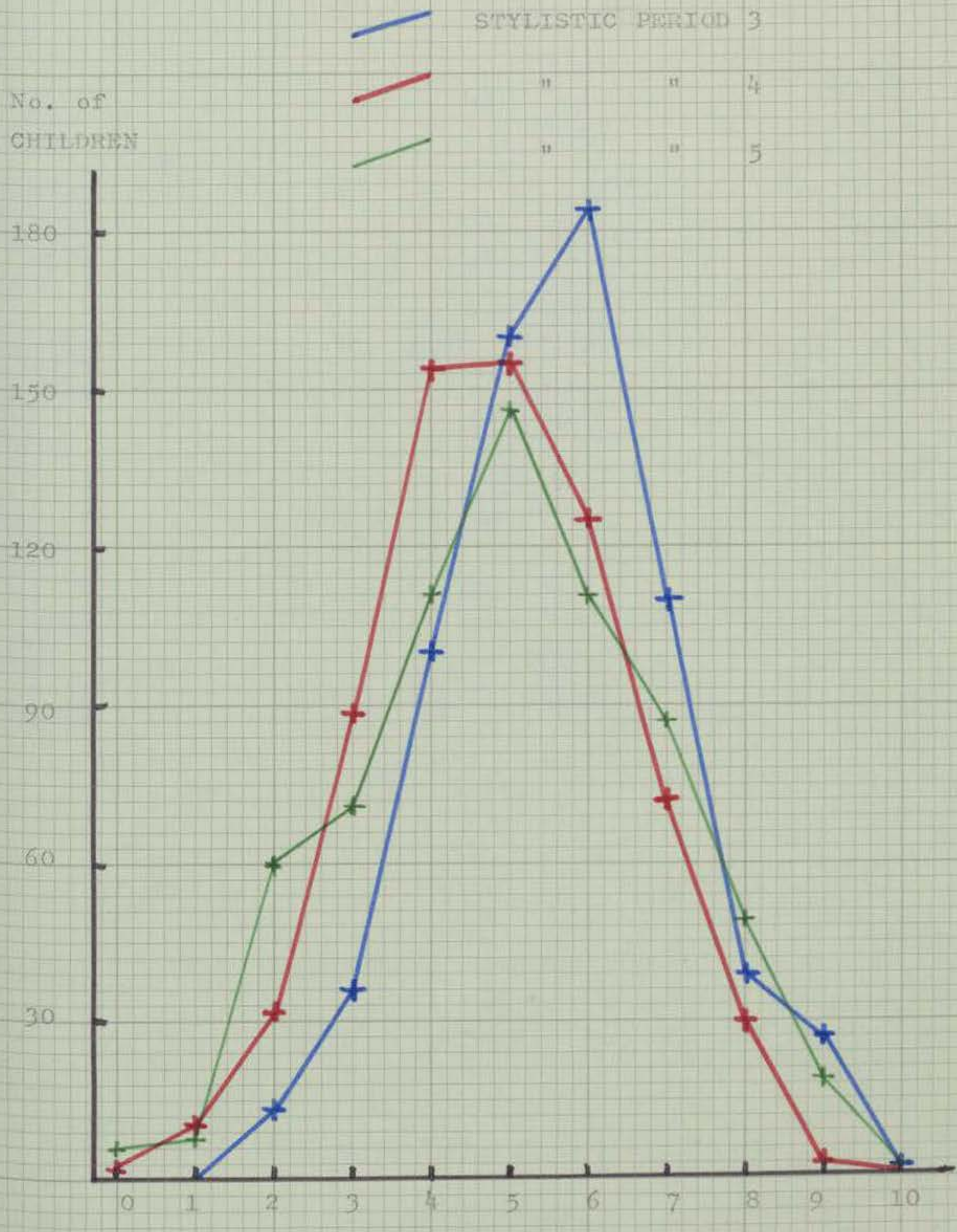


FIGURE 21 PREFERENCE TEST

DISTRIBUTION OF SCORES 7 - 11 YEARS



spite of these necessarily drastic limitations, and in spite of the exclusion of all choral music and the so-called 'popular' music from this enquiry, sufficient evidence has been forthcoming from the data to reveal trends throwing a great deal of light on children's musical preferences.

Although some of the samples are reasonably big - number of boys between 7 and 11 years = 315, girls 365, instrumentalists 306, non-players 365 - the t-test, normally a small sample technique, was found to be the most useful method of examining differences of musical choice between the various categories of children defined in the hypotheses. Other statistical techniques which have been found useful for the purposes of this chapter include product-moment correlation, biserial correlation and chi-squared tests of significance.

Means and standard deviations have been calculated as part of the process of probing differences in musical preference, The latter part of this chapter is devoted to item analysis, a necessary proceeding when a new test is being tried out, even though this particular test has been designed specifically for the purposes of the present research.

Musical Preference and Age

The great majority of children tested lay within the 7 - 11 years age range; however, smaller numbers of both younger and older children were also tested, together with a variety of adults. This spread of ages on each side of the chosen sample has proved very useful from the point of view of examining trends. Time precluded the testing of even younger children than the tiny sample of 6 - 7 year olds who form the youngest group of the sample. In the writer's opinion, the test is quite suitable for very young children, if a break is made in the middle.

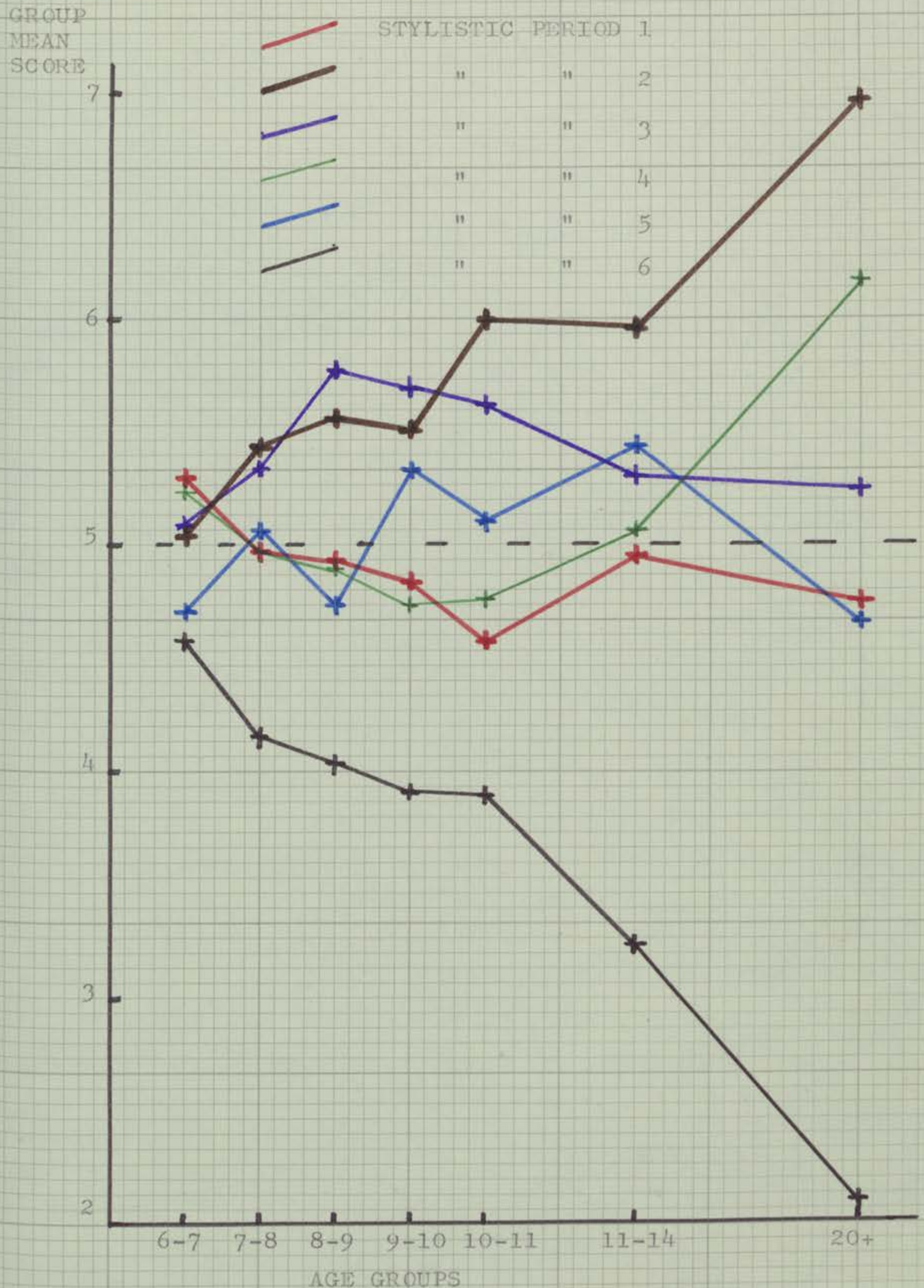
Mean scores were obtained for each year group for each stylistic period up to the age of eleven. Above this age, two separate categories - 11 - 14 year old secondary school pupils, and adults - were formed and mean scores obtained for each. These mean preference scores are shown in figure 22 for the purpose of displaying preference trends right through from the age of six to adulthood.

The graph displays how, from the relatively undifferentiated acceptance of musical idiom from all stylistic periods at the age of six, the trend appears to be for stronger and stronger rejections of, and preferences for the musical idiom of certain stylistic periods. This feature is particularly striking in the case of period 2 (Bach/Handel) and period 6 (Hindemith/Stravinsky/Schoenberg).

By the 7 - 8 year level, we see the beginnings of a trend to reject music of contemporary idiom, whilst the bunching of the other five stylistic periods is still close. At the 8 - 9 year level there is the emergence of stronger preference for the idiom of stylistic periods, 2 and 3, relatively to the other four periods. An interesting phenomenon is revealed when we inspect preferences at the 9 - 10 year level; here we find a significant rise, at the 1% level, in the popularity of the fifth stylistic period (Brahms/Tchaikovsky), which is accompanied by a slight fall in the mean preference scores for all the other stylistic periods. We have already discussed in chapter five the emergence of a significant increase in children's ability to discriminate harmonically around the age of nine. Here is an interesting link, when we consider the adventurous harmonies and instrumentation of the period five musical idiom, which is represented in the musical excerpts chosen for this test.

A further cause for speculation is occasioned by the

COMPARISON OF AGE GROUPS



substantial increase in popularity of the music chosen for the third stylistic period (Haydn/Mozart) between the 7 - 8 and 8 - 9 year group levels. One reason for this might possibly be because ability to appreciate the melodic shape of these simply- harmonised excerpts develops strongly around this age.

When considering the relative parity of esteem accorded to all stylistic periods at the 6 - 7 year level, including the music of contemporary idiom, might not one reason be that the music of period six contains a rhythmic virility which appeals to an age group where melodic and harmonic awareness is perhaps less developed than the rhythmic aspect of musical ability.

The hypothesis we are examining in this section has been stated in its null form for purposes of statistical analysis: Hypothesis 1. The musical preferences of children, as measured by the Music Preference Test, do not change with age.

A cursory inspection of figure 22 should be sufficient to cast serious doubts on the above statement. The results of analysis of each age group's preferences have been gathered together in tables 22 and 23. These set out for comparison the mean preference scores for each stylistic period together with significance values in the form of t-test ratios. Comparisons have been made at the one year, two year and three year interval within the 7 - 11 sample, and also with age groups outside this range.

The trend of preferences for certain of the stylistic periods is irregular; this is particularly so for period 5. A further examination of some of these trends will be undertaken in the section on item analysis. Trends on the whole tend to be gradual, with few increases or decreases in popularity for the musical idion of any stylistic period at a significant level. Even when we consider the two year and three year intervals, only one third and one half

TABLE 22 PREFERENCE TEST

MEAN SCORES FOR EACH AGE GROUP

AGE GROUP		STYLISTIC PERIODS 1	2	3
6 - 7	N = 27	5.30	5.04	5.07
7 - 8	N = 138	4.96	5.44	5.33
8 - 9	N = 208	4.94	5.57	5.78
9 - 10	N = 144	4.83	5.49	5.69
10 - 11	N = 181	4.57	6.00	5.62
11 - 14	N = 106	4.96	5.94	5.31
20+	N = 39	4.74	6.95	5.23

	4	5	6
6 - 7	5.22	4.70	4.59
7 - 8	4.96	5.07	4.15
8 - 9	4.92	4.73	4.04
9 - 10	4.73	5.33	3.90
10 - 11	4.77	5.11	3.88
11 - 14	5.06	5.45	3.25
20+	6.18	4.67	2.10

TABLE 23 PREFERENCE TEST

t-RATIOS BETWEEN AGE GROUPS

ONE YEAR INTERVAL

Period	7-8/8-9	8-9/9-10	9-10/10-11
1	t = 0.11 decrease	t = 0.57 decrease	t = 1.33 decrease
2	0.68 increase	0.42 decrease	2.54 increase 2% level
3	2.61 increase 1% level	0.54 decrease	0.43 decrease
4	0.23 decrease	1.13 decrease	0.22 increase
5	1.63 decrease	2.84 increase 1% level	1.02 decrease
6	0.58 decrease	0.74 decrease	0.09 decrease

TWO AND THREE YEAR INTERVALS

Period	7-8/9-10	8-9/10-11	7-8/10-11
1	t = 0.62 decrease	t = 2.19 decrease 5% level	t = 2.14 decrease 5% level
2	0.025 increase	2.39 increase 2% level	2.80 increase 1% level
3	2.055 increase 5% level	1.03 decrease	1.69 increase (10% level only)
4	1.13 decrease	0.98 decrease	1.01 decrease
5	1.10 increase	2.01 increase 5% level	0.36 increase
6	1.09 decrease	0.88 decrease	1.21 decrease

TABLE 23 (Cont.)

PREFERENCE TEST

t-RATIOS BETWEEN AGE GROUPS

AGE GROUPS OUTSIDE 7 - 11 SAMPLE

Period	6-7/7-8	10-11/11-14	11-14/20+
1	t = 1.01 decrease	t = 1.84 increase (10% level only)	t = 0.59 decrease
2	1.15 increase	0.27 decrease	2.97 increase 1% level
3	0.78 increase	1.65 decrease (10% level only)	1.57 decrease
4	1.06 decrease	1.53 increase	3.84 increase 1% level
5	0.94 increase	1.57 increase	2.25 decrease 5% level
6	1.21 decrease	2.69 decrease 1% level	3.13 decrease 1% level

The increase or decrease of the mean preference score from the first to the second age group is indicated, and also the level of significance.

respectively prove to be at significant level.

It is an interesting feature that, although preference for the music of period six diminishes consistently throughout the whole age range examined, nowhere is this at a significant level before the age of eleven, even when comparing preferences at the three year interval. Moving outside our main 7 - 11 sample, we note certain stronger emerging trends; there is strong preference for period two at adult level, and very strong rejection of period six at both 11 - 14 and adult levels. However within the 7 - 11 range, trends are more gradual and quite consistent, with the exception already noted of the sharp rise in preference for period five between the 8 - 9 and 9 - 10 year groups.

Within this 7 - 11 age range, stylistic periods two and three are consistently popular in relation to expressed preferences for the other periods. At the three year interval only stylistic periods one, two and three exhibit preference changes at a level of significance.

Do figures obtained so far justify the quotation from Farnsworth given at the end of chapter seven suggesting that there is a trend towards conventional adult taste throughout the whole period of child growth? Perhaps we need to examine particular categories within the test sample before hazarding an answer to this question.

Musical Preferences of Boys and Girls

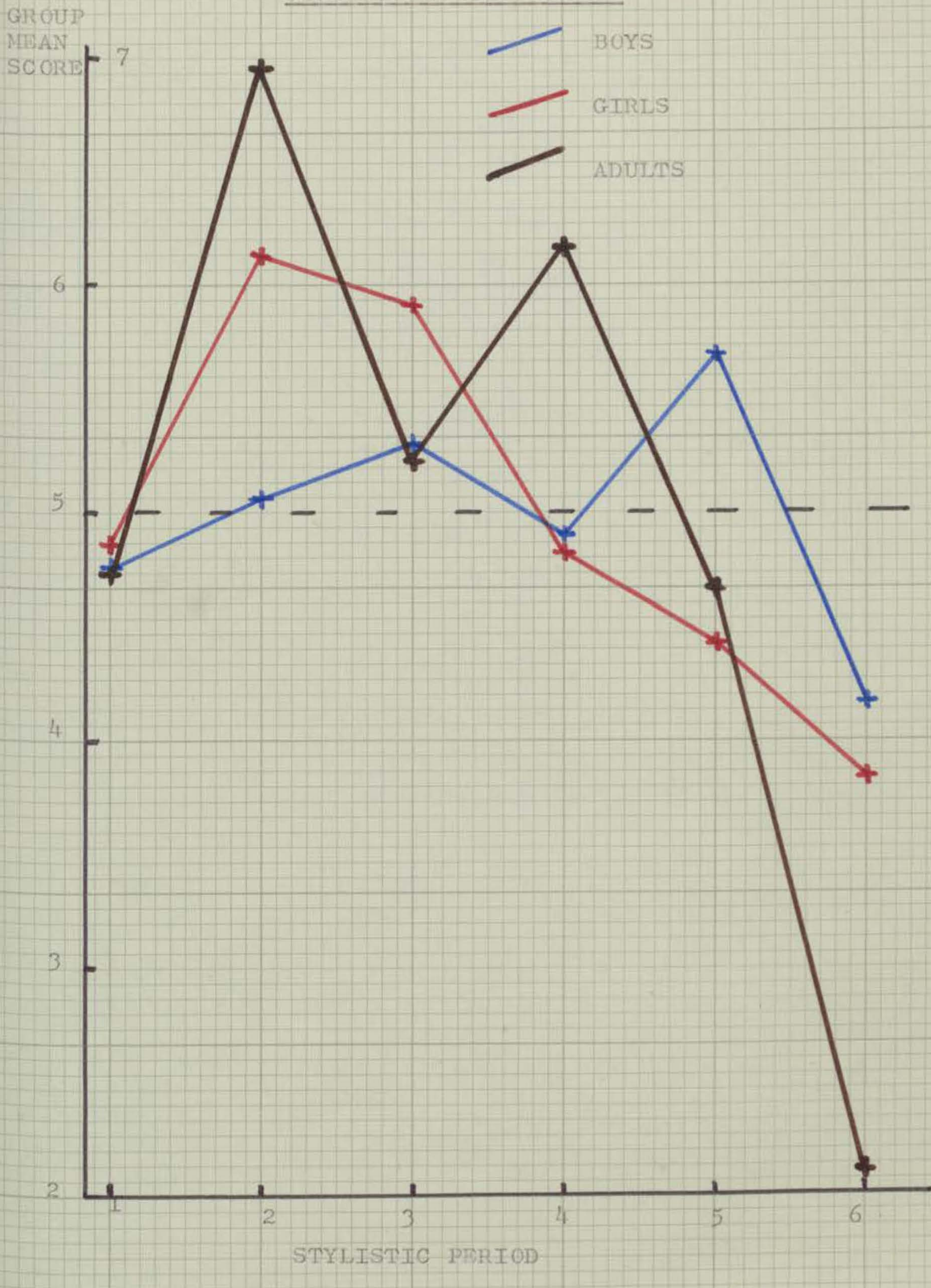
In our search for broad trends in children's musical preferences, we will now focus attention on possible differences between musical taste in boys and girls. The first task is to compare preferences for the whole 7 - 11 sample of boys and girls with the figures for our small adult sample. Figure 23 illustrates several points well:

(a) All three categories show close agreement in their preferences for stylistic period one, each scoring just under 5/10.

FIGURE 23 PREFERENCE TEST

MEAN SCORES OF GIRLS AND BOYS AGED 7 - 11

COMPARISON WITH ADULTS



(b) Girls' preferences are closer than those of boys to the strong adult preferences for period two. All three categories score over 5/10, with adults exhibiting the greatest liking for this period (M = 6.95).

(c) The preference of boys for period three is closer than that of girls to adult choice. All three categories score over 5/10, but the girls' mean score is decidedly higher at 5.91.

(d) The chief feature of interest in period four is the wide difference between both boys' and girls' scores (under 5/10) and those of the adult sample whose strong preference for this stylistic period, M = 6.18, comes second only to period two in popularity.

(e) Girls score lower than either of the other two categories for period five. The mean score for both girls and adults lies below 5/10, whereas the boys show a relatively strong preference (M = 5.71).

(f) All three categories reject period six in varying degrees relative to the other stylistic periods. However the mean scores of boys and girls in this 7 - 11 age range nowhere approach the extreme rejection of adults for contemporary idiom (M = 2.10).

It needs to be remembered that within these broad trends there continue to be wide individual variations running counter to the main trends displayed. It also needs to be kept in mind that the adult sample is very small (N = 39) and is drawn in the main from a special class of the population - teachers and student-teachers. For this reason it would be foolish to pretend that the adult sample is necessarily truly representative of the whole consensus of adult taste to any degree of accuracy. All the same, the trends displayed in figure 22 for periods two and six are unmistakable and must command our attention and merit our careful consideration.

The next step in analysing the musical preferences of boys and girls is to break down the 7 - 11 sample into its constituent year groups. The rather complex table 24 shows mean scores, t-values and levels of significance; year groups for boys and girls separately are rather small, in nearly all cases less than 100, therefore the corresponding figures for the whole 7 - 11 sample are placed alongside for comparison.

There are wide differences in taste exhibited by boys and girls for the stylistic periods two, three and five, in every case at the 1% level of significance, whilst period six reveals sex difference in taste at the 10% level. For stylistic periods one and four there are no substantial differences between the musical preferences of boys and girls, and figure four offers visual confirmation of this closeness, with mean scores close to the 5/10 line.

Because of the relatively complicated structure of table 24, a series of graphs - figures 23 to 27 - have been added to illustrate the gradual changes in musical preferences of boys and girls through the 7 - 11 age range. Sadly, the sample sizes are rather small, but pressure of time precluded an extension of the testing programme. Perhaps there is sufficient evidence to arrive at certain conclusions regarding the sex hypothesis: Hypothesis two - There is no significant difference between the musical preferences of boys and girls in the sample.

A careful study of table 24, and a comparison of figures 23 to 27 leads us to the general conclusion that, for the music presented in the test, hypothesis two is proved wrong. For periods two, three and five, differences in preferences are significant at the 1% level for the whole 7 - 11 range, and for period six there is a

TABLE 24

COMPARISON BETWEEN MEAN SCORES OF BOYS AND GIRLS

AGE GROUPS

PERIOD	7 - 8	8 - 9	9 - 10	10 - 11	7 - 11
1					
Boys	4.82	4.99	4.84	4.51	4.78
Girls	5.10	4.90	4.83	4.64	4.86
t-ratios	1.62	0.38	0.28	0.52	0.61
2					
Boys	4.86	4.93	5.03	5.36	5.06
Girls	5.92	6.05	5.89	6.66	6.14
t-ratios	3.94 1%	4.86 1%	3.01 1%	5.13 1%	8.31 1%
3					
Boys	4.71	5.58	5.35	5.46	5.31
Girls	5.89	5.93	6.0	5.80	5.91
t-ratios	4.82 1%	2.06 5%	2.86 1%	1.54	3.80 1%
4					
Boys	5.14	4.88	4.69	4.83	4.88
Girls	4.80	4.96	4.76	4.71	4.82
t-ratios	1.16	0.40	0.25	0.50	0.46
5					
Boys	6.01	5.42	5.94	5.62	5.71
Girls	4.22	4.20	4.78	4.58	4.42
r-ratios	6.16 1%	4.90 1%	3.56 1%	3.93 1%	9.63 1%
6					
Boys	4.26	4.14	4.07	4.20	4.17
Girls	4.04	3.96	3.74	3.56	3.83
t-ratios	0.73	0.79	0.98	2.32 5%	1.69(10% only)
Boys	N = 65	N = 90	N = 68	N = 92	N = 315
Girls	73	118	76	89	356

Percentages after the t-ratios show the level of significance.

FIGURE 24 PREFERENCE TEST

BOYS AND GIRLS AGED 7 - 8

FIGURE 25

PREFERENCE TEST

BOYS AND GIRLS AGED 8 - 9

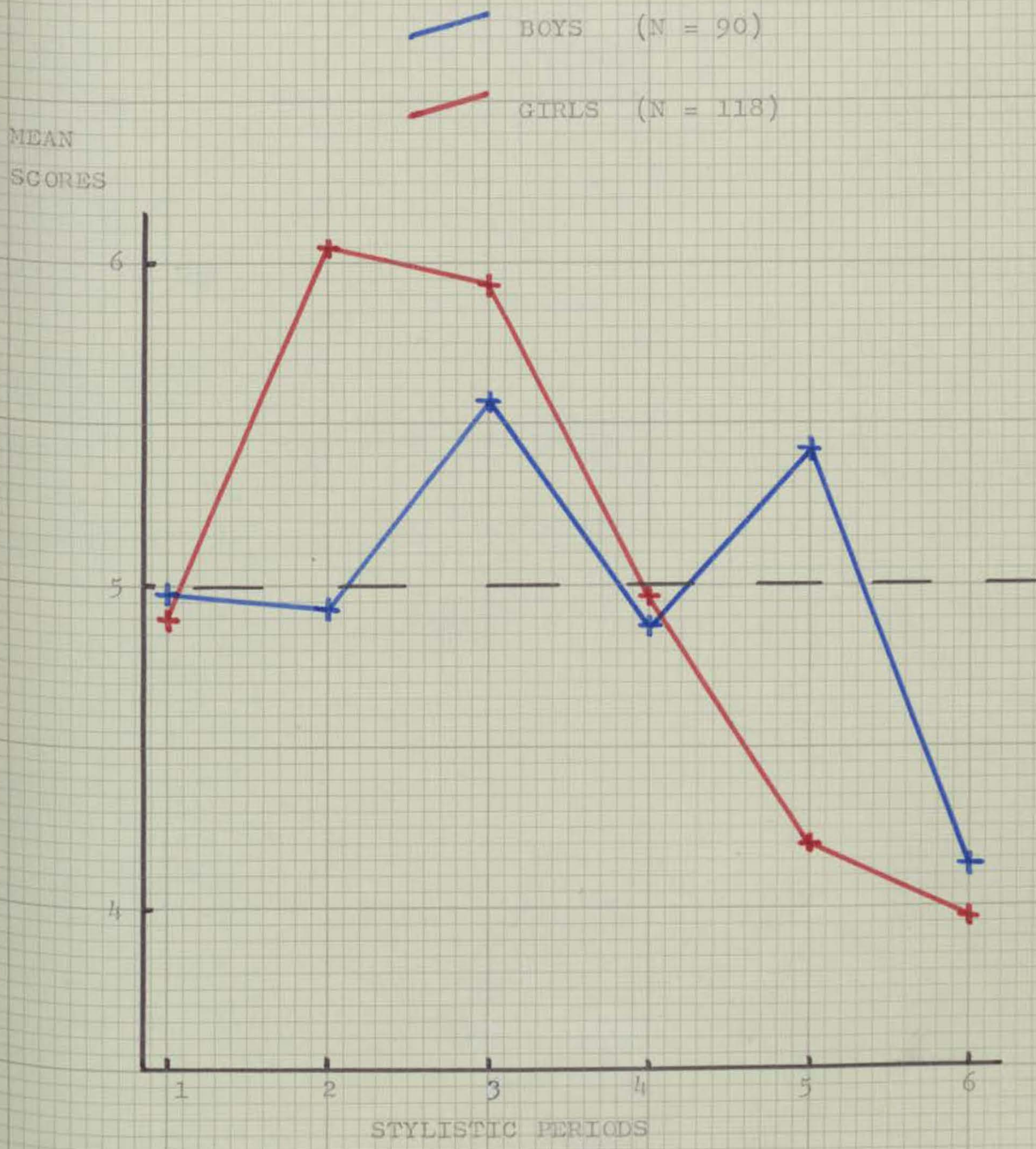


FIGURE 26 PREFERENCE TEST

BOYS AND GIRLS AGED 9 - 10

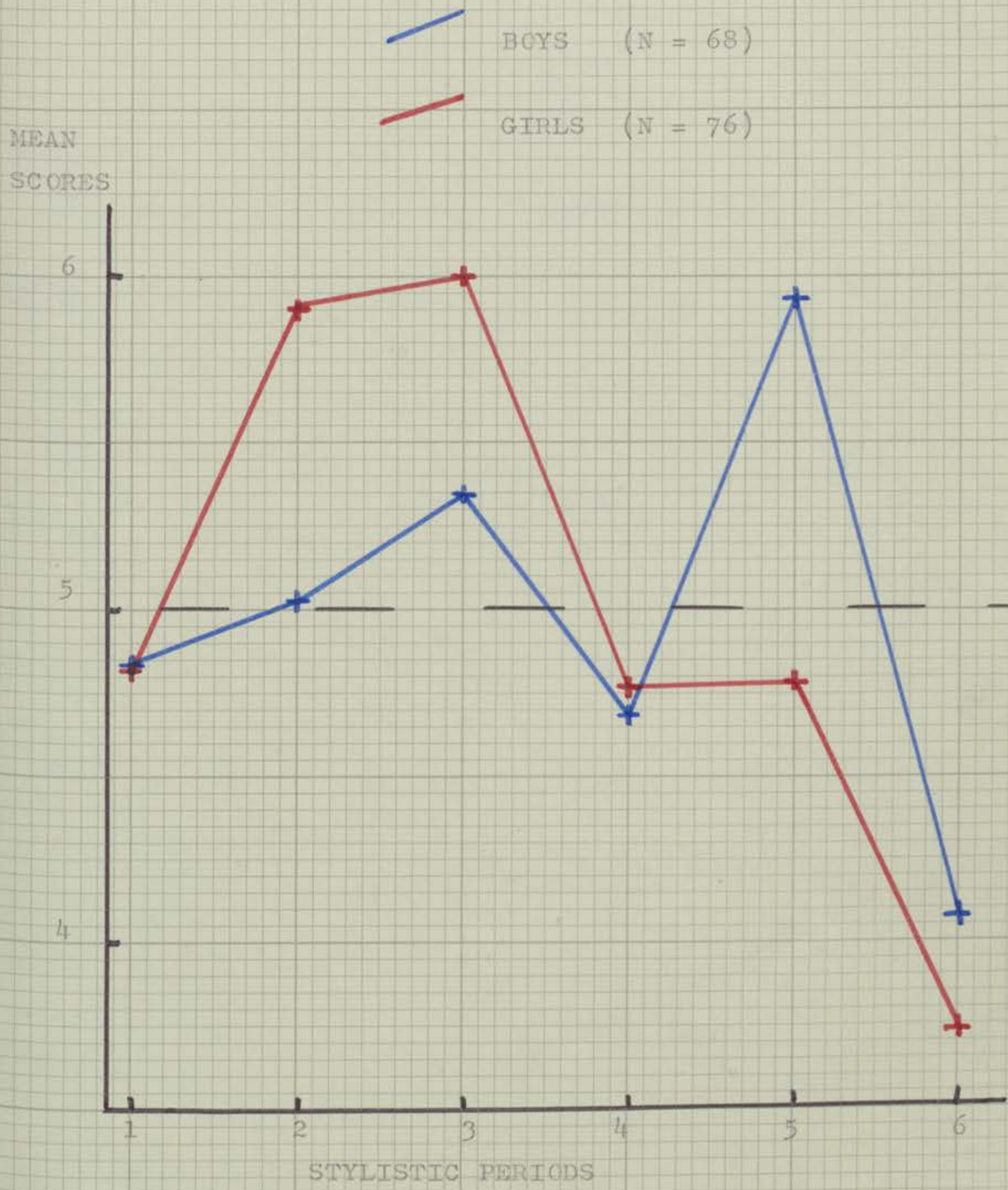
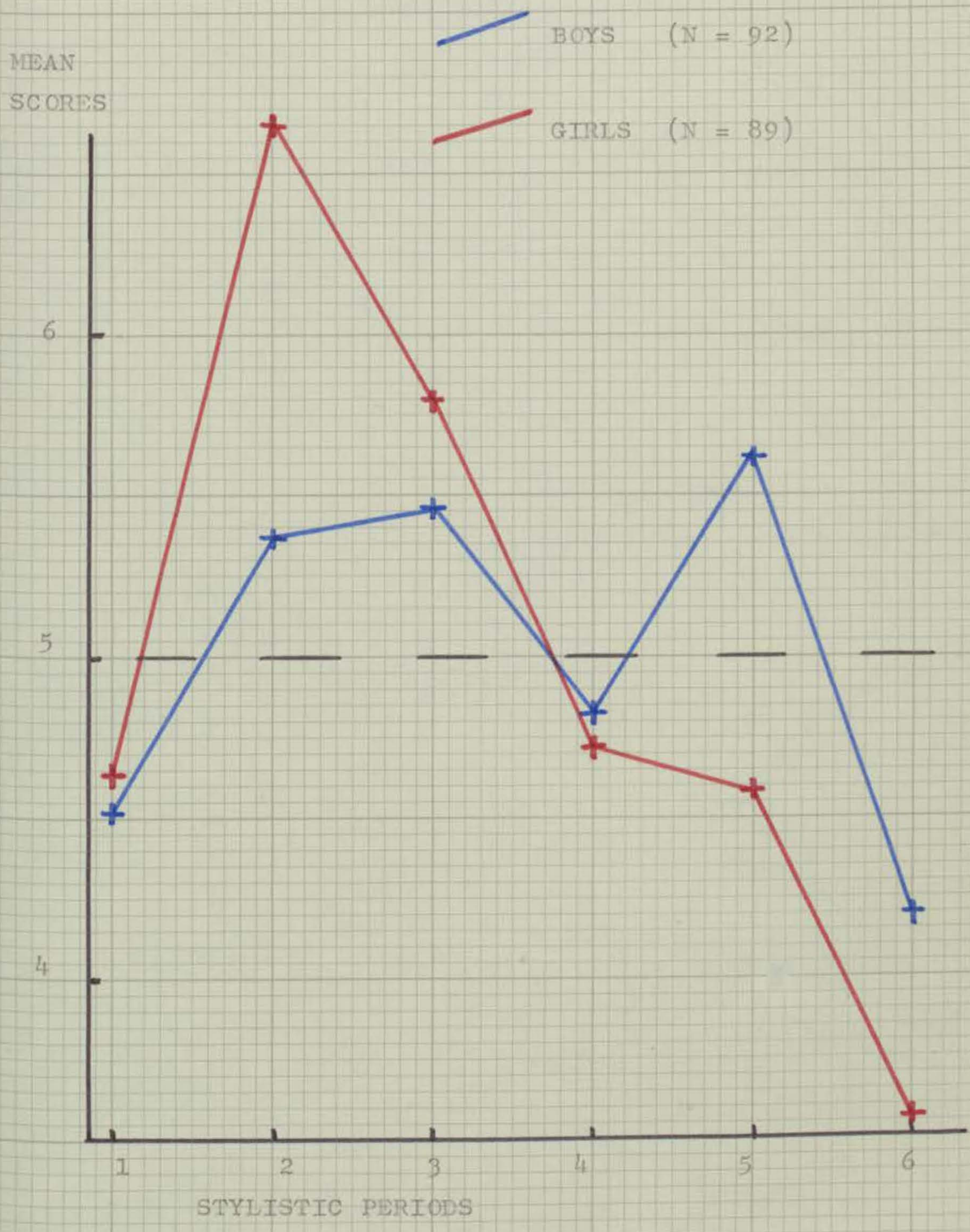


FIGURE 27 PREFERENCE TEST

BOYS AND GIRLS AGED 10-11



difference at the 10% level.

Even when comparing children within one year group, there are revealed significant differences in the musical tastes of boys and girls. Periods two and five show consistent differences at the 1% level of significance in each of the four year groups. For period three there are significant differences in each of the 7 - 8, 8 - 9 and 9 - 10 year groups, and for period six there is a significant difference in the 10 - 11 year group.

Some of the t-values are very high, particularly in the fifth and second stylistic periods, showing highly significant sex differences in taste for this particular idiom and style. Nowhere does difference in taste approach a level of significance in the case of stylistic periods one and four.

It is only when we come to the graph giving the mean preference scores of the 10 - 11 year sample of girls that we begin to see some resemblance to the curve for the adult sample tested (figure 27), and even here the fourth stylistic period mean scores differ very widely. So a further tentative conclusion might be that we still have insufficient evidence to permit us to give unreserved approval to the Farnsworth tenet that children's musical tastes move consistently towards adult norms with increase of age.

It is noteworthy that girls show a stronger preference at all age levels within the sample for the musical idiom of the Bach/Handel era (period 2); this is balanced by the girls' stronger rejection of the more adventurous harmonies and more strongly contrasted timbres of stylistic period five. Certain of these conclusions have already been ably couched in words by some of the children whose writings expressing their feelings and associations were quoted in chapter seven.

It seemed a useful exercise to make a check on these t-test results by applying some other form of statistical analysis. Accordingly, biserial correlation was calculated for the mean preference scores of boys and girls at the 7 - 8 and 10 - 11 year levels. The following coefficients were obtained, positive correlation indicating that girls obtained the higher mean scores, and negative coefficients showing that girls' mean scores were lower than those of boys.

PERIOD	7 - 8 BISERIAL r	10 - 11 BISERIAL r
1	+ 0.11	+ 0.04
2	+ 0.40	+ 0.44
3	+ 0.49	+ 0.10
4	- 0.13	- 0.04
5	- 0.59	- 0.35
6	- 0.26	- 0.24

The very low coefficients for periods one and four at both age levels correspond to the closely related musical preferences of boys and girls for these periods. In the case of periods two and five we see moderate correlations that correspond to the wide differences that exist between boys' and girls' musical preferences for these stylistic periods. However, the reduction in this wide difference in taste from the younger to the older year group, evident in the figures for period five, is particularly striking when we consider period three.

On the whole these biserial correlation coefficients confirm the findings from the t-tests.

Comparison of Preference Scores with Verbal Reasoning

Certain previous researches have shown interest in the relationship between intelligence and musical ability. In view of evidence given in these researches that selection for instrumental tuition is sometimes carried out on the basis of superiority of intellectual ability, or academic ability through the medium of examination or selection test, it may be worthwhile probing whether any evidence is forthcoming relating to any of the stylistic periods of the Preference Test and proved academic ability in some field which has a bearing on general intelligence, or which is connected in some way with selection for various school courses at different intellectual levels.

In the cause of research, confidential information was provided by two schools enabling the writer to make comparison with the quotients obtained from the [1]Moray House Verbal Reasoning Tests used in the Dorset county secondary selection procedure. Lists of quotients were given to the writer at his request on a confidential basis for two groups of children in the 10 - 11 age range (N = 64). Product-moment correlation of verbal reasoning quotients with preference scores for each stylistic period gave the following figures:

Verbal reasoning quotients/	Period	one	r = - 0.146
"	"	two	- 0.055
"	"	three	+ 0.687
"	"	four	- 0.131
"	"	five	+ 0.146
"	"	six	- 0.077

With the exception of period three, correlations tended to be very low indeed, if not negligible. The quotients for period three however is of some interest in view of its size in comparison with these for the other stylistic periods. Therefore just one of the two classes was taken for a re-calculation; again all stylistic periods except period three gave low or negligible figures. For period three, the coefficient was again much more substantial ($r = 0.51$) and this gave confirmation of evidence from the first testing procedure.

1. Dorset Secondary Selection - 1968

Using the t-test procedure to examine the significance of these correlations, only period three proved to be significant: $r = 0.687$ $N = 64$ $t = 7.4$ giving 1% level of significance. The next highest correlations, those for periods one and five ($r = 0.146$ in each case), were not significant.

Hypothesis three - There is no significant association between children's musical preferences and their revealed intellectual or verbal ability.

With such a small sample it is not possible to infer any findings to the whole population. However, for this limited group of 10 - 11 year old children we find that the hypothesis does not appear to be disproved except in the case of stylistic period three where there is significant positive correlation with verbal reasoning.

<u>Comparison of Instrumentalists and non-players</u>

In this section we are concerned with the possible influence of one specific type of musical experience on children's musical preferences in the 7 - 11 age range. The criterion used to define the term 'instrumentalist' was whether the child was receiving regular instrumental instruction at home or at school; such tuition was designed to lead to some mastery of instrumental techniques and some ability to read staff notation.

The 7 - 11 sample included adequate numbers both of instrumentalists and non-players at every year level, and there was a reasonable balance between these two categories at each year level, sufficient to enable comparison of mean preference scores to be made. The only variable was the factor of musical experience - instrumental tuition - for the rest, the children received the same school lessons together. So far as the writer could ascertain there seemed to be no policy of selection for instrumental tuition on any consistent basis, such as proved intellectual ability. Interest and possession of an instrument were often the deciding factors in opting for school instrumental tuition.

This was certainly the position in the schools tested as regards recorder lessons, and the majority of children classified as instrumentalists were, in fact, recorder players. More girls than boys received instrumental lessons, but this ratio was not unduly disproportionate (approximately 2:1). 306 out of a 7 - 11 sample of 671 were classified as instrumentalists. Once more a null hypothesis was formulated with a view to testing the factor of instrumental experience:

Hypothesis four - There are no differences between the musical preferences of children who have instrumental experience and those who have not.

Table 25 pairs together the mean preference scores for both categories and shows the size of the t-ratio, indicating where there is a significant difference in means. An inspection of the figures relating to the whole 7 - 11 sample shows divergence of taste for stylistic periods two, three, five and six at the one percent level of significance.

An examination of each year group separately reveals consistently significant differences in preference only for period two, although for periods three, five and six there are significant differences at most year levels. For stylistic periods one and four however, no significant differences in musical preference occur at any year level. We once more note that the highest value of the t-ratio occurs in stylistic period two, followed by periods five, three, six and four in that order.

Figures twenty eight to thirty two illustrate the above-mentioned points graphically. There is no implicit suggestion that the scores obtained from this small adult sample accurately represent norms of musical preference for

TABLE 25 PREFERENCE TEST

INSTRUMENTALISTS AND NON-PLAYERS

COMPARISON OF MEAN SCORES

PERIOD	7 - 8	8 - 9	9 - 10	10 - 11	7 - 11
1					
Instrumentalists	4.933	4.779	4.643	4.625	4.752
Non-players	5.0	5.071	4.955	4.535	4.882
t-ratios	0.242	1.697	0.312	0.37	0.98
2					
Instrumentalists	5.88	5.937	5.964	6.575	6.095
Non-players	4.873	5.257	5.182	5.545	5.252
t-ratios	3.646 1%	2.869 1%	2.657 1%	3.915 1%	6.34 1%
3					
Instrumentalists	5.747	5.863	5.982	6.0	5.892
Non-players	4.841	5.708	5.511	5.327	5.405
t-ratios	3.565 1%	0.702	2.001 5%	3.07 1%	4.185 1%
4					
Instrumentalists	4.973	5.011	4.982	4.775	4.935
Non-players	4.937	4.850	4.568	4.762	4.773
t-ratios	0.122	0.807	1.434	0.055	1.31
5					
Instrumentalists	4.547	4.368	4.964	4.563	4.572
Non-players	5.683	5.027	5.557	5.545	5.411
t-ratios	3.596 1%	2.537 2%	1.714	3.687 1%	5.757 1%
6					
Instrumentalists	3.893	4.0	3.446	3.462	3.732
Non-players	4.444	4.071	4.182	4.218	4.203
t-ratios	1.846	0.302	2.107 5%	2.761 1%	3.336 1%
Instrumentalists	N = 75	N = 95	N = 56	N = 80	N = 306
Non-players	63	113	88	101	365

Percentages after the t-ratios show the level of significance.

TABLE 25
(Cont.)

PREFERENCE TEST

BISERIAL CORRELATION

INSTRUMENTALISTS AND NON-PLAYERS 7 - 8 AND 10 - 11

STYLISTIC PERIODS

AGE GROUP		1	2	3	4	5	6
7 - 8	r bis.=	+0.04	+0.37	+0.49	-0.11	-0.44	-0.15
10 - 11	r bis.=	-0.01	+0.35	+0.24	+0.02	-0.31	-0.26

The positive sign indicates that instrumentalists have a stronger preference that non-players, and the negative sign denotes stronger rejection.

FIGURE 28 PREFERENCE TEST

INSTRUMENTALISTS AND NON-PLAYERS 7 - 11

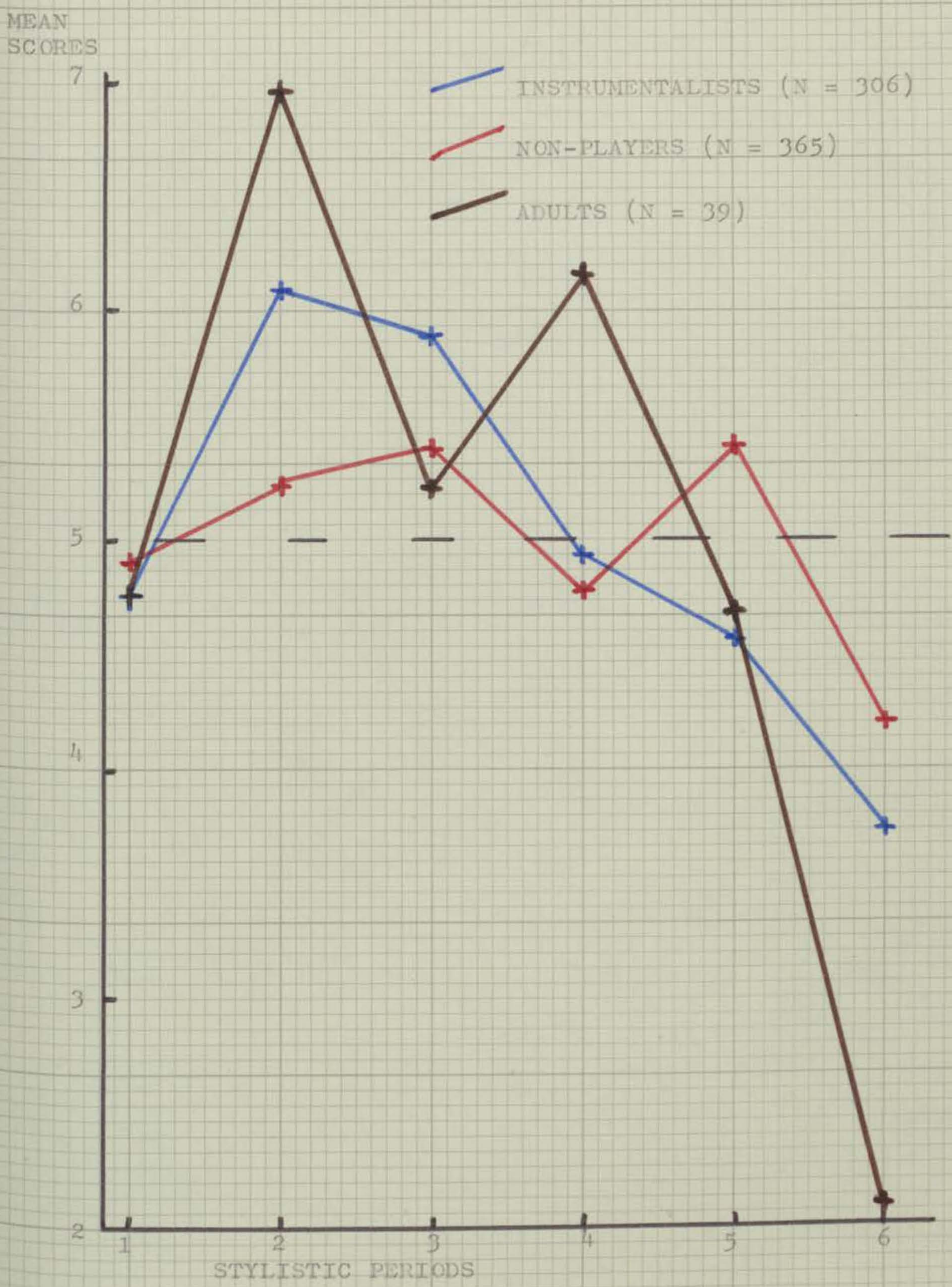


FIGURE 29 PREFERENCE TEST

INSTRUMENTALISTS AND NON-PLAYERS 7 - 8

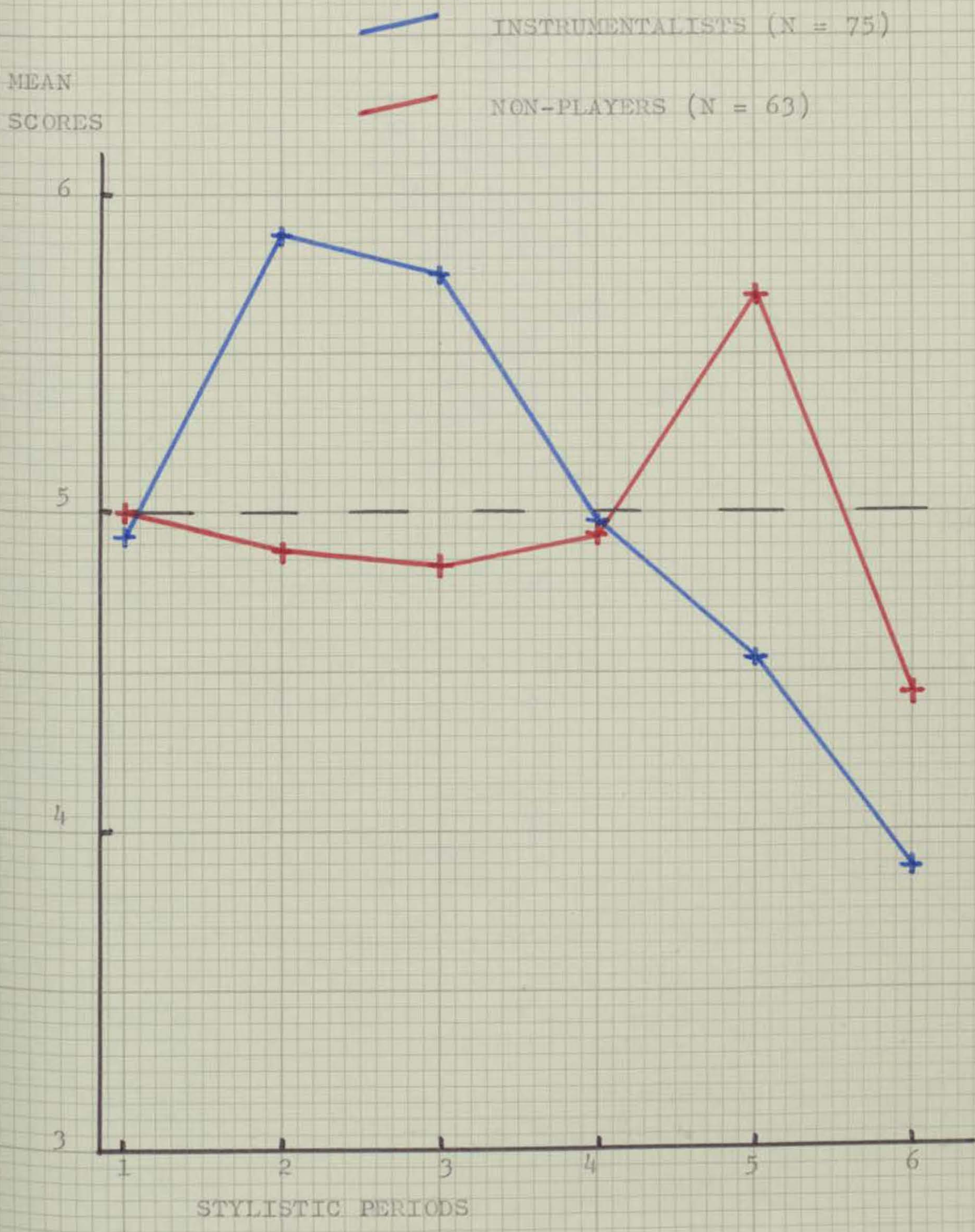


FIGURE 30 PREFERENCE TEST

INSTRUMENTALISTS AND NON-PLAYERS 8 - 9

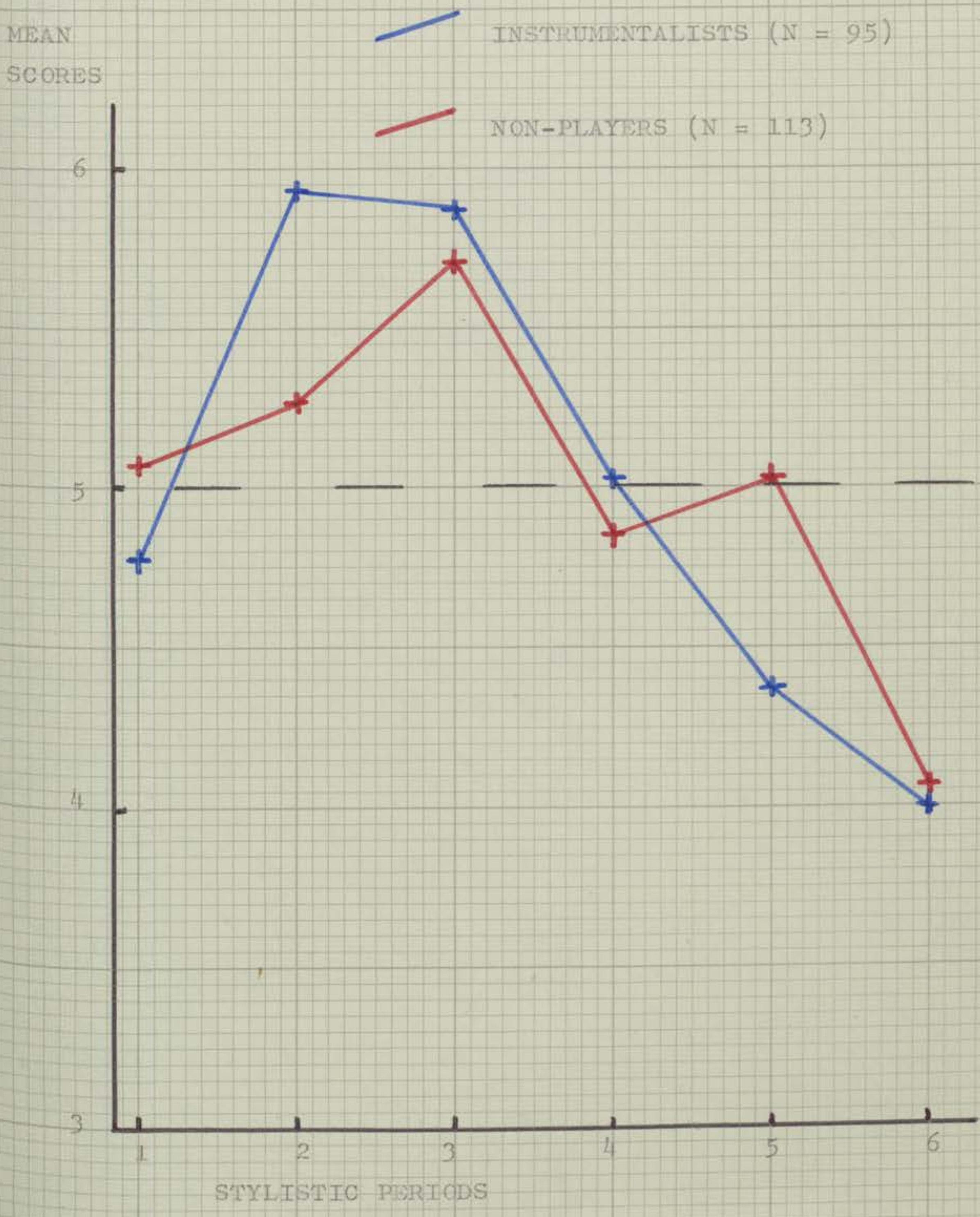


FIGURE 31 PREFERENCE TEST

INSTRUMENTALISTS AND NON-PLAYERS 9 - 10

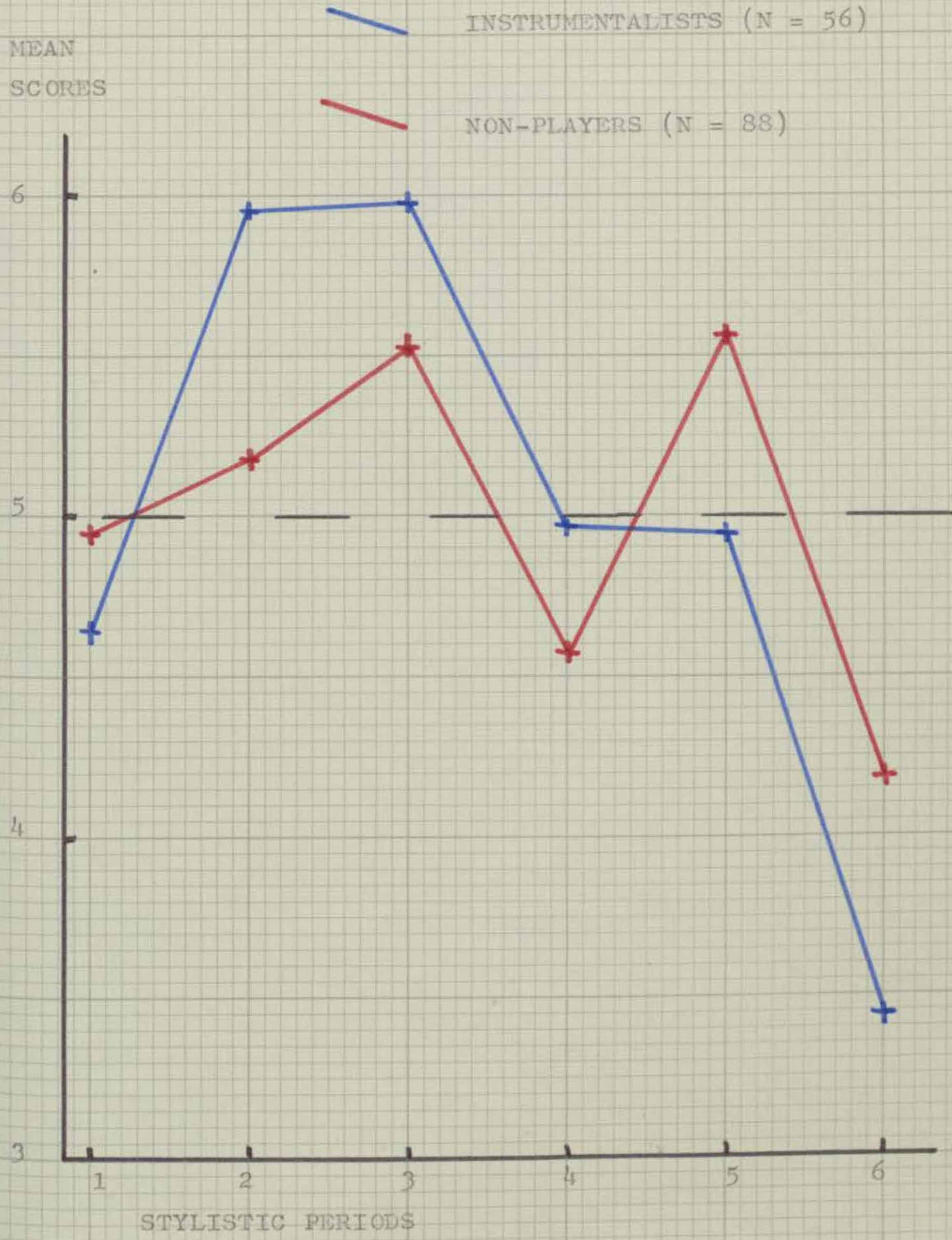
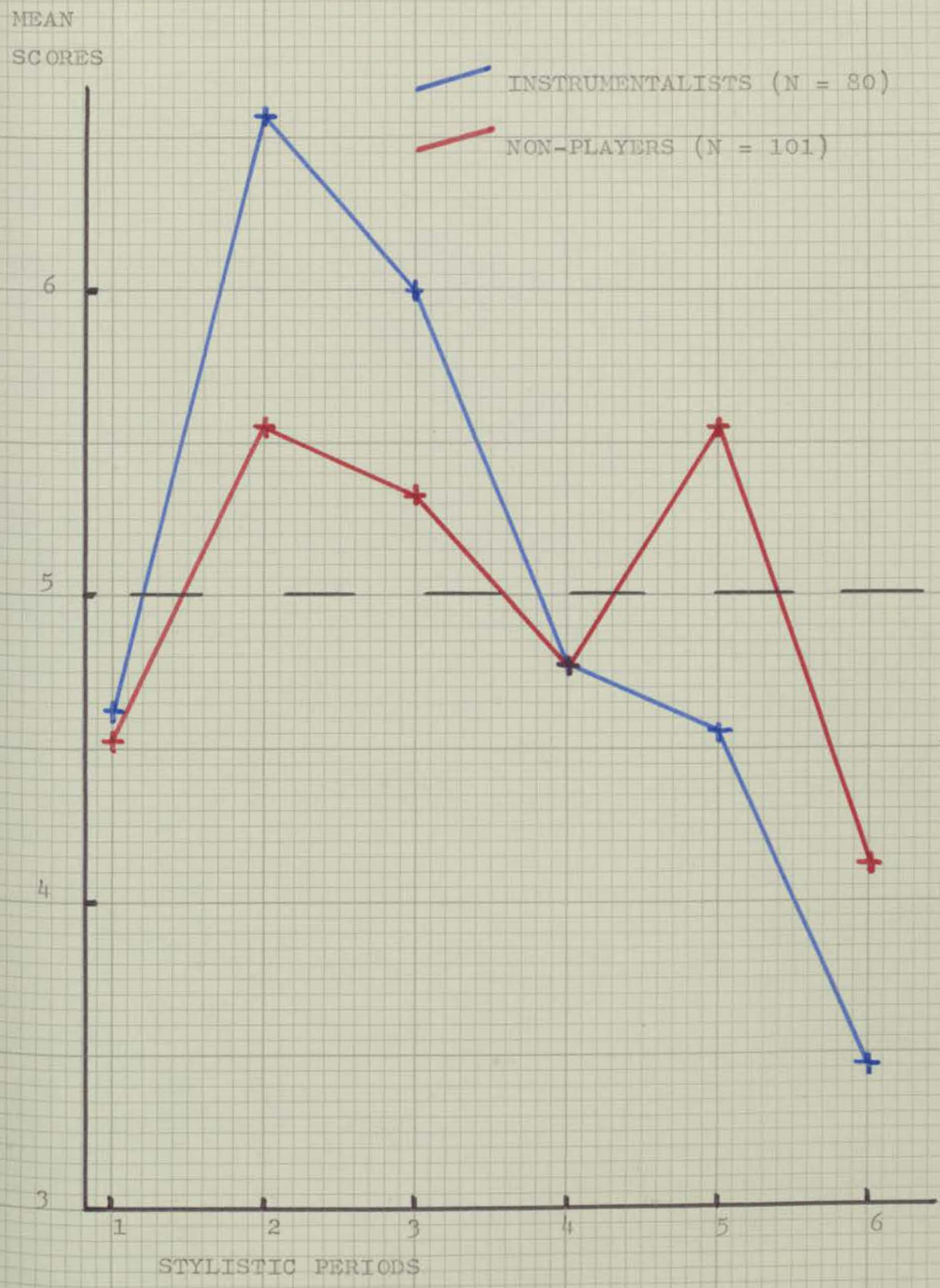


FIGURE 32 PREFERENCE TEST

INSTRUMENTALISTS AND NON-PLAYERS 10 - 11



the whole adult population of this country, but the adult scores have been inserted in figure 28 to help clarify whether there are trends towards stronger preference and rejection with age in the case of both the categories being examined in this section.

Perusal of figure 28 which is concerned with the whole age range from 7 - 11 in the two categories instrumentalist and non-player, reveals the following points when making comparison with our small adult sample:

(a) For stylistic period one there is close agreement amongst the three categories as regards preference. All mean scores are below 5/10.

(b) Instrumentalists' preferences are much closer to those of our adult sample than those of non-players for stylistic period two. Whereas non-players' mean scores are only slightly above 5/10, those of instrumentalists and adults are in the region of 6/10 and 7/10 respectively.

(c) The mean preference scores of non-players correspond more closely to those of the adults for period three, though the divergence of taste is by no means so wide as for period two.

(d) There is a wide disparity of tastes when we turn to period four. Those for instrumentalists and non-players are reflected in their mean scores of under 5/10, and are similar; adults' taste for this musical idiom, as represented by our sample, rates it much higher with a mean preference score of over 6/10.

(e) Instrumentalists and adults in our sample agree on a rating of under 5/10 for period five, whilst non-players rate it much higher in choice with a mean score between 5/10 and 6/10.

(f) Both the instrumentalist category and that of non-player reject period six relative to the other stylistic periods. The stronger rejection of the former category is reflected in the smaller mean preference score of less than four; however, this is not so strong a rejection as that of the adult sample which rated this stylistic period, as represented by the excerpts in the test, at no higher than 2/10.

Inspection of figures 29 to 32 reveals that the rise in popularity of period three between the 7 - 8 and 8 - 9 year levels is due almost entirely to the influence of the non-player category. At every year level, taste of instrumentalists approximates more to the figures for the adult sample, and in the case of the 10 - 11 year category of instrumentalist, there is a very decided resemblance with the exception that period four is more highly rated by our adult sample. The instrumentalist category has much stronger preferences and rejections than does the category of non-player; it appears that likes and dislikes in musical idiom are more firmly established in the instrumentalist category.

Special Choral Experience and Musical Preference

Hypothesis five - There are no differences between the preferences of children who have special choral experience, and those who do not.

The classification is restricted to membership of church and school choirs, and we shall concern ourselves with the 9 - 11 age groups only, as a relatively insignificant proportion of the younger groups were members of such choirs. More than half the children in the 10 - 11 year group were members either of school or church choirs (92/181), whilst between one quarter and one third of the children in the 9 - 10 year group so qualified (40/144).

Table 26 shows the comparison of mean preference scores of choir-members and non-members for each age group, together with t-ratios; it also indicates where differences are significant. It will be observed that there

TABLE 26 PREFERENCE TEST

CHOIR MEMBERS AND NON-MEMBERS

9 - 10 AND 10 - 11 YEAR GROUPS

PERIOD	9 - 10 YEAR GROUP	10 - 11 YEAR GROUP
1		
Choir-members	4.428	4.261
Non-members	4.981	4.888
t-ratio	1.584	2.659 1%
2		
Choir-members	5.625	6.478
Non-members	5.442	5.461
t-ratio	0.554	3.857 1%
3		
Choir-members	5.975	5.826
Non-members	5.596	4.404
t-ratio	1.472	1.901 (10% only)
4		
Choir-members	4.7	4.870
Non-members	4.735	4.652
t-ratio	0.111	0.922
5		
Choir-members	5.225	4.870
Non-members	5.356	5.326
t-ratio	0.344	1.678 (10% only)
6		
Choir-members	4.1	3.587
Non-members	3.865	4.259
t-ratio	0.598	2.442 2%
Choir-members	N = 40	N = 92
Non-members	104	89

Percentages after the t-ratios show the level of significance.

are no significant differences at all in the mean scores at the 9 - 10 year level; however, when we come to the mean scores of the 10 - 11 year group we find a number of significant differences. Stylistic periods one and two are significantly different at the 1% level, period six at the 2% level, and periods three and five at the 10% level only. Here we have the only example in the whole of this chapter where two categories have a difference in mean preference scores for period 1 at the 1% level of significance. Figures 33 and 34 illustrate in graphical form the contrasts in preference at the 9 - 10 and 10 - 11 age levels respectively. Note the increased preference of the older group for period two, and the trend towards a greater rejection of both stylistic periods five and six. Once more we can see the increasing resemblance of the curve for the 10 - 11 year old choir-members to that for our adult sample, again with the exception of a lesser preference for the musical idiom of period four.

A comparison of the two categories of children with musical experience detailed in hypotheses four and five has been attempted by another method of graphical representation - that of figure 35. Here we are not concerned with mean scores as points on the vertical axis of the graph, but with t-test values. The two most useful levels of significance are marked in; the distance of each t-value above these dotted lines is a measure of the significance of the difference in musical preference between the two categories of children with both kinds of musical experience specified in the hypotheses, and those not having the benefit of such experience.

It is clear that the Bach/Handel excerpts (period 2) exercise a stronger attraction for those children in our sample fortunate enough to be enjoying additional musical experience. One good reason for the selection of these

CHOIR-MEMBERS AND NON-MEMBERS 9 - 10

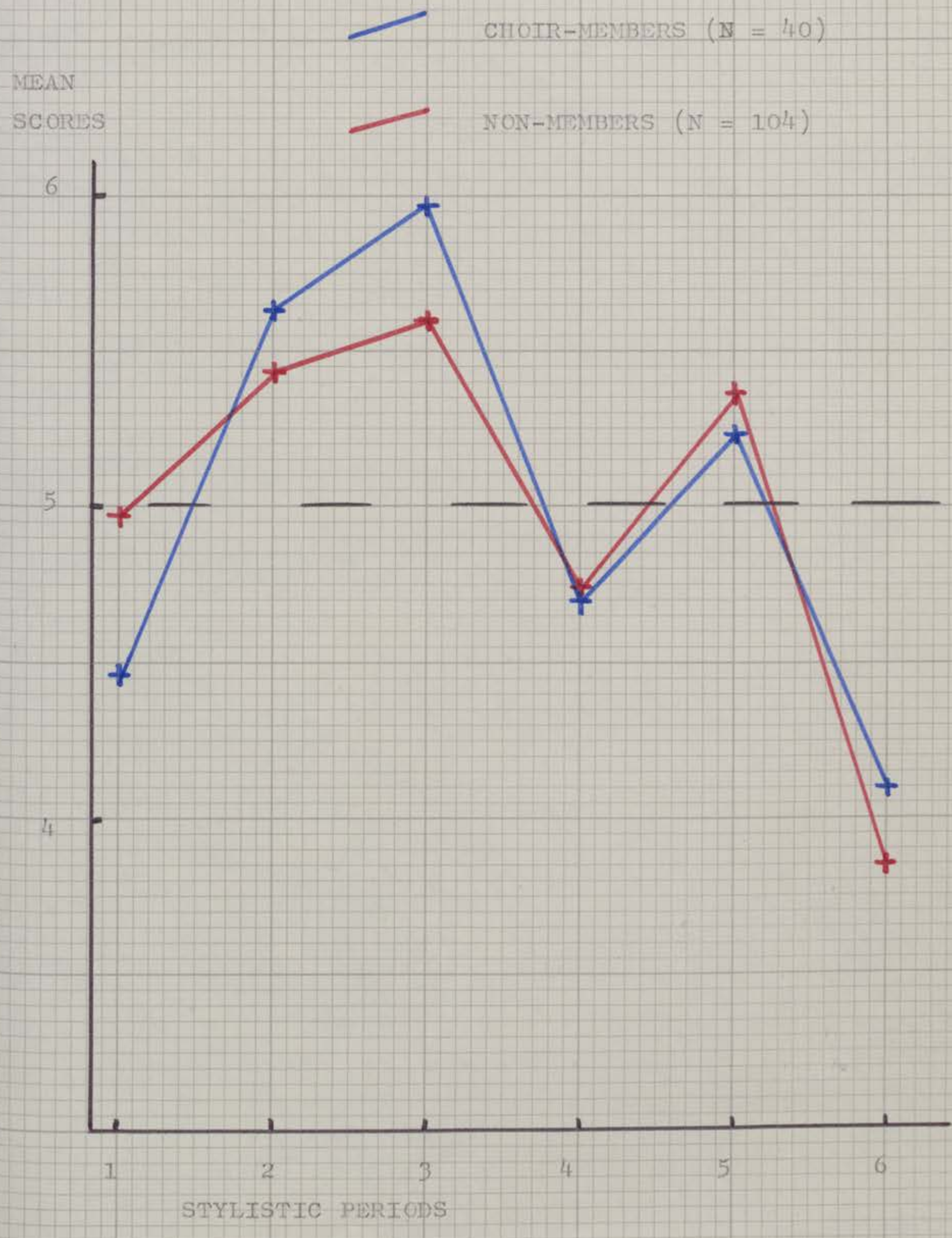


FIGURE 34 PREFERENCE TEST

CHOIR-MEMBERS AND NON-MEMBERS 10 - 11

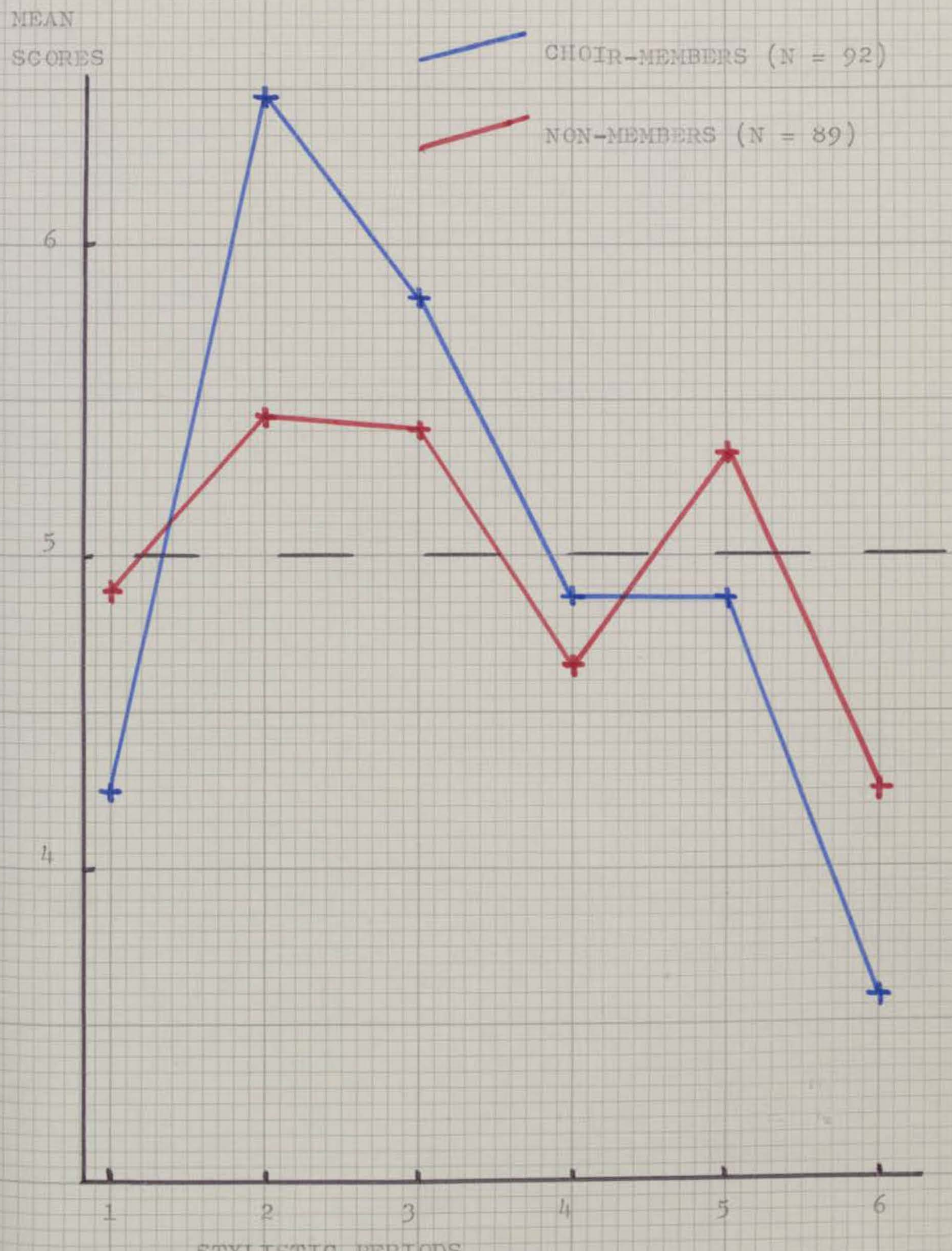
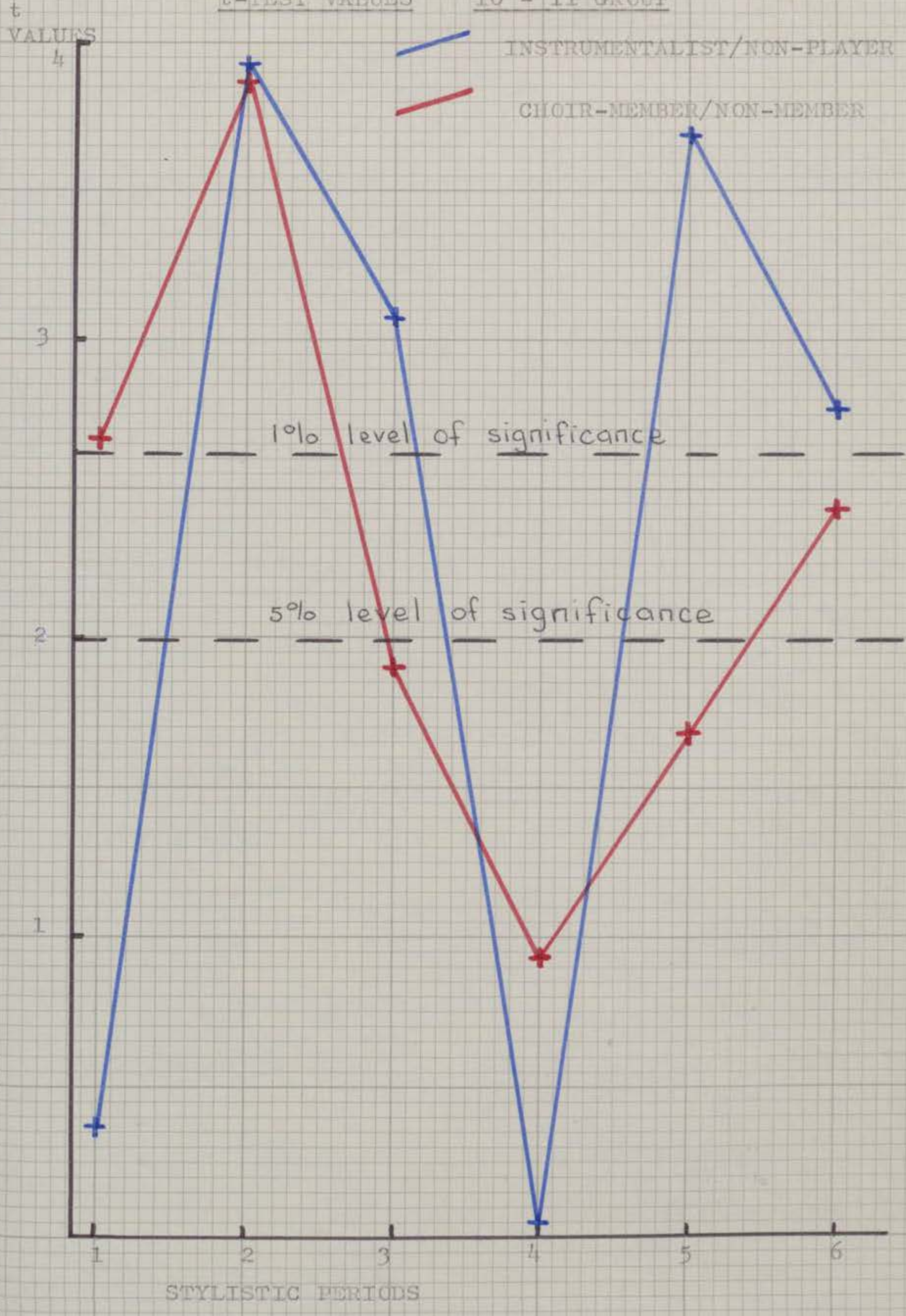


FIGURE 35 PREFERENCE TEST

t-TEST VALUES 10 - 11 GROUP



particular excerpts was that it was highly unlikely that children in the 7 - 11 year range would have had the opportunity of studying the actual music from which these excerpts were taken. Events proved the writer correct in this belief as regards the extracts from period two, although very occasionally, during testing, classes were found who were familiar with one or two of the excerpts - both the Brahms Hungarian Dances were instances of this.

To a lesser extent this strong contrast in taste between the musically-experienced categories and the others was true also of period three; the lesser popularity of the music chosen in Haydn/Mozart musical idiom is at the 1% level of significance when we compare the categories to do with instrumental experience, and is only just below the 5% level when we compare the preferences of these with and without special choral experience.

Between the ages of 9 and 11, period four exercises no special attraction for either of the musically-experienced categories over those without such experience and vice versa. In fact, for the instrumental/non-player categories, the t-ratio is almost nil. We have already mentioned the significant difference in preference for the choral/non-choral categories, and this is due to an aversion for this music, presented from the Bryd/Monteverdi era, on the part of choir-members. No such divergence of taste arises in the case of the instrumental/non-instrumental categories, and the t-ratio in this case for period one is very low indeed.

The situation is reversed when period five is examined; in this case those with instrumental experience show a strong aversion relative to the non-player category well above the 1% level of significance, whereas the difference in preferences is by no means so striking in the case of those with and those without special choral experience.

For stylistic period six, rejection is stronger for both categories having musical experience than for those lacking such experience; this is at a significant level for both types of musical experience, but is rather higher for the instrumentalist/non-player comparison.

Pairing of Items and its effect on Preference.

In the previous chapter an experiment by Farnsworth (1958) was reported in which he presented music by Stravinsky and Beethoven to college students. He concluded that the order of presentation affected popularity and stated: 'Stravinsky, the least enjoyed suffered an additional drop in popularity when following the Beethoven excerpt.'

Farnsworth was dealing with college students whereas the sample for this piece of research is much younger. Nevertheless, it seemed important to probe the differential effects of such placing, and the trends throughout all age groups tested are displayed in table 27. The only firm conclusion to be drawn from this is that an excerpt gains from being presented second in the pair, and that this additional popularity becomes more accentuated the younger the sample of children being tested. It may be that this sharply-defined trend has some connection with the memory span which increases with increase in age; perhaps because the initial impact of the tune - its strong opening phrase in many cases - being further removed from the present at the moment of choice in the case of excerpt A than in the case of excerpt B, a limited memory span militates in favour of excerpt B whose strong opening theme is still fresh in the mind of the young child. The moment of choice for the younger groups tested seemed to be quite early in the playing of excerpt B for each item, once the test routine was under way; more children from the older groups tested appeared to wait almost to the end of the second excerpt before making their choice. However, in the

TABLE 27 PREFERENCE TEST

CHOICE OF FIRST OR SECOND MUSICAL EXCERPT FROM EACH PAIR

AGE GROUP	N	% A	% B
6 - 7	27	38	62
7 - 8	138	38	62
8 - 9	208	39	61
9 - 10	144	40	60
10 - 11	181	40	60
11 - 14	106	43	57
20+	39	44	56

TABLE 28 PREFERENCE TEST

STRONG PREFERENCE SCORES 8 - to 10 AND REJECTION SCORES 0 to 2

AGE GROUP	N	PREFERENCE SCORES 8 to 10	$\frac{T}{N}$ ratio	REJECTION SCORES 0 to 2	$\frac{T}{N}$ ratio
6 - 7	27	8	0.30	6	0.22
7 - 9	342	150	0.44	169	0.49
9 - 11	326	171	0.52	190	0.58
11 - 14	106	57	0.54	64	0.60
20+	39	37	0.95	41	1.05

The ratio is obtained by dividing the number of preference scores (8 to 10) or rejection scores (0 to 2) by the number of individuals in each age group. The totals of preference scores and rejection scores are calculated from a scrutiny of each individual's test leaflet. This table is only concerned with very strong preferences and very strong rejections.

second half of the test, where all excerpts were being repeated under conditions of re-pairing, certain of the more individualistic selections were immediately recognised, and their selection or rejection greatly facilitated.

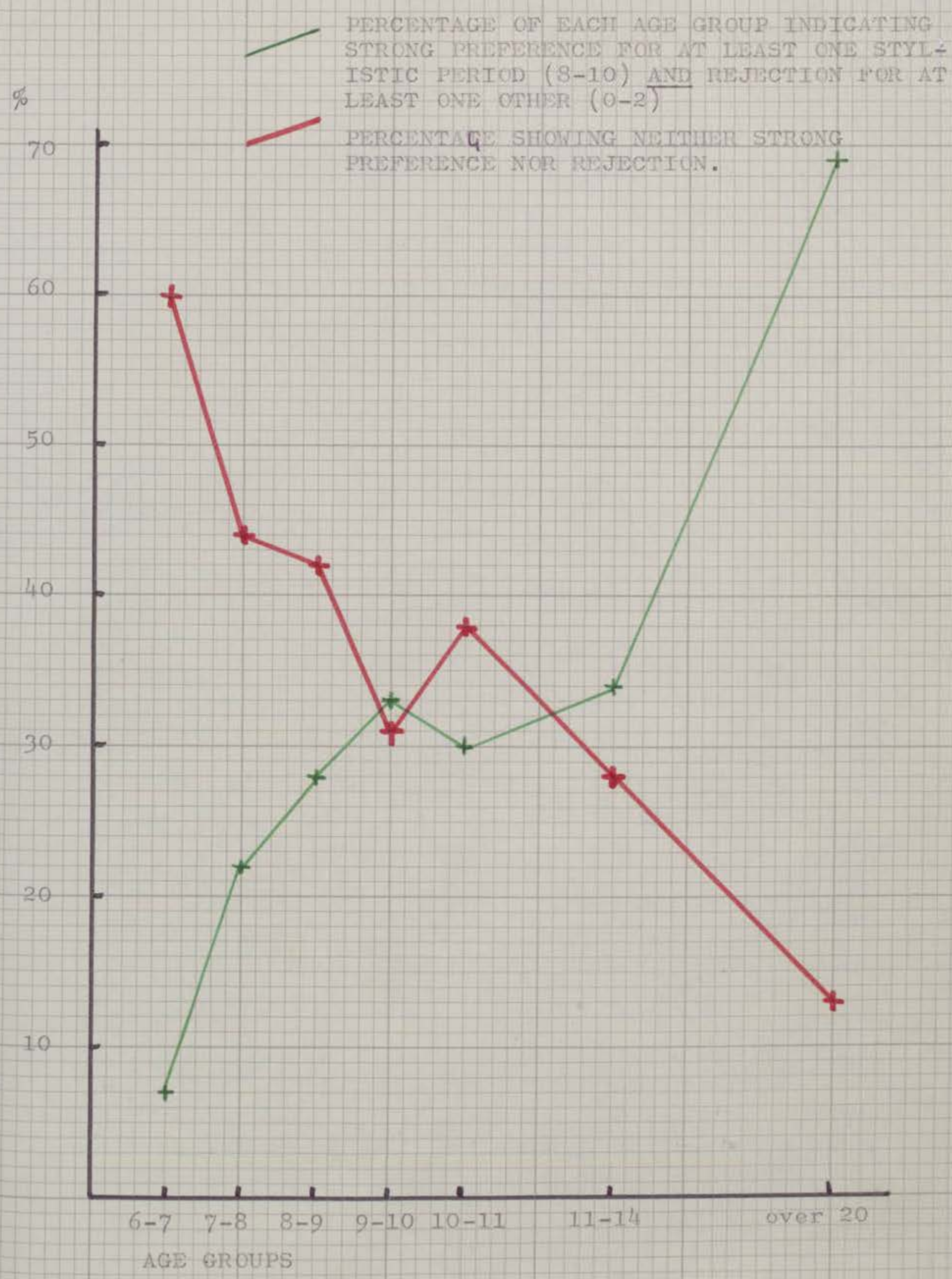
Item Analysis - Strong Preferences and Rejections

A short study was made of the incidence of very high (8 - 10) and very low (0 - 2) preferences for the whole sample tested. The total number of such strong preferences and rejections was worked out for each age group, and a ratio obtained by dividing the ensuing figure by the number in that particular age group. Strong preferences and strong rejections were displayed separately, and table/twenty ~~eight~~ demonstrates the trend towards stronger preferences and rejections with increasing age. Outside the youngest group tested, rejection ratios run at a higher rate than preference ratios through the entire gamut of ages.

This particular piece of analysis has links with those trends displayed in figure 22; it also ties up with results obtained from investigating the boys/girls, instrumentalists /non-players and choir-member/non-member categories. Figures 27, 32 and 34 all show that by the age of eleven, girls, instrumentalists and choir-members have stronger musical preferences and rejections than boys, non-players and those who are not members of special choirs, respectively. Nowhere are these trends so strong as is the case with the adult sample tested. Figure 36 illustrates trends for strong preferences.

Item Analysis - Individual Excerpts

An attempt will be made in this section to assess the popularity rating of each individual excerpt. It has to be borne in mind that popularity depends in part on the pairing arrangement. For instance, the Dowland excerpt's poor rating in the eyes of the sample of children tested


PERCENTAGE OF EACH AGE GROUP INDICATING STRONG PREFERENCE FOR AT LEAST ONE STYLISTIC PERIOD (8-10) AND REJECTION FOR AT LEAST ONE OTHER (0-2)
PERCENTAGE SHOWING NEITHER STRONG PREFERENCE NOR REJECTION.
%
70
60
50
40
30
20
10
6-7
7-8
8-9
9-10
10-11
11-14
over 20
AGE GROUPS

is partly a result of its being paired against two very popular excerpts, the Bach Brandenburg Concerto 4 in the first half, and the Mozart Horn Concerto in the second half. For a similar reason, the Haydn Symphony 73 excerpt, one of the most popular, undoubtedly gained from being paired with the Hindemith Symphonic Dances excerpt in the first half of the test, and against the Schoenberg excerpt in the second half.

Popularity ratings were compiled for the 7 - 8 year group (N = 138) and the 10 - 11 year group (N = 181). These have been placed alongside in table 29 for purposes of comparison. Since the total possible score for any individual excerpt in the test is 2, mean scores range between 0 and 2; in fact the lowest figure is that accorded to the Allison excerpt (period one) by the 10 - 11 year group where the mean score is only 0.541. The highest mean score, also from the 10 - 11 year group is that for the Haydn Symphony 73 excerpt and this stands at 1.541. It is significant that the highest and lowest mean scores are from the 10 - 11 year group where preferences and rejections are stronger than is the case with the 7 - 8 year group.

Product-moment correlation of the mean scores for each of the thirty excerpts from each age group (at the three year interval) was calculated giving r = 0.82. This was a high correlation and gave some indication of the reliability of the test. It also led the writer to look for any individual excerpts where there was a statistically significant change in preference over this three year interval between the two samples being compared. Five such extracts were found by use of chi-squared analysis. The Monteverdi, Allison and Hindemith Symphonic Dances excerpts all showed a significant drop in popularity from the 7 - 8 to 10 - 11 groups, and these were at the 1% level of significance. The Handel and the Brahms Hungarian Dances No. 5 excerpts

POPULARITY RATINGS OF INDIVIDUAL EXCERPTS

EXCERPT	7 - 8 GROUP SCORE	Mean	RANK	10 - 11 GROUP SCORE	MEAN	RANK
Monteverdi	168	1.217	5	161	0.890	18
Allison	118	0.855	22	98	0.541	29
Dowland	85	0.616	30	127	0.702	25
Byrd	143	1.036	13	185	1.022	16
Morley	169	1.225	4	237	1.309	7
Bach Br.5	145	1.051	11	203	1.122	11
" 4	150	1.087	9	213	1.177	9
" Suite 2	145	1.051	11	192	1.061	14
" 3	164	1.188	6	241	1.331	6
Handel	142	1.029	15	236	1.304	8
Haydn Sym. 73	183	1.326	2	279	1.541	1
" 83	132	0.957	19	154	0.851	19
" 88	123	0.891	21	188	1.039	15
Mozart Horn	188	1.362	1	259	1.431	2
" Clarinet	111	0.804	24	140	0.773	22
Beethoven 3	107	0.775	26	111	0.613	28
" 6	137	0.993	17	149	0.823	20
" Piano C.	148	1.072	10	205	1.133	10
Schubert 4	128	0.928	20	146	0.807	21
" 9	164	1.188	6	244	1.348	5
Brahms Acad.	109	0.790	25	124	0.685	27
" Hung. 3	114	0.826	23	136	0.751	23
" 5	143	1.036	13	248	1.370	3
Tchaikov. 6	151	1.094	8	197	1.088	13
" Cap.Ital.	183	1.326	2	248	1.370	3
Schoenberg	99	0.717	28	125	0.691	26
Hindemith Bb	99	0.717	28	132	0.729	24
" Mathis	140	1.014	16	201	1.110	12
" Sym. Dan.	104	0.754	27	95	0.525	30
Stravinsky	133	0.964	18	162	0.895	17

showed a significant improvement in popularity at the 5% and 1% levels of significance respectively. The chi-squared figures are shown below:

Monteverdi 8.18, Allison 11.32, Handel 4.97, Brahms Hungarian Dance no. 5. 7.05, Hindemith Symphonic Dances 6.64.

A similar kind of analysis was carried out on the individual excerpts to compare their popularity for the boys and girls in the 10 - 11 year sample. The results are displayed in table 30; again the same excerpts tended to appear near the top and near the bottom of the popularity rankings for both boys and girls, but there were significant variations in the ratings accorded by the boys and girls through their preferences and these, calculated by chi-squared analysis are listed below :

Bach Brandenburg Concerto no 4.	More	popular	with	girls	at 5%	level
" Suite No 2.	"	"	"	"	1%	"
Mozart Clarinet Concero	"	"	"	"	2%	"
Schubert Symphony No 4	"	"	"	boys	5%	"
Brahms Adademic Festival Overture	"	"	"	"	1%	"
" Hungarian Dances No. 3	"	"	"	"	5%	"
Schoenberg	"	"	"	"	1%	"
Hindemith Symphony in B flat	"	"	"	"	2%	"
Stravinsky	"	"	"	"	2%	"

The Schoenberg excerpt was by far the most significant of these excerpts in the difference of choice of boys and girls. In the period six excerpts it is interesting to note that although on the whole girls rejected this contemporary idiom more strongly than did the boys of the 10 - 11 year sample, the Hindemith 'Mathis' was a notable exception, rated higher by girls than by boys. This could be due to the fact that it is paired against a period five excerpt in each half of the test, and every item in period five was

TABLE 30 PREFERENCE TEST

BOYS AND GIRLS AGED 10 - 11

MEAN SCORES AND RANKS OF INDIVIDUAL EXCERPTS

EXCERPT	BOYS MEAN SCORE	RANK	GIRLS MEAN SCORE	RANK
Monteverdi	0.79	25	0.98	15
Allison	0.48	30	0.60	25
Dowland	0.77	26	0.62	23
Byrd	1.0	16	1.03	14
Morley	1.29	6	1.31	6
Bach Brandenburg 5	1.04	13	1.19	12
" 4	1.03	14	1.31	6
" Suite 2	0.86	20	1.26	10
" 3	1.27	7	1.38	4
Handel	1.14	9	1.46	2
Haydn Symphony 73	1.49	1	1.57	1
" 83	0.84	22	0.86	19
" 88	1.12	10	0.94	17
Mozart Horn Concerto	1.39	4	1.46	2
" Clarinet	0.62	28	0.92	18
Beethoven Sym. 3	0.69	27	0.53	27
" 6	0.80	24	0.83	20
" Piano Concerto	1.11	11	1.16	13
Schubert Sym. 4	0.94	17	0.67	22
" 9	1.34	5	1.34	5
Brahms Acad.Fest. Overtune	0.84	22	0.52	28
" Hungarian Dn 3	0.88	18	0.61	24
" 5	1.43	3	1.30	8
Tchaikovsky Sym.6	1.20	8	0.97	16
" Capr.Italien	1.46	2	1.27	9
Schoenberg	0.88	18	0.49	30
Hindemith Sym.B f.	0.86	20	0.59	26
" Mathis	1.01	15	1.20	11
" Sym. Dances	0.52	29	0.52	28
Stravinsky	1.05	12	0.72	21

preferred more by the boys than by the girls.

Conclusion

This is the appropriate point at which to sum up possible ways in which the development or formation of musical taste takes place. If we are to think of aesthetic development in terms of moving towards adult norms of taste, as shown in mean preference scores of the adult sample, then there is some evidence of this when surveying the whole 6 to 20+ sample. Within our 7 - 11 sample, however, there are many individual variations on this theme, as illustrated in figure 22, infact, no clear-cut picture emerges if this 7 - 11 sample is analysed apart from the results of testing the younger and older groups.

Within the 7 - 11 sample, however, we do see certain special categories moving closer to adult norms. The figures for the 10 - 11 year old instrumentalists, and to a lesser extent choir members, are beginning to approach those of the adult sample, and they are much closer than the corresponding non-player and non-choral categories.

Another approach is to see whether there is any development towards stronger preferences for the musical idiom of certain stylistic periods through the age groups in the sample. We have found evidence that this trend towards these stronger musical preferences does occur with increase in age. Certain kinds of musical experience seem to lead to earlier development of these strong preferences for the musical idiom of one or two of the stylistic periods presented in the test.

There is no doubt that, in spite of these trends, there are numerous instances of the development of strongly individualistic tastes running counter to the trends just indicated. A clearer picture might have emerged had the number of stylistic periods presented been halved, or even reduced to four. It seemed a pity, though, to cut out music of the Bach, Mozart, Beethoven or Brahms eras, and the test would have been the poorer for their omission. There is a stylistic change from the excerpts of the Haydn period to those of Beethoven, and again from the Schubert selections to those chosen from Tchaikovsky's compositions.

The writer would emphasise that he tried to present only music of high quality, and that typical of the six stylistic periods in the test. The selections chosen were those that particularly appealed to the small pilot groups who were tested before finalisation. This meant that, although certain excerpts appear less popular, this is only so in relation to the other pieces of music chosen.

The test is designed to probe children's differential response to the musical idiom of a selected number of stylistic periods through the examination of broad trends and the testing of hypotheses directed towards certain categories.

It remains to say that the cultural explanation of musical taste seems the only possible one emerging from our analysis of the broad trends to do with additional musical experience and those to do with age. The environment is the chief determiner of what kind of musical preferences children have; yet environmental determinants may be different, even when the musical tastes of brothers and sisters are being examined. In the final analysis each individual is unique and no two individuals receive identical influences from their environment.

The writer interprets this not in the light of an environment acting upon a passive recipient, but as a dynamic interaction between the individual and his environment.

In giving pride of place to environmental influences, we need to remember that the choices of girls and boys were clearly differentiated, and to an extent that no social explanation of pressures towards roles and expectations can explain away entirely. There is a genetic basis, and heredity, our inherited sensory equipment, sets limits to the process of aesthetic development, no matter how strong the cultural pressures.

CHAPTER 9

DISCUSSION OF FINDINGS

The stage has now been reached at which evidence from the various programmes of testing can be re-examined in such a way as to see the whole picture of emerging trends more clearly. Over three years of testing, with a total sample of more than 3000 children, enables us to place some confidence in trends displayed as a result of analysing data from the Music Responsiveness Test, the Music Discrimination Test and the Music Preference Test.

This research has a well-defined set of aims. In using a series of tests especially designed for this study, it is important to inspect the limits set by the kinds of tests constructed. There is the further need to re-define how far selection of test items and the chosen methods of scoring have also restricted the scope of the research.

Since this study has relied in the main upon cross-sectional methods rather than on longitudinal procedures, there are further limits set on what results of testing are able to prove. However, although the sample populations of the three testing programmes are, on the whole, distinct and separate, there are occasional overlaps where two of the tests have been administered to the same group of children; where relevant, a comparison of results will be attempted in this chapter.

The questions asked relate to a specified number of aspects of musical ability in children, and to their musical preferences; we are concerned about the musical development of the 7 - 11 age group in particular. One question concerns the connection between the growth of musical ability with age, and possible changes in musical taste with age. Another question probes possible differences between boys and girls in musical situations.

Still another question seeks to determine how far musical experience - special cultural and environmental pressures - enters into the development of musical ability and the formation of musical taste in young children.

Analysis of the boys/girls and instrumentalists/non-instrumentalists categories and their scores in the three tests is shown in Appendix A. There were fractionally more girls than boys in the samples. Instrumentalists and non-players were also not dissimilar in numbers, there being slightly more of the latter.

Six of the schools included in the testing programmes were situated in central areas of towns, A further five were somewhat isolated village schools. The remainder, the majority, were in residential areas with a variety of urban development from older, declining districts to brand-new housing estates. The schools visited varied in size from one with less than forty children to one primary school with over 600 children and a secondary school with well over a thousand. Wide variations of socio-economic areas were included, from culturally-deprived children in slum clearance districts and rural hovels on one extreme to affluent suburbia on the other.

The writer had already made the acquaintance of staff in most of the schools visited for the purpose of testing, and was thus able to obtain a reasonable cross-section of ages. Pressure of time and the fact that testing programmes had to take place chiefly at the beginnings and ends of school terms led to certain irregularities in sample numbers.

Only one class tested contained no children who played a musical instrument. There was only one case of a class in the 7 - 11 age range where every child in the class was receiving tuition on a musical instrument. All the classes tested were coeducational.

Music Responsiveness Test

This test was designed to measure a child's developing ability to analyse melodically, rhythmically and harmonically in a musical setting in three separate subtests. The testee has the task of perceiving and recording musical changes. These constituted the child's response in a musical situation. The title of the test came from critical reading and appraisal of J.L. Mursell (1937,[1] 1948 [2]). The melody subtest had a different basis of scoring from the rhythm and harmony subtests. In the rhythm subtest the testee's task was to hear a tapped pattern transformed into a musical setting as a simple, short but rhythmically-stressed tune. The harmony subtest was an excerise in cadential discrimination. Both these subtests employed a Gestalt type of response - the child was not required to pinpoint where a change occurred as in the melody subtest, but was merely requested to indicate which version he considered correct.

Points emerging from item analysis:

(a) Melody Subtest - The shorter items were also the easier ones.

(b) Variations in pitch, ranging over three octaves seemed to have little effect on their level of difficulty, although a small minority of children had some difficulty with the lowest notes of the clarinet.

(c) It was more difficult to pick out the changed note where the flow of the melodic contour was least disturbed.

(d) Rhythm Subtest - No more difficulty was experienced by the children when items were presented at a pitch three octaves below, than when items were within the child's normal singing range.

1. J.L. Mursell 'The Psychology of Music' New York 1937
2. " 'Education for Musical Growth' 1948

(e) Difficulty was associated with the relative closeness of the alternative rhythm patterns to the correct pattern, and seemed to bear little relation to differences in timbre or variations in the texture of the harmony.

(g) Harmony Subtest - The lightly harmonised piano cadences were found to be slightly easier than the final items where the piano harmony was fuller.

(h) Piano items were found slightly easier than those played by the recorder trio.

(i) On the whole, item difficulty was related chiefly to the closeness of the alternatives to the correct cadences.

Music Discrimination Test

This was designed as an extension of the testing programme into the territory of music appreciation; the writer regards ability to discriminate correct versions of a piece of music from distorted versions as an essential ingredient in the ability to appreciate musically. Here, a more complex, thoughtful and intensive type of sensory analysis was required.

The musical setting of the items in this test was more varied than for the items in the Music Responsiveness Test. More musical instruments were employed over the test as a whole; there was a combination of four instruments in several of the items. Two items were piano solos, and two others were arranged for church organ, these latter proving the most difficult items in the test.

Penalties for wrong guessing were fairly evenly distributed through the age groups in the sample. Slightly more penalties were incurred by the younger age groups. It was interesting to observe that a minority of children from all ages represented in the sample risked losing marks rather than leave the corresponding letter in the test leaflet unmarked. When questioned by the writer afterwards, the children concerned would unblushingly admit to taking a gamble, whilst understanding their instructions well enough.

Many tests of musical ability include the advice to guess when in doubt. It was considered that in this particular test ability to discriminate correctly should be rewarded, whereas guesswork should be discouraged. This enabled a more effective analysis to be carried out. Item analysis revealed:

(a) Ability to detect correct versions showed a steeper growth gradient through the ages in the sample than ability to detect distorted items.

(b) Children found 'flattened instrument' items easier to detect than those items where notes were altered or omitted.

(c) Irregular rhythms, involving accelerando and rallentando, were more difficult to detect than those where the rhythmic pattern was modified throughout, eg by 'dotting' a hitherto smooth rhythm.

(d) It was more difficult for children to detect rhythmic changes if these occurred only in the accompaniment and not in the melodic line.

(e) It proved more difficult to discriminate a harmonically distorted version when harmonic changes were restricted to the bass line only.

Music Preference Test

Whereas in the two previous tests it had been possible to give tentative ability rankings for the children in each class tested, there was no question of 'more able' or 'less able' tags being put against individual children's names and scores as a result of doing the Music Preference Test. Although the testee was in the position of having to choose between two alternatives, neither choice was 'correct' in any objective sense. Below are summarised certain points arising from this final test:

(a) It was restricted to the typical musical idiom of six stylistic periods, using short excerpts, but sufficient in length to be representative of the style of the period.

(b) Only instrumental music was chosen; there were no vocal items, nor was 'popular' music included.

(c) Some matching of pairs as regards tempo and tone colour was attempted in the first half only of the test.

(d) Children opted more often for the second excerpt in each pair, though there was a diminution in this trend with increase in age through the sample tested.

(e) A large proportion of the children made their choice quite early during the playing of the second excerpt of each pair.

(f) Although all excerpts were chosen from some of the finest music of many eminent composers, scarcely any of the music was familiar to the young children tested.

(g) Certain excerpts were rated consistently low, and others equally high by all age ranges in the sample.

Age

As expected, both for relatively straightforward, and for more complex tasks of sensory analysis, children's ability to discriminate musically develops with age; this trend is well illustrated in the 7 - 11 range of ages in our sample. Results from the tests indicate that the growth gradient is not by any means smooth for all aspects of musical ability. Nevertheless, when considering the melodic and rhythmic aspects as measured by the Music Responsiveness Test, there is a fair approximation to a straight line graph.

Examination of the growth gradient for the harmonic aspect as measured in the harmony subtest, the greatest increase in scores occurs between the 8 - 9 and 9 - 10 year groups. This phenomenon is repeated for the Music Discrimination Test scores in an even more emphatic manner. This is also the age at which a sharp increase in the popularity of the musical idiom of the Tchaikovsky period occurs. This period may be said to be characterised by its greatly increased use of contrasting instrumental timbres and adventurous harmonies.

It is very tempting to link this trend with the increased awareness of children around this age for harmonic values, as evidenced in their scores in the first two tests for this study. However these are broad trends only, and there are multitudinous instances from the test leaflets of children whose development gradient differs considerably. Trends emerging from testing these large samples suggest however that ability to discriminate harmonically does develop strongly around the age of nine.

Increasing familiarity with the musical idiom of the different stylistic periods selected for the Preference Test leads to the development of differing levels of preference through the 7 - 11 age range. A sharp rise in the popularity of the music of the Bach and Handel era occurs around the age of 10, and perhaps this reflects the beginning of an appreciation of the more subtle musical values.

It is interesting to note that the beginning of the increase in popularity of the strongly rhythmic music chosen from the Haydn and Mozart era occurs around the age of 8, and we have already noted the rise in popularity of the Brahms/Tchaikovsky musical idiom around the age of 9. Of course all these are only broad trends, but they do occur against a continuing though gradual decline in the popularity of the stylistic periods at both ends of our musical spectrum - the Byrd/Monteverdi and Hindemith/

Stravinsky periods. It would seem that there is some evidence here pointing to the beginning of a trend towards accepted adult musical tastes.

Boys and Girls

Let us turn our attention first of all to the musical preferences of boys and girls in the 7 - 11 age range. We need to examine possible inferences from the fact that girls showed significantly greater preference for the musical idiom of the Bach and Mozart eras, whilst boys revealed significantly stronger preference for Tchaikovsky.

We must put against this the fact that girls perform better at simple tasks of sensory analysis in a musical setting; in the case of rhythm this superiority was most pronounced in the 8 - 9 age range; for melody, girls' superiority was greatest in the 9 - 10 range; when we consider harmony, girls are superior to boys through the whole 7 - 11 age range, but particularly from the age of 9 onwards.

Is there any connection between these distinct differences, both in the field of musical preferences, and in that of their developing ability to deal with tasks of musical analysis? Crickmore (1968) discusses the possible distinction between these at some length, and comes to a definite conclusion:

[1]'It follows, therefore, that aesthetic perception and critical reflection have to be classed as separate activities .. most of the tests of music appreciation described by Wing (1948) involve some kind of critical comparison between two or more musical items. Music appreciation is defined as the ability to distinguish between what is generally accepted by experts as good and bad music.'

1. 'An Approach to the Measurement of Music Appreciation(I)' Leon Crickmore - Journal of Research in Music Ed. Vol XVI, No. 3, Fall 1968. pages 239-240

Crickmore follows this with his own personal interpretation:

[1]'The present investigation, however, identifies music appreciation with musical enjoyment. It assumes that where there is enjoyment there is also understanding..'

The present writer also reports no obvious and direct connection between the aesthetic and discriminatory aspects of musical development. Greater liking for the Bach musical idiom by girls and for Tchaikovsky by boys seems to bear little relation to trends in melodic, rhythmic and harmonic development, although experience in one field must affect ability to perform musically in the other.

The next stage is to examine possible interpretations of the differences between the scores of boys and girls in the Music Responsiveness and Discrimination Tests. Even though the sample populations for these two series of testing programmes were quite separate, there are nevertheless broad trends which would appear to be to some extent contradictory.

In the Music Responsiveness Test scores of girls are better on average than those of boys; this superiority is at a significant level for the scores of each subtest over the whole sample age range. When comparing all boys with all girls in the 7 - 11 range, the superiority of girls is at such a level that it could not have arisen by chance, eg. because of sampling error. Moreover, this superiority tends to appear in all year levels within this sample, though not always at such a high level of significance, and it also appears for all three aspects of musical ability tested.

When considering scores of boys and girls in the Music

1. 'An Approach to the Measurement of Music Appreciation (I)' Leon Crickmore - pages 240

Discrimination Test, no significant differences can be found; nowhere are there the pronounced superiorities of girls' scores that were revealed by analysis of the Music Responsiveness Test data. In fact, in the 7 - 10 age range, boys tended to do slightly better. Continuing our investigation into the 11 - 13 age range, we find the same close association of boys' and girls' Discrimination Test scores still persists, with no clear-cut difference in ability to perform the complex tasks set by the test.

Yet, when we investigate the data from the Music Responsiveness Test for the 11 - 13 range, with different pupils, of course, girls still continue to exhibit superior scores, particularly for the melody and rhythm subtests. We have in earlier chapters, examined conflicting evidence from previous researches on the various aspects of musical ability in boys and girls.

One possible explanation is that the conflict of evidence in this present study is due to the unrepresentative nature of one of the large samples. This is rejected by the writer because, in all other respects, the samples for this age range seem quite representative. There is no reason to expect that where more than forty classes of children have been tested, each containing approximately equal numbers of boys and girls, there should result so grossly biased a sample. Although different classes were involved in the two tests, in many cases these came from the same schools. Great care was also taken to select a cross section of children representative of the normal range of school sizes, of rural/urban communities, and of socio-economic backgrounds.

So we turn to a second possible explanation of this conflict of evidence; this consists in looking at the differences in the musical tasks set by these two tests. In the Music Responsiveness Test, the melodic, rhythmic and harmonic aspects of musical ability are separated out into three subtests to enable sensory analysis of one aspect of musical ability at a time. For the Music Discrimination Test, the testee is called upon to make a series of complex decisions for each item presented.

Now, although the form of the Music Discrimination Test makes it suitable for administering to children at as young an age as 7, and indeed a proportion of the youngest age group tested obtained very good scores, yet the inescapable fact remains that it was a different, more complicated type of operation that was being demanded from the children. So these were two different types of musical task, even though each was in a musical setting, and each was broadly discriminatory in nature.

It is an established fact of physical development that the average girl matures earlier than the average boy. Of course the same variations in maturation occur within each sex, so that in general boys with an early adolescence are those whose growth to maturity has been advanced at all ages before adolescence. Girls are, then, generally ahead of boys in physical maturity, and it would appear that this sex difference is genetically controlled. This prompts the question, therefore, as to whether this inherited sex difference might not exist in other more specific responses also.

To what extent does intellectual and emotional advancement relate to developmental rather than chronological age? It has been common practice for several decades for local education authorities, when determining transfer to the secondary stage of education at the age of 11, to draw up separate selection lists for boys and girls. Is there any equivalent difference between the sexes in the field of musical development?

Findings from the Music Discrimination Test suggest that the answer is 'no'. Findings from the Music Responsiveness

Test indicate 'yes'. Perhaps boys fare better in the decision-making role when the situation is a complex one, though on the whole girls' sensory development appears to be ahead of that of boys. Certainly the decisive difference between their musical preferences indicates something more than chance differences in taste, and this seems to point to a genetically-based explanation.

Verbal Reasoning and Musical Development

We have evidence from earlier researches that correlation between various musical aptitude test scores and intelligence, though certainly not high, could not be classed as negligible. Earlier in this study Wing and Kwalwasser were quoted as giving 0.3 as the correlation normally to be expected. Bentley, also quoted earlier, considers 0.4 to be a reasonably representative figure.

Findings from this study give a range of correlations from 0.4 to 0.6, the latter figure cropping up only with the younger age groups. Coefficients range most consistently from 0.42 to 0.47 for the Music Responsiveness and Music Discrimination Tests. These figures are derived in most cases from comparison with the Moray House Verbal Reasoning Tests.

Two reasons for this rather higher set of correlations are advanced:

(a) The tests are in a very full musical setting, and here we may expect a closer association with other situations calling for analysis in a more meaningful, less artificial situation, eg with the kind of problems which form part of verbal reasoning tests.

(b) The children forming this sample are younger than those from whom former researchers have obtained data; it is probable that there is a closer association of all cognitive types of behaviour at the age of seven than there is at the age of thirteen, in view of the fact that ranges of experience and interest are much narrower at the former age.

Turning to the findings for the Music Preference Test, we note that where the preference scores for the various stylistic periods were correlated with verbal reasoning test quotients very few significant associations were found. The one outstanding exception to the series of very low correlation coefficients cropped up when examining the degree of association between preference scores for the Haydn/Mozart period with verbal reasoning. Here the relevant figure was 0.68. This unusual and striking phenomenon seems worth following up and investigating much more fully in some future research.

On the whole, findings from this section concerned with intelligence seem to fall into line with those of previous research workers. The writer prefers the term 'verbal reasoning' as defining more accurately the limits of the particular complex ability with which comparison is being made.

Special Musical Experience

A substantial part of this study has been devoted to testing hypotheses related to two categories of special musical experience which are available to a proportion of children in the 7 - 11 age range - ie choral and instrumental experience. These have been defined carefully to exclude certain musical activities common to the great majority of children in the sample. For example, all children in the 7 - 11 range have the benefit of singing in their school classes, or in larger groups as part of morning assembly and prayers, and during regular music lessons.

Similarly, where there was a stock of tuned or untuned percussion instruments in a school, it was the writer's experience that:

(a) These percussion instruments were available to nearly all children at some stage in their progress through the school.

(b) Because of this sharing round, regular instrumental tuition on a systematic basis was the exception rather than the rule.

(c) Such experience rarely led to a mastery of staff notation and the development of specific instrumental techniques.

There is no intention to disparage, nor indeed to play down in any way the usefulness of these percussion instruments; in fact the emergence of Orff and other tuned percussion instruments in schools in recent years, albeit in small numbers and shared round many children, or even passed round several classes because of expense, has nevertheless helped considerably in the surge forward in standards of music making in many schools. This has been particularly noticeable in the creative approach to music making, as opposed to the mechanical, over-directed methods which have held sway for so long. Even so, the use of percussion, even its creative use, does not necessarily mean that children are developing real mastery of instrumental skills, in spite of the other benefits conferred by its introduction.

Therefore, our definition of choral experience for the purposes of this study has been defined as that gained by selected groups over and above the normal run of singing lessons in school. Two kinds of special choral experience have been detailed:

(a) Some children are selected at the age of 9 or 10 to receive special tuition to a higher standard of excellence in order that certain functions in the life of the school may benefit from a trained body of good voices.

(b) A minority of children give voluntarily of their own out-of-school time on weekday evenings and Sundays to serve as members of church choirs, and particularly Anglican choirs where, so often, even in small parish churches, boys' voices are preferred to those of girls.

Turning to our second category, that of instrumental experience, it has been surprising to note how many children have been receiving regular instrumental tuition, either at home or at school in recent years. Quite a sizeable proportion of children in the 7 - 11 age range tested were receiving piano lessons, and, to a smaller extent, there were other children receiving tuition on orchestral instruments. In addition to the more traditional instruments - violin, clarinet, trumpet - there were several children receiving guitar lessons on a regular basis, designed to lead to a limited mastery of staff notation, as well as exercising instrumental techniques. These factors caused the writer to include this small group of children in his instrumental category.

Finally, there was the largest group of instrumentalists coming within the definition laid down for this study - recorder players. These children were also receiving instrumental tuition, usually in school, and almost always in groups. These might vary in size from two or three to as many as 50 in exceptional circumstances. Lessons were on a regular basis, and led to the development of instrumental techniques, the mastery of staff notation reading, and the development of ensemble playing habits where problems of tempo, rhythm and intonation had to be faced and overcome.

Between one third and one half of the total sample of children tested, aged between 7 and 11, came into this large category of instrumentalists. Even where another instrument was being learned, eg piano, in many cases recorder techniques were being developed as well; this learning of a plurality of instruments often complicated the business of analysis into instrumental classes.

Another feature of recorder tuition in schools was that the larger sizes, treble, tenor and bass, were also quite practicable for the young children in our sample, and this led, in most schools, to the early introduction of playing in parts, with the subsequent enhancement of harmonic concepts. No matter how crude technique and intonation were in the early stages, the groups showed obvious enjoyment at the experience of playing together and, where tuition was good, very little lapsing and giving up playing ensued.

This high level of motivation, commonly observed by the writer, seemed to be due predominantly to three factors:

(a) Making music in groups was attractive to the children as a social enterprise.

(b) The technique of the recorder appeared to be relatively simple, making children's progress encouragingly rapid and certain.

(c) There were numerous opportunities for the display of group achievements; these included both short term goals such as playing during morning assembly in school, or in adding to the effectiveness of class music lessons; they also included longer term targets such as the preparation for school concerts, 'Open Days' and special services and festivals.

(d) The success of part-playing recorder groups in schools could perhaps be attributed in some measure to the fact that the age at which so many children experience this strong development in harmonic awareness (around 9) often coincides with their introduction to the larger sizes of recorder.

The Basis of Selection

In general the bases for selecting pupils for these two categories of special choral and instrumental experience were quite different. Membership of special choirs was achieved usually as a result of one of a variety of auditioning methods, with quality of singing voice as the main criterion. This was normal and traditional, and such selection in nearly all cases occurred either at the age of nine, or else more usually at the age of ten, at the beginning of their final Primary School year. In the sample of 3000 children tested, something of the order of one third to one half of the children in the 9 - 11 age range were benefiting from this special choral experience.

Where recorder groups were in process of formation, it seemed to the writer, as a result of close enquiries, that there was no corresponding rational basis of selection. Naturally, there was some degree of overlap in the 9 - 11 age group where a proportion of choir members was also included in the instrumentalist category. In the case of the younger children - those in the 7 - 9 age range where membership of a special choir was rare - teachers in many schools took the opportunity of introducing the recorder to those children showing interest, particularly following the move from the Infant stage (age groups 5 - 7) to the Junior stage (7 - 11).

The writer came across several instances of voluntary groups, containing children as young as 6 years of age. In nearly every case of this kind which was investigated, there was continuity of instruction into the Junior years. It seemed worthwhile probing a little further into this question of beginning instrumental tuition, and the possibility of some basis of selection perhaps not immediately obvious on first sight. In nearly all cases the sequence seemed to be:

(a) An interested teacher announced to her young charges that she proposed to start recorder lessons.

(b) A proportion of the children responded by persuading their parents to buy an instrument - the proportion so responding depending partly on the personality of the teacher and partly on the tradition and atmosphere of the school.

(c) Lessons were started, usually on a voluntary basis, often in the midday break, or perhaps after school hours. It was less usual to use school hours for this activity.

Variants on (b) included borrowing the recorder of an elder brother or sister or one belonging to the school. In a minority of cases only, regular lessons were regarded as part of the normal timetable. In a larger number of cases there was a specialist teacher to whom the children with recorders went for group tuition at certain specified times during the working week when timetable switches could accommodate such interchanges. Equally common was the phenomenon of the hard working, dedicated teacher who undertook this voluntary work in her own leisure time, either with children from her own class or with a group coming to her from several classes.

From this evidence, the writer concluded that there seemed to be no conscious basis for selection, on grounds of either musical or general intellectual promise. Many of the children starting lessons had elder brothers or sisters who were actively engaged in recorder groups. The whole process seemed to depend on the continuing enthusiasm of the teachers responsible, and on the opportunities provided in the life of the school. Discontinuity and disappointment arose chiefly from teachers leaving the school - an occurrence of increasing frequency in recent years.

The special choral category did significantly better than the non-choral in the melody subtest of the Music Responsiveness Test, but not significantly better in either the rhythm or harmony subtests. The chorally experienced category also tended to do somewhat better in the Music Discrimination Test; this proved particularly the case when comparing the scores of the 9 - 10 year group - the age when early selection for school choirs took place.

When comparison was made between the instrumentalist and non-player categories at all age levels within the 7 - 11 sample, the scores of the former were significantly superior not only in all subtests of the Music Responsiveness Test, but also in the Music Discrimination Test. This superiority was much more pronounced than the corresponding superiority of the choir category over non-choristers.

Turning to the findings from the Music Preference Test, it is possible once more to compare directly the difference in the musical preferences of the various 'musical experience' categories. In four of the stylistic periods, differences in preferences between the instrumentalist/non-player categories were highly significant. In only one instance was this so when comparing the preferences of the choir/non-choir categories, and this occurred for period 1 (Monteverdi/Byrd) where there had been no significant difference in preferences in the case of the instrumentalist/non-player analysis.

Since the basis of selection for the two musically-experienced categories was so different, it is not surprising that such contrasts in musical preferences should be observed. Could self-selection, due not merely to interest but also to superior musical ability, have been a determining factor in deciding a child to opt for learning a musical instrument when the opportunity presented itself, even though no teacher-audition mechanism was in operation? Did children choose to start learning the recorder, or to forego such opportunities, purely on grounds of interest or lack of interest? Was there perhaps also an element of opportunism, where the child seized the chance that presented itself because, consciously or unconsciously, his superior musical ability impelled him towards the attractions of mastering instrumental techniques and, hence, of indulging his propensity towards greater participation in music making?

Without doubt, one stimulus which motivates many children to begin recorder lessons is envy of the instrumental prowess of some of their peers. This reason would seem to have little to do with possible innate factors making for superior musical potential. This is an important discussion point as the clear-cut superiorities of instrumentalists' test scores might reasonably be allocated to one of the following causes:

(a) It might be entirely due to benefits conferred by instrumental experience.

(b) It might arise from the greater musical ability that was present before instrumental tuition was undertaken, and which was merely confirmed in their test score superiorities.

(c) It could be a result of a combination of the two reasons mentioned above.

However, to what degree we can attribute superiority either to genetic or early environmental determinants, or to the direct beneficial influence of the instrumental experience itself, cannot be determined conclusively in a cross-sectional type of study such as this. It would be necessary to carry out a longitudinal study which would start by pre-testing, and then go on to forming matched groups. Then would follow some kind of experimental treatment for one group, which would deprive the corresponding control group of the benefit, in this case, of group instrumental tuition. After a specified period of time, re-testing would make possible a statement detailing the effects of such experimental treatment. Such a longitudinal approach has not been attempted here, and perhaps some future researcher will seek an answer to this problem.

Nevertheless the important differences in the findings from the choral and instrumental categories analyses cannot be ignored. These two categories were not by any means the same sample population, though there was a degree of overlap in the 9 - 11 age range. Evidence suggests (eg.pp 166 172) that the differences in scores are related first to the differential selection methods by which the two categories came into being, and secondly to the differential effects of the particular musical experiences to which they had been subjected.

Cultural Bases of Musical Taste

The writer was able, as a follow-up to work done with the small samples outside the 7 - 11 range, to administer the Music Preference Test to over 100 musicians from several European countries who were assembled for a vacation course. Many of these were students at academies and colleges of music, and the others were excellent amateur musicians. Apart from their other instrumental studies all had a common interest, as teachers and intending teachers, in the recorder.

There was a minority of teenagers on the course, mostly English, which meant that the English sample had a lower average age than the other nationalities represented. Of the latter, the most substantial groups were French, Dutch and Italian. It seemed an interesting exercise to check on how national cultural influences affected musical preferences. Figure 37 shows a comparison of the preferences of the four nationalities.

Note the strong preference of all groups for the Bach/Handel idiom, and also the quite decided preference for the music of Byrd and Dowland. Against this may be contrasted the relative rejection of the excerpts from the Haydn/Mozart era, and the definite rejection of the Brahms/Tchaikovsky idiom. Finally, it is noteworthy how much greater is the preference of these groups (excepting the Italians) for contemporary styles when their scores are compared with the small adult sample incorporated into the normal testing programme.

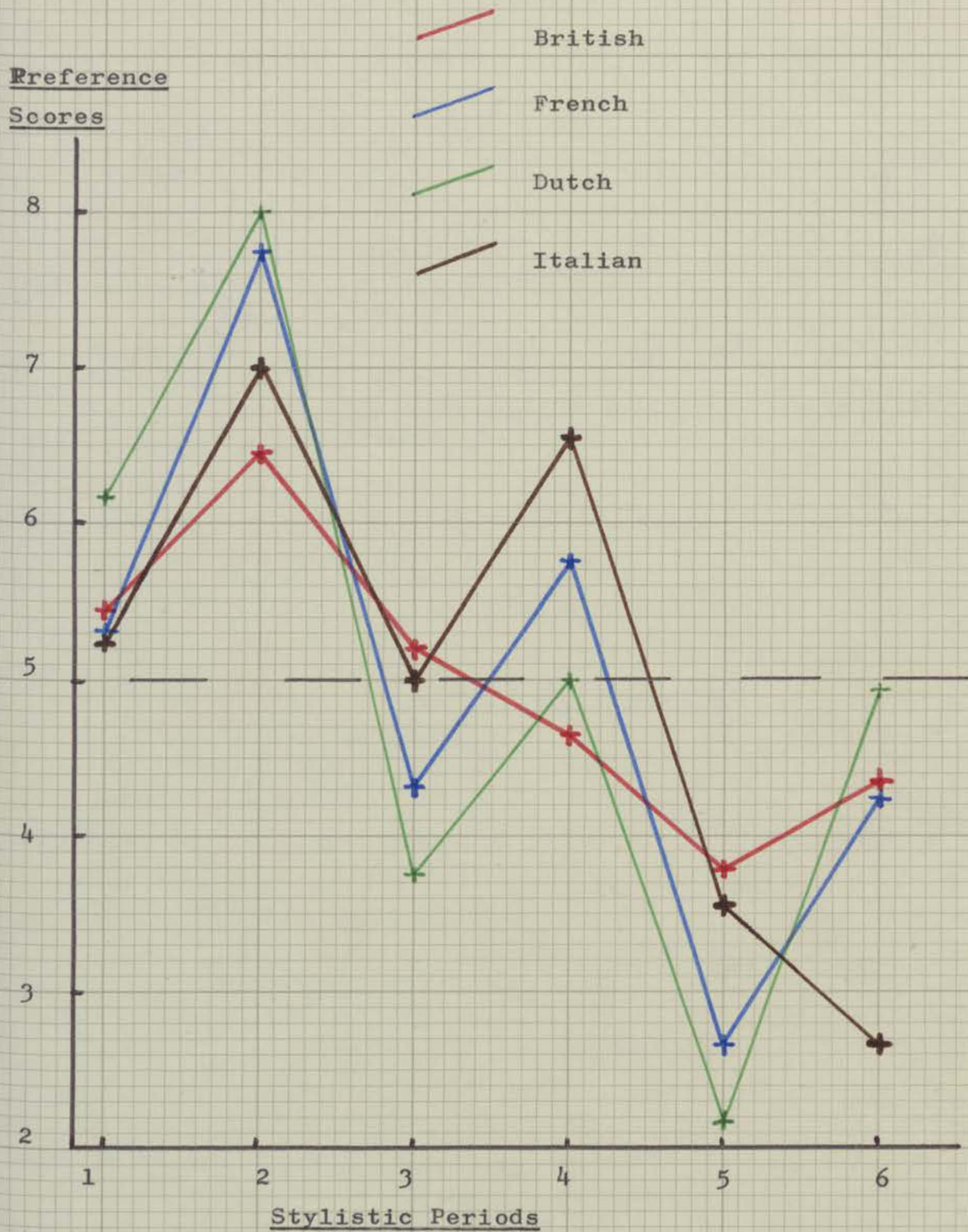
Although these samples were not large - 9 Italians, a dozen or so Dutch and bigger numbers of French and English - there is sufficient evidence for three discussion points:

(a) There are intriguing contrasts of preferences between the various nationalities, eg Dutch/Italian for period 6, Italian/English for period 4 and Dutch/English for periods 3 and 5, giving some indication of differing national cultural pressures.

(b) The fact that original recorder music is either pre-1750 or post- 1940 may have influenced their preferences, if experience and familiarity is any guide. There appears a stronger liking for Baroque and pre-Baroque, as well as for contemporary idiom than was evident in the more representative samples of adult taste. The very decided preference of the Dutch contingent for the earliest stylistic period may have some connection with the fact that nearly all this group were particularly interested in, and exponents of old instruments, eg cornett and crumhorn.

(c) The stronger preferences and rejections of these trained musicians can be seen by comparing the vertical scale of figure 37 with corresponding graphs in chapter eight.

COMPARISON OF FOUR NATIONALITIES



CHAPTER 10.

CONCLUSIONS

The writer's interest in this study arose from using and witnessing the use of a variety of relatively new media which have revolutionised the role played by music in all our lives. Such resources, not available to our grand-parents, range from radio and television through the whole paraphernalia of electronic equipment, down to the musical instruments and music provided by an affluent society; this miscellany has created new social and individual opportunities in the home, the school and at all manner of social gatherings, and it has radically changed the tenor of all our lives. The educational tools are at hand - to what kind of operations shall we commit them?

We need to know much more about children's musical ability and their musical tastes before we can give clear, unequivocal answers to the question just posed. Yet the resources are there to be used, and the situation is so completely different from what it was even thirty years ago. The introductory chapter surveyed the kind of musical experiences young children received in schools during the past hundred years or so. It also made reference to some recent attempts to harness modern resources to the learning process. This evaluation of the present situation concluded by pointing to the inadequate knowledge and research upon which many quite interesting new ideas, at present being tried out in schools, were based. In so many cases resources have been wrongly used, and so often reaction and rejection have resulted from this insufficient knowledge, preparation and research.

Age

Music Responsiveness Test:

1. There was a significant increase in melody subtest mean scores between each year group tested at the one year interval from the 7 - 8 year group through to the 10 - 11 year group.

2. At the one year interval there was a significant increase in rhythm subtest mean scores between the 7 - 8 year group and the 9 - 10 year group, but not between the 9 - 10 and 10 - 11 year groups. However, at the two year interval there was a significant increase in mean rhythm scores for both cases within the 7 - 11 age sample.

3. Harmony subtest mean scores showed a significant increase at the one year interval through the 8 - 11 age range, but not between the 7 - 8 and 8 - 9 year groups. But at the two year interval there were highly significant increases in mean scores.

Music Discrimination Test:

4. Highly significant increases in test mean scores were reported between the 7 - 8 and 9 - 10 year groups at the one year interval and for the whole 7 - 11 sample at the two year interval. However the increase in mean scores between the 9 - 10 and 10 - 11 year groups was less significant.

5. When continuing comparisons above the main 7 - 11 sample, the same significant increases in test mean scores were observed between the 10 - 11 and 11 - 13 age groups and between the 11 - 13 and 19 - 21 age groups.

Music Preference Test:

6. Very few significant changes in musical preferences occur at the one year interval within the 7 - 11 age range of the sample tested. Stylistic periods 1 and 6 (Byrd/ Monteverdi and Stravinsky/Hindemith) show a gradual decline

in popularity but never at a significant level.

7. At the two year and at the three year interval, the increase in popularity of stylistic period 2 (Bach/Handel) was at a significant and highly significant level respectively.

8. Beyond the 7 - 11 age range certain trends persisted. The continuing downward trend of preference scores for period 6 to adulthood should be noted, as also the correspondingly consistent upward trend for period 2. Changes in popularity of periods 4 and 5 are less consistent.

9. From the 11 - 14 age group to the adult group, four of the six stylistic periods showed changes in popularity at a significant level.

10. The overall picture of changes in musical preferences through the age groups in the sample is one of a broad trend towards adult tastes. Certain apparent inconsistencies may relate to stages in the development of certain aspects of musical ability, eg melody, rhythm and harmony.

Boys and Girls

Music Responsiveness Test:

1. For a sample of approximately equal numbers of boys and girls - nearly 800 children aged 7 - 11 – the scores of girls were clearly superior at a significant level for all three aspects of musical ability tested, viz melody, rhythm and harmony.

2. When the mean scores of boys and girls from each year group in the 7 - 11 age range were compared, although the girls' scores were superior, it was only in the 9 - 10 year group that this superiority was at a significant level. Year groups for this calculation ranged in size from 54 to 71.

Music Discrimination Test:

3. When comparing the test mean scores of boys and girls

in a sample of over 1000 children aged 7 - 11, no significant differences were revealed.

4. Comparison of boys' and girls' scores for each year group in turn from the 7 - 11 age range again revealed no significant differences. Boys' mean scores showed a very slight superiority in each of the year groups from 7 - 10 and girls' scores were slightly better in the 10 - 11 year group, but differences were very small.

Music Preference Test:

5. For stylistic period 1 boys' and girls' preference scores were similar and agreed closely with those of the small adult sample.

6. In the case of stylistic period 4 there was once again close agreement between boys and girls, but their mean scores differed widely from the adult sample mean score which was much higher.

7. Stylistic periods 2 and 3 were significantly more popular with the girls, and stylistic period 5 was significantly more popular with the boys.

8. Relative to the other periods, girls rejected period 6 more strongly than boys, but not significantly so.

9. At all year levels within the 7 - 11 sample girls rated period 2 significantly higher, and boys rated period 5 significantly higher.

10. Periods 1 and 4 revealed no significant differences between preferences of boys and girls at any year level.

11. In the first three year groups, girls registered significantly stronger preferences for period 3.

12. For period 6, boys' preferences were significantly greater at the 10 - 11 year level.

Association with Verbal Reasoning Ability

Music Responsiveness Test:

1. From a sample of seventy 10 - 11 year old children,

where confidential Moray House Verbal reasoning quotients were made available to the writer, the following product-moment correlations were obtained - V.R./Melody r = 0.40 V.R./Rhythm r = 0.37 V.R./Harmony r = 0.58. All these coefficients were significant.

2. Five schools supplied the two-fold modern/grammar 'secondary selection' classification. In ten out of twenty chi-squared calculations no significant differences were found between the two categories.

Music Discrimination Test:

3. Correlation between Burt Revised Reading Age quotients and test scores for 29 children aged 7 - 8 gave r = 0.61

4. Correlation between Maddox Verbal Reasoning Test quotients and test scores for 22 children aged 9 - 10 gave r = 0.46.

5. Correlation between Moray House Verbal Reasoning Test quotients and test scores for 95 children aged 10 - 11 gave r = 0.47.

6. A Moray House/test score correlation with 33 children aged 9 - 10 gave r = 0.42

Music Preference Test:

7. Moray House Verbal Reasoning Test quotients for a group of 60 children aged 10 - 11 from 2 schools were correlated with their preference scores for each of the six stylistic periods. Negligible or very low coefficients were found except for period 3 for which r = 0.687.

8. Re-calculations using only one of the schools gave substantially the same results. For period 3 the coefficient was 0.51 this time.

<u>Instrumental Experience</u>

Music Responsiveness Test:

1. In 14 out of 20 classes, children with instrumental experience showed significant superiority of melody subtest

mean scores over non-players.

2. Only in 5 out of the 20 classes did children with instrumental experience score significantly better than non-players in the rhythm subtest.

3. In 17 out of the 20 classes, harmony subtest mean scores of instrumentalists were significantly superior.

4. Children with instrumental experience had battery mean scores which were significantly superior to those of non-players in 19 out of the 20 classes.

Music Discrimination Test:

5. Comparison of test scores for the instrumentalist/non-player categories for the sample of over 1000 children aged 7 - 11 revealed a highly significant superiority for instrumentalists.

6. The superiority of recorder players' scores over those of non-players increases through the age groups in the 7 - 11 sample. The superiority of mean scores is highly significant for the 9 - 11 age range, significant at the 8 - 9 year level and almost significant even in the first months of playing, at the beginning of the 7 - 8 group's school year, when these young instrumentalists had only just started their recorder lessons.

7. Test scores of those children learning to play treble, tenor and bass recorders were significantly higher than those of children receiving lessons only on the smaller descant size.

8. In the 9 - 11 age group test scores of pianists are higher than those of other categories of instrumentalists, but this is not so for those in the 7 - 9 age group.

9. The small sample of guitar and brass-wind players tended to do less well than the other categories of instrumentalists already listed. String players fared better, but not so well as pianists.

Music Preference Test:

10. Divergence of taste for the instrumentalist/non-player categories was widest for stylistic period 2. For every year group in the 7 - 11 sample this difference was highly significant, with instrumentalists showing strongest preference.

11. The same applied in lesser degree to period 3, where instrumentalists in all except one of the year groups in the sample found this musical idiom more attractive, at a significant level, than those who did not play.

12. The reverse was true of period 5 where non-players showed a stronger preference, and in three out of the four year groups this was at a significant level.

13. For the 9 - 10 and 10 - 11 year groups, and for the 7 - 11 sample as a whole, the difference in popularity of period 6 was at a significant level, with instrumentalists scoring lower in all year groups.

14. Little difference in popularity for periods 1 and 4 was found between these two categories.

15. The instrumentalist category expressed much stronger preferences and rejections than did the category of non-players.

<u>Special Choral Experience</u>

Music Responsiveness Test:

1. For three groups of 10 - 11 year old children from separate schools (total 161) no significant differences in mean scores for either rhythm or harmony subtests were found between the choral and non-choral categories.

2. In two of the three groups, the superiority of the melody subtest scores of the special choral category was at a significant level, but for the third group no significant difference was found.

Music Discrimination Test:

3. The test scores of children in the 9 - 10 age range with special choral experience were significantly superior to the non-choral category.

4. For the corresponding categories in the 10 - 11 year group, superiority of test scores was not quite at a significant level.

Music Preference Test:

5. In the 9 - 10 year sample there were no significant differences in preferences between the choral and non-choral categories for any of the six stylistic periods.

6. In the 10 - 11 year sample, choir members expressed a significantly stronger preference for the musical idiom of period 2, and non-members showed a significantly stronger preference for periods 1 and 6.

7. For the same 10 - 11 year group, differences in musical preference were scarcely at a significant level for periods 3 and 5, and there was no significant difference in preference for period 4.

Test Intercorrelations

Music Responsiveness Test:

1. Correlations between the subtests for each year group in the 7 - 11 age sample ranged from r = 0.15 for melody/rhythm to r = 0.62 for melody/harmony. Higher coefficients were consistently found between melody and harmony subtest scores than between scores for these two subtests and that of rhythm. These averaged out at r = 0.25 for melody/rhythm, 0.5 for melody/harmony and 0.25 for rhythm/harmony.

2. The rhythm subtest score constituted the highest weighting in the battery score for 7 - 8 year olds; for the 10 - 11 year group the harmony score constituted the greatest weighting in their total score.

Responsiveness/Discrimination correlation:

3. 48 children who in the 7 - 8 year group had taken the Music Responsiveness Test were included in the sample of 9 - 10 year olds who took the Music Discrimination Test. A moderately low coefficient ($r = 0.45$) resulted from correlation of the total scores. This was not unexpected in view of the two year interval and the rather different type of musical task.

Major Conclusions of Thesis

1. Melodic, rhythmic and harmonic aspects of musical ability develop with age.
2. Girls achieve better scores than boys where analysis is simplified by separating out the selected aspects of musical ability into subtests.
3. Boys score at least as well as girls where the musical task is complex.
4. There is strong harmonic development around the age of 9.
5. Correlation between musical ability and verbal reasoning is only moderate.
6. Early instrumental experience has a distinctly beneficial effect on the development of musical ability; the beneficial influence of choral experience is less marked.
7. Trends towards adult norms of musical taste begin to take shape early in childhood.
8. There are striking differences in the musical preferences of boys and girls.
9. Children with instrumental experience show stronger musical preferences than non-players.
10. Musical taste is subject to cultural and environmental pressures, within the limits of inherited sensory equipment.

Potential Uses of Tests

Much care and thought, reading and experimentation went into the planning of this original series of tests. Although designed specifically for the purposes of the present research, the writer feels that, properly standardised, all three tests could be used effectively in a variety of ways for educational purposes. They were constructed with the 7 - 11 age range in mind, but much testing was done also with age groups outside this range.

Music Responsiveness Test

Subtest mean scores for the 7 - 11 age range show how suitable the test proved for this particular sample of children. However, by the age of 11 it is noticeable that, for the harmony subtest, many children are tending to achieve scores approaching the maximum, and the curve of distribution of scores begins to assume a slightly negative skew. This is less true of the melody and rhythm subtests.

It appears probable, though, that this test would be suitable also both for the 6 - 7 year group and 11 - 13 age range. The smaller samples fringing the main age groups give some evidence of this.

Although the mean scores of the 6 - 7 group for the rhythm and harmony subtests were not substantially greater than the guessing score, 5/15, individual scores, particularly the higher ones, give teachers extra information about the ability of their children. The group test situation was taken by these young children in their stride. This seems quite an appropriate test for very young children if a break is made after the second subtest. In the testing done with the younger groups the pause control needed to be used in the early stages of each subtest. This test could be valuable to obtain more information about the musical development of these young children. It would be useful to have information of this kind if some sort of instrumental work, such as recorder playing, was to be started.

Looking at the 11 - 13 age group, again information regarding the range of musical development in certain specified classes could be very useful when considering how continuity of instrumental experience through the 'Middle School' years has influenced the course of musical development. It is possible that the skewing effect on score distribution would become more pronounced as mean scores approached more closely to the maximum.

The writer can see little future for the use of this test with older students and adults. There would be insufficient spread of scores, and the task for the testee would become too easy.

Music Discrimination Test

Figure 13 at the beginning of chapter six indicates how suitable this test has proved for the 7 - 11 age range. There is a regular distribution of scores on either side of the mean score which is placed centrally on the 0-60 continuum. It would appear that much useful information about children's ability to discriminate musically could be obtained from using this test with classes within this 7 - 11 age range, particularly where instrumental work is being considered or evaluated.

As was the case with the Responsiveness Test, small samples on either side of the main sample age range were tested. It might be useful to examine data from this extension of the test sample age range to see whether the Discrimination Test could be employed with these younger and older children.

A group of 31 children aged 6 - 7 obtained a mean score of 17/60 with a scatter of scores from 6 - 35. In view of the fact that these children enjoyed the test procedure, and appeared to find the scoring system employed not too difficult for their understanding, it would seem a very appropriate test to use with this age group if information were needed on this aspect of children's musical development. Knowledge about children's ability to cope in a complex musical situation might be useful if some form of instrumental work were to be undertaken.

For pupils aged 11 - 14 there also appears to be a possible useful future for this test. The scatter of scores for the 11 - 12 year group tested was 20 - 48/60, and for the 12 - 13 group 21-52. As no scores approached maximum, it would seem that the test has possible application when evaluating or planning music programmes in this 11 - 14 age range.

However, when this test was administered to boys in a large cathedral choir school as part of the process of validation, no less than six boys out of the thirtyseven tested obtained the maximum of 60, and another seven boys were within five marks of this target. Perhaps then it might be less discriminatory as a test with very musically able pupils in the 11 - 14 age range.

One further extension of the use of this test has been envisaged. Often, in colleges of education it would be useful to know more about students' ability to help with parts of the music curriculum during their teaching experiences in schools. Is it really fair to expect all student-teachers to undertake work for which they may not be equipped (in the musical sense)? Surely it is an essential part of the lecturing staff's duty to know as much as possible about the strengths and weaknesses of entrants to the teaching profession. Then effective advice will be more likely to be forthcoming as to their best contribution to the life of the schools.

The range of scores obtained from testing a group of 27 second year students was 26 - 54 which would indicate that the test has possibilities for adults where this type of guidance may be needed.

Music Preference Test

Unlike the two previous tests in the series, this one is of no direct use in estimating aspects of musical ability. It is, rather, designed for answering such questions as 'Who is the most popular composer for this age group?' or 'Which musical style does this class enjoy the most?' Perhaps even to these questions, the answers are limited by the restricted range offered by the test.

Yet it has been immensely useful to the writer in the extension of his research to the aesthetic side of children's musical development. Results have emphasised how much music programmes usually underestimate children's ability to appreciate musically. At any age level, the test results offer a guide to how to achieve the best balance of listening experiences. It is quite possible for a class of children to be 'starved' of the variety of listening experiences which they need. The test supplies information to the musical educator.

Balance in Music Curricula

Whilst the writer is fully in agreement with stimulating and extending the creative approach to children's music making, he has evidence, based on children coming to his home during the past five years, as members of experimental music groups, that children are also very concerned for mastery of instrumental techniques, achievement of musical literacy and opportunities to demonstrate their prowess. All of these mean paying attention to high standards of interpretation of existing music, and this constitutes another aspect of creativeness.

In the writer's view, much future progress in music education will depend upon flexible use of groups rather than on rigid 'streaming' into classes, whatever the basis of selection. Musical ability is a complex part of that immensely complex thing we call personality, and development depends in large part on the educative influences provided to which we give the term 'environment'. Our function, as music educators, is to plan an environment for all children, not merely the most musically able.

This aim represents a challenge which needs to be faced boldly and imaginatively.

Finally, a quotation from Sir Thomas Elyot, written over four centuries ago:

'Academic study should be mixte with pleasant lernynge by playing upon instruments of musicke.'

Sir Thomas Elyot 'The Book named the Governor' 1531

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APPENDIX A

SELECTION OF DATA FROM THE THREE TESTS

A Music Responsiveness Test
1. Melody Subtest
2. Rhythm Subtest
3. Harmony Subtest

B Music Discrimination Test

C Music Preference Test

Figures for each year group from 7 - 8, 8 - 9, 9 - 10, and 10 - 11 are shown separately.

These figures are listed under four headings: boys, girls, instrumentalists and non-instrumentalists.

These are the four categories which form the basis for most of the statistical analysis, eg tests of significance such as the t-test.

MUSIC RESPONSIVENESS TEST — DISTRIBUTION OF SCORES

MELODY SUBTEST

	7 - 8 Year Group				8 - 9 Year Group			
	boys	girls	inst.	non. inst.	boys	girls	inst.	non. inst.
15	0	0	0	0	0	0	0	0
14	0	0	0	0	1	0	1	0
13	0	1	1	0	0	0	0	0
12	1	2	3	0	4	4	5	3
11	4	2	5	1	3	9	10	2
10	6	9	13	2	11	13	19	5
9	6	13	15	4	14	16	19	11
8	6	10	12	4	9	18	21	6
7	14	20	21	13	8	9	12	5
6	18	15	19	14	13	12	8	17
5	7	11	6	12	8	12	8	12
4	15	10	12	13	7	7	2	12
3	6	9	7	8	5	6	3	8
2	0	2	2	0	4	0	0	4
1	2	1	1	2	0	1	0	1
0	2	1	1	2	0	0	0	0
	87	106	118	75	87	107	108	86

	9 - 10 Year Group				10 - 11 Year Group			
15	0	0	0	0	0	0	0	0
14	2	1	2	1	1	1	0	2
13	0	6	6	0	1	8	5	4
12	3	10	11	2	4	10	7	7
11	9	10	16	3	12	24	19	17
10	9	13	11	11	14	14	9	19
9	21	19	24	16	19	11	4	26
8	12	11	9	14	16	11	5	22
7	13	10	9	14	14	7	5	16
6	11	2	3	10	12	4	4	12
5	8	4	7	5	5	8	4	9
4	7	2	2	7	1	1	0	2
3	2	4	2	4	1	0	0	1
2	3	1	1	3	1	0	0	1
1	0	0	0	0	0	1	0	1
0	0	0	0	0	0	0	0	0
	100	93	103	90	101	100	62	139

RHYTHM SUBTEST

	7 - 8 Year Group				8 - 9 Year Group			
	boys	girls	inst.	non. inst.	boys	girls	inst.	non. inst.
15	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
13	1	0	1	0	0	1	1	0
12	2	0	2	0	1	4	4	1
11	5	4	6	3	3	5	7	1
10	1	8	9	0	7	10	9	8
9	5	15	13	7	10	15	12	13
8	9	10	14	5	13	21	21	13
7	16	7	14	9	13	16	14	15
6	13	20	19	14	13	13	15	11
5	9	11	10	10	6	9	9	6
4	15	14	14	15	7	7	9	5
3	7	12	12	7	9	3	4	8
2	3	3	2	4	4	2	3	3
1	1	2	2	1	1	1	0	2
0	0	0	0	0	0	0	0	0
	87	106	118	75	87	107	108	86

	9 - 10 Year Group				10 - 11 Year Group			
15	0	1	1	0	0	0	0	0
14	0	2	1	1	0	2	1	1
13	1	1	1	1	1	4	3	2
12	3	3	3	3	3	6	5	4
11	9	6	9	6	6	6	1	11
10	6	5	6	5	8	19	10	17
9	12	19	21	10	20	17	12	25
8	14	14	20	8	14	17	12	19
7	17	21	23	15	15	9	7	17
6	11	12	8	15	10	3	2	11
5	12	2	3	11	7	7	4	10
4	7	5	3	9	6	5	4	7
3	4	2	2	4	4	3	1	6
2	2	0	1	1	6	1	0	7
1	1	0	0	1	1	1	0	2
0	1	0	1	0	0	0	0	0
	100	93	103	90	101	100	62	139

HARMONY SUBTEST

7 - 8 Year Group / 8 - 9 Year Group

	7-8 boys	7-8 girls	7-8 inst.	7-8 non. inst.	8-9 boys	8-9 girls	8-9 inst.	8-9 non. inst.
15	0	0	0	0	0	0	0	0
14	0	0	0	0	2	2	4	0
13	1	2	3	0	1	5	5	1
12	1	2	3	0	1	3	4	0
11	3	6	8	1	4	8	9	3
10	8	9	13	4	2	10	9	3
9	7	11	13	5	7	8	8	7
8	6	8	11	3	11	9	11	9
7	17	20	21	16	8	13	12	9
6	13	16	15	14	18	17	17	18
5	8	17	13	12	17	19	16	20
4	8	4	7	5	9	8	9	8
3	7	5	4	8	4	3	2	5
2	7	5	5	7	1	2	1	2
1	1	1	2	0	2	0	1	1
0	0	0	0	0	0	0	0	0
	87	106	118	75	87	107	108	86

9 - 10 Year Group / 10 - 11 Year Group

	9-10 boys	9-10 girls	9-10 inst.	9-10 non. inst.	10-11 boys	10-11 girls	10-11 inst.	10-11 non. inst.
15	2	4	3	3	0	6	5	1
14	1	9	9	1	3	7	7	3
13	8	12	15	5	11	13	6	18
12	7	3	7	3	15	21	15	21
11	11	13	14	10	12	12	9	15
10	9	12	14	7	9	9	5	13
9	10	10	12	8	10	5	4	11
8	10	9	6	13	9	6	4	11
7	5	9	10	4	14	7	2	19
6	16	4	4	16	9	4	3	10
5	7	5	2	10	3	4	1	6
4	7	1	3	5	2	3	1	4
3	6	1	2	5	4	2	0	6
2	0	1	1	0	0	1	0	1
1	0	0	0	0	0	0	0	0
0	1	0	1	0	0	0	0	0
	100	93	103	90	101	100	62	139

MUSIC DISCRIMINATION TEST — DISTRIBUTION OF SCORES

7 - 8 Year Group

	Boys	Girls	Inst.	Non.Inst.
57 - 60	0	0	0	0
53 - 56	0	0	0	0
49 - 52	0	0	0	0
45 - 48	0	1	1	0
41 - 44	5	5	7	3
37 - 40	11	3	10	4
33 - 36	5	7	8	4
29 - 32	21	20	21	20
25 - 28	25	27	29	23
21 - 24	26	25	25	26
17 - 20	21	24	28	17
13 - 16	15	9	13	11
9 - 12	2	1	1	2
5 - 8	1	2	1	2
1 - 4	0	0	0	0
n = 256	132	124	144	112

8 - 9 Year Group

	Boys	Girls	Inst.	Non.Inst.
57 - 60	0	0	0	0
53 - 56	1	0	0	1
49 - 52	0	0	0	0
45 - 48	1	1	1	1
41 - 44	2	4	5	1
37 - 40	10	18	13	15
33 - 36	15	18	15	18
29 - 32	24	26	14	36
25 - 28	22	24	17	29
21 - 24	21	37	20	38
17 - 20	8	20	13	15
13 - 16	3	7	2	8
9 - 12	3	3	1	5
5 - 8	2	0	0	2
1 - 4	0	1	0	1
n = 271	112	159	101	170

9 - 10 Year Group

	Boys	Girls	Inst.	Non.Inst.
60 - 57	0	0	0	0
56 - 53	0	0	0	0
52 - 49	3	0	2	1
48 - 45	5	1	5	1
44 - 41	14	16	16	14
40 - 37	16	15	13	18
36 - 33	22	27	21	28
32 - 29	28	17	22	23
28 - 25	23	19	19	23
24 - 21	16	16	9	23
20 - 17	13	6	6	13
16 - 13	0	4	1	3
12 - 9	0	0	0	0
8 - 5	0	0	0	0
4 - 1	0	0	0	0
n = 261	140	121	114	147

10 - 11 Year Group

	Boys	Girls	Inst.	Non.Inst.
60 - 57	0	1	1	0
56 - 53	0	0	0	0
52 - 49	6	2	3	5
48 - 45	5	9	9	5
44 - 41	9	13	13	9
40 - 37	19	25	23	21
36 - 33	25	32	22	35
32 - 29	27	23	17	33
28 - 25	17	21	12	26
24 - 21	10	6	5	11
20 - 17	10	11	6	15
16 - 13	1	2	0	3
12 - 9	1	0	0	1
8 - 5	0	0	0	0
4 - 1	0	1	0	1
n = 276	130	146	111	165

MUSIC PREFERENCE TEST — DISTRIBUTION OF SCORES

PERIOD 1

	7 - 8 Year Group				8 - 9 Year Group			
	Boys	Girls	Inst.	Non. Inst.	Boys	Girls	Inst.	Non. Inst.
10	0	0	0	0	0	0	0	0
9	1	2	2	1	1	1	0	2
8	1	2	2	1	5	5	6	4
7	7	11	10	8	7	17	8	16
6	11	15	14	12	21	23	20	24
5	18	17	17	18	23	28	21	30
4	16	13	14	15	18	18	16	20
3	6	9	10	5	9	12	14	7
2	4	3	5	2	5	11	9	7
1	1	1	1	1	1	2	1	2
0	0	0	0	0	0	1	0	1

	9 - 10 Year Group				10 - 11 Year Group			
	Boys	Girls	Inst.	Non. Inst.	Boys	Girls	Inst.	Non. Inst.
10	0	0	0	0	0	0	0	0
9	2	2	1	3	1	0	0	1
8	4	5	3	6	2	3	4	1
7	6	5	3	8	9	6	6	9
6	13	17	11	19	10	19	11	18
5	12	15	11	16	26	22	21	27
4	15	15	13	17	18	16	20	14
3	10	8	8	10	15	15	11	19
2	3	5	4	4	9	6	5	10
1	3	3	1	5	2	2	2	2
0	0	1	1	0	0	0	0	0

PERIOD 2

7 - 8 Year Group

	Boys	Girls	Inst.	Non-Inst.
10	0	0	0	0
9	0	7	5	2
8	1	5	6	0
7	12	13	18	7
6	11	17	14	14
5	12	16	16	12
4	15	11	11	15
3	11	4	4	11
2	2	0	1	1
1	1	0	0	1
0	0	0	0	0

8 - 9 Year Group

	Boys	Girls	Inst.	Non-Inst.
10	0	2	2	0
9	0	4	3	1
8	4	14	10	8
7	13	28	24	17
6	19	27	17	29
5	18	26	21	23
4	18	11	11	18
3	12	4	5	11
2	4	0	1	3
1	1	2	1	2
0	1	0	0	1

9 - 10 Year Group

	Boys	Girls	Inst.	Non-Inst.
10	0	0	0	0
9	1	4	4	1
8	3	10	5	8
7	13	15	14	14
6	10	14	8	16
5	15	17	14	18
4	13	11	9	15
3	6	4	2	8
2	6	1	0	7
1	1	0	0	1
0	0	0	0	0

10 - 11 Year Group

	Boys	Girls	Inst.	Non-Inst.
10	2	4	4	2
9	2	8	10	0
8	5	18	15	8
7	4	22	16	10
6	31	16	12	35
5	25	7	9	23
4	12	11	8	15
3	8	2	4	6
2	1	1	1	1
1	2	0	1	1
0	0	0	0	0

PERIOD 3

7 - 8 Year Group / 8 - 9 Year Group

	7-8 Boys	7-8 Girls	7-8 Inst.	7-8 Non-Inst.	8-9 Boys	8-9 Girls	8-9 Inst.	8-9 Non-Inst.
10	0	2	1	1	0	0	0	0
9	1	1	2	0	3	8	8	3
8	0	5	5	0	7	7	8	6
7	6	12	11	7	15	27	18	24
6	10	28	27	11	19	38	21	36
5	19	13	14	18	23	18	20	21
4	16	8	9	15	16	10	13	13
3	10	4	6	8	7	5	3	9
2	3	0	0	3	0	5	4	1
1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

9 - 10 Year Group / 10 - 11 Year Group

	9-10 Boys	9-10 Girls	9-10 Inst.	9-10 Non-Inst.	10-11 Boys	10-11 Girls	10-11 Inst.	10-11 Non-Inst
10	0	0	0	0	0	0	0	0
9	2	4	3	3	2	5	5	2
8	3	5	6	2	4	8	7	5
7	7	15	11	11	13	15	15	13
6	16	24	13	27	27	22	22	27
5	24	19	16	27	22	22	21	23
4	11	9	5	15	19	11	7	23
3	3	0	1	2	3	4	3	4
2	2	0	1	1	2	2	0	4
1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

PERIOD 4

7 - 8 Year Group	Boys	Girls	Inst.	Non-Inst.
10	0	0	0	0
9	0	1	0	1
8	8	3	6	5
7	10	9	13	6
6	7	10	9	8
5	14	16	14	16
4	14	19	17	16
3	9	10	11	8
2	2	3	4	1
1	1	2	1	2
0	0	0	0	0

8 - 9 Year Group	Boys	Girls	Inst.	Non-Inst.
10	0	0	0	0
9	0	1	1	0
8	3	7	4	6
7	6	7	7	6
6	19	24	20	23
5	27	36	32	31
4	23	24	16	31
3	8	15	12	11
2	4	2	3	3
1	0	2	0	2
0	0	0	0	0

9 - 10 Year Group	Boys	Girls	Inst.	Non-Inst.
10	0	0	0	0
9	0	1	1	0
8	2	2	1	3
7	9	10	7	12
6	16	11	10	17
5	11	16	16	11
4	10	18	11	17
3	12	13	9	16
2	5	5	1	9
1	3	0	0	3
0	0	0	0	0

10 - 11 Year Group	Boys	Girls	Inst.	Non-Inst.
10	0	0	0	0
9	0	0	0	0
8	3	2	2	3
7	11	10	8	13
6	16	22	19	19
5	23	12	12	23
4	24	22	26	20
3	9	13	8	14
2	4	6	3	7
1	1	2	2	1
0	1	0	0	1

MUSIC PREFERENCE TEST DISTRIBUTION OF SCORES

PERIOD 5

7 - 8 Year Group

	Boys	Girls	Inst.	Non-Inst.
10	1	0	0	1
9	3	1	2	2
8	9	0	3	6
7	13	5	4	14
6	13	11	13	11
5	13	15	16	12
4	10	18	19	9
3	2	11	7	6
2	1	8	7	2
1	0	2	2	0
0	0	2	2	0

8 - 9 Year Group

	Boys	Girls	Inst.	Non-Inst.
10	1	0	0	1
9	2	0	1	1
8	9	2	5	6
7	12	12	10	14
6	19	13	9	23
5	22	25	18	29
4	12	26	18	20
3	8	15	15	8
2	4	20	17	7
1	0	3	1	2
0	1	2	1	2

9 - 10 Year Group

	Boys	Girls	Inst.	Npn-Inst.
10	0	0	0	0
9	6	2	1	7
8	12	5	5	12
7	12	5	7	10
6	10	16	10	16
5	11	15	10	16
4	9	13	11	11
3	3	11	5	9
2	5	6	5	6
1	0	2	1	1
0	0	1	1	0

10 - 11 Year Group

	Boys	Girls	Inst.	Non-Inst.
10	0	0	0	0
9	2	3	4	1
8	10	2	1	11
7	22	6	5	23
6	17	12	11	18
5	16	29	24	21
4	13	10	9	14
3	7	14	13	8
2	5	11	12	4
1	0	2	1	1
0	0	0	0	0

MUSIC PREFERENCE TEST — DISTRIBUTION OF SCORES

PERIOD 6

	7 - 8 Year Group				8 - 9 Year Group			
	Boys	Girls	Inst.	Non-Inst.	Boys	Girls	Inst.	Non-Inst.
10	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
8	4	2	1	5	3	4	5	2
7	6	5	4	7	4	4	3	5
6	10	0	5	5	10	12	8	14
5	7	23	20	10	16	25	21	20
4	12	13	9	16	29	26	23	32
3	12	20	21	11	15	23	14	24
2	10	7	12	5	8	14	13	9
1	4	3	3	4	4	9	6	7
0	0	0	0	0	1	1	2	0

	9 - 10 Year Group				10 - 11 Year Group			
	Boys	Girls	Inst.	Non-Inst.	Boys	Girls	Inst.	Non-Inst.
10	0	1	0	1	0	0	0	0
9	2	0	1	1	1	0	1	0
8	2	3	2	3	2	0	0	2
7	9	3	3	9	11	5	5	11
6	6	4	2	8	9	9	5	13
5	6	14	4	16	15	10	9	16
4	10	11	10	11	24	19	16	27
3	16	22	18	20	10	21	19	12
2	10	9	8	11	11	16	14	13
1	6	7	5	8	7	7	9	5
0	1	2	3	0	2	2	2	2

APPENDIX B

INSTRUCTIONS FOR:

MUSIC RESPONSIVENESS TEST

MUSIC DISCRIMINATION TEST

MUSIC PREFERENCE TEST

Page 1 — TEST LEAFLET — Page 2

MUSIC RESPONSIVENESS TEST:5/65

(TAYLOR)

NAME ....

AGE .... BOY OR GIRL .

++++++++++++++++++++++++++++++

WHAT INSTRUMENT DO YOU PLAY?

....

TO WHICH CHOIR DO YOU BELONG?

....

SCORES		TESTS:
PART ONE :	------	Melody
PART TWO :	------	Rhythm
PART THREE :		Harmony

T O T A L :

MELODY TEST

EX:	1 2 3 4
EX:	1 2 3 4 5
1:	1 2 3
2:	1 2 3 4
3:	1 2 3 4 5
4:	1 2 3 4 5 6
5:	1 2 3 4 5 6 7
6:	1 2 3 4
7:	1 2 3 4 5
8:	1 2 3 4 5 6
9:	1 2 3 4 5 6 7
10:	1 2 3 4 5 6 7 8
11:	1 2 3 4 5
12:	1 2 3 4 5 6
13:	1 2 3 4 5 6 7
14:	1 2 3 4 5 6 7 8
15:	1 2 3 4 5 6 7 8 9

Page 3 RHYTHM TEST

EX:	A	B	C
1:	A	B	C
2:	A	B	C
3:	A	B	C
4:	A	B	C
5:	A	B	C
6:	A	B	C
7:	A	B	C
8:	A	B	C
9:	A	B	C
10:	A	B	C
11:	A	B	C
12:	A	B	C
13:	A	B	C
14:	A	B	C
15:	A	B	C

HARMONY TEST Page 4

EX:	A	B	C
1:	A	B	C
2:	A	B	C
3:	A	B	C
4:	A	B	C
5:	A	B	C
6:	A	B	C
7:	A	B	C
8:	A	B	C
9:	A	B	C
10:	A	B	C
11:	A	B	C
12:	A	B	C
13:	A	B	C
14:	A	B	C
15:	A	B	C

INSTRUCTIONS FOR MUSIC RESPONSIVENESS TEST

The children complete the front page of the test leaflet. With younger age groups the teacher's help is sometimes needed in these early stages, eg with calculating ages, spelling names, etc. The blackboard is useful for putting up words frequently needed, such as piano, violin, recorder, descant. The children will need another sheet of paper to cover their test leaflets.

Here are the instructions to be given live in standard form after the front page details have been completed:

'We are going to play a musical game. Open your papers. On the first side at the top it says MELODY TEST. Please remember this is a game we are playing, although it says test. On the next line it says EX: 1 2 3 4 (Write on blackboard). You will hear a tune played with four notes in it. Here it is. (Play - pause control) Now I will play it again, changing one of the four notes. (Play - pause control)

'Which note was changed? Was it 1, 2, 3 or 4? (Obtain answers from four or five confident-looking children) Yes, that's right, it was the first note. Hands up those who got it right, those who knew it was number ONE.. Good! Don't worry if you weren't sure. Everyone cross out ONE like this. (Demonstrate on blackboard) Are there any questions? (Satisfy any queries, ensuring that all children understand. The writer's experience has been that there have been practically no cases of misunderstanding. However, these short questioning sessions are useful to give confidence to the children who tend to worry, and this kind of tenseness must be avoided wherever possible)

'Now, underneath that it says EX: 1 2 3 4 5. (Write this on blackboard) This next tune will have five notes in it. Listen carefully whilst it is played the first time, and when it is played the second time see if you can tell which of the five notes is changed. (Play Example 2 - pause control) Hands up those who know which note was changed. (Obtain answers from three or four children) Yes, it was the last note - number FIVE. So cross out 5 like this. (Demonstrate on blackboard)

'Underneath you will see a long list of numbers from 1 to 15. These stand for fifteen tunes, and the tunes are not all the same length. Which is the shortest? (Obtain answers from class) And the longest? (More answers - this will ensure that all children see the relation between the row of numbers and the length of tunes) Now remember that each tune will be played twice, and the second time one of the notes will be changed. You have to cross out the number of the note you think is changed. After each crossing out, and before the next tune is played, move the other piece of paper you have been given down over the cross you have made, like this. (Demonstrate)

'Are you all ready to begin? Now here is number one. Listen carefully, and don't forget to cross out the note you think is changed. (Start the test proper, using the pause control between items in the early stages where necessary. Write each item number on the blackboard just before it is played to help the children keep their place. With the younger classes, it may be necessary to use the pause control after items 5 and 10 to make a few encouraging remarks)

(After the fifteenth item) 'You did that very well, Now for a different kind of game. Look at the next page. It says RHYTHM TEST at the top. Underneath that is EX: A B C. (Write on blackboard) You will hear a rhythm tapped out. It will be tapped again to help you remember it.

After the tapping you will hear three tunes, A. B and C. Only one of these will have the same rhythm as the tapping. Now listen (Play example tapping pattern - pause control) I will repeat the tapping to help you to remember it. (Play example tapping repeat - pause)

'Now here are the three tunes A B and C (Play - pause) Which of these tunes do you think was the same as the tapping? Put your hands up. (Question two or three children) Yes it was C. Hands up those who thought it was C. Good. Never mind if you weren't sure. Everyone cross out C on your paper. (Demonstrate on blackboard) Has anybody any questions? (Satisfy queries to ensure that all children are confident to proceed)

'We will play the rhythm game now. Remember, you listen to the tapping twice, and then cross out A B or C. Don't forget to move that piece of paper down after each crossing out. (Demonstrate) Here is number One. (Write each item number on the blackboard in turn to help the children to keep their place in the test. With younger groups use the pause control after items 5 and 10)

(At the end of the rhythm subtest) 'You did that very well. Now turn to the back page (If necessary, a break may be made before this last subtest is started) At the top of the page it says HARMONY TEST and underneath that EX: A B C. (Illustrate on the blackboard) In this last musical game you will hear the ending of a tune being played - just the ending. This will be played again to help you remember it. (Play the ending and its repeat) Now here are three pieces of music A B and C. Listen to the endings of each piece. Only one of them is the same as the ending you have just heard. The other two will sound different. (Play A B C - pause)

'Which piece had the same ending? Put your hands up if you know. (Question one or two children) Yes, it was B. How many people were right? Good. Everyone cross out B like this. (Demonstrate on blackboard) Are there any questions? (Answer any queries to ensure that all the children understand)

'Now we will play the harmony game. Here is number ONE. Listen to the ending which will be played twice to help you remember. Then try to pick out which ending is the same, and cross out A B or C. Don't forget to cover up each crossing out with the paper provided, like this. (Demonstrate) Listen carefully. Here is number ONE. (Play the fifteen items, pausing after 5 and 10 with the younger groups. Write each item number on blackboard just before it is played to help the children keep their place in the test)

(After the fifteenth item) 'You did that very well. Thank you very much for playing these musical games with me.' (The writer usually ends by asking which game the children liked the best, whether they recognised any of the musical instruments played, and whether they knew any of the tunes played. In the rhythm subtest, some waving of pencils was allowed as a kinaesthetic aid to remembering the tapped pattern. Children should not be allowed to tap their pencils on the desk, as this would interfere with the test procedure)

TEST LEAFLET

Page 1 MUSIC DISCRIMINATION TEST (TAYLOR)

6/67

NAME in full ....

BOY or GIRL ....

AGE ....

Do you play a musical instrument? ....

Are you a member of a Choir? ....

****

Inside

EXAMPLE:	A	B	C	D	8	A	B	C	D
1	A	B	C	D	9	A	B	C	D
2	A	B	C	D	10	A	B	C	D
3	A	B	C	D	11	A	B	C	D
4	A	B	C	D	12	A	B	C	D
5	A	B	C	D					
6	A	B	C	D					
7	A	B	C	D					

INSTRUCTIONS FOR MUSIC DISCRIMINATION TEST

The children complete the front page of the test leaflet. With younger children, the teacher's help is sometimes needed at this stage, eg with calculating ages, with points of spelling, etc. The blackboard should be used for putting up key words, eg descant recorder, piano, violin, etc. The children will need another sheet of paper to cover their test leaflets. This is not primarily an anti-cheating precaution. When previous work is covered up, there is no temptation for the children to make some kind of pattern in their crossings and circlings.

Here are the instructions to be given 'live' though in standard form after the front page details have been completed:

'Today we are going to be musical detectives looking for mistakes in the music. Open your yellow papers and look inside. You will see EXAMPLE: at the top, followed by A B C D (Use blackboard to demonstrate) This is where you start to be a detective. There will be an EXAMPLE piece of music played. This will be followed by four more pieces of music A B C and D. These will all sound like the EXAMPLE music, but only one will be exactly the same. The other three will have mistakes which make them different. After you have listened to the EXAMPLE music, you will hear A. If you think this has a mistake in it, cross out A on your paper. If you don't think it has a mistake, or you are not sure, don't cross it out - leave it unmarked.

'Then you will hear B. The same thing here, don't cross it out unless you are sure it contains a mistake. This will be followed by C and then D. Only cross out if you are sure there is a mistake. After you have heard all four, you have to put a ring round the letter where you think there were no mistakes. So there will be a ring round one letter on each line, and some of the others may be crossed out. Perhaps some will have no mark at all.

'Now listen to the EXAMPLE music. (Play - pause control) Try to remember that music. Now listen to A. (Play - pause control) If you are sure you heard a mistake, cross out A, but if you are not sure, leave it unmarked. Here is B (Play - pause control) Again, don't cross it out unless you are sure you heard a mistake which wasn't in the EXAMPLE music.

'Here is C. (Play - pause control) Cross out if you heard a mistake, but leave it if you are not certain. Now for D (Play - pause) Only cross out D if you are sure you heard a mistake. Now which of the unmarked ones is the correct music, exactly the same as the EXAMPLE music? Put your hands up if you think you know. (Question four or five confident-looking children) Put your hands up those people who think the correct one is D. Good. You are the best detectives so far. Don't worry if you were not sure. Just keep listening for mistakes. Everyone put a ring round D. (BB)

'There are two important things to remember. Put one ring in on every line, because you get extra marks for putting a ring round the right letter. Cross out where you are sure there is a mistake, because you get marks for crossing out, but don't cross out where you are not sure, because you can lose marks for crossing out when it is the correct music.

'Now this is where the detective game really starts. Listen to the number ONE music and try to remember it. Then listen to A, only crossing out when you are sure. Then do the same thing for B, C and D. Finally put in the ring where you heard the correct music, the same as number ONE. Don't worry if you are not sure. Keep on listening, and try to be good detectives. Then do the same for number TWO and right down to SEVEN at the bottom. Numbers 8 to 12 are on the second page. So you ought to finish up with twelve rings, one on each line from ONE to TWELVE.

'I shall keep writing up the numbers and letters as the games goes on so that you need not lose your place. Don't forget to cover up each line with your other piece of paper as soon as you have finished the ringing and marking. Are you ready? Here is number ONE music! (As test starts, the writer puts up the numbers and letters on the blackboard. With the youngest groups, it was sometimes necessary to use the pause control at the end of item ONE to remind the children to put in the ring.)

The analogy to being a musical detective proved a successful procedure. All children tested appeared to enjoy the test, and some quiet smiles were apparent on the occasion of some of the grosser errors. Pilot work had shown the need to have a covering paper. Usually at the end of the test, the writer would have a discussion with the class about points from the test, such as some of the mistakes they had heard, some of the instruments used, etc.

TEST LEAFLET

Page 1 ..

MUSIC PREFERENCE TEST

(TAYLOR)

9/67

NAME ....

BOY or GIRL ....

AGE ....

DO YOU PLAY A MUSICAL INSTRUMENT? ....

ARE YOU A MEMBER OF A CHOIR? ....

inside

1	A	B	9	A	B
2	A	B	10	A	B
3	A	B	11	A	B
4	A	B	12	A	B
5	A	B	13	A	B
6	A	B	14	A	B
7	A	B	15	A	B
8	A	B			

16	A	B	24	A	B
17	A	B	25	A	B
18	A	B	26	A	B
19	A	B	27	A	B
20	A	B	28	A	B
21	A	B	29	A	B
22	A	B	30	A	B
23	A	B			

INSTRUCTIONS FOR MUSIC PREFERENCE TEST

The children complete the details on the front of the test leaflet. Some may need the help of the teacher with points of spelling, calculation of ages, etc. It usually helps to write key words on the blackboard, eg descant recorder, piano. The children will need another sheet of paper to cover up each item as it is completed. This is not primarily an anti-cheat device, but is necessary to prevent the children from being tempted to form patterns as they put circles round A or B.

Here are the instructions to be given 'live' after the completion of the first page:

'We are going to play a musical game. Open your blue papers. Inside you will see several rows of figures. Down the first page are one to eight, and nine to fifteen, and down the second page sixteen to twentythree and twenty-four to thirty. After each figure it says A B. A and B stand for two pieces of music. For each number you listen to the A music and then the B music. Then you put a ring round the letter of the music you like the 'best'. If you don't like either very much, you must still pick out the 'best' by putting a ring round. You must choose either A or B.

'Listen to ONE A. (Play - pause control) Now listen to ONE B. (Play - pause) Now put a ring round A or B which-ever you like the 'best'. Are there any questions? These should be dealt with sympathetically but briefly. 'Best' is the colloquialism used for ensuring the understanding of these young children) Put your other piece of paper over the letters of number ONE.

'Now listen to TWO A (Play - pause) And TWO B. (Play - pause) Put a ring round A or B. Now we are going to go on with the music without stopping. Don't forget to put a ring round either A or B, whichever you like the 'best'.

Keep covering up the letters you have just ringed. (Demonstrate) Here is number THREE.' (It will be necessary to remind them of the number of each item. In the case of younger classes it is useful to put the numbers up on the blackboard. With the younger groups, there should be a break after item 15)

This test procedure is relatively straightforward. Pilot work showed the necessity for the children to cover up their work with another sheet of paper. All children showed great interest and enjoyment. The writer usually followed each session by general discussion, which proved animated with many interesting points raised.

APPENDIX C

MUSIC SCORE:

MUSIC RESPONSIVENESS TEST

MUSIC DISCRIMINATION TEST

MUSIC RESPONSIVENESS TEST SCORE

MELODY SUBTEST

MUSIC RESPONSIVENESS TEST SCORE

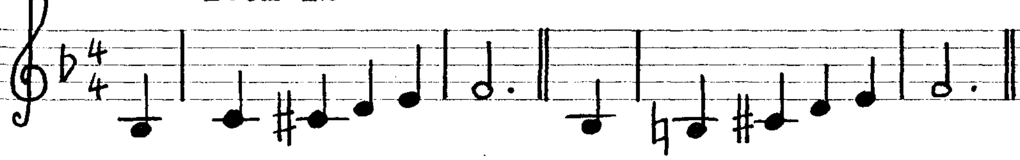
MELODY SUBTEST

MUSIC RESPONSIVENESS TEST SCORE

MELODY SUBTEST

CLARINET

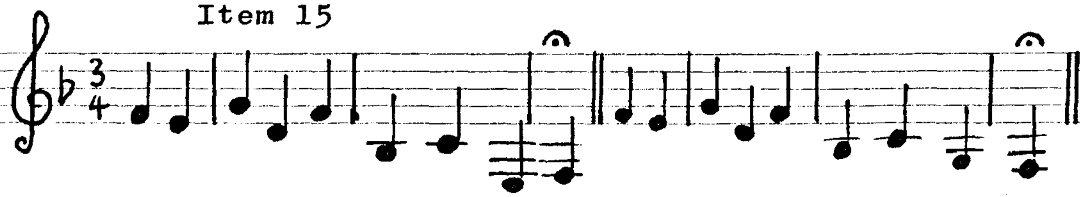
Item 12



Item 13

Item 14

Item 15



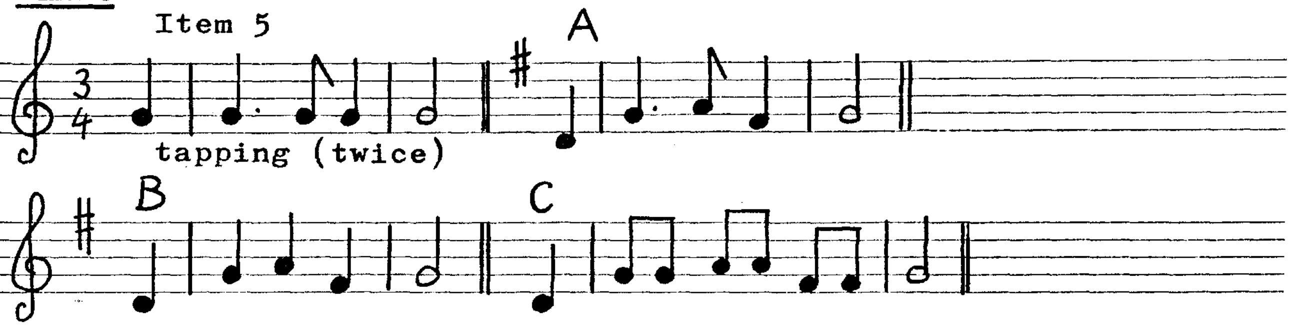
MUSIC RESPONSIVENESS TEST SCORE

RHYTHM SUBTEST

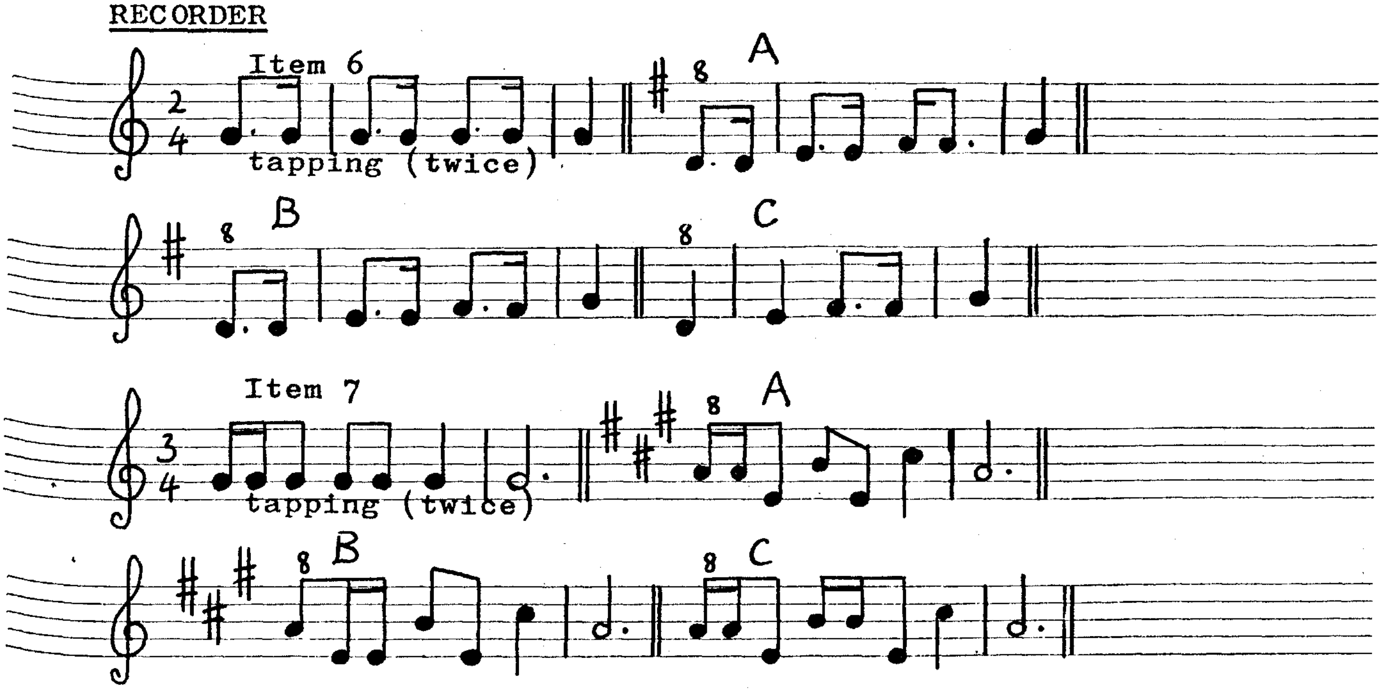
MUSIC RESPONSIVENESS TEST SCORE

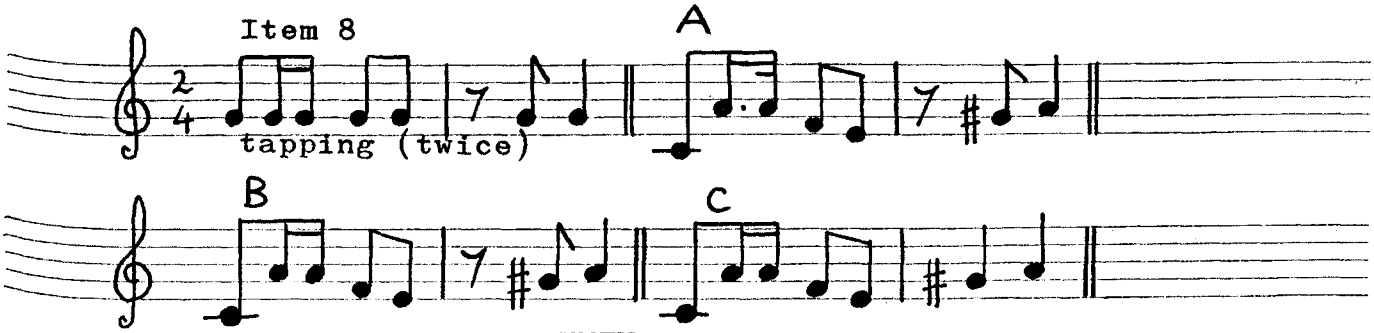
RHYTHM SUBTEST

PIANO



RECORDER





MUSIC RESPONSIVENESS TEST SCORE

RHYTHM SUBTEST

MUSIC RESPONSIVENESS TEST SCORE

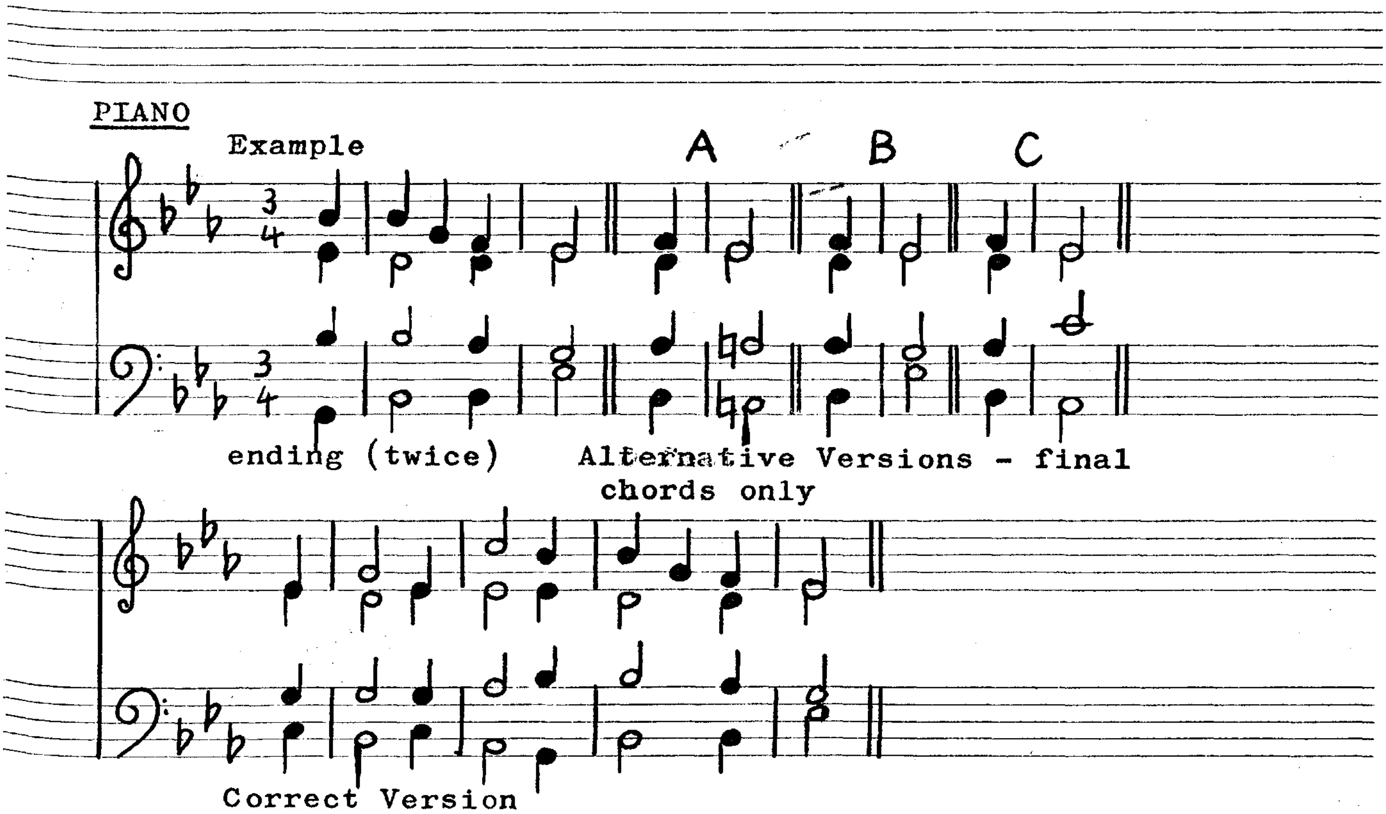
RHYTHM SUBTEST

MUSIC RESPONSIVENESS TEST SCORE

RHYTHM SUBTEST

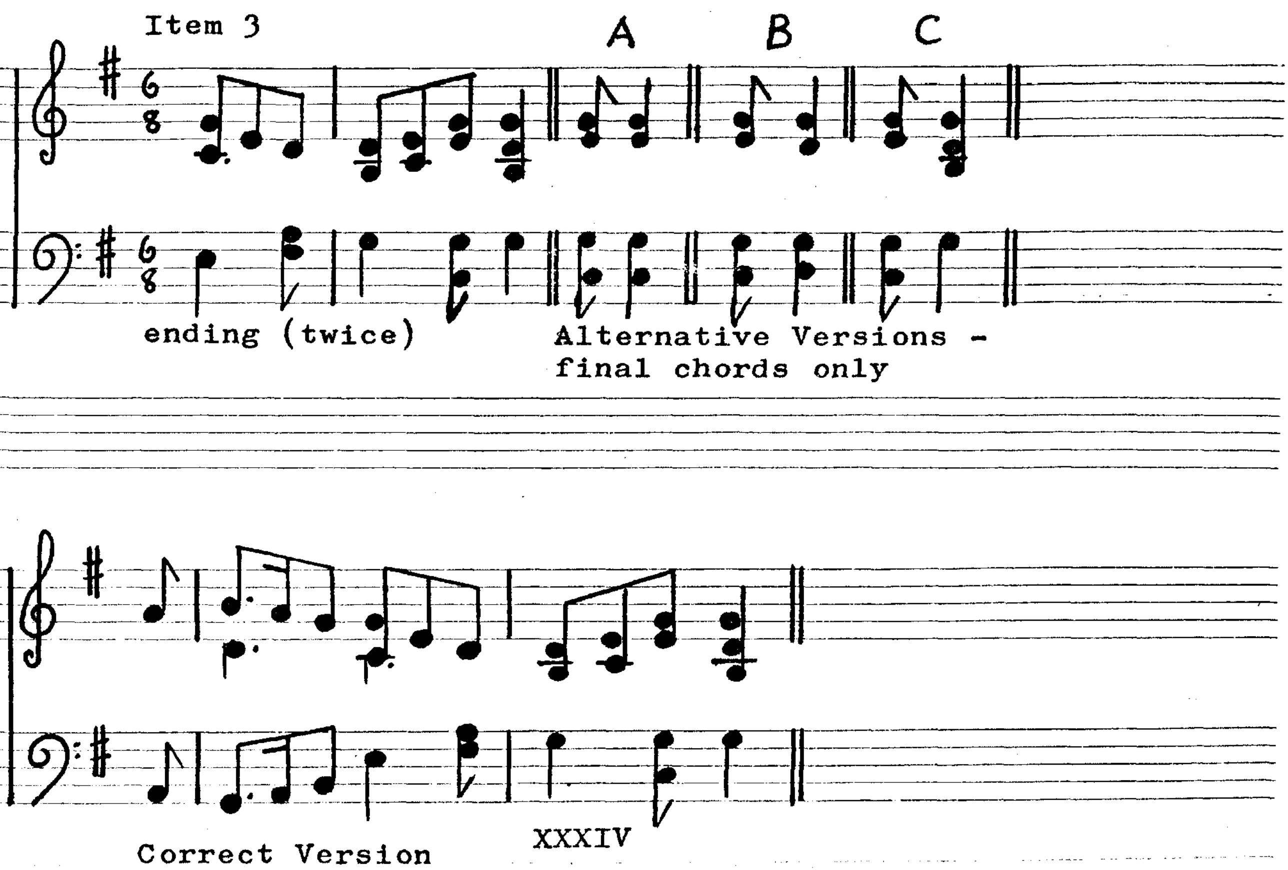
MUSIC RESPONSIVENESS TEST SCORE

HARMONY SUBTEST



MUSIC RESPONSIVENESS TEST SCORE

HARMONY SUBTEST

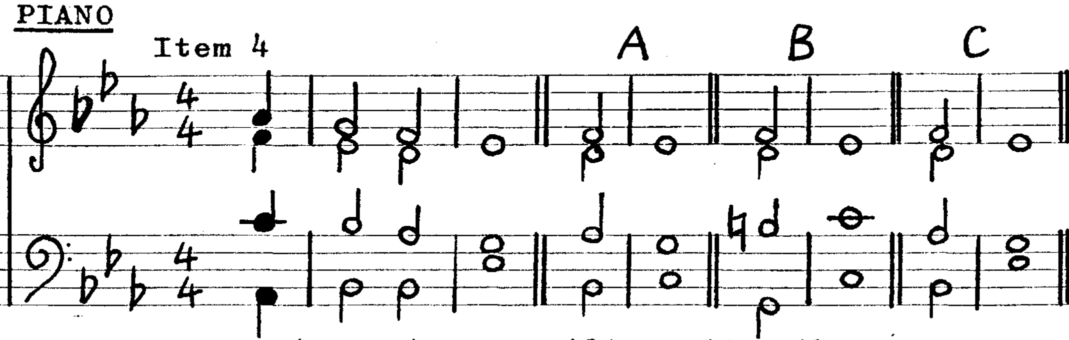


MUSIC RESPONSIVENESS TEST SCORE

HARMONY SUBTEST

PIANO

Item 4



ending (twice) Alternative Versions - final chords only

Correct Version

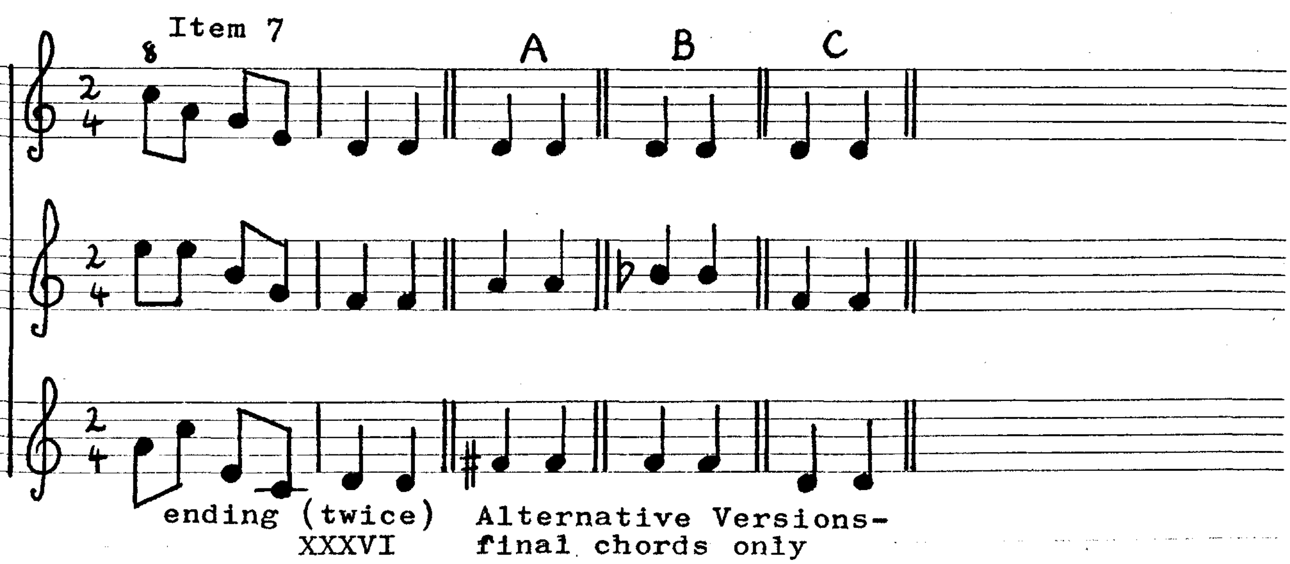
Item 5

ending (twice) Alternative Versions - final chords only

Correct Version

MUSIC RESPONSIVENESS TEST SCORE
HARMONY SUBTEST

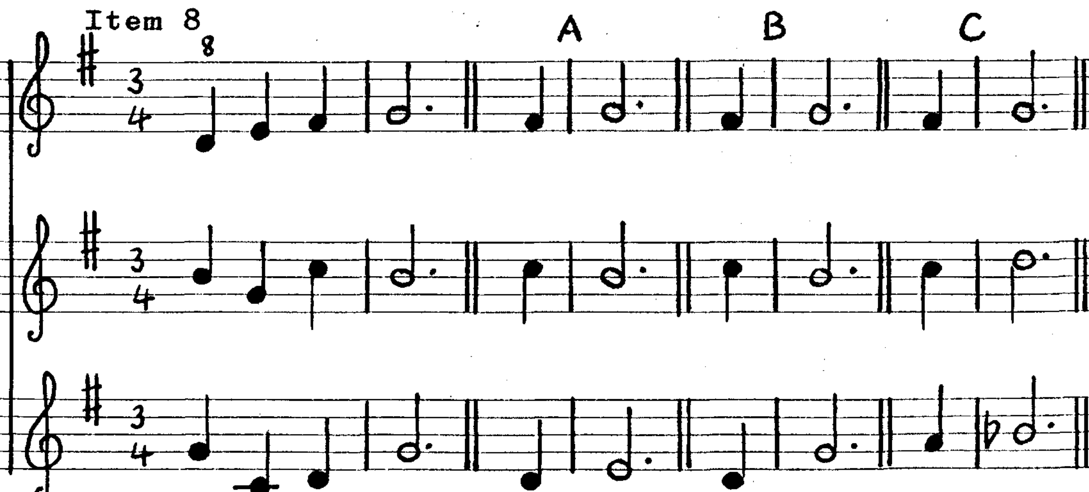
RECORDER TRIO



MUSIC RESPONSIVENESS TEST SCORE
HARMONY SUBTEST

RECORDER TRIO

Correct Version



ending (twice)

Alternative Versions - final chords only

Correct Version

MUSIC RESPONSIVENESS TEST SCORE

HARMONY SUBTEST

RECORDER TRIO

Item 9

ending (twice)

Alternative Versions - final chords only

Correct Version

Item 10

ending (twice)

Alternative Versions - final chords only

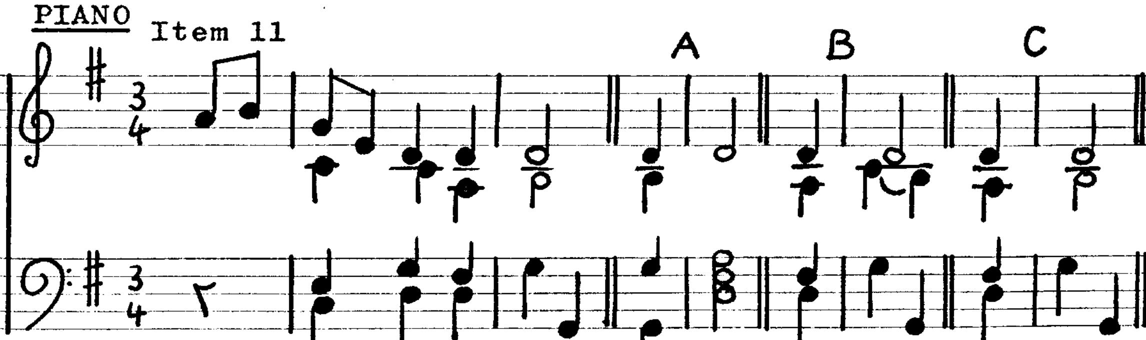
MUSIC RESPONSIVENESS TEST SCORE

HARMONY SUBTEST

RECORDER TRIO

Correct Version

PIANO



ending (twice)

Alternative Versions - final chords only

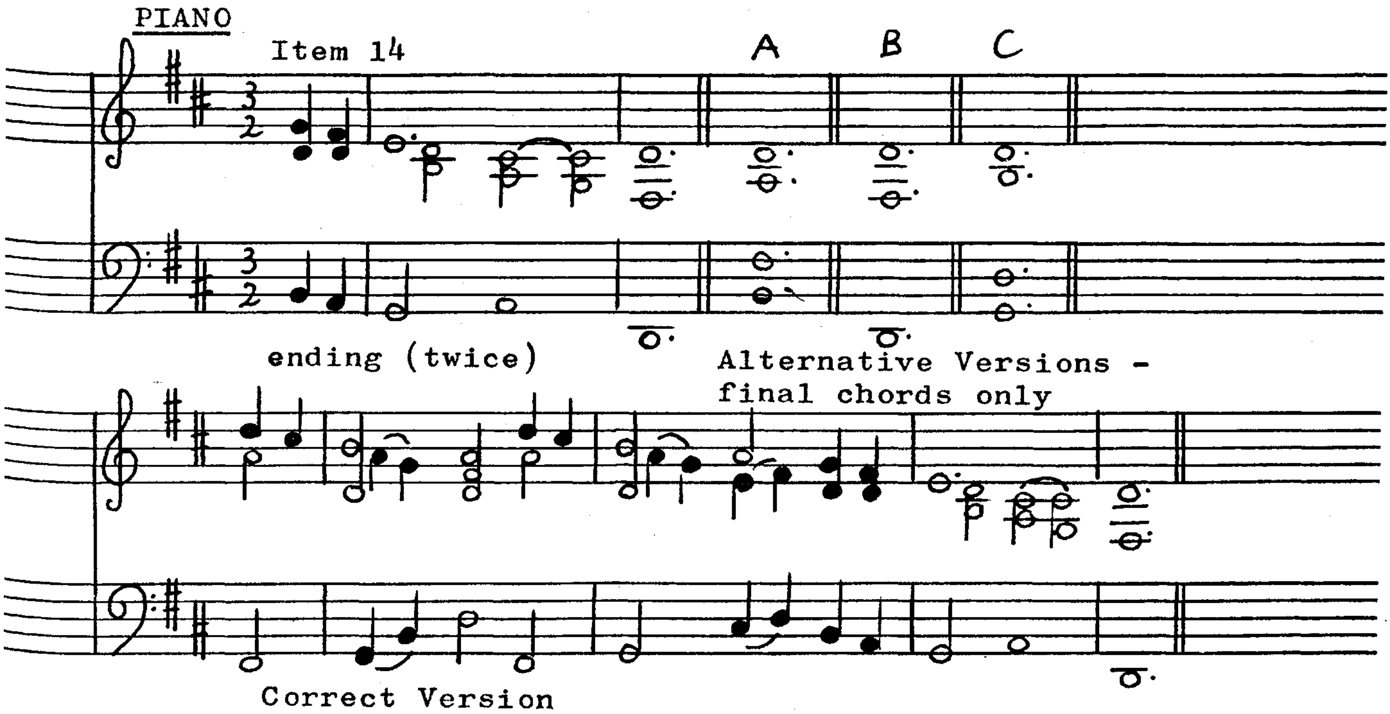
Correct Version

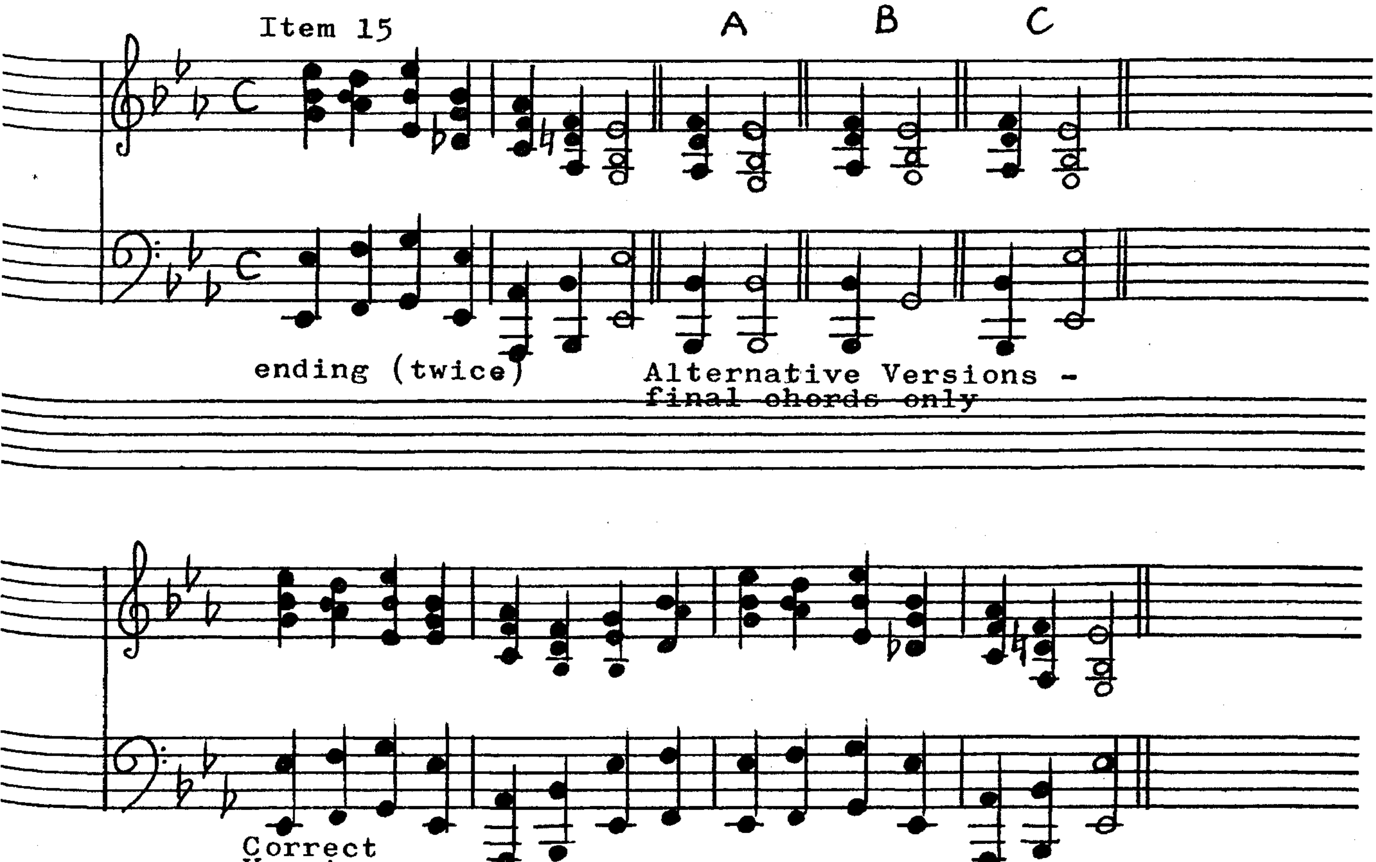
MUSIC RESPONSIVENESS TEST SCORE

HARMONY SUBTEST

MUSIC RESPONSIVENESS TEST SCORE

HARMONY SUBTEST





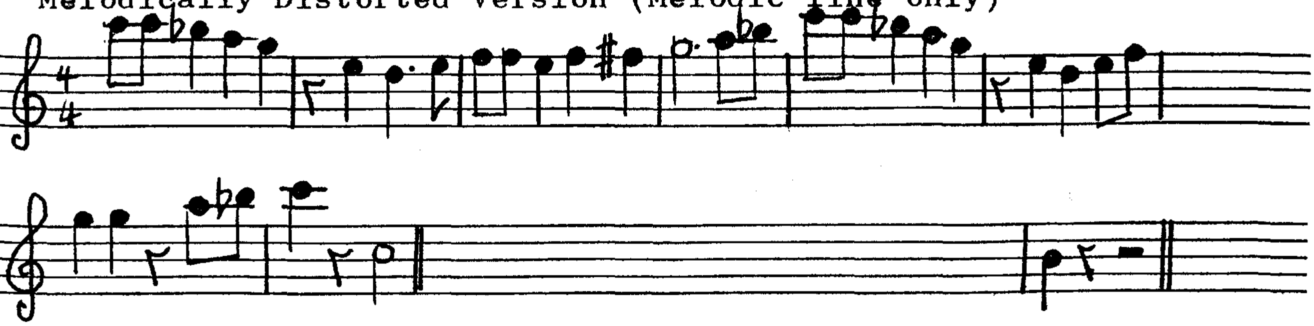
MUSIC DISCRIMINATION TEST SCORE

EXAMPLE

RECORDER, PIANO and DRUM

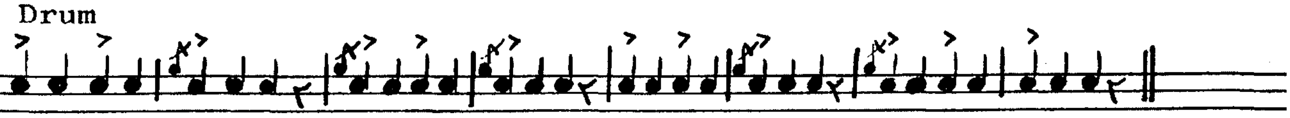
Correct Version

Melodically Distorted Version (Melodic line only)



Harmonically Distorted Version (left hand of piano part only)

Drum



MUSIC DISCRIMINATION TEST SCORE

Three bars of the tenor part contain similar rhythmic changes

MUSIC DISCRIMINATION TEST SCORE

ORGAN

ITEM 2

MUSIC DISCRIMINATION TEST SCORE

ITEM 3

RECORDER and GUITAR

Correct Version

Harmonically Distorted Version (guitar tonic ostinato)

Melodically Distorted Version - tenor recorder flattened

Rhythmically Distorted Version - recorder irregular tempo

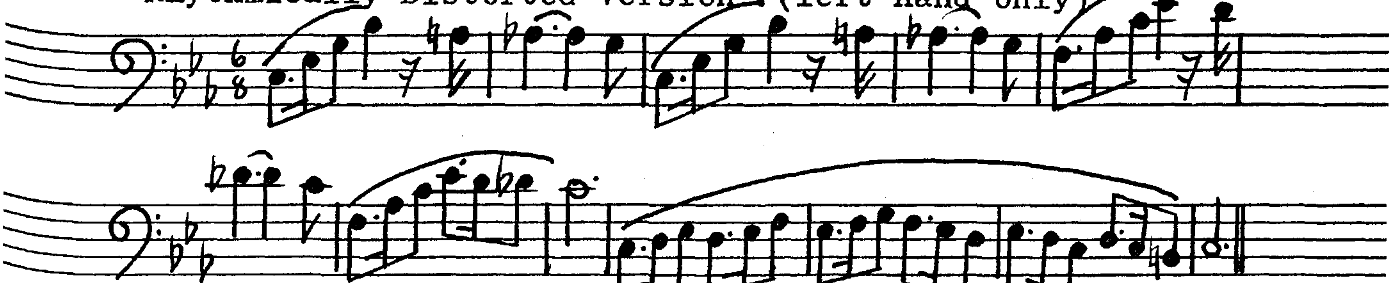
MUSIC DISCRIMINATION TEST SCORE

ITEM 4

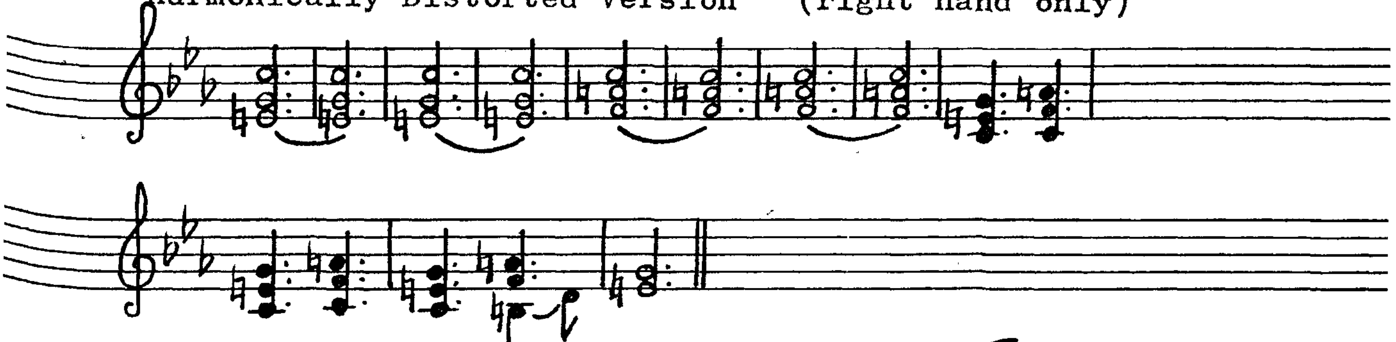
PIANO

Correct Version

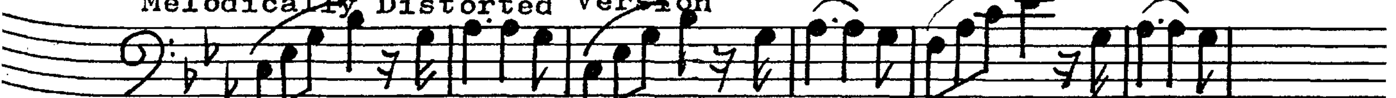
Rhythmically Distorted Version (left hand only)



Harmonically Distorted Version (right hand only)



Melodically Distorted Version



(left hand only)

MUSIC DISCRIMINATION TEST SCORE

ITEM 5

RECORDER QUARTET

Correct Version

Melodically Distorted Version - descant part flattened

MUSIC DISCRIMINATION TEST SCORE

ITEM 5

Rhythmically Distorted Version

MUSIC DISCRIMINATION TEST SCORE

ITEM 5

Harmonically Distorted Version

MUSIC DISCRIMINATION TEST SCORE

ITEM 6

B♭ CLARINET, PIANO and DRUM Correct Version

Melodically Distorted Version - clarinet flattened

L

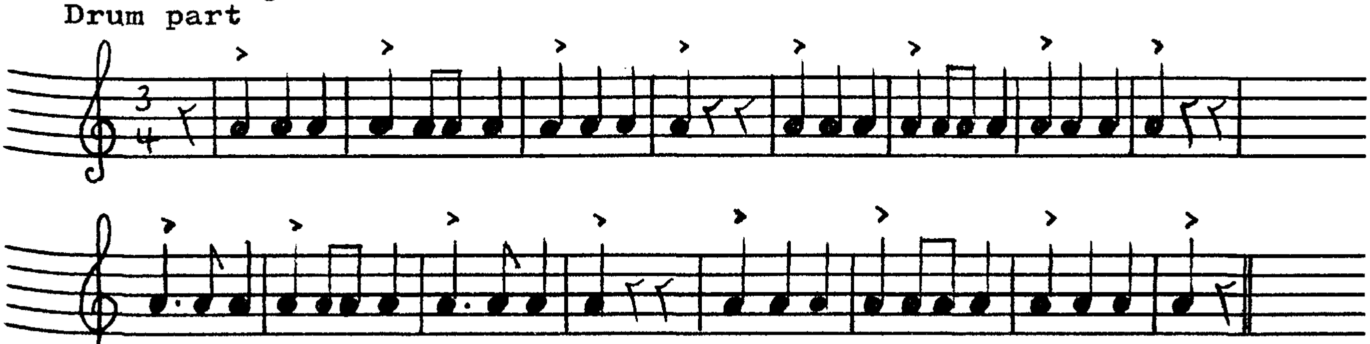
MUSIC DISCRIMINATION TEST SCORE

ITEM 6

Harmonically Distorted Version (piano left hand only)

Rhythmically Distorted Version (piano part only)

Drum part

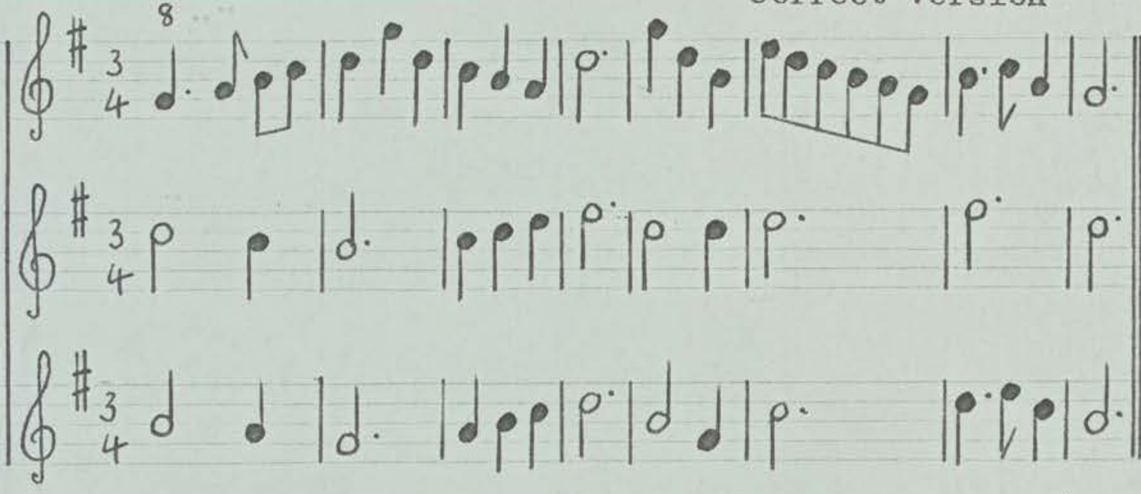


MUSIC DISCRIMINATION TEST SCORE

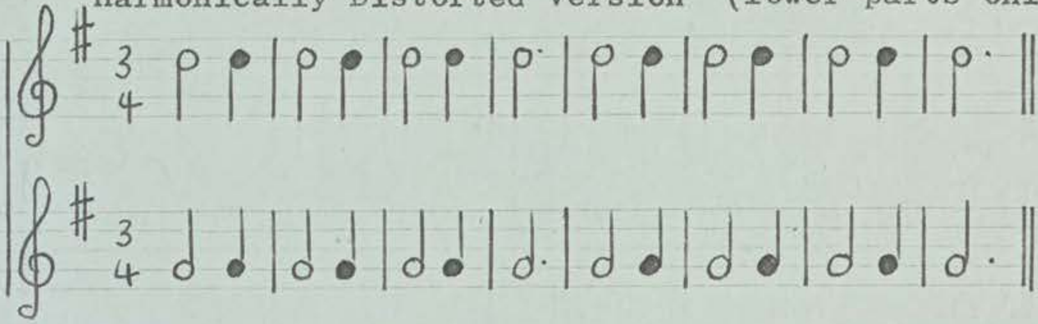
ITEM 7

RECORDER TRIO and CYMBAL

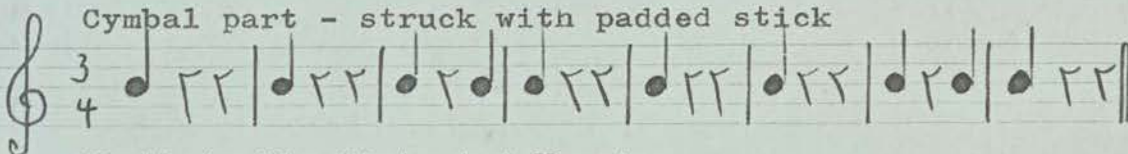
Correct Version



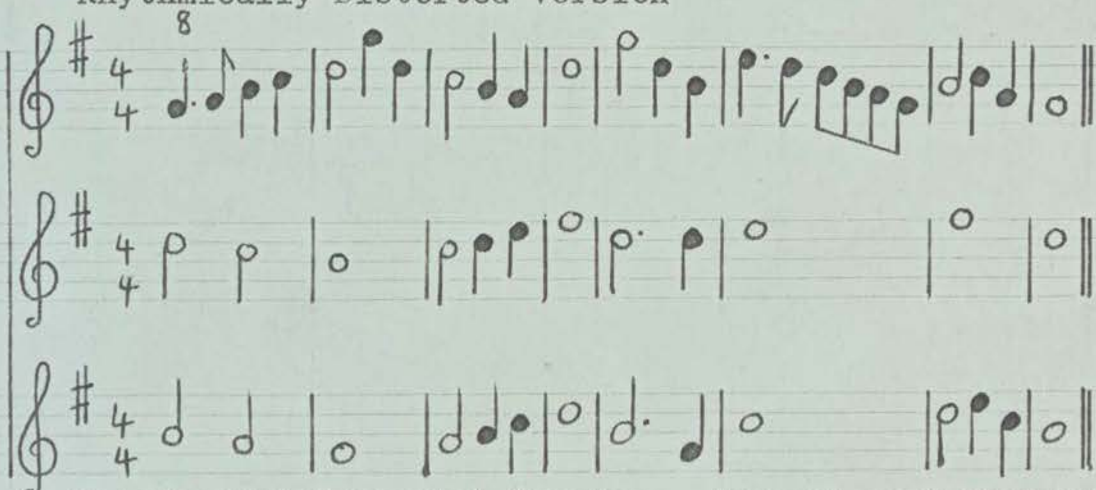
Harmonically Distorted Version (lower parts only)



Cymbal part - struck with padded stick

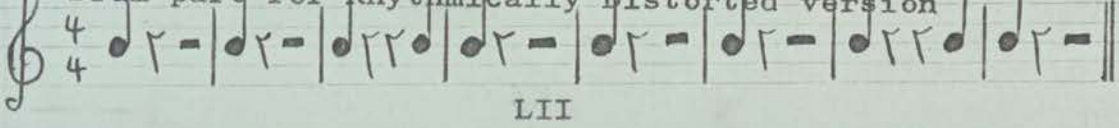


Rhythmically Distorted Version



Melodically Distorted Version - descant part flattened

Drum part for Rhythmically Distorted version

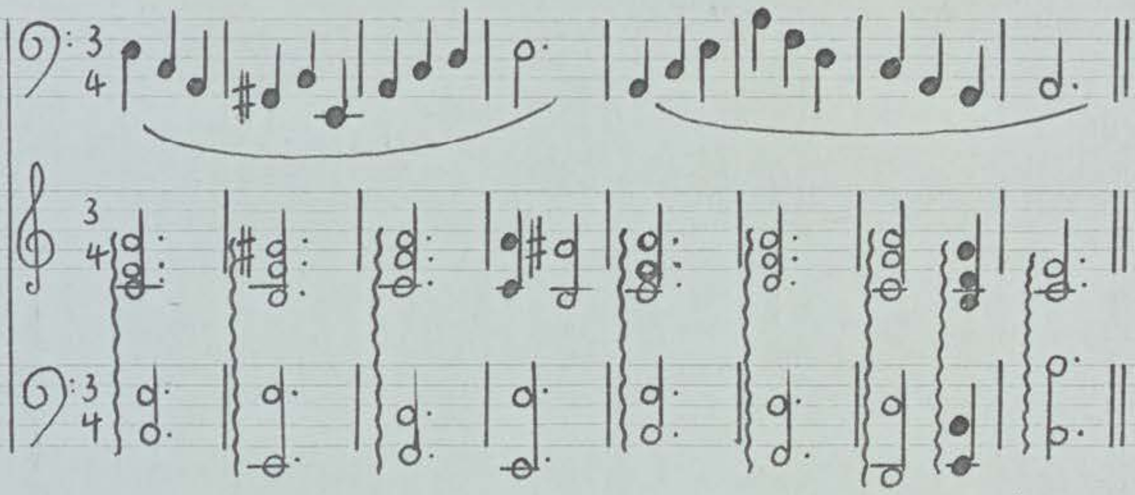


MUSIC DISCRIMINATION TEST SCORE

ITEM 8

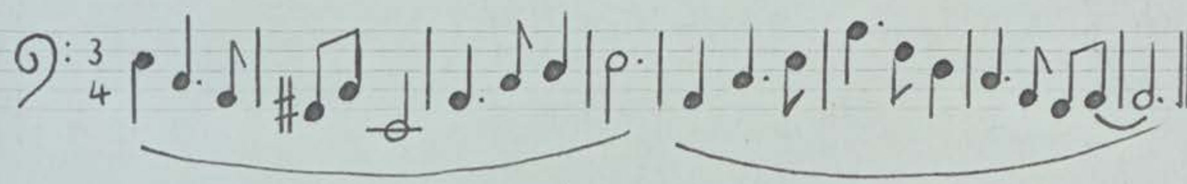
BASSOON and PIANO

Correct Version



Harmonically Distorted Version (piano part only)

Rhythmically Distorted Version (melodic line only)



Melodically Distorted Version (melodic line only)

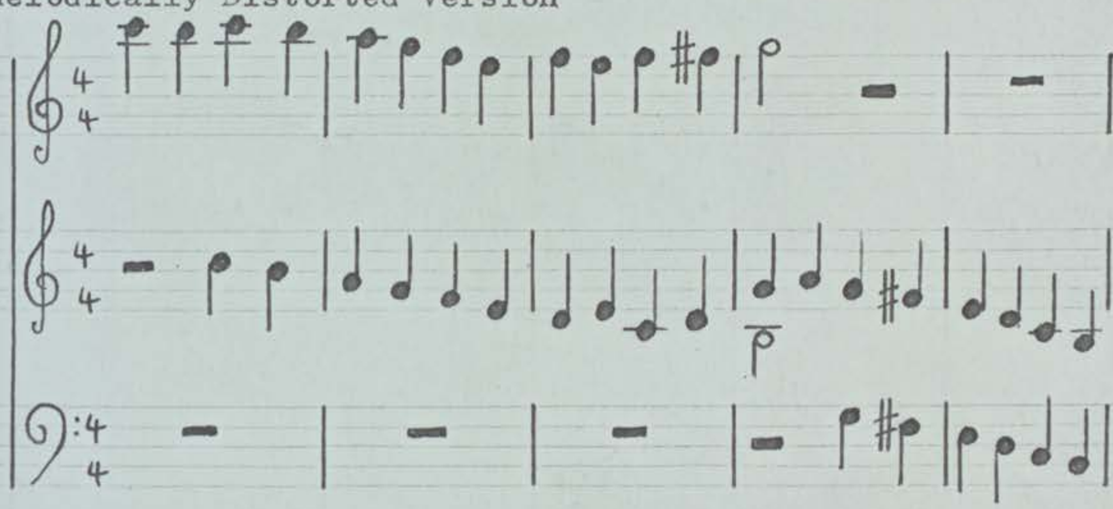
MUSIC DISCRIMINATION TEST SCORE

ITEM 9

ORGAN

Correct Version

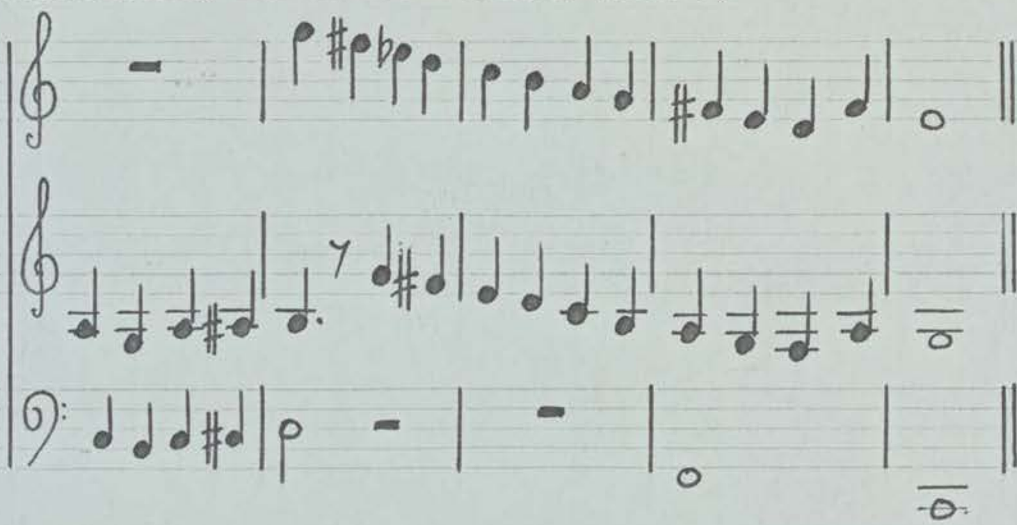
Melodically Distorted Version



MUSIC DISCRIMINATION TEST SCORE

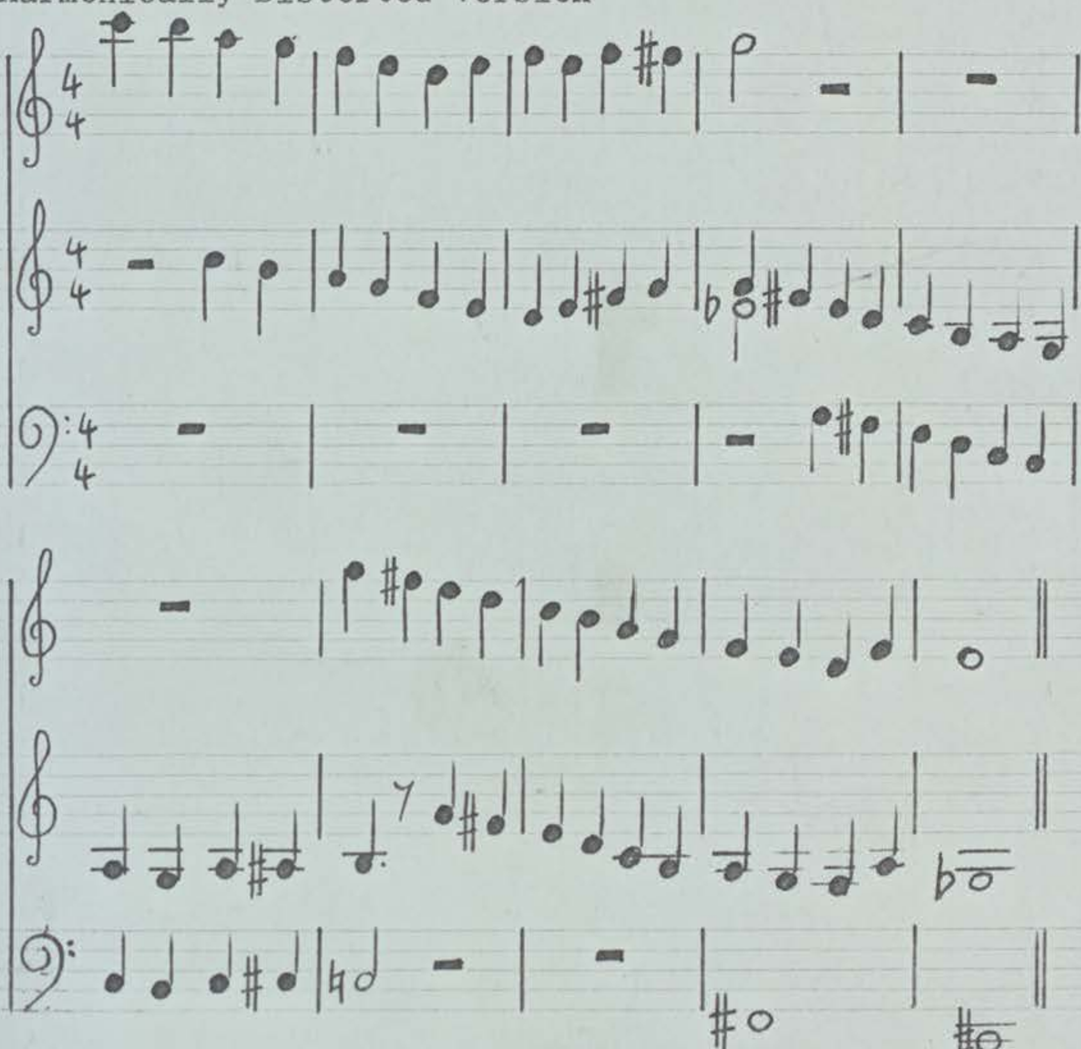
ITEM 9

Melodically Distorted Version (cont.)



Rhythmically Distorted Version - irregular tempo

Harmonically Distorted Version

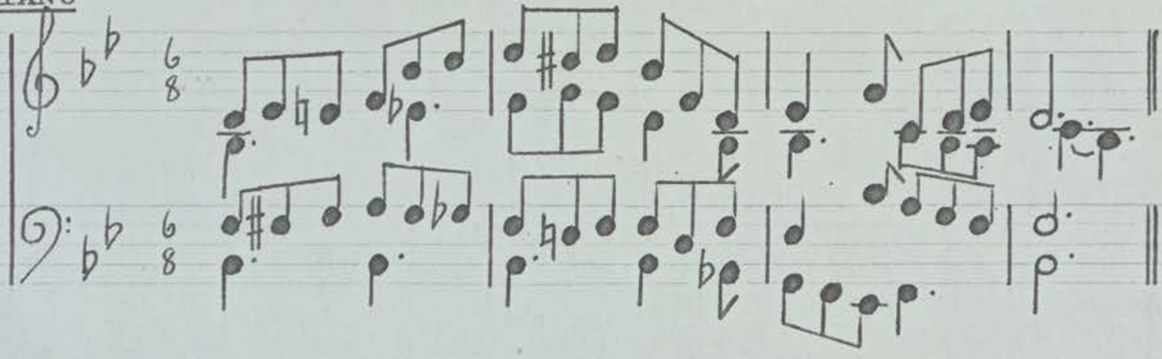


MUSIC DISCRIMINATION TEST SCORE

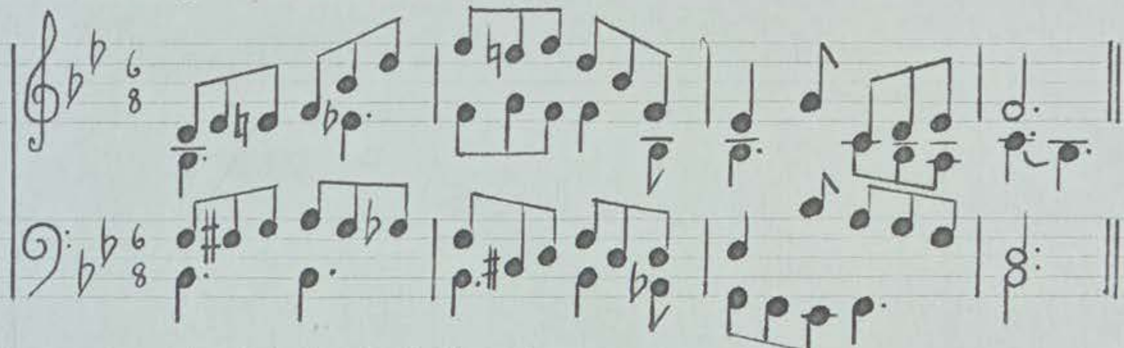
ITEM 10

PIANO

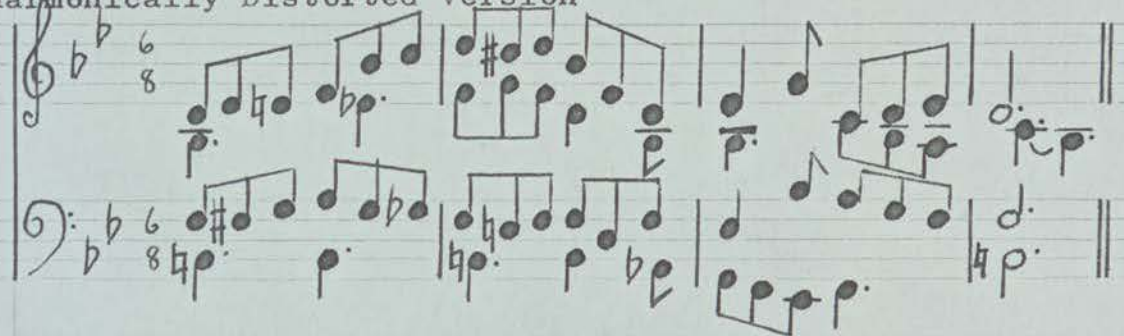
Correct Version



Melodically Distorted Version



Harmonically Distorted Version



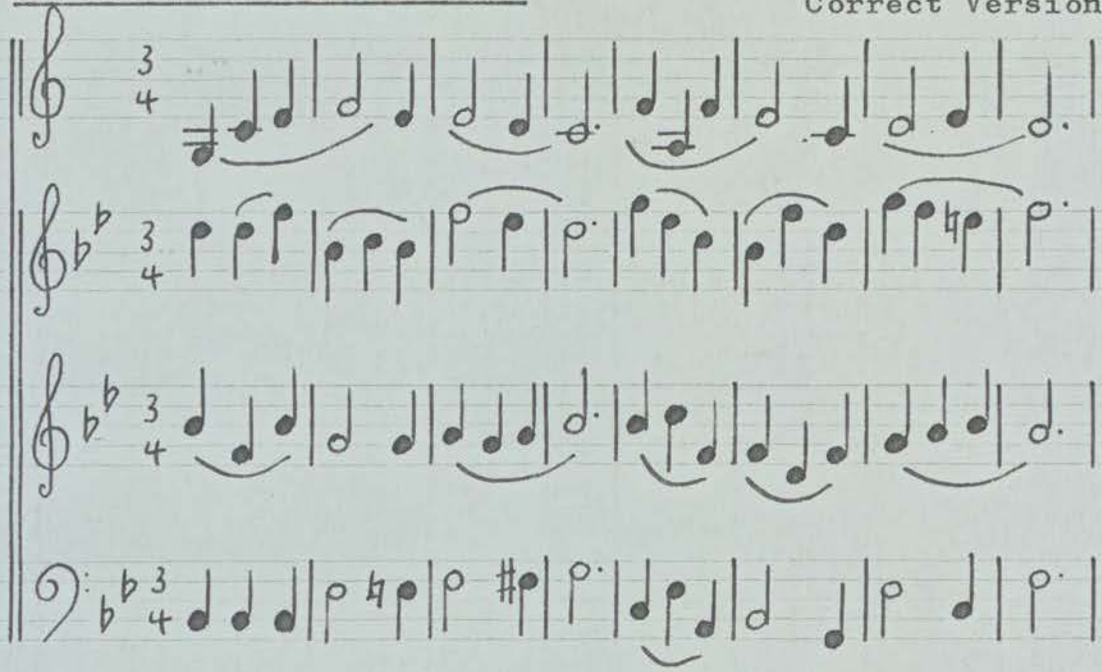
Rhythmically Distorted Version

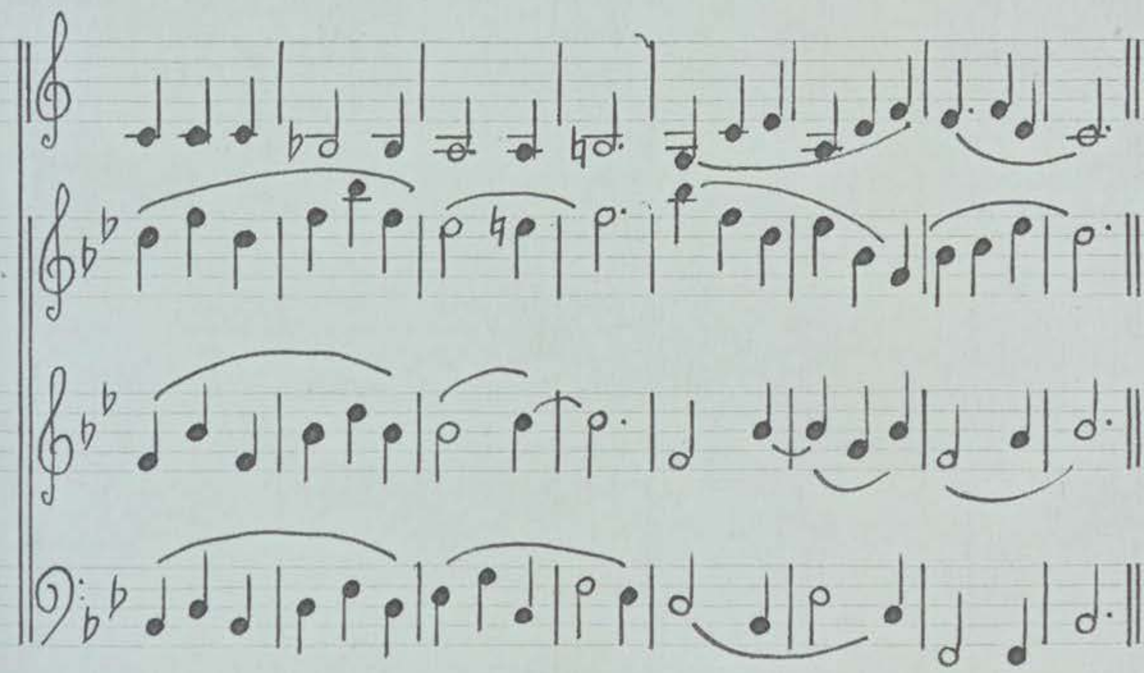
MUSIC DISCRIMINATION TEST SCORE

ITEM 11

CLARINET AND RECORDER TRIO

Correct Version



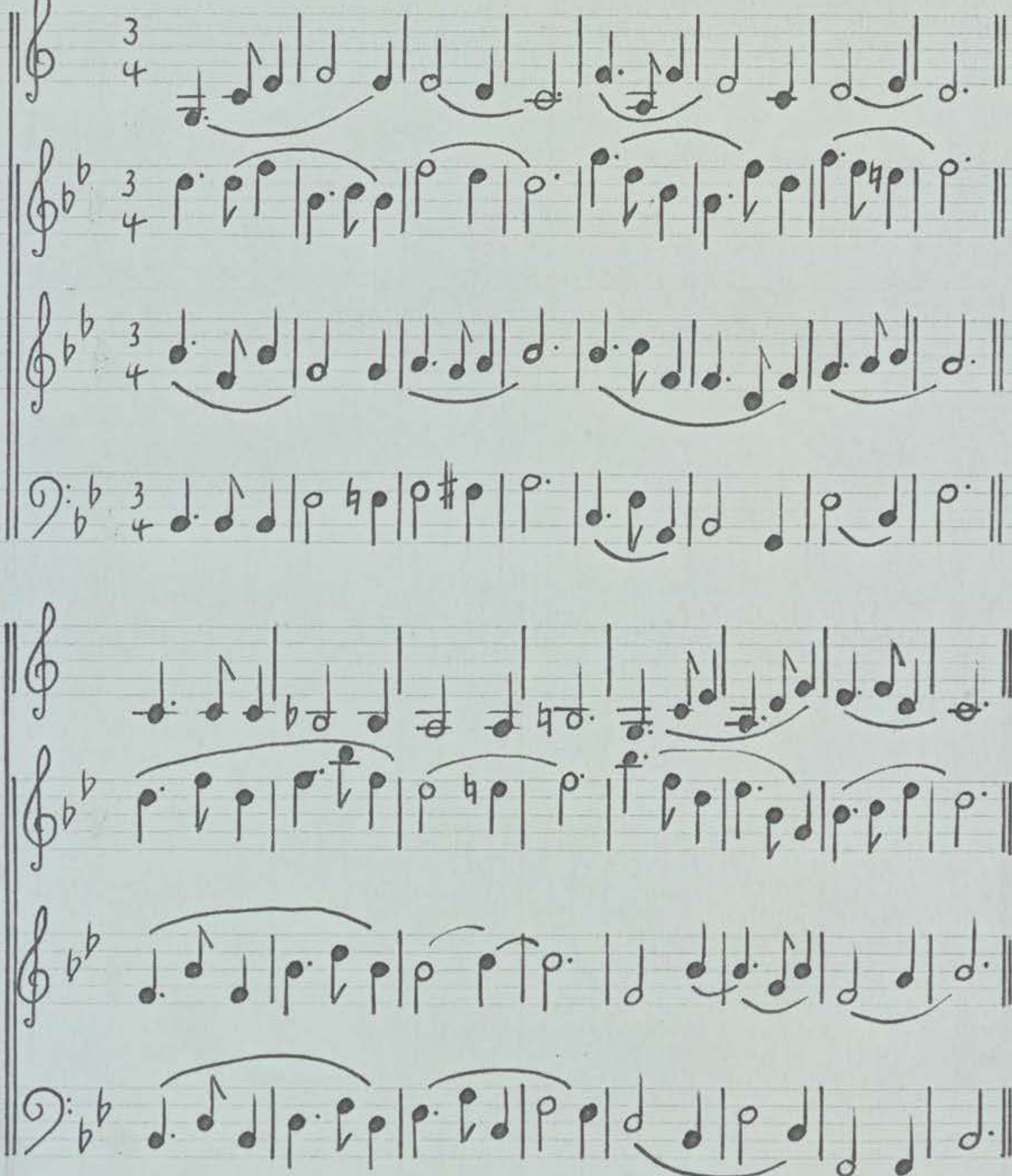


Melodically Distorted Version - clarinet flattened

<u>MUSIC DISCRIMINATION TEST SCORE</u>

<u>ITEM 11</u>

Rhythmically Distorted Version

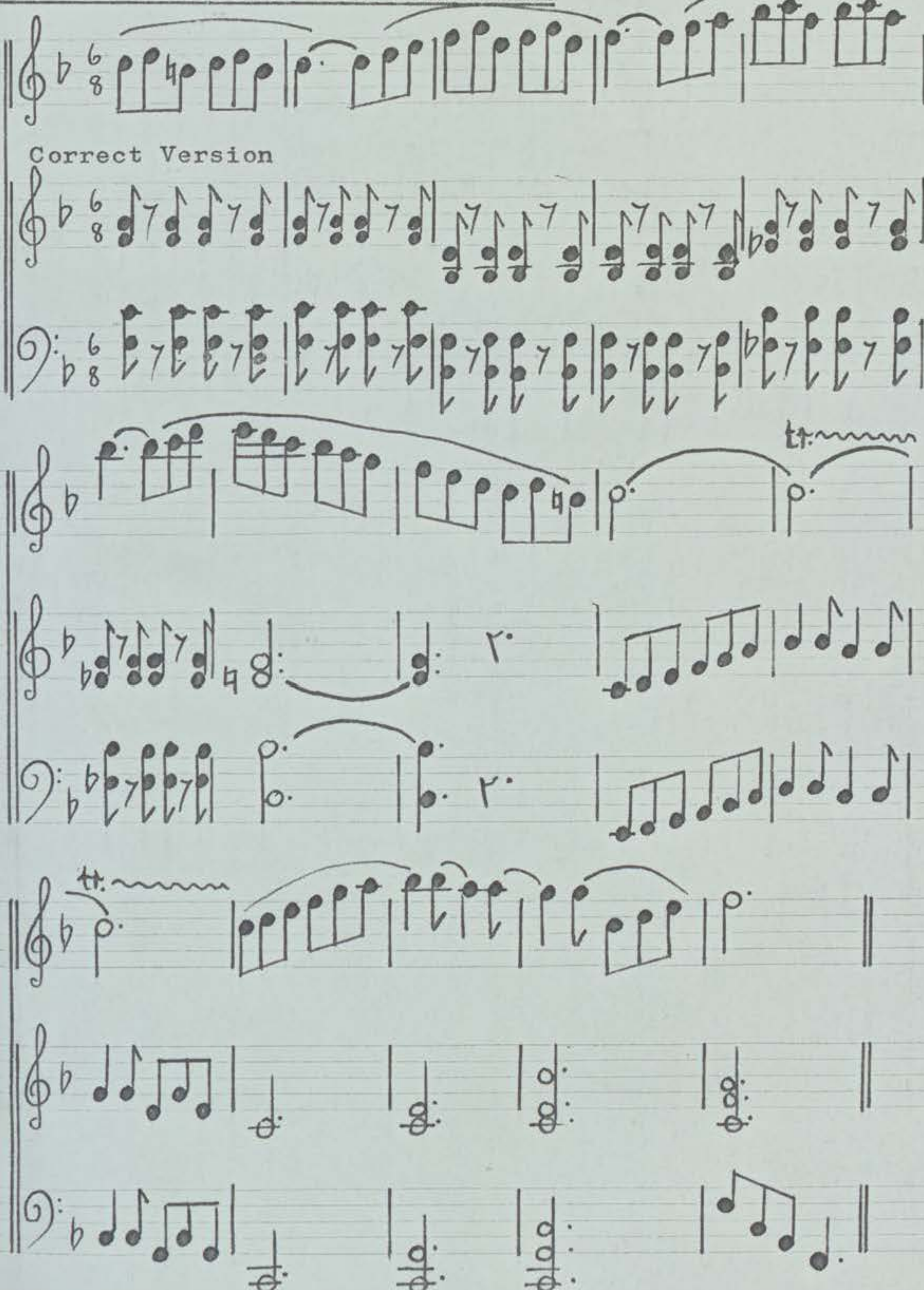


Harmonically Distorted Version - as correct version but
bass part omitted

MUSIC DISCRIMINATION TEST SCORE

ITEM 12

RECORDER and PIANO with TAMBOURINE

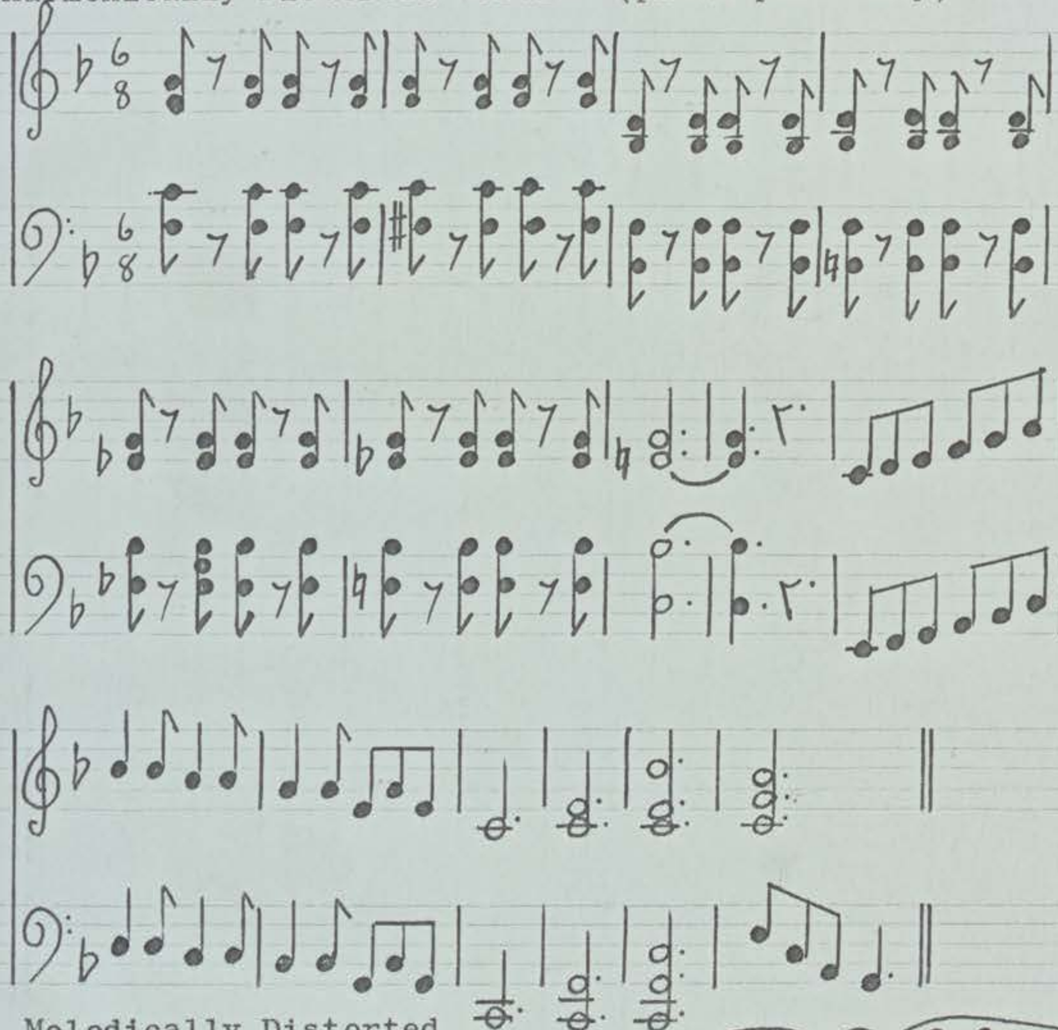


Rhythmically Distorted Version - irregular tempo in recorder part

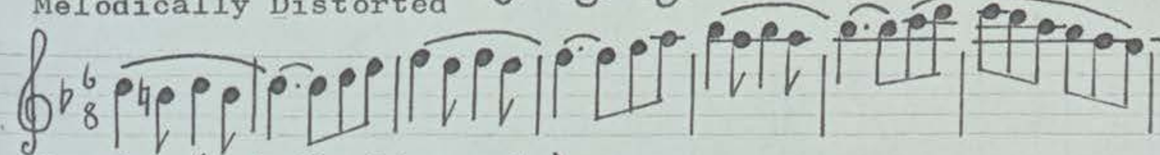
MUSIC DISCRIMINATION TEST SCORE

ITEM 12

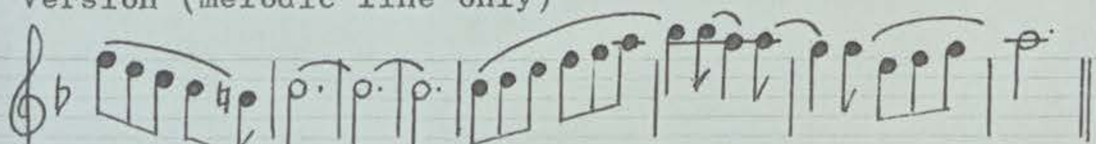
Harmonically Distorted Version (piano part only)



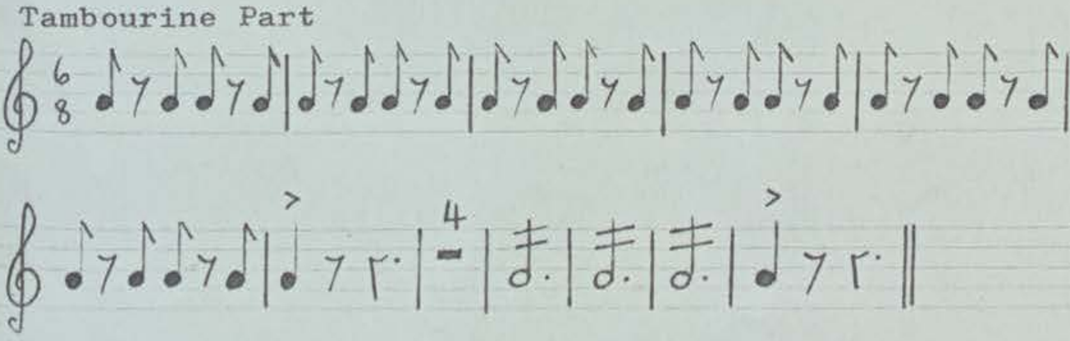
Melodically Distorted



Version (melodic line only)



Tambourine Part



MUSIC DISCRIMINATION TEST (TAYLOR)
6 / 67

NAME in full ....

BOY or GIRL ....

AGE . . . .

Do you play a musical
instrument? . . ..

Are you a member of a
Choir? . . ..

EXAMPLE:	A	B	C	D
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D

M U S I C

P R E F E R E N C E   T E S T

(TAYLOR)

9 / 67

NAME: ....

BOY or GIRL : ....

AGE: ....

DO YOU PLAY a MUSICAL
INSTRUMENT ?   ....

ARE YOU a MEMBER of a CHOIR? ....

: :: :: :: :: :: :: :: :: :: :

1	A	B	9	A	B	16	A	B	24	A	B
2	A	B	10	A	B	17	A	B	25	A	B
3	A	B	11	A	B	18	A	B	26	A	B
4	A	B	12	A	B	19	A	B	27	A	B
5	A	B	13	A	B	20	A	B	28	A	B
6	A	B	14	A	B	21	A	B	29	A	B
7	A	B	15	A	B	22	A	B	30	A	B
8	A	B				23	A	B			

:: ::

HARMONY TEST

EX:	A	B	C
1	A	B	C
2	A	B	C
3	A	B	C
4	A	B	C
5	A	B	C
6	A	B	C
7	A	B	C
8	A	B	C
9	A	B	C
10	A	B	C
11	A	B	C
12	A	B	C
13	A	B	C
14	A	B	C
15	A	B	C

MUSIC RESPONSIVENESS TEST : 5 / 65 :
(TAYLOR)

NAME: ....

AGE: .... BOY or GIRL

=====================================

WHAT INSTRUMENT DO YOU PLAY?

....

TO WHICH CHOIR DO YOU BELONG?

....

SCORES:		TESTS:
PART ONE:		Melody
PART TWO:		Rhythm
PART THREE:		Harmony

TOTAL :

MELODY TEST

EX:	1	2	3	4					
EX:	1	2	3	4	5				
1	1	2	3						
2	1	2	3	4					
3	1	2	3	4	5				
4	1	2	3	4	5	6			
5	1	2	3	4	5	6	7		
6	1	2	3	4					
7	1	2	3	4	5				
8	1	2	3	4	5	6			
9	1	2	3	4	5	6	7		
10	1	2	3	4	5	6	7	8	
11	1	2	3	4	5				
12	1	2	3	4	5	6			
13	1	2	3	4	5	6	7		
14	1	2	3	4	5	6	7	8	
15	1	2	3	4	5	6	7	8	9

RHYTHM TEST

EX:	A	B	C
1	A	B	C
2	A	B	C
3	A	B	C
4	A	B	C
5	A	B	C
6	A	B	C
7	A	B	C
8	A	B	C
9	A	B	C
10	A	B	C
11	A	B	C
12	A	B	C
13	A	B	C
14	A	B	C
15	A	B	C