

APPROACHES TO LEARNING AND PERFORMANCE
OF EXPERT AND NOVICE MUSICIANS

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ABSTRACT

This research considered the teaching and learning of music in the light of relevant psychological models with a view to informing both research and practice.

Carroll's (1963) model of learning was tested using 109 violin/viola pupils aged 6-16 years. Measures relating to time required for learning and time spent learning were regressed on independent measures of learning outcome. A multiple R of .902 ($p=.0000$) was obtained. The variables included in the final equation were: time learning (beta weight .796), teachers rating of ability to understand instructions (.199), Mill Hill Vocabulary grade (.172) and Bentley Test Music Grade (.167).

This clear demonstration of the importance of time in learning music led to further investigation exploring the nature of the development of individual expertise. Three groups were compared: twenty two professional musicians, 6 advanced students and 49 novices. Semi-structured interviews were conducted to investigate approaches to interpretation, practice, memorisation and performance. The students and novices, aged 6 to 18 were also recorded both practising and performing a short piece. Current models were analysed and evaluated for their goodness of fit to the data. These included the formulations of Pask (1976b), Biggs and Collis

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(1982), Perry (1970), Marton and Saljo (1976a,b), Entwistle et al (1979b), Sloboda (1985), and Luria (1970).

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The results reinforced the greater explanatory value of these multivariate orientation models over older single construct models. However, while each illuminated aspects of the learning and performance of expert and novice musicians, none alone were able to provide an adequate explanation. The data showed that a better explanation was obtained when orientation to learning was seen to include measures of planning and arousal. The study also monitored changes in approach to learning occurring as part of the actual development of expertise.

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THE ISSUE: PART 1

INTRODUCTION: ISSUES IN LEARNING AND PERFORMING MUSIC

Historically research into the psychology of music education has largely been concerned with questions relating to musical ability. What is musical ability? What are the determinants of musical ability? How does musical ability relate to other abilities? How can musical ability be developed? Parallel with research in the field of intelligence much attention was devoted to developing tests of musical ability to aid in the identification of potentially talented children. However identifying children who may become proficient musicians cannot rely solely on such test scores, as the possession of a good ear although important, is only one attribute necessary for the acquisition of musical expertise. To play an instrument, motor skills need to be developed and even when technical problems have been mastered there remains an "emotional" element necessary for successful public performance. Personality characteristics are also important in so far as considerable persistence and motivation are required. Support from home, friends and school may also contribute to the child's enthusiasm and subsequently whether they continue to play an instrument. Early research based within a psychometric framework paid little attention to such factors. Neither had any guiding model been presented whereby the

many influences could be meaningfully combined to account for the learning and performance of music.

To address these issues a series of studies are presented. The first attempts to identify a practical model of the teaching/learning experience to include the contributions to learning outcome made by teacher, learner and significant others. The second study builds from the first attempting, from the perspective of the learner, to provide a framework that may guide our understanding of learning and performance in music. The third study examines the development of musical expertise by contrasting the approaches of experts with those of advanced students and novices. Although the first study was carried out before the commencement of the PhD registration proper the data were reanalysed and reported to enable a clear understanding of the development of the later concepts and research.

BACKGROUND

Historically there has been little research into the ways in which professional musicians prepare themselves for public performance and with the notable exception of Sloboda (1982; 1985) there has been no attempt to formulate an overall conception of the many skills which performers require. The expert performer needs to consider the musical interpretation of the composition, must develop

technical perfection, may have to play from memory, perform in co-operation with other musicians and contend with stagefright. Orchestral musicians also have to be able to perform in such a manner as to interpret the wishes of the conductor. These elements require technical, cognitive and performance skills. The former are usually acquired concurrently during the process of practice. However very little is known about the communicative and social skills required for musical performance.

Research on practice

Developing mastery of the instrument is acquired through many hours of practice. As Sloboda (1985a) puts it

"Most musicians probably expend the majority of their musical time and effort on rehearsal. The nature and quantity of rehearsal carried out is, therefore, likely to be the most important determiner of performing skill. However we know almost nothing about the precise ways in which musicians of differing skill go about their rehearsal." (p. 90)

Such studies as have been undertaken have adopted different methodology and there has been no underlying theoretical framework to assist in the interpretation of findings. An early study by Wicinski (cited in Miklaszewski, 1989) for instance, based on interviews with eminent Moscow pianists indicated two distinctive

approaches. In the first, distinctive stages in the work could be identified, i.e. acquiring knowledge of the music and identifying preliminary ideas, hard work on technical passages, a fusion of ideas from the earlier stages. The other approach was distinguished by practice proceeding in an undifferentiated way throughout the process.

In contrast Miklaszewski (1989) studied a single piano student in the initial stages of work on Debussy's Prelude Feux d'Artifice. Here the composition was initially divided into meaningful units for practice, there being a negative relationship between difficulty and length of section. As practice progressed the length of the sections tended to increase.

Gruson (1981) confirmed this finding in a study of the practice of 40 piano students and 3 concert pianists. Recordings of practice of pieces of appropriate standard were made and the analysis revealed that uninterrupted playing accounted for about 25% of total practising time, the other most frequent occurrences being, repeating a single note, repeating a bar, slowing down and errors. Four behaviours increased in frequency with increasing skill, repeating a section larger than a bar ($r=0.72$), playing hands separately ($r=0.49$), verbalisations ($r=0.37$) and actual time spent practising as opposed to unrelated behaviour. Three behaviours decreased with increasing skill, making errors ($r=-0.31$), repeating single notes ($r=$

-0.31) and pausing for more than 2 seconds ($r = -.31$). When discriminant analysis was carried out repeating sections larger than a bar was the most reliable predictor of membership of apprentice, senior student and professional groupings. Further recordings of a subset of subjects demonstrated consistency in their rehearsal behaviour.

Taken together these studies indicate that there may be individual differences in the way musicians approach learning and also that changes occur as the result of developing expertise. However they leave a great many questions regarding approaches to learning and practice unanswered. For instance are there individual differences in the regularity and extent of practice? How is practice organised? Does the attitude to practice influence the quantity or quality of work undertaken? Does the approach to learning differ according to the nature of the material to be learned? How is interpretation developed?

Within the musical literature there is little which might guide such enquiry although Sloboda (1985a) suggests that two quite separate activities are necessary for the acquisition of musical skill. Firstly a performer needs to analyse, listen to and discuss a great deal of music so that he has a large store of knowledge available to help in planning musical interpretation. He or she also needs to spend many hours practising to acquire technical skill. These activities can be carried out independently and

Sloboda suggests that they account for the existence of two common types of musician.

"The first type is the musician who can play relatively simple music with the utmost sensitivity and has a profound critical appreciation of other people's performance, but falters when high levels of speed or fluency are required. Such a person tends to spend a lot of time involved with music but neglects systematic practice..... The second type is the musician who can tackle the most demanding pieces in the repertoire from a technical point of view, but often performs them insensitively. Such a person tends to spend hours each day at his instrument, diligently attending to scales and other technical exercises but neglects to deepen his understanding of music through analysis and critical listening.....the master musician, of course, combines excellence in both these skills." (p 90)

This view is supported by Milstein.

"There are two requirements which must be present in a genius. First a sensitive imagination to interpret with feeling that which he plays. Second physical powers which will enable him to devote years of application to the steady study necessary to the acquisition of a perfect technique. A rare combination!" (Applebaum and Applebaum, 1972, p135)

Perhaps then there are qualitative differences in the way musicians approach their learning and practice which lead to qualitatively different performance outcomes. Can the

literature concerned with technical skill shed any light on this issue?

Technical skill

Bloom (1986) points out that

"The mastery of any skill, whether a routine daily task or a highly defined talent, depends on the ability to perform it unconsciously with speed and accuracy while consciously carrying on other brain functions."

In studying outstanding individuals in several areas of expertise including music, he found that generally 16 years of practice were required to achieve excellence. Twenty five hours of weekly practice were typical during adolescence subsequently increasing to perhaps fifty hours. Ericsson, Tesch-Romer and Krampe (1990) suggest that not only is practice vital to skill acquisition but that level of performance is a direct function of the amount of practice. Although paradoxically Sloboda and Howe (1991) found that music students judged as "better" than their peers had practised less in childhood. Perhaps then there is a trade off between ability and time spent in skill acquisition as indicated by Carroll (1963) and Davou, Taylor and Worrall (1991).

The development of automaticity enables economy of effort and rapid and accurate performance. Current theories suggest that musical skills are organised in terms of

schemas, i.e. organised units of knowledge, which are related to each other in a hierarchical way, higher level schemas controlling lower level schemas. Overall intentions are related to the highest order schemas and once these become activated the lower levels carry out their components with little upward reference (e.g. Shaffer, 1981; Sloboda, 1985; Smyth, Morris, Levy and Ellis, 1987). Conscious brain functions are thus free for consideration of such aspects of performance as interpretation (Sloboda, 1983). The level of automaticity acquired by expert musicians has been demonstrated by Allport, Antonis and Reynolds (1972) who demonstrated no decrement in comprehension of a shadowed passage while a musician was playing the piano.

There has been little direct investigation into the process of skill acquisition within the musical domain although there has been a considerable amount of research investigating the role of feedback. Computer feedback for instance has been found to improve performance (e.g. Brick, 1984; Tucker et al, 1977), while biofeedback techniques have assisted in muscular relaxation to improve technique (e.g. Levine and Irvine, 1984), and children experiencing musical learning difficulties have been found to benefit from augmented feedback (e.g. Cobes, 1972; Jones, 1979). There are also a number of studies which indicate that the feedback which musicians experience directly is systematically different from that perceived by

the listener (e.g. Harvey, 1985; Madsden, 1974; Patterson, 1974). This has important implications for performance.

Considered together this research then suggests that the amount of practice carried out is an important determinant of level of skill acquisition although other factors may also be implicated. The type of feedback for instance is important, reflecting the quality of teaching and the learning environment. The amount of time spent in practice will also be dependent on motivation and there may be a trade off between ability and time required for learning. Can the research regarding the acquisition of cognitive musical skill assist us further in the search for understanding the learning and performance of musicians?

Cognitive music skills

Musicians must not only acquire automated technical skills but must develop fluency in reading music, the ability to memorise and the knowledge required for successful interpretation. Much research in the field has explained these skills in terms of similarities between the processing of language and music, (e.g. Martin, 1972; Shaffer, 1976; Sloboda, 1985). There is, for instance, evidence that the same perceptual mechanisms may be deployed in both speech and music perception (Cutting et al., 1976), that music and grammar are processed in the

same way (Fodor and Bever, 1965; Gregory, 1978), that reading text and music involve similar processes (Green and Mitchell, 1978; Sloboda, 1974a), that proof readers errors occur in both (Pillsbury, 1897; Wolf, 1976; Sloboda, 1976b), and ¹ that increasing expertise in music reading brings about qualitative changes in processing in like manner to reading, (e.g. Sloboda, 1974b; 1977a; 1978a; 1978b). These perceived similarities have led to the development of artificial intelligence programs in music (e.g. Chomsky and Halle, 1968; Longuet-Higgins, 1972; Sundberg and Lindblom, 1976).

Although the mechanisms for generating and processing music and language may be the same the relationship between semantics in the two domains is more complex. What is meaning in music? It is generally accepted that there are two main types. Meyer (1967) labels them embodied and designative. Embodied meaning is "that which is perceived in the manipulation of the materials of the art", while designative meaning is "that which is perceived as referring to the world outside the work of art". A musical composition may therefore be heard as the relationships of harmonies or as referring to emotions, e.g. sadness, happiness. Support for this distinction comes from Gardner, Siverman, Denes, Semenza and Rosenstiel (1977) who concluded from studies of brain lesioned subjects that there is a behavioural and neurological dissociation between the two forms of musical sensitivity.

A number of studies have attempted to establish how emotional responses to music are elicited. One theory is in terms of the composer manipulating expectations, emotional reactions following their violations. There is some support for this (Swanwick, 1973) and also for the view that there are shared cultural meanings in music (e.g. Hevner, 1936; Watson, 1942; Sloboda, 1985).

Musical performance also depends on the musician drawing on a body of knowledge and expertise which enables him or her to go beyond the written notation and give meaning to the music. Studies addressing this issue suggest that musicians interpret notation in certain systematic ways dependent on unwritten rules, e.g. the nature of the work, placing of bar lines (Bengtsson and Gabrielsson, 1977; Gabrielsson, 1982; Sundberg and Lindblom, 1976; Sloboda, 1983). There are therefore clear parallels with text comprehension where meaning must be constructed.

It seems then that there are a number of similarities between the processing and generation of language and music although there are also a number of differences. Firstly musical symbols relate to action to produce sound in addition to the sound itself and these actions are predominantly motor skills. Secondly meaning in music has two distinct aspects. Thirdly music is performed, often from memory.

Studies of musical memory have generally been concerned with short term memory for fragments of music, rather than addressing the issue of how musicians commit to memory large scale musical works, although Rubin-Rabson (e.g. 1937) did conduct experiments on piano music memorisation. More recently Sloboda and Parker (1985) investigated memory for folk songs and proposed that the task involved building a mental model of the underlying structure in which not all the surface detail was retained, as occurs in the recall of text. Another facet of musical memory which has received considerable attention is absolute pitch. A recent review (Ericsson and Faivre 1988) concluded that the ability to recognise musical pitch can be demonstrated at many levels. Best performance is on familiar instruments, with a decline as artificially produced tones are presented (Bachem, 1937). Naming of pitches is also closely related to amount of formal training (Oakes, 1955) and absolute pitch can be acquired through training (Brady, 1970; Cuddy, 1970), although not all musicians acquire it (Sergeant, 1969).

Can this body of research guide our consideration of musicians approaches to learning and performance? While the analogy with language has aided understanding of specific cognitive processes and provided a framework for research it has not provided information as to how the relevant skills are acquired or applied. The research on

musical memory, in particular absolute pitch, leaves a number of unanswered questions regarding the relationship between ability and learning, although its recent consideration within the expertise paradigm has enabled a more considered evaluation of the literature. Typically however within the cognitive musical literature there is a disregard for individual differences in approach and a neglect of how these skills are acquired. The analogy with language highlighted the distinctive nature of musical performance. Might this influence the way learning is approached?

Performance Skills

Musical performance is essentially a social event. A musician or group of musicians attempt to communicate with an audience. There has been no systematic attempt to study the skills involved in this activity, neither has there been any study of the audiences perceptions of such communication. The literature includes no information regarding specific performance preparations although the problems of stagefright and overcoming it have generated interest.

Bochkaryov (1975) studying contestants in international music competitions found that while the less successful contestants reported more nervous feelings, they did not show more arousal as measured in terms of temperature,

heart rate or galvanic skin response. In contrast successful contestants showed heightened arousal actually during performance as oppose to just prior to it. Bochkaryov suggests that these candidates were able to mobilise arousal specifically for performance. Similarly Hamann (1982) and Hamann and Sobaje (1983) found that increased anxiety tended to facilitate performance skills, particularly for subjects with high task mastery, who had been learning for a greater length of time.

Several techniques for reducing debilitating stagefright have been examined, e.g. use of beta blockers (e.g. James, Borgoyne and Savage, 1983), cognitive therapy, (e.g. Whitaker, 1984), training in musical analysis (Appel, 1976), with mixed results.

One might hypothesise that personality characteristics would contribute to performance outcomes. However such studies as there have been have either considered the personalities of musicians in relation to the general population (e.g. Kemp 1981a; 1981b; 1982a; 1982b) or have compared the personality profiles of distinct groups of instrumentalists, i.e. strings, brass, woodwind (e.g. Bell and Cresswell, 1984; Davies, 1978). Given the lack of research a question that might be addressed is whether musicians vary significantly in their approaches to performance.

Conclusion

It is apparent from this consideration of the psychology of music literature that to further our understanding of how musicians learn new music and prepare for public performance some theoretical framework or model is required. Current psychological models of learning will therefore be considered in terms of their usefulness or otherwise in encapsulating the learning and performance behaviours of expert and novice musicians.

INITIAL STUDY

Aim

Historically the musical literature has been dominated by the psychometric measurement of abilities (Shuter-Dyson and Gabriel, 1981), latterly however there has been a consideration of the importance of learning, with an emphasis on time spent in learning and thus implied motivational factors (Sosniak, 1985a). Evidence, as to the relative importance of ability and practice is, as we have seen from studies of both technical and cognitive skill, equivocal and taken together indicates that there may be a relationship between the two. A psychological model of teaching and learning which takes account of such factors is that of Carroll (1963). The initial study therefore attempts to apply Carroll's model to the tuition of instrumental music.

Carroll's (1963) model of learning proposes that:-

$$\text{Degree of learning} = f \frac{(\text{time actually spent})}{(\text{time needed})} \times 100\%$$

This model is based on the premise that the learner will succeed in learning a given task to the extent that he spends the amount of time required for him to learn the task. Time is not merely elapsed time but rather time

oriented directly to the task and actively spent in learning. The determinants proposed as defining the time needed for learning are aptitude, ability to understand instruction and the quality of instruction, while time spent in learning depends on both opportunity and perseverance.

Method

Subjects

One hundred and nine children learning to play either violin or viola were studied. They ranged in age from 6.6 to 16.3 years and had been playing for between .3 and 9.75 years. Eighty two of the students attended one of five junior schools, the remaining 27 were at the local comprehensive school. The sample consisted of 48 males and 71 females, a reflection of the proportions of each sex generally receiving musical tuition. After a period of 6 months a record was made of those children who had given up playing. All the students had the same teacher.

Measures and procedure

Time needed for learning

Time needed was assessed by aptitude, ability to understand instruction and the quality of instruction. These were operationalised as follows:-

- a) To test aptitude, the Bentley Test of Musical Ability (Bentley, 1966), the Mill Hill Vocabulary Scale and

Raven's Progressive Matrices scales (Raven, 1938) were administered.

b) Ability to understand instruction was measured by requiring the childrens' class teachers in junior schools and class music teachers at secondary level to rate the children on a scale from 1 to 7, the lower end of the scale, i.e. 1 to represent very poor, the upper end, i.e. 7, very good with 4 as average. Musical ability was assessed similarly by the violin tutor.

c) Quality of instruction was held constant as the same teacher taught all the children.

Time spent learning

Time spent was assessed through a diary technique. Parents were asked to record the amount of time their child spent in practice each day. In addition a record was made of the child's age and the length of time he or she had been playing the violin/viola.

It was also felt that motivational factors would determine what Carroll called "perseverance". Hence seven point bipolar rating scales were designed to record pupils' intention to practise, attitude towards practice, the attitudes of significant others, i.e. parents, teachers, peers, towards practice and the motivation to comply with these significant others. These are presented in the appendix.

Degree of learning

Degree of learning was measured by results obtained in external examinations of the Associated Board of Music. As the examinations progress equally from Grade 1 to 8 it was decided, in consultation with professional colleagues, that a composite achievement score could be obtained by multiplying the grade taken by the mark gained. The examinations are marked out of 150 with a pass mark of 100. For subjects not yet of Grade 1 standard a scoring system ranging from 1 to 100 (100 being a pass at Grade 1) was devised based on the place reached in the music tutor used.

Analysis

The first step in the analysis considered the relationship of each predictor variable with overall achievement score. The correlation coefficients are presented in Table 1. Six of the ten predictor variables are estimates of the latent variable "time needed" in Carroll's model. These are labelled TN in Table 1. Four predictor variables estimate the latent variable "time spent" and are labelled TS in Table 1. Of the six predictors of time needed four bear a significant relationship to the overall achievement score. These are the Bentley Test score, the teacher's rating of ability to understand instructions, the teachers rating of musical ability and age. All of these relationships are at a high level of statistical confidence.

Of the four estimates of "time spent learning" two were significantly related to the achievement scores. These were time spent learning as measured by months of tuition, and total playing time calculated by multiplying observed average weekly practice by length of time spent learning music. Both correlations were substantial, .86 and .67 respectively.

The estimates of weekly practice, the Mill Hill vocabulary grades and the Raven's Progressive Matrices were not significantly related to measured achievement. However this lack of relationship may reflect the inaccuracy of measurement used rather than the lack of a true conceptual relationship. Weekly practice for example is not a sufficiently sensitive measure to be an index of overall achievement attained over months of exposure to music. Measured weekly practice may relate to learning for that week but not to achievement over a year. An important lesson to be learned therefore is the need to match the levels of measurement with the level of outcome measure. Similarly the Raven's Progressive Matrices and the Mill Hill Vocabulary grades may reflect immediate behaviour in a lesson but not be related to cumulative performance over a longer period of time. Examining variables at an appropriate level would seem therefore to be vital to avoid premature rejection of theoretical relationships which are true but only when tested at such levels. The four non-significant relationships

therefore do not negate the possibility of true theoretical relationships.

TABLE 1
CORRELATIONS WITH OVERALL ACHIEVEMENT SCORE N = 79

VARIABLE	CORRELATION	SIGNIFICANCE	
Age	.7006	.001	TN
Time learning	.8626	.001	TS
Total Playing Time	.6708	.001	TS
Weekly Practice	.2090	NS	TS
Mill Hill Vocabulary Grade	.2054	NS	TN
Raven's Progressive Matrices Grade	.1928	NS	TN
Teachers Rating Understanding	.4381	.001	TN
Teachers Rating Musical Ability	.4008	.001	TN
Bentley Musical Ability Grade	.4203	.001	TN
Overall attitude score	.0092	NS	TS

TN = Time needed

TS = Time spent

The second step in the data analysis was to examine the combination of predictor variables which would maximise the prediction of overall achievement, this analysis representing a more sensitive test of the Carroll model than the univariate correlations in Table 1. It also permitted an examination of the extent to which each of the variables contributed to the total variance, while controlling for the effects of the other variables. A stepwise multiple regression was thus carried out. The analysis revealed a multiple R of .902

($p=.0000$), the variables included in the final equation being: time learning with a beta weight of .796 ($p=.0000$); teachers rating of ability to understand instructions with a beta weight of .199 ($p=.0022$); attitude to¹ practice with a beta weight of .118 ($p=.0255$); Bentley Test Music grade with a beta weight of .167 ($p=.012$); Mill Hill Vocabulary Grade with a beta weight of .172 ($p=.008$). (See Table 2).

TABLE 2

STEPWISE MULTIPLE REGRESSION ON OVERALL ACHIEVEMENT SCORE

Multiple R = .90269 R squared = .81484
 F = 64.252 Significance = .0000

Variable	Beta Weight	Significance	
Time learning	.796873	.0000	TS
Teachers Rating of ability to understand instructions	.199840	.0022	TN
Mill Hill Vocabulary grade	-.172767	.0085	TN
Bentley Musical Ability Grade	.167702	.0127	TN
Attitude to practice	.118836	.0255	TS

TS = Time spent TN = Time needed

These results show that the Carroll model as operationalised by these measures accounted for 81% of the variance in overall achievement scores. This constitutes a level of prediction which cannot be obtained

with most, if not all intelligence tests and provides a valuable evaluation of the model. It also demonstrates its relevance within the domain of instrumental tuition. A number of significant points also arise from the data. When the single measures in Table 1 are combined, the rank order of importance does change although relatively little. Time learning and one measure of attitude to practice are maintained as predictors from the original estimates of "time spent". Teachers rating of ability to understand instructions, the Bentley Test grade and the Mill Hill Vocabulary grade also contribute to the predictive powers of the instrument, these being estimates of the latent variable "time needed". These two overarching constructs continue then to provide the basis for prediction of achievement.

It is also of interest that the Mill Hill Vocabulary grade and the attitude measure are now elevated to the level of acceptable predictors which they were not in the univariate analysis. This can be explained in terms of the power of the multiple regression procedure to assess the extent to which individual variables are associated with overall achievement while allowing for their association with the other predictor variables.

For the practitioner these findings confirmed the importance of time learning as the most important

determinant of achievement, while indicating the contribution of specific musical ability, ability to understand instructions and motivation as assessed by attitude to practice. This latter was one of a number of motivational factors considered, the others relating to the influence of friends, teachers and parents. None of these contributed to predicting learning outcome suggesting that the prime motivating factor in success is one's own interest and persistence. However such factors may be relevant in overall persistence, i.e. whether students continue to play or drop out. Interestingly the Mill Hill Vocabulary scale has a small, but significant negative weighting. This is particularly surprising as teachers rating of ability to understand instruction, which might be construed as a "verbal" ability measure is positively weighted.

Comparison of groups continuing and not continuing to play

As playing a musical instrument is a voluntary activity a number of students cease to play before attaining high grades and hence any sample is bound to be biased. For this reason subsequent to the original data collection a record was kept of those students who gave up playing over the next six months. This amounted to 26 students, 24% of the original sample. A discriminant analysis was then carried out to ascertain the factors distinguishing between those children continuing to play and those who

had given up playing. Using a stepwise method based on Wilks Lambda the following variables were found to contribute to the overall discrimination: teachers rating understanding (standardised canonical discriminant function co-efficient (.57), intention to practice (.527), Mill Hill Vocabulary Grade (-.60), teachers rating of musical ability (.448), Ravens Progressive Matrices Grade (.426), friends influence (-.338) and parents influence (.314). The eigenvalue was .4117 ($p=.0000$) and the canonical correlation .5400 (See Table 3). Table 4 shows the standardized Canonical Discriminant Function Coefficients and the group centroids.

Consideration of the correlations between the variables and the canonical discriminant function also enhances the interpretation of the analysis. The highest correlations were with; teacher's rating of ability to understand instructions, .6; teacher's rating of musical ability, .5; intention to practise, .4; Raven's Progressive Matrices Grade, .3; Bentley Test of Musical Ability, .24. The remaining variables had correlations of below .2 indicating a weak association with the function.

TABLE 3

DISCRIMINANT ANALYSIS ON GROUPS OF CHILDREN CONTINUING
OR NOT CONTINUING TO PLAY

Variable	Step entered	Wilks Lambda	Significance
Teachers rating			
understanding	1	.87071	.0001
Intention to practise	2	.80108	.0000
Mill Hill Vocab. grade	3	.77692	.0000
Teachers rating of			
musical ability	4	.74873	.0000
Raven's Progressive			
Matrices grade	5	.73306	.0000
Friends influence	6	.72389	.0000
Parents influence	7	.70838	.0000

Eigenvalue = .4117 Canonical correlation = .54

Wilks Lambda = .7084 Significance = .0000

TABLE 4

CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

Variable	Function 1
Mill Hill Vocabulary Grade	-.60108
Raven's Progressive Matrices	.42604
Teachers Rating Understanding	.57207
Teachers Rating Musical Ability	.44870
Intention to practise	.52783
Parents influence	.31471
Friends influence	-.33867

Group centroids

Group	Function 1
0 (Given up playing)	-1.12184
1 (Continuing to play)	.36010

The analysis also revealed that the discrimination was successful in classifying 79.82% of cases (See Table 5). The discriminatory model enabled a reduction in the proportion of errors of 45% beyond that which could be obtained by random allocation to the groups based on their size.

TABLE 5
CLASSIFICATION RESULTS

Actual Group	No of cases	Predicted Group Membership	
		0	1
Group 0	26	12	14
		46.2%	53.8%
Group 1	83	8	75
		9.6%	90.4%
Percentage correctly classified: 79.82%			

While overall the discriminant analysis correctly classified some 79.82% of cases the accuracy was considerably higher for the group continuing to play. Overall however the analysis supports Carroll's model of learning indicating the importance of ability factors and motivational influences, although some interesting features have emerged. For instance the importance of the influence of friends or parents, the influence of the former proportionately greater where students have given up playing. The loadings of the Mill Hill Vocabulary Scale and Raven's Progressive Matrices, suggest different discriminatory functions, the vocabulary scale having a negative weighting, the matrices a positive weighting.

Music School Attendance

TABLE 6

DISCRIMINANT ANALYSIS ON MUSIC SCHOOL ATTENDANCE

Variable	Step entered	Wilks Lambda	Significance
Teachers Rating			
musical ability	1	.85653	.0028
Intention to practise	2	.75776	.0003
Bentley Musical Ability			
grade	3	.67591	.0001
Overall attitude score	4	.61825	.0000
Mill Hill vocab. grade	5	.58502	.0000

Eigenvalues	Percentage of variance	Canonical correlation
Function 1 = .4439	70.71%	.5544
Function 2 = .1839	29.29%	.3941

Function	Wilks Lambda	Significance
0	.5850	.0000
1	.8447	.0141

As some children attended music school and this was also felt to be a valuable indicator of motivation and interest a discriminant analysis was carried out to establish what factors may predict attendance, non-attendance and initial attendance followed by drop out at music school. The

significant discriminators were the teachers rating of musical ability, intention to practise, Bentley Musical Ability Grade, overall attitude score and Mill Hill Vocabulary Grade. Table 6 summarises the analysis and Table 7 gives the standardized canonical discriminant function coefficients.

TABLE 7
CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

Variable	Function 1	Function 2
Mill Hill Vocabulary Grade	.47804	.20091
Teachers rating of musical ability	.19891	-.96750
Intention to practise	.79482	-.35986
Overall attitude to practice	-.04520	.90106
Bentley Test of Musical Ability	.41890	.72648

Group centroids

Group	Function 1	Function 2
0 (Never has attended music school)	-.58451	.32409
1 (Attended and then dropped out)	-.52148	-.93539
2 (Currently attends music school)	.75137	.01558

The percentage of cases correctly categorised was in this case considerably less than for children having given up playing, being only 50.01%. The detailed classification is given in Table 8. However the model enabled a reduction in the proportion of errors above random allocation to groups

of 33%.

TABLE 8

Actual group	No of cases	<u>CLASSIFICATION RESULTS</u>		
		Predicted Group Membership		
		0	1	2
0	45	27	2	16
		60%	4.4%	35.6%
1	20	12	3	5
		60%	15%	25%
2	42	10	1	31
		23.8%	2.4%	73.8%

Percentage of cases correctly classified, 57.01%

The accuracy of prediction is higher for the non-attending and attending groups, but rather poor for those who attend and subsequently leave. However the first function links teachers rating of musical ability, with Mill Hill Vocabulary scores, Bentley test scores and a weighting of attitude towards practice. The second function links Mill Hill Vocabulary Scores, with negative weightings for teachers rating of musical ability and intention to practise, but positive weightings for the Bentley test score and overall attitude to practice. The correlations between the variables and the canonical discriminant functions revealed that Function 1 had a grouped set of positive correlations; Bentley Test of Musical Ability, .58; teacher's rating of musical ability,

.56; Mill Hill Vocabulary Grade, .54; intention to practise, .497; teacher's rating of ability to understand instructions, .47; Raven's Progressive Matrices Grade, .45 and actual time spent practising, .21. The remaining variables fell below .2. Function 2 had only one substantial correlation, with overall attitude scale, .57. The group who attend music school show high loadings on Function 1 with slightly negative loadings on function 2. Those who attended and then dropped out show a moderately negative loading on function 1, but a high positive loading on function 2 and those who have never attended show moderate negative loadings on both functions.

Conclusion

Overall then the evidence from this study suggests that time learning, specific and general abilities in addition to motivational factors contribute to degree of learning and subsequent performance in music.

The subsequent elements of this study focus on the learner and address the issue of how expertise is acquired. The lack of appropriate models within the psychology of music literature suggested the need to consider a broader field particularly that relating to adult learning in view of the intention to study professional musicians approaches to learning and performance. It is to this that we now turn.

THE ISSUE: PART 2

What empirical or theoretical guidance then can recent psychological research offer to aid our search for understanding of the learning and performance of expert and novice musicians? Current developments suggest that learning can be better understood if it is viewed as the outcome of the learner's orientation, approach or style. Such complex perspectives seem to provide more coherent explanations of learning, particularly at advanced levels, and have also been successfully applied to practical and technical situations. As we have seen, single variable explanations in terms of ability, teaching quality or motivation alone seem to be inherently misleading as these factors combine differentially to influence learning and performance. Researchers have described the resulting combinations of these factors in different terms. Entwistle (e.g. Entwistle and Waterston, 1988) argues for an approach identifying the subcomponents in terms of factor analysis. Ames discusses the cognitions and self-evaluations which emerge from differing goal structures and their possible long term effects on learning orientation (Ames and Ames, 1984; Ames and Archer, 1988). Dweck on the other hand refers to personal theories of intelligence which in turn affect the conception of learning, motivational style and subsequent performance (e.g. Elliott and Dweck, 1988). Marton and his co-workers (e.g. Marton and Saljo, 1976b) emphasise the

phenomenological aspects of learning, considering both the learners intention and the specific context. The factors entering into the final combination are however less well defined. Adopting a rather different perspective Pask (e.g. 1976b) proposes learning styles and strategy use as the two main determinants of learning and performance. In spite of the differences in their positions these theorists agree on two main and fundamental points. Learning outcome and performance must be seen as a process and can only be explained by a higher order combination of cognitive, affective and conative factors.

The final strand of the study is concerned with the way in which musical expertise is acquired and draws on research concerned with the expert/novice distinction (e.g. Chase and Ericsson, 1981), interventionist models concerned with improving learning (e.g. Dansereau, 1978) and the empirical approach advocated by Bransford and co-workers (1980) which examines and contrasts exactly how learners at different levels of competence perceive and carry out their learning tasks.

The essential thrust of this research then is to explore the usefulness of these contemporary conceptions of learning and performance when applied to the musical domain.

INTRODUCTION

What factors might we expect to influence the way we learn and play music? Firstly, we need to consider the outcomes of learning. Given a similar learning task is it sufficient to measure outcomes in quantitative terms or do we need to consider qualitative differences? If there are indeed qualitative differences, how can we conceptualise them and do they relate to the approaches to the task adopted by learners? Perhaps within the musical domain it is also necessary to differentiate between approaches to elements within the overall task. For instance it may be possible to identify distinct approaches to learning, practice, memorisation and performance. The approach to learning may for instance depend on cognitive style, and levels of both acquired expertise and intellectual development, while the approach to practice may be more closely related to personality factors and motivation. Memorisation may be influenced by available strategies, specific task demands and anxiety, the latter also being particularly important in the way performance is viewed and prepared for. Or perhaps the approach adopted is dependent overall on the level of expertise which has been acquired?

Recent research in learning, particularly in Higher

education, has attempted to address these issues. During the late 1970's a number of contrasting approaches to the study of adult learning emerged quite independently, although they shared a common aim in attempting to define the "quality" of learning, moving away from simplistic quantitative assessment. This section will consider first research on learning styles, which developed from the cognitive style tradition, and then will discuss studies attempting to conceptualise changes in the quality of learning in terms of adult intellectual development. The phenomenological approach of Marton and his co-workers in Gothenberg will then be considered with its attendant concern for contextual factors and its subsequent development by Entwistle to a "motivational orientation" paradigm. Finally empirical work addressing the novice/expert distinction will be discussed including related research on metacognition.

LEARNING STYLES

Allport (1937) first adopted the term "cognitive style" conceptualising it as an individual's habitual mode of perceiving, remembering, thinking and problem solving. Later in the 1960's a number of researchers identified distinct cognitive styles e.g. Witkin (1962) field independence-dependence, Kagan (1965) impulsivity-reflectivity. Research flourished. By 1984 Messick was

able to identify 19 different cognitive styles, although most attracted little subsequent attention. Currently however there is a renewed interest in the field, although conceptually the construct is still problematic, perhaps more so given that some researchers have now additionally identified "learning styles" with the terms often being used interchangeably, e.g. Entwistle (1981). There is however consensus that cognitive/learning styles attempt to bridge the gap between personality and cognition, and that they are distinct from strategies in that they are applied without conscious consideration in numerous situations. There is however little consensus regarding the nature of such styles, while most are viewed as bipolar, each pole having differing implications for cognitive functioning (Messick, 1981; Witkin and Goodenough, 1981), some conceptions envisage utilisation of the positive features of both ends, e.g. Pask's (1976) "versatile learners" and Hudson's "all-rounders" (1966). Conceptually cognitive styles have been viewed as structures or processes. In the former the implication is of inherent stability over time while in the latter the interest focuses on the nature of change. Some researchers view style as a combination of these, i.e. relatively stable but modified by experience. These contrasting conceptions clearly have widely differing implications for educational intervention.

Of recent work related to specific styles the most

influential has undoubtedly been the work of Pask (1976b, 1977). He, concerned with both the quality of learning outcome and how it is achieved has identified two components necessary for a full understanding of a subject, "comprehension learning", which is concerned with building descriptions of "what may be known" in a subject area and "operation learning", which is concerned with "mastering operations and procedures" which satisfy descriptions. "Descriptions of what may be known" within a subject seem to provide a unifying framework in which otherwise discrete operations and procedures become integrated. "Versatile learning" utilising operation and comprehension learning is essential for full understanding. Comprehension learning is reflected in holist strategies and students showing a bias towards this approach adopt a wide view of what is to be learned looking for connections between disparate ideas and making wide use of analogies and illustrations. Students relying on operation learning adopt serialist strategies and focus narrowly on the elements of the task presented, examining immediate logical connections and looking for evidence. Versatile learners adopt both strategies interchangeably utilising whichever is appropriate. These conceptions were established by giving learners problem solving tasks in a "free learning situation" (Pask and Scott, 1972) and have clear links with the work of Bruner, Goodnow and Austin, (1956). Some students labelled redundant holists were also found to personalise their learning actually creating information. Two major

pathologies of learning, "improvidence" (an excessively narrow style) and "globe-trotting" (making hasty decisions from insufficient evidence) were also noted. Pask also demonstrated the effectiveness of matching learning materials to learning style (Pask, 1976b), and has subsequently developed concept maps demonstrating topics analogous to and pre-requisite for understanding others.

Pask's work has been important in enabling the focus of individual assessment to move away from quantitative notions towards a consideration of quality while additionally stressing that for complete understanding "versatile learning" is required. The importance of diversity in learning is also stressed by Hudson (1966) and Ramirez and Castaneda (1974). Perhaps then to elucidate the learning and performance of musicians' such diversity needs to be considered? It also seems critical to give due attention to the quality of learning. Both of these issues have been addressed from a number of differing perspectives and it is to one of these, the intellectual development approach that we now turn.

INTELLECTUAL DEVELOPMENT

Some researchers have considered changes in the quality of learning from a developmental perspective. Of these the work of Perry (1970) and Heath (1964; 1978) has been

particularly influential. Perry has considered in detail the way in which students move from simplistic assertions regarding the nature of knowledge to a more complex pluralistic perspective, while Heath examines a similar progression but in terms of personality characteristics.

Perry (1970) proposes a sequence of developmental stages, with nine positions along an intellectual and ethical dimension (See Table 9). Of the 9 positions position 5 is seen as pivotal in that relativistic reasoning is consciously recognised and incorporated into academic activities. Positions 1, 2, and 3 are described as the period of dualism, Positions 4, 5, and 6, the period of relativism and Positions 7, 8, and 9 as the period of commitment in relativism. Perry also identifies three conditions of delay, deflection and regression.

These levels are remarkably similar to the levels of information processing outlined by Schroder, Driver and Streufort (1967), although their scheme is not conceptualised as developmental, but rather descriptive of information processing within specific domains. In contrast Perry sees development occurring across domains, representing changes in the individual frame of reference. This view is supported by research suggesting a functional relationship between the way individuals construe learning and their approach to learning (Marton and Saljo, 1984; van Rossum and Schenk, 1984; Watkins, 1983).

TABLE 9

PERRY'S (1970) STAGES OF INTELLECTUAL DEVELOPMENT

Position 1. The student sees the world in polar terms of we-right-good vs. other-wrong-bad. Right Answers for everything exist in the Absolute, known to Authority whose role is to mediate (teach) them.

Position 2. The student perceives diversity of opinion, and uncertainty, and accounts for them as unwarranted confusion in poorly qualified Authorities or as mere exercises set by Authority "so we can learn to find The Answer for ourselves".

Position 3. The student accepts diversity and uncertainty as legitimate but still temporary in areas where Authority "hasn't found the Answer yet". He supposes Authority grades him in these areas on "good expression" but remains puzzled as to standards.

Position 4. a) The student perceives legitimate uncertainty (and therefore diversity of opinion) to be extensive and raises it to the status of an unstructured epistemological realm of its own in which "anyone has a right to his own opinion".

OR

b) the student discovers qualitative contextual relativistic reasoning as a special case of "what They want" within Authority's realm.

Position 5. The student perceives all knowledge and values (including authority's) as contextual and relativistic and subordinates dualistic right-wrong functions to the status of a special case, in context.

Position 6. The student apprehends the necessity of orienting himself in a relativistic world through some form of personal Commitment.

Position 7. The student makes an initial Commitment in some area.

Position 8. The student experiences the implications of Commitment, and explores the subjective and stylistic issues of responsibility.

Position 9. The student experiences the affirmation of identity among multiple responsibilities and realizes Commitment as an ongoing, unfolding, activity through which he expresses his life style.

In contrast, Heath (1964; 1978) stressed the importance of motivational and personality characteristics in facilitating intellectual progression. He described students in terms of, three personality types, and an ideal of intellectual development. The types, Non-committers, Hustlers and Plungers all progressed through their period of studying towards the same intellectual goal, the Reasonable Adventurer. The Non-committer is characterised by trying to avoid involvement explained in terms of a fear of failure. The Hustler in contrast is achievement oriented, aware of time pressures, and prefers factual courses. Examples of Plungers are few, but they are viewed as being dominated by their emotions, eccentric and individualistic. The ideal type the "Reasonable Adventurer" is characterised by six attributes: intellectuality, close friendships, independence in value judgements, tolerance of ambiguity, breadth of interests, and sense of humour. He is also capable of curiosity and criticism, both required for effective learning. Examination results showed those who approximated most closely to the "reasonable adventurer" to be most successful, Hustlers the least so (Heath, 1964). While the personality types remained consistent throughout the project there were substantial changes along the developmental category.

Although these approaches are similar, there being a close parallel between Perry's description of students at Position 9 and the characteristics of Heath's

Reasonable Adventurer, the emphasis is different. Perry adopts a somewhat narrower perspective concentrating on development in relation to understanding and subsequent commitment while Heath envisages a broader notion of development¹ including personality factors, relationships, etc. The tighter focus of Perry's formulation may therefore be of greater value, although his research did not consider relationships with academic achievement. Similar notions however have been presented by Schroder, Driver and Streufort (1967), and Gibbs, Morgan and Taylor (1984). Both approaches may nevertheless be relevant in considering the learning of expert and novice musicians, Perry's in relation to the development of awareness of alternative interpretations and personal styles of playing, Heath's in terms of the relationships between motivational and personality characteristics.

Recent research in Gothenberg, e.g. Marton and Saljo (1976b) has also considered learning in terms of the individual's intentions and the relationship of these to outcomes of learning. It is to this "approaches to learning" model which we will now turn.

APPROACHES TO LEARNING

Outcomes of Learning

Historically most studies aimed at improving learning

attempted to teach strategies for aiding recall of information and measured learning in terms of quantifiable outcomes. (Entwistle and Hounsell, 1979; Marton, 1976). More recently as we have seen research has been concerned with the quality of learning and the student's level of understanding, although this has not always been reflected in course requirements. The evidence indicates however that strategies appropriate for aiding the recall of information may not be appropriate for enhancing other aspects of learning (e.g. Nitsch, 1977; Mayer and Greeno, 1972).

A number of researchers concerned with students understanding, or achievement at "distinct levels of abstraction", "abstraction" being defined as "the identification of an underlying structure.....by means of which otherwise discrete arguments and details become integrated", have independently identified qualitatively distinct levels of understanding (e.g Fransson, 1977; Marton and Saljo, 1976a; 1976b; Svensson, 1976), differentiating between those who stress conclusions and those who describe information without relation to the conclusion. These categories have been subdivided to show four overall levels of understanding as described by Fransson (1977):

a) Conclusion-oriented, content.

The student summarises his main conclusions, explains his thoughts and reflections while reading the

text and summarises parts of the information that he has found interesting.

b) Conclusion-oriented, mentioning.

The student reports that he has found parts of the information interesting but he does not summarise the contents.

c) Description, content.

The student tries to give a neutral and complete summary of the content.

d) Description, mentioning.

The student has intended to write a complete list of the content of the text.

These approaches conceive of understanding at higher levels of abstraction as involving the perception of concepts as similar or dissimilar, e.g. facts, details and arguments might have similarities in that they support a common conclusion (Marton and Saljo, 1976a; Svensson, 1976; Fransson, 1977).

Work by Schroder, Driver and Streufort (1967) addressed similar issues studying how individuals resolved discrepancies, uncertainties or constraints in subject matter. Their classificatory scheme described levels at which individuals processed information and proposed a model of mental structures underlying these differences. Adopting a similar framework Biggs and Collis (1982) developed a taxonomy of learning outcomes, SOLO

(Structures of Observed Learning Outcome), which was designed to assess differential levels of abstraction. The first level, pre-structural, reveals an inability to comprehend, as the response has no logical relationship to the given information. At the second level, uni-structural, the response contains one relevant item but ignores other contradictory items, while at the multi-structural level the response contains several relevant items but all are consistent with the chosen conclusion. At the relational level most data is utilised and conflicts are resolved by a relational concept thus leading to a firm conclusion. Finally at the extended abstract level, basic assumptions are questioned, counter examples and new data are given, and a firm conclusion is seen to be inappropriate. This approach to measuring learning outcomes is distinctive in that it is not related to theory per se and aims simply at classifying outcome measures in relation to levels of cognitive abstraction.

There is clearly overlap between these attempts to describe levels of understanding. All might be considered as objective means of assessing the qualitative aspects of effective learning in particular contexts. How might these differences be exhibited in the sphere of musical performance? Accurate reproduction of the music is essential for public performance, representing perhaps a quantitative outcome, while quality might be assessed in terms of interpretation, musical expression, tone quality,

style, etc. If then it is possible to define qualitative as oppose to quantitative differences in the outcomes of learning is it also possible to identify qualitatively different means of achieving these outcomes?

Learning at Higher Levels of Abstraction

As we have seen research on the understanding of text indicates differential levels of abstraction. How then do individuals achieve these qualitative differences in understanding and remembering text? More meaningful learning might be expected to occur when there are extensive links between new concepts and those already stored in memory (Johnson, 1975). For new material to be matched to existing knowledge some transformation will be necessary and understanding at different levels of abstraction has indeed been linked with processing at different levels of abstraction as measured by subjective reports. Deep level processing appears to be related to attempts to understand, integrate or draw conclusions from the material (Marton and Saljo, 1976a; Entwistle, Hanley and Ratcliffe; 1979), while surface level processing is related to verbal reports of obtaining facts and information, trying to memorise, or the effects of external factors, e.g. anxiety, artificiality etc.

This work was considerably extended by Entwistle, Hanley and Radcliffe (1979). Although the findings from the

questionnaire data were equivocal, the interview data suggested that a distinction should be made between active and passive approaches. Four approaches to learning therefore paralleled the four outcomes outlined in the previous section.

Approach to learning	Outcome of Learning
Deep active	Describing and justifying conclusion
Deep passive	Mentioning overall argument and conclusion
Surface active	Describing facts and components of argument
Surface passive	Mentioning facts

The active and passive distinctions depended largely upon the degree of activity, attention and involvement shown by the student. The clearest pattern of results came from the science students, although distinctions could be made within other groups.

Also concerned with the quality of learning, Saljo (1979) demonstrated that individuals had very differing conceptions of their learning, some seeing it as merely a passive transfer of facts from teacher to pupil while others saw learning itself as an object of reflection. Pramling (1983) detected similar approaches to learning in very young children, paralleling the deep and surface outcomes found in Gothenberg (Marton, 1987).

Svensson (1977) extended the research additionally considering examination results and found that over two thirds of the students consistently adopted the same approach. Ninety percent of the doubly "deep" students were successful in their examinations in contrast to twenty three percent of the doubly "surface" students. However those adopting a deep approach also spent longer studying, which could account for their superior results.

Hounsell (1984a, 1984b) demonstrated the importance of the students conception of learning in relation to essay writing, some students conceiving essays as a question of argument, while others as the arrangement of facts and ideas. The former conception was clearly related to a deep approach the latter to a surface approach. These findings are supported by Van Rossum and Schenk (1984) who demonstrated links between deep and surface approaches to studying and the five qualitatively different conceptions of learning identified by Saljo (1979).

A number of studies have addressed ways of encouraging deep or surface approaches. Marton and Saljo (1976b), for instance, demonstrated that repeated experience of factual questions after reading, encouraged students towards a surface approach although experience of questions requiring a deep approach often was interpreted as demanding a superficial summary, described as a

"technified" deep approach. Fransson (1977) was able to facilitate a deep approach by making the content of the article more personally relevant, while stress tended to lead to the adoption of a surface approach. Biggs (1976) similarly found that the approach adopted reflected task demands, although for some students functioning at high levels of abstraction was problematic. Laurillard (1979) found that of 31 students, 19 used different strategies on different occasions although 12 did consistently adopt deep strategies, the nature of the article effecting the clarity of the observed effects. Similar effects were found by Selmes (1985, 1986) studying "A" level students.

Attempts have also been made to establish individual approaches using objective assessment procedures. From early work based on personality characteristics, aptitude scores, attitudes, values, motivation, study methods and self-rating scales (Entwistle and Wilson, 1977), Entwistle and his co-workers developed a study strategy inventory based on a number of the ideas discussed above and the work of Pask (1976b; 1977). They (Entwistle, Hanley and Hounsell, 1979b) applied the notion of approach to learning to a range of academic tasks in a natural setting. The inventory was administered to 700 first year students and factor analysis identified three main dimensions of study strategies. Factor I linked the deep approach, intrinsic motivation, comprehension learning and

syllabus freedom. Factor II grouped the surface approach, extrinsic motivation, syllabus-boundness, the strategic approach and to a lesser extent fear of failure and achievement motivation. This factor also had high loadings on operation learning. Factor III had the highest loadings on organised study methods and positive attitudes to studying but also contained elements of achievement motivation, intrinsic motivation and to a lesser extent deep approach. Entwistle described this as the Strategic approach. This analysis is similar to that obtained by Biggs (1978) in his examination of study orientations. Further exploration (Entwistle, 1981; Ramsden and Entwistle, 1981; Entwistle and Ramsden, 1983) necessitated reinterpreting the meaning of the deep approach within each academic discipline. These studies demonstrated that intention to adopt the deep approach is not sufficient for it to be successfully achieved and that particularly in science adequate prior knowledge and intellectual ability are also important. A fully deep approach was also seen to require both operation and comprehension learning (Entwistle, 1981). Further research has tended to confirm these findings, although four factors have subsequently been identified. These have been described as deep, surface, organised and strategic (Entwistle and Waterson, 1985). The organised and strategic factors are however less stable and represent the two main facets of the strategic approach. The main approaches identified in this work are summarised in Table 10.

TABLE 10
APPROACHES TO LEARNING

DEEP APPROACH

Intention to understand	
Vigorous interaction with content	
Relate new ideas to previous knowledge	{ Comprehension
Relate concepts to everyday experience	{ Learning
Relate evidence to conclusions	{ Operation
Examine the logic of the argument	{ Learning

SURFACE APPROACH

Intention to complete task requirements

Memorise information needed for assessments

Failure to distinguish principles from examples

Treat task as an external imposition

Focus on discrete elements without integration

Unreflectiveness about purpose of strategies

STRATEGIC APPROACH

Intention to obtain highest possible grades

Organise time and distribute effort to greatest effect

Ensure conditions and materials for studying appropriate

Use previous exam papers to predict questions

Be alert to cues about marking schemes

From the initial work in Gothenberg we can see how conceptions of the quality of learning and approaches to studying have developed. Qualitatively differing outcomes of learning have been related to both approaches to learning and differing conceptions of the learning experience itself. The evidence can be interpreted to support consistent individual differences in approach to learning and situational variability. Not all the studies assessing understanding were successful in producing clear cut distinctions in approach. In general however anxiety tended to induce a surface approach and personally relevant information a deep approach. An attempt has been made to identify types of students, who it is suggested maintain considerable consistency in their approaches to studying, although the importance of contextual effects is accepted. Perhaps then musicians adopt consistent individual approaches to practising? Or maybe the distinctive nature of musical performance and the learning task it presents constrains the choice of approach? Or perhaps as in other subject domains the specific nature of the particular task, e.g. concerto performance, orchestral work, dictates the learning activity utilised? Given then the agreed importance of contextual factors let us now consider which particular features of the learning environment have influence on the approach to learning adopted.

The Context of Learning

What particular features of the context might then influence the quality of learning? Is the nature of the teaching relevant? Is the nature of course assessment important? How might these exert an influence on the student's approach to learning? Let us examine the literature.

Ramsden (1981) investigated departmental effects on deep and surface approaches to learning and found that students in departments perceived as having good teaching showed higher scores on intrinsic motivation and the deep approach to learning. Further study (Ramsden, 1984) revealed both large differences in students' perceptions of departments regardless of academic discipline, and subsequent effects on approaches to learning. Heavy workloads with little freedom tended to induce surface approaches, while good teaching and syllabus freedom encouraged deep approaches. Some students however maintained a surface approach in spite of conducive conditions. While students attitudes to studying were affected by their perceptions of the department their organisation of studying was not. This seemed to be related to personal characteristics.

In addition to lecturer characteristics and course requirements the mode of presentation of material seems to

be important. Hodgson (1984) for instance showed that striking explanations and lecturers' own enthusiasms had an impact on students, encouraging changes of motivational emphases from extrinsic to intrinsic. Mahmoud (1985) also indicated that detailed handouts fostered dependency and a passive surface approach while Selmes (1985, 1986) found that formal teaching methods e.g. dictation, direct instruction, tended to induce passive learning and surface approaches. Informal methods and discussion groups facilitated a deep approach as did encouraging the learner to be independent. This is further supported by Newble and Clarke (1987) and Coles (1985). Similar contextual effects have been found in studies of approaches to learning in schools (e.g. Entwistle and Kozeki, 1985; Selmes, 1987).

Possibly the most important influence on students' learning is the mode of course assessment. Becker, Geer and Hughes (1968) found that students' academic life was dominated by assessment demands. Their studying could be viewed as a series of coping ploys designed to achieve the necessary grades for course completion. Snyder (1971) explained this kind of coping behaviour in terms of a distinction between the formal and "hidden" curriculum, the latter being what the students perceived as being most highly rewarded by the assessment system. Elton and Laurillard (1979) in a review concluded that "the quickest way to change student learning is to change the assessment

system." Students seem to actively attempt to establish what is required and will adapt their learning procedures accordingly (e.g. Deardon, 1976; Gibbs, 1981; Newble and Jaeger, 1983). If they perceive that memorisation of facts leads to better scores in assessment then they will adopt suitable learning strategies (Dahlgren, 1978; Dahlgren and Marton, 1978; Marton, Hounsell and Entwistle, 1984; Ramsden, 1984). The successful students are the cue-seekers and the cue-conscious (Miller and Parlett, 1974), who actively seek out the relevant information.

Anxiety can also induce a surface approach to learning, (e.g. Fransson, 1977). Students motivated by fear of failure seem to rely on surface approaches to studying (Entwistle and Wilson, 1977; Biggs, 1976) and Marton and Saljo (1984) describe what they call "hyper-intention", an extreme form of concentration on the surface of the presentation, characterised by a failure to learn, due to over anxiety to perform well. Perry (1970) also notes how students revert to earlier stages in their intellectual development when their ideas are under threat.

A number of contextual factors then, singly or in combination may effect the quality of student learning. Heavy inflexible syllabuses can produce anxiety, reduce the possibility of personal commitment, and lead to an attempt to memorise rather than understand in order to pass examinations. Traditional teaching may also lead to

passivity and reliance on others. Where there is greater syllabus freedom, examinations systems are more likely to be flexible allowing for greater personal commitment, lower anxiety and subsequent deep approaches. The tendency for students to seek out cues relevant to assessment, which may affect their approach to learning is an issue that must be addressed within the educational sphere at all levels. These studies then reinforce earlier suggestions that there is indeed a relationship between contextual factors and the quality of learning, irrespective of the individual characteristics of students. However there do seem to be consistent individual differences in both the quality of learning and the conception of learning. Could this be related to motivational factors? An alternative research focus has attempted to address this question considering the "motivational orientations" of the students. It is to this that we now turn.

MOTIVATIONAL ORIENTATIONS IN EDUCATION

Recently interest has focused on the role of motivation in education and there has been an appreciation of its vital importance in learning. For instance Bloom (1985) in researching outstanding individual achievements stressed that encouragement from early instructors was more important than their level of technical expertise (Sosniak, 1985). Motivational orientation research (e.g. Entwistle and Wilson, 1977; Pintrich 1989)

has combined a number of elements from previous research to attempt to encapsulate the complexities of motivation within an educational setting.

Entwistle and Wilson (1977) adopted cluster analysis and identified three distinctive motivational orientations. The first combined intellectual ability, high motivation and conscientiousness; the second was based on fear of failure, good results being obtained by effort and a focus on course requirements; the third was individualistic, characterised by aesthetic interests and radical attitudes. Interview data confirmed the distinction between students "hoping for success" and those who "feared failure" (Thompson, 1981) also revealing differing approaches to and perceptions of studying and the academic and social life of the university (Entwistle, Thompson and Wilson, 1974). A revised study inventory additionally assessed intrinsic and extrinsic motivation and revealed that interest facilitated both deep and organised approaches to learning while fear of failure and narrow vocational motives were associated with a surface approach. Hope for success was related to deep approaches but was more strongly associated with a strategic approach (Entwistle and Ramsden 1983).

Parallel work by Biggs (1978; 1985) outlined a similar three-stage model of student learning accounting for personal and situational factors and relevant

processes, which were then related to learning outcomes. The research indicated three common expectations influencing students motives, obtaining a qualification with minimal effort; actualising one's interest; and manifesting one's excellence publicly by obtaining the highest grades. These motives seem to be related to cognitive strategies; to reproduce what is seen to be essential; to understand; and finally to organise one's schedule to optimise available time on task. Factor analysis indicated three main orientations. The first is a striving towards "personal meaning", involving intrinsic motivation and strategies concerned with relating new information to existing knowledge. The second, "reproducing", has a vocational goal, motives being a need for qualifications and a fear of failure. Strategies involve rote learning and focus narrowly on the syllabus. The third orientation is "achieving" where opportunities to demonstrate excellence and compete are sought and the motivation is a need for achievement. Strategies involve organisation, structuring, meeting deadlines and playing the game, to win.

Not all research has confirmed these three orientations. Taylor (1983) identified four distinct orientations, vocational, academic, personal and social, each existing in two forms, extrinsic and intrinsic. Interviews (Taylor et al, 1981; 1982) revealed that school leavers commencing a course were motivated predominantly by

combinations of academic, vocational and social concerns while Open University students emphasised personal development.

Combining previous work and adding an inventory based on information processing (Inventory of Learning Processes, Schmeck et al., 1977), Entwistle and Waterston (1988) supported earlier findings, reporting four main factors. The first brought together surface processing, reproducing orientation, pathologies and serialist style; the second linked elaborative processing, meaning orientation and positive attitudes to studying; the third was composed mainly of items describing disorganised study methods and social motivation, with elements of negative attitudes; the fourth was less clear bringing together fact retention, with all three components of achieving orientation. The essence of these findings have been demonstrated in a number of studies in a variety of settings; in Australia (Watkins 1983), Hungary (Entwistle and Kozeki, 1985), and in Venezuela (Diaz, 1984), although the strategic and achieving dimensions merge or are combined with the other two factors in some analyses (see Entwistle 1988).

A related approach has been adopted by Pintrich (1983) who based his work on "general expectancy-value models", which take as their central interest students perceptions of themselves and the tasks they confront in the classroom

(e.g. Dweck and Elliott, 1983; Eccles, 1983; Nicholls, 1984; Weiner, 1986). Three main elements are considered, value components, expectancy components, and affective components. Pintrich (1989) also using cluster analysis revealed 5 "types" of students who differed in their performance patterns. Cluster 1 received the best grades on all performance measures, often engaged in metacognition effort management and were "good" students. Cluster 2 were "poor", performing at low levels on all tasks, adopting few metacognitive strategies, failing to regulate effort, expecting poor results and relying heavily on rote learning. The remaining groups were similar in overall performance but demonstrated differing patterns of behaviour. On the basis of these results Pintrich suggests that intervention to assist students can be pinpointed in ATI manner.

This approach then seems to provide a more complete and useful conception of motivation within an educational setting, particularly as it offers the possibility of positive intervention to improve learning. Although the vital importance of motivation in the development of musical expertise has been recognised there has been no attempt to explore individual differences in musicians' motivational orientations. Perhaps similar orientations to those outlined by Biggs and Entwistle, i.e. personal meaning (deep), reproducing (surface), and achieving (strategic) can be identified in musicians. Or perhaps the

approach of Pintrich with its emphasis on individual patterns of motivation may be more relevant to an understanding of learning and performance in musicians?

Before considering metacognitive models of learning let us examine the accumulated evidence on the development of expertise which are clearly pertinent to the present study.

THE DEVELOPMENT OF EXPERTISE MODEL

Early research into the achievements of outstanding individuals concentrated on explanations in terms of general or specific inherited abilities e.g. Terman and Oden (1947). Such approaches proved inadequate in accounting for individual differences in performance in many domains (Tyler, 1965) and more recent research has supported explanations in terms of acquired skill. This shift of focus led to initial explanations in terms of general problem solving heuristics (e.g. Newell and Simon, 1972), soon overturned by evidence of the importance of detailed domain knowledge in expertise (e.g. Chase and Simon, 1973; de Groot, 1965).

What then has research within the novice/expert paradigm revealed? Firstly that experts show superior memory performance for representative stimuli from their domain of expertise and for knowledge related to the

domain. This has been demonstrated in a variety of areas, e.g. musical notation (Sloboda, 1976), chess (e.g. Chase and Simon, 1973; Chi, 1978), go (Reitman, 1976), soccer (e.g. Morris, Tweedy and Gruneberg 1985). Experts in addition to having more knowledge can access it more easily, (e.g. Voss, Green, Post and Penner, 1983). and if it is relevant more efficiently (e.g. Jeffries, Turner, Polson and Atwood, 1981). On presentation information in the problem is also integrated with relevant domain knowledge (Patel and Groen, 1986). However the knowledge used to encode presented information varies widely from expert to expert as do retrieval structures (e.g Chase and Ericsson, 1982; Ericsson, 1985).

The expert also has highly developed metacognition, being aware of the demands of the task, the nature of the materials, their own capabilities, potential activities which will enable the goal to be achieved and the interactions between these factors. Studies of the relationships between high and low ability, available knowledge and self-regulation (e.g. Curtis, Gitomer & Glaser, 1983) have concluded that the observed self-regulatory differences between high and low ability individuals may be related to deficiencies in the knowledge base, precluding adequate monitoring of performance. Bransford, Stein, Shelton and Owings (1980) studied knowledge acquisition and demonstrated that successful students were more active in learning, related

information to past experience, and considered practical implications, while the less successful simply re-read. Further research indicated that while the less able students were able to recognise some indicators of difficulty, e.g. passage length, others, e.g. arbitrariness of relationships were ignored, although training did improve this skill. Similarly Chi, Bassok, Lewis, Reimann and Glaser (1989) found that better physics students took a more active approach to learning trying to explain why the steps of illustrated solutions were required.

These studies perhaps then provide a clue to the development of expertise emphasising the importance of monitoring, evaluation and planning of behaviour. As research has expanded across domains it has become apparent that there is little agreement as to what constitutes expert performance and evidence is equivocal (Holyoake, 1991). An expert may perhaps be best defined as "someone who is capable of doing the right thing at the right time" (Dorner and Scholkopf, 1991). There appears to be no single expert way of approaching all tasks. In general an expert will have succeeded in adapting his or her behaviour to the task so that it can be carried out most effectively.

How can this paradigm be utilised within a musical context? As we saw earlier, research has already compared

expert and novice performance in specific skills e.g. the reading of music (Sloboda, 1974; 1978). However comparisons of the approaches to learning, practice, memorisation and performance of both novice and expert musicians would further our understanding of how musical expertise develops and the relative importance of the knowledge base, strategy use, ability and time spent in learning. It may also provide pointers to individually preferred approaches which endure throughout the acquisition of expertise.

Given that experts seem to demonstrate greater metacognitive skill let us now consider research which has focused on improving learning through the teaching of strategies, self awareness or study skills.

INTERVENTIONIST MODELS

Effective learning may as we have seen depend to a great extent on "metacognition". Early research in the field tended to be concerned specifically with metamemory and concentrated on improving memory by instructing students in a specific technique, (e.g. Anderson, 1970; Brown and Barclay, 1976). Within the field of child development it was suggested that age related changes in memory performance resulted from the growing child's more frequent use of strategies (Brown 1975; Hagen, Jongeward and Kail, 1975) in conjunction with metamemorial processes and

knowledge acquisition (Harris, 1978). While research also demonstrated that strategy use could be taught a "production deficiency" was noted, where the child did not produce the strategy spontaneously but could be instructed to do so (Flavell, Beach and Chinsky 1966). Generally developmental research tended to indicate that children, with increasing age, developed a greater awareness of strategies and their likely outcomes, improved accuracy of prediction about performance and better estimates of their own individual memory capabilities (e.g. Cavanaugh and Perlmutter, 1982; Horowitz and Horowitz, 1975).

Transfer of strategy use was also found (e.g. Brown, Campione and Barclay, 1979), but training was only effective when a sufficient level of mental maturity had been attained. Within any one individual, metamemory skills also varied (Markman, 1974), and improvement in metamemory skills did not always lead to improvement in recall (e.g. Cavanaugh and Borkowski, 1980; Markman, 1974). Other important factors seemed to be prior knowledge and verbal ability (e.g. Hunt, Lunneberg and Lewis, 1975; Chi, 1978; Macleod, Hunt and Mathews, 1978). Strategy use itself may be a consequence of the verbal knowledge available to the child (e.g. Chi and Koeske, 1983; Naus and Ornstein, 1983), although not all the evidence supports this assertion (e.g. Schwartz and Wiedal, 1978). Increasing metamemorial knowledge may be

useful but it also appears to be limited by other factors such as general ability, prior knowledge, and motivation.

Another strand of research has considered the improvement of support strategies in children. One aspect of this research has concerned creating an optimal level of arousal. For instance, operant conditioning techniques have been used to improve hyperactive behavior (e.g. Doubros, 1966; Alabiso, 1975). Egeland (1974) has succeeded in teaching strategies for scanning visual displays and Luria (1961) taught verbal self-control strategies aimed towards internalizing the control of behaviour. Similar concentration improvement has been brought about by positive self-talk (e.g. Meichenbaum and Goodman, 1971; Meichenbaum and Turk, 1975; Patterson and Mischel, 1975) and success has also been found in encouraging the learner to "Stop, Look and Listen" (e.g. Douglas 1972).

Attempts have been made to improve students cognitive skills, often within a study skills programme. Early research demonstrated that students had little knowledge of alternate learning techniques (Dansereau, Long, McDonald and Actkinson, 1975a), and that there were large individual differences in conceptions of learning (Saljo, 1979). A wide range of study difficulties were also reported in schools (Tabberer and Allman, 1983; Swatridge, 1982; Thompson, 1982).

To address these issues interventions ranged widely in their approach from those with highly specific purposes to those encompassing both learning and support strategies. An example of the former are strategies taught to aid summarisation (e.g. Brown and Day, 1980; Day, 1980). Research utilising these suggested that instruction can aid "learning to learn" but ability will limit its effectiveness, and for the less able instruction will have to be very specific. Learning skills programmes specifically concerned with text processing also led to improvement on measures of grade point average, (e.g. Briggs, Tosi and Morley, 1971; Whitehill, 1972) and on study habits, (e.g. Bodden, Osterhouse and Gelso, 1972; Brown, Webe, Zunker and Haslam, 1971) However training has generally been non-specific, the student being required to develop more specific procedures unaided and as the study by Day (1980) indicated the less able student finds this problematic.

More generalised programmes have also been developed. For instance, Pask (1976b), encouraged the development of "versatile learning" in students. Some schemes derived directly from cognitive psychology (e.g. Sternberg, 1968a; Feuerstein, 1979). Dansereau (1978) devised a Learning Strategies Curriculum consisting of both primary and support strategies. This in contrast to other research benefitted lower ability students most, although this was mainly in terms of increased understanding of ideas

rather than increased recall of details.

Evaluations of "learning to learn" schemes have revealed that the context of learning can minimise any benefits gained, (e.g. Martin and Ramsden, 1987) and in some cases, (e.g. Ramsden and Beswick, 1987) study skill programmes increased the adoption of surface approaches compared with controls, the programmes encouraging strategic behaviour to meet assessment demands.

Can we say then that it is possible to teach young people to "learn to learn"? Howe (1991) while stressing that teaching certain cognitive skills and strategies can be useful, e.g. rehearsal, summarization, note taking, suggests that dramatic improvements in the facilitation of learning have not been demonstrated. As research considering the development of expertise has indicated it is not possible to make a clear distinction between a person's cognitive skills and the knowledge that that individual possesses (Glaser, 1984). The two appear to interact. While transfer may occur between related fields, (where there is sufficient overlap) skills do not appear to transfer easily. Shayer (1991a, 1991b,) agrees that intervention programmes have had little success in improving school achievement (Shayer and Beasley, 1987; Collings, 1987) but suggests that what is required is intervention within the content of the course material.

How then can the interventionist model be utilised in our consideration of expert and novice approaches to learning music? Much of the research on metamemory in children has indicated that while strategy used can be taught its effectiveness is limited by the learners ability, the level of prior knowledge, the context of learning, and the lack of transfer to other domains. Within the musical domain almost nothing is known about the kind of strategies which may be adopted, whether their use is dependent on ability, prior knowledge or the context of learning. This issue needs to be addressed. Research relating to support strategies also seems particularly pertinent in the musical domain given the nature of musical performance and practice. Control of arousal levels during performance is clearly important as is concentration during practice, where the lack of a visible end product can create unique persistence problems. The approach adopted by Dansereau et al. (1978) which initially attempted to establish the nature of strategic activity in students also provides a methodological framework for establishing expert and novice strategy use in the musical domain.

CONCLUSIONS

The purpose of the following studies is to elucidate the nature of expert and novice musicians' approaches to learning and performance. Which models from the literature introduced in the previous sections can best

assist in this task? What criteria must they satisfy? Firstly they must be capable of addressing the complexities of the musical learning experience, considering the technical, cognitive and social aspects in addition to motivational factors. Secondly they must be concrete enough to offer practical guidance. Thirdly they need to take account of changes arising as expertise develops and finally they need to be acceptable, i.e. have face validity, to professional musicians. Which of the models then can begin to satisfy these criteria? From the musical literature the work of Sloboda (1985) distinguishing technical and musical approaches with the "master" musician combining both, addresses issues of clear and practical relevance to musicians, thus having face validity. However the question remains as to whether it will satisfy the other criteria.

Within a cognitive framework, the work of Pask (1976), with its acceptance of differing styles of learning both required for a full understanding of a topic, in a number of respects parallels the ideas of Sloboda. In addressing individual differences in this manner it may within the musical domain have applicability regarding individual approaches to interpretation. The phenomenological approach pioneered in Gothenberg (e.g. Marton and Saljo, 1976) and subsequently extended by Entwistle and his co-workers (e.g. 1979) to a motivational orientation approach also considers individuality in

learning and the importance of both intentions and situational factors. It offers a means of addressing the complexity of musical learning and performance while its methodology in the form of interviews or questionnaires is both accessible and acceptable to participants. Perry's (1970) scheme of intellectual development and the SOLO taxonomy of Biggs and Collis (1982) also offer means of conceptualising changes in the processes underlying learning and its outcomes as expertise develops. Within the expert/novice paradigm the empirical work of Bransford and his co-workers (1980) seems particularly significant addressing as it does the issues of ability, knowledge acquisition and developing levels of expertise and relating them to observable learning activities. Similar differences in activity are identifiable in young musicians and the model is therefore deserving of further investigation within the musical context. These models, with the exception of that of Sloboda, also have in common that they are based within an educational framework where they have been applied, to good effect, in practical settings.

THE STUDY

Consideration of the musical literature and that concerned with models of learning enables the current research to be subsumed within the confines of the following questions:-

- 1) Can professional musicians' approaches to learning new music be explained by any current learning models?
- 2) Do any of the current models of learning adequately explain professional musicians' approaches to practice?
- 3) Can any of the current models of learning explain professional musicians' approaches to memorisation?
- 4) Do any current learning models have explanatory value in terms of musicians' approaches to performance?

Identical questions were also posed in relation to novice musicians thus enabling differences in strategies and conceptions of learning between novice and expert to be considered. This gave rise to a subsidiary question:-

- 5) Does the current expert/novice paradigm have meaningful application within the context of learning a musical task?

Methodological Considerations

The methodology was based on the principles of "grounded theory" advocated by Glaser and Strauss (1967) and was influenced not only by previous research but also by a number of constraints. First its' exploratory nature coupled with the degree of sensitivity required in data

collection argued in favour of a more open qualitative approach rather than a constrained experimental one. Second the more complex conceptions of learning in terms of orientation and approaches promised a more realistic interpretation of the tasks involved in learning and performing music. Research in these areas has developed a freer and more sensitive qualitative methodology through interviewing (e.g. Marton and Saljo, 1976a) and questionnaire data (e.g. Entwistle, Hanley and Radcliffe, 1979). Thirdly, the significant factors emerging from such research have tended to be internal processes concerned with mental structures such as intentions and personal conceptions of learning, all of which are only open to observation through the respondents reports. Fourthly, the nature and tradition of the subject matter, music, determined the most valid ways of quantifying performance itself. The most appropriate data collection technique therefore seemed to be in-depth interview or questionnaire.

The work of Dansereau, Long, McDonald and Actkinson (1975a), who administered an extensive learning strategy inventory to students provided one framework, and the methodology pioneered by the workers at Gothenberg, eg. Svensson, (1976) another. A semi-structured interview technique seemed to combine the virtues of each, particularly as the nature of the research was exploratory. This was therefore adopted for both professionals and

students.

While interviewing may reveal self perceptions of learning activities and capabilities there is considerable evidence of mismatch between reported stragey use and actual strategy use. Care was therefore taken to ensure the quality and meaningfulness of the data both at the point of collection and during analysis.

The successful outcome of this study therefore required rich and detailed information about the way expert and novice musicians conceptualised their tasks and undertook them. The semi-structured interview was designed much as in Svensson (1976), although initially the musicians were asked to outline their musical experience, this serving not only an information gathering function but providing an opportunity for the interviewees to familiarise themselves with the procedure before more searching questions were posed. All the interviews were conducted in the interviewees homes by the researcher also a professional musician and colleague of the subjects. Set questions were posed and as responses were given the interviewer probed further where appropriate to elicit more information.

The authenticity of the data were checked for internal consistency and where appropriate by collaborating sources. The issue of musicians misinterpreting their own inner perceptions was avoided by asking only for accurate

descriptions of their habitual actions.

The design also required the selection of a number of models perceived to be most appropriate to guide the analysis and interpretation of the data. Those chosen for the analysis were:-

- 1) Learning styles model (Pask, 1976b).
- 2) Intellectual development model (Perry, 1970).
- 3) Phenomenological approach (e.g. Marton and Saljo, 1976).
- 4) Motivational orientation model (e.g. Entwistle, 1987).
- 5) Musical orientation model (Sloboda, 1985).

The interviews provided the data base from which to assess the appropriateness of these chosen models of learning in relation to questions 1 to 3. The data relevant to a consideration of questions 4 and 5 came from the tape recorded practising and performance of pieces of music, information from the former being collated on a detailed observational scale, while the latter was assessed on a number of criteria, which were allocated marks out of 10 by two independent judges.

Question 5 was approached by identifying the major characteristics shown to discriminate between experts and novices in other learning tasks and, where these were deemed appropriate to the musical setting, basing

hypotheses on them. The study described earlier by Bransford et al (1980) was particularly influential in determining both the procedure and the hypotheses. The distinguishing characteristics associated with experts and novices based on this study can be summarised as follows:-

EXPERTS:- engage in active processing.
relate new materials to past experience.
attempt to remove arbitrariness from content.
discriminate easy from difficult content.
relate their learning effort to content difficulty.
make spontaneous use of elaboration.

NON-EXPERTS:- engage in passive processing, e.g. rereading of material.
little tendency to relate new materials to past experience.
little attempt to remove arbitrariness from content.
do not discriminate easy versus difficult content.
do not relate learning effort to content difficulty
do not make spontaneous use of elaboration.

These characteristics might also relate to the learning and performance of music. Perhaps they could also

discriminate between expert and novice musicians? Perhaps successful music students more readily identify difficult passages and concentrate their efforts accordingly? Perhaps the less successful music students adopt a strategy of repetition? How do students begin to recognise what is "difficult"? Is a certain level of knowledge and skill acquisition necessary? Clearly interview data alone would be inadequate to answer such questions, therefore as outlined earlier each student was recorded practising. An examination system already in operation in the L.E.A. required students to prepare a piece for 10 minutes before performing it in an examination. It was decided that this procedure would provide a slightly stressful and therefore realistic situation. Performance and practise were both recorded.

Gruson (1981) had already demonstrated the possibility of recording practice as a means of establishing strategy use. The data in her study were analysed according to a detailed observational scale and the results presented in terms of the proportion of time spent on various activities, eg. repeating a single note, repeating a bar, slowing down, errors etc. It was decided in this case to adopt a more qualitative analysis, omitting the time dimension, while nevertheless attempting to identify the kinds of behaviour undertaken during practice.

The present study then adopted a semi-structured interview

approach for the professional musicians and a recorded practice and performance session followed by a similar interview for the students.

PROFESSIONALS

A total of 22 professional musicians spanning a wide range of age and experience were interviewed, some at the beginning of their careers, others nearing the end. They played a variety of instruments representing most of the traditional orchestra, although one organist was included. All were practising freelance professionals working in a variety of environments as soloists, chamber music players, chamber orchestra players, etc. Most fulfilled all of these roles as the specific engagement required.

The interviews began by asking for a brief resume of the player's early musical experiences and their subsequent careers. Probing questions were then posed regarding current and previous practice habits, attitude to practice, and the approach to learning. The questions were designed to address the following specific areas of interest.

1) APPROACH TO PRACTICE.

- a) the regularity of practice
- b) the extent of practice
- c) the degree of organisation of practice

- d) the structure or routine of practice
- e) attitude toward practice
- f) the extent to which practice was technically oriented
- f) the ways in which difficult sections are identified
- g) ways in which difficult sections are practised
- h) detailed methods of practice
- i) physical props used in practice
- j) visual props used in practice

2) APPROACH TO LEARNING

- a) how unfamiliar music is learned
- b) how modern music is learned
- c) how the problem of interpretation is approached
- d) the role of listening to recordings in the acquisition of schemata or development of interpretation
- e) the use of a score to assist in learning new music
- f) differences in approach dependent on the nature of the task, i.e. orchestral as oppose to solo or chamber music

3) CHARACTERISTICS OF EXPERTS AND NOVICES

- a) differences in the nature and extent of expert and novice practice
- b) differences in the identification of difficulties

c) differences in the approaches to overcoming difficulties

d) differences in strategy use

e) differences in approach to performance

f) differences in strategies adopted for memorisation

g) differences in motivational orientations

h) differences in approach to learning new music

4) APPROACH TO MEMORISATION

a) the nature of the memorisation process

b) the way this process is effected by task demands

c) the effects of anxiety on memorisation, both process and performance

5) APPROACH TO PERFORMING

a) specific preparations made for performance

b) effects of stage fright on performance

c) effects of stage fright on performance preparations

d) coping strategies adopted

A few interviewees were given a piece of unfamiliar music to examine in an attempt to minimise discrepancies between reported and actual approaches to learning. They were requested to describe how the learning process would proceed, providing a convenient check of what had been reported in the preceding interview regarding their

approaches to learning new music.

The opening questions in the semi-structured interviews were as outlined below. After these had been presented follow up questions were posed as necessary to probe areas of interest further.

Structured Questions

Is your practice regular?

How much practice do you do?

Do you practise every day?

How do you organise your practice?

Do you enjoy practising?

Does your practice follow a regular routine?

Do you have a warm up procedure?

Do you practise studies, scales or exercises?

How do you go about learning a new piece of music?

Is your approach different if the new piece is totally unfamiliar?

Is your approach to learning modern atonal music the same as your approach to learning more traditional music?

Do you start playing immediately or look through the music first?

If the latter what are you looking for?

What do you find difficult?

How do you practise to overcome difficulties?

Do you use a metronome, if so what for?

Do you make a lot of markings on the part? If so why?

Would you acquire a score to help in learning a piece of music?

Would you listen to a recording to help you to learn a piece of music?

Is there any difference in your approach to practising different instruments?

If you have to play from memory how do you go about it?

Do you make any special preparations for performance?

Do you get nervous? If so how do you deal with it?

Do you teach? If so do you try to teach your pupils how to practice? Do you help them with performance tactics?

Early plans also included the administration of Eysenck's Personality Inventory (Eysenck and Eysenck, 1975) to examine the relationship between Introversion/Extroversion and practice habits, Rotter's (1966) Locus of Control Scale and a measure of Reflection/Impulsivity, the Matching Familiar figures Test (Kagan, Rosman, Day, Albert and Phillips, 1964). Although these tests were successfully completed for the student sample, the professional musicians objected strongly to the format of both the EPI and the Locus of Control tests and many refused to

complete them. It soon became apparent that the data would be incomplete and the tests were dropped from this element of the study. In contrast the Matching Familiar Figures test was perceived by the majority of the musicians as something of a challenge. Almost without exception they spent an inordinate amount of time ensuring that they gave the correct response. This proved very time consuming and was also abandoned in the later stages of the study. However the reaction of these professional musicians to alternate forms of psychological testing is interesting and may be worthy of further investigation.

STUDENTS

Fifty five students ranging in age from 6 to 18, and attainment from beginner standard to post Grade 8 were given a piece of sightreading to prepare and perform and were then interviewed regarding their practising at home. All the students were pupils of one teacher and played either the violin or the viola. The teacher, also the researcher, had deliberately avoided discussing practising with the pupils prior to the research. All the pupils were also taught as part of a scheme provided by their local education authority, either individually or in groups.

The beginners, who had only been learning for a few weeks were not given prepared sightreading to attempt independently, but were asked to perform one piece that they knew well and one newly presented immediately before the recording.

The other students had for the main part experienced preparing a piece in a 10 minute period for their L.E.A. violin/viola examinations and were therefore familiar with the format of the study in a normal setting. The recording element was carried out discreetly although a very small number of students "discovered" the equipment when they were left unattended to carry out their preparation.

The student interviews were identical in format to those of the professionals, although some additional questions were posed regarding external influences on their practice, e.g. parents attitudes. Because of the combined teacher/researcher role, the students were informed that the interviews and testing had significance in the wider context of raising standards of instrumental playing and tuition throughout the County. For the research to be effective questions must be answered honestly, disregarding, if necessary, the researchers normal role as teacher. This did seem to be effective in eliciting honest replies. The import of these

interviews related to analysing the contrasts between novice and expert approaches to learning and performance, therefore identical questions were posed. However additional areas of interest were relating reported information regarding strategy use to actual strategy use as observed in the recordings and also assessing the effects of parental support and assistance on learning approaches and outcomes. Specific areas of interest therefore which differed from those of the professional interviews were:-

- a) the effects of parental influence on practice
- b) the effects of parental influence on learning outcome
- c) comparison of actual with reported stragey use
- d) the specific effects of taking examinations on motivation and practice

The music chosen for the prepared sightreading was unknown to the children in advance and was of an appropriate standard for them to learn unaided.

VIOLIN

BEGINNERS Cowboy Chorus, Twinkle Twinkle Little Star, Hard and Fast, Old Macdonald, Frere Jacques. (From Tetra-tunes by S. Nelson).

PRELIMINARY GRADE Three in a bar from "Right from the Start" by S. Nelson.

GRADE 1 Fiddlers Fancy from "Right from the Start" by S Nelson; Allegro (No. 8) from Suzuki Violin School Vol. 1; Minuet No 1 by Bach (No 13) from Suzuki Violin School Vol. 1.

GRADE 2 and 3 Associated Board "Sightreading for violin" No 8; Hunter's Chorus by Weber in Suzuki Violin School Vol. 2; Minuet 3 by Bach (No. 15) from Suzuki Violin School Vol. 1;

GRADE 4 Gavotte in D Major by Bach in Suzuki Violin School Vol. 3.

GRADE 5 Bouree by Bach (No 7 in Suzuki Violin School Vol. 3); Gavotte in D major by Bach (No. 1) in Suzuki Violin School Vol. 5.

GRADE 6 Gigue from Sonata in D minor by Veracini (as far as the first repeat).

GRADE 7 and 8 Rawsthorne Violin Concerto (first page of the first movement OUP edition).

VIOLA

BEGINNER Short 4 bar piece written for L.E.A. viola examinations prepared sightreading assessment.

GRADE 6 Song Without Words by Mendelssohn in "A Book of Classical Pieces" by W. Forbes.

GRADE 7 Sonata No 1 in B minor by Bach (last movement, Allegro).

All the interviews were transcribed. The length of the interviews varied from two hours for some of the professionals to 10 minutes for the youngest novices. Answers were classified under headings relating to the main research questions. The diversity and richness of responses to the professional interviews confirmed the need for a phenomenological approach to analysis. The student interviews were similarly transcribed and the nature of their responses made it possible for yes/no categorisation to be carried out in addition to qualitative analysis.

Detailed written descriptions were also made of the practice sessions, on the basis of which it was

possible to complete checklists of actual behaviour for comparisons with verbal reports. The descriptions were very detailed including, errors, their correction, stops, starts, poor intonation, inaccurate rhythm, faltering, etc.

Two independent judges also rated the performances on marks out of ten on indices of overall impression, rhythmical accuracy, steadiness of pulse, notational accuracy, intonation, tonality and musicality (attention to dynamics, feeling for the music, etc.).

PROFESSIONAL AND STUDENT INTERVIEWS: AN ANALYSIS

The data obtained from the interviews were analysed in relation to the five main research questions. These were:-

1) Can professional musicians' approaches to learning be explained by any current learning models?

2) Can professional musicians' approaches to practice be adequately explained by current models of learning?

3) Can professional musicians' approaches to memorisation be explained by current models of learning?

4) Can professional musicians' approaches to performance be explained by current models of learning?

5) Does the current expert/novice paradigm have meaningful application within the context of learning a musical task?

If we consider the models of learning discussed earlier and relate them to the research questions we can ask:-

In relation to approaches to learning:

Can Pask's (1976) distinction between comprehension and operation learners assist in explaining musicians' approaches to learning new music? Do some musicians demonstrate the characteristics of versatile learners? Can the outcomes of learning be explained in terms of

"Structures of Observed Learning Outcome" (SOLO) as outlined by Biggs and Collis (1982)? Can developmental stages, from an absolute stance on the fundamental nature of knowledge to a complex pluralistic perspective be identified as outlined by Perry (1970)?

In relation to approaches to practising:

How successful is Entwistle's formulation (1987) of deep, surface and strategic approaches in accounting for professional musicians' approaches to practice? Or is the earlier work carried out in Gothenberg more appropriate, or perhaps the formulation proposed by Sloboda?

In relation to memorisation:

Is the relationship between the surface approach and rote learning applicable in a musical context? Is it possible to adopt a deep approach to the memorisation of music?

In relation to performance:

Can musicians' approaches to performance be explained in terms of the deep/surface/strategic approaches of Entwistle? Or is performance better encapsulated within Sloboda's framework?

To answer research question 5 the data were analysed to reveal fundamental differences in the ways in which the professionals i.e. experts, approach learning as distinct from the students, i.e. novices.

In previous research differential outcomes of learning have been identified which have then been related to the approaches adopted. In this research, the performance of all the professional musicians was of an extremely high standard technically and all displayed considerable musicianship and sensitivity. Nevertheless it was still possible to identify clear differences in their approaches to learning music, practising and memorising. In the students, differences in approach were initially obscured by their need to develop aural, cognitive and technical schemata but did emerge with increasing expertise. Quantitative and qualitative data regarding their performance were also analysed in terms of strategy development.

PROFESSIONALS APPROACHES TO LEARNING

Method of Analysis

The interview data were examined to identify direct or indirect statements in support of protocols which identified a particular strategy or learning style as identified by Pask (1976b). The protocols used were:-

STRATEGIES

IDENTIFYING PROTOCOLS

Holist	Subject seeks an overview of the music to be learned.
Serialist	Subject tends to work through the music sequentially.
Operation learning	Narrow focus on the demands of the presented task, examining immediate technical problems.
Comprehension learning	Subjects adopt a wide view of what is to be learned, listen to a great deal of music to develop ideas.
Versatile learning	Both strategies adopted interchangeably.

Objectivity was established by insisting on agreement between two independent judges. Only where there was consensus that a statement supported a protocol was it included in the analysis.

Analysis of data

The data revealed several distinctive approaches to the formulation of musical interpretation. Four areas of

differential behaviour emerged. Firstly it was possible to identify the use of holist and serialist strategies and those who tended towards operation, comprehension and versatile learning (Pask 1977). Secondly there was a distinction between subjects who preferred an analytic to an intuitive approach. Thirdly subjects varied in the level at which they allowed for spontaneity in performance, and finally there was evidence of learning at differential levels of abstraction as described by Biggs and Collis (1982), and at differential stages of intellectual development (Perry, 1970).

Holist Approach

Seventeen of the twenty two subjects reported consistently adopting a holist strategy on their initial examination of a new work. A further four did this on some occasions. This involved acquiring an overall conception of the work before detailed practice began and was expressed in statements such as the following:-

"I do have to play it through.....just to get the idea of what it's all about."

"Initially I feel my way through the piece, fumble through and somehow get through any difficult bits. In this way I find something in the music to latch onto, some shape."

"Probably the music will be played straight through

initially to get a feel for the piece in its entirety, particularly tempo and generally how it should go. This means that the speed of the difficult passages is established."

The three main reasons for adopting an initial holist strategy were then 1) acquiring an overview of the music

2) establishing the tempo

3) identifying difficult passages which will need extensive technical practice.

The approach adopted to execute this initial examination depended to a great extent on whether the musician was able to formulate an internal aural representation of the music without actually hearing it. Some, who required aural feedback played the piece through. For instance one stated

"I need to actually hear things, I can't hear very well in my head." Another said

"I do have to play it through a little bit just to get the idea of what it is all about."

"I must have something to hear. I can't hear very well just from the printed page."

Often a combination of activities was adopted, e.g. "I have a good look at the part and then will play the "salient passages" i.e. the thematically important

material."

There can also be an affective component. "On the first play through I get a feel for the whole thing, whether I like it. I pinpoint technical difficulties and bits I need to practise, whether the mood is the same all the way through, whether there are tempo changes. I try to relate speeds to each other, and get a feel for the pattern of the whole thing."

Contextual factors sometimes led to the acquisition of a very superficial overview, e.g. for the purpose of identifying difficult passages in an orchestral work, which needed technical practice but where interpretation would be controlled by others.

One musician consciously rejected the initial holist strategy because

"When younger, I tried to learn whole pieces too quickly, with poor results. Now I learn a chunk at a time. I choose a section to some obvious musical stopping place, play that through then pinpoint the difficulties and practise them."

However some framework must have been established to enable identification of the musical "stopping place". Two musicians reported rehearsing difficult passages "en route" as they progressed through a piece suggesting the

adoption of a more serial approach, although these instances were exceptional.

The initial approach of seventeen of the twenty two musicians interviewed was then holist enabling a musical framework to be established. The extent to which this approach continued to be utilised varied and depended to a great extent on the ability to create an internal aural representation of the music. What strategies then were subsequently adopted in the learning process? Was it for instance possible to find instances of comprehension, operation and versatile learners? Let us first consider comprehension learning.

Comprehension Learners

The data revealed that the two musicians who exclusively preferred the holist approach to interpretation adopted very analytical strategies. They also made wide use of analogy in their interviews, suggesting comprehension learning (Pask, 1976), a feature not observed in the other musicians. One, an organist, explained how he analyses thematic and rhythmical figurations, and harmonic structure, deliberately avoiding playing which may lead to technical practice which would distract from the analysis.

"You spend most of your time delving into the reasons of

it and then when you've virtually understood the reasons, the background of the age and the personality of the composer, then comes the time when you actually put it to the instrument, and more and more I find I spend far more time in dealing with construction and analysis and I learn quite a lot of my works without actually playing them."

The study of modern music, in particular Messiaen, lead him to realise that analysis was necessary to discover the underlying meaning of the music. Now he consistently adopts this approach and finds it rewarding.

"With Messiaen, one is dealing not just with the music but with the underlying parts of the meaning of his music, his modes of composition, his rhythmical complexities, and inversions, whatever....so even before one attempts to play notes, to actually analyse the work is so very, very important.this gradually rubs off on music from previous centuries and then one's most certainly into Bach's music where one analyses the fugal movements.....and from that side of analysis one can look at the rhetorical part of Baroque music."

Musically he aims to be "unique". If his interpretation diverges from that of the composer he will try to persuade the audience to his view. Interpretation grows from listening to a wide range of music, not merely organ music, and influences from different periods are incorporated into other genre, e.g. the clarity of baroque music has

influenced interpretation of modern works, illustrating the linking of disparate ideas described by Pask. Years will be spent preparing a "big work" before performing it in public. This description then indicates comprehension learning i.e. building descriptions of what may be known and also the use of holist strategies involving encapsulating an entire work, with interpretation planned in advance. One could describe it as a "top down" approach. where a cognitive analytic approach is adopted within the comprehension learning style. Is this merely an idiosyncrasy or is it also evident in other musicians?

One other musician exhibited characteristics which might also be considered as indicating comprehension learning. His interpretations are also developed from years of critically listening to records, concerts etc. and comparing and contrasting different performances, leading to a distinctive personal style. When discussing the interpretation of modern unperformed works he illustrated the tendency to draw on a broad knowledge base, suggesting first listening to the range of the composers output and then remarked that:-

"you might be able to bring some general expertise, but you will not in one performance really get to know the work, and only after a really long time do you really begin

to understand and know the piece. Really the way you interpret goes hand in glove with your maturity, and you can't mature in five minutes. Some people don't mature at all and others are incredible at a very early age. One needs time to evaluate a piece of music, one needs to live with it for a long time."

His performance plans, centring on pre-planned musical interpretation, indicate the adoption of a holist strategy, plans being formulated prior to the commencement of actual physical practice.

"Everything should be geared to sound. When one starts learning a new piece you start playing trying to produce certain sounds."

Detailed technical matters are seen as unimportant.

"If you can play all the right notes then it does not matter which fingering you use."

This then indicates an approach based on a holistic conception of the work.

Can we then describe these musicians as comprehension learners? Both made wide use of analogy in their interviews drawing from disparate fields, e.g. architecture, car mechanics, physical fitness, body temperature. Both develop interpretation from listening to a wide variety of music and have planned musical representations which they wish to achieve, established before they embark on

physical practice. In addition time is stressed as an important factor in developing deep knowledge of a work, not merely time on task, but elapsed time, although both believe it is neither necessary or desirable to physically practice for hours a day, providing that you have done "the right kind of cognitive work first". Here then an analytic stance is adopted within a comprehension learning framework. This seems to reflect alternative modes of conceptualising musical understanding, i.e embodied and designative. Other common characteristics of these two musicians was their development of distinctive styles of playing, the first describing a desire to be unique and the second explaining how in his youth he imitated preferred recordings, gradually developing his own ideas. Also important is their emphasis on constant re-evaluation of interpretation.

Issues of this nature are not well addressed by Pask's learning styles formulation but may perhaps be considered within the context of either the approaches to learning paradigm, in particular the work of Biggs and Collis (1982) or possibly the intellectual development model of Perry (1970). Let us then consider whether either of these formulations can encapsulate the depth of understanding exhibited by musicians in their approaches to interpretation.

Structure of Observed Learning Outcomes

Within the context of understanding text SOLO can be applied to learning outcomes, however within a musical sphere this may not be possible. Nevertheless it may have relevance in evaluating the actual approaches to interpretation. Table 11 then outlines how the levels might apply within this context. How successful then is the scheme in evaluating actual approaches to interpretation? Certainly both of the comprehension learners can be described as exhibiting behaviour at the highest SOLO level, the extended abstract, where basic assumptions are questioned, counter examples considered and a firm conclusion is seen to be inappropriate, as they constantly reassess interpretation, although within the limits of individual style. Despite the applicability of this highest SOLO level the lower levels would seem to be more appropriate for novice and less expert musicians. There are also clear difficulties in relating the presentation of arguments derived from text to a musical context. In music central issues concern whether the musician considers that there is a "right" way for things to be played, whether favourite interpretations are "copied", whether a number of influences are absorbed and, how individual style is developed.

TABLE 11

SOLO LEVELS APPLIED TO TEXT AND MUSICAL INTERPRETATION

<u>Level</u>	<u>Text</u>	<u>Music</u>
Prestructural	Inability to comprehend	Inability to translate notation into sound.
Uni-structural	Contains one relevant item	Correctly translates one aspect of notation but ignores others, e.g. key signature, rhythm.
Multi-structural	Several relevant items consistent with chosen conclusion	Able to accurately translate notation into sound.
Relational level	Most data utilised conflicts resolved by relational concept, firm conclusion reached.	Begins to recognise notions of style and interpretation
Extended abstract level	Basic assumptions questioned, counter examples and new data given, firm conclusion seen as inappropriate.	Challenges ideas of the composer, constant re-evaluation of interpretation.

Perhaps Perry's (1970) scale of intellectual developmental positions may be a more appropriate index of depth of approach to interpretation? Table 12 outlines how they might be reformulated in musical terms. If we examine the relationships in Table 12, this would designate the comprehension learners to the highest level 9, where commitment to a particular identity has been realised. It would also accommodate the second musician's report that early in his career he had "imitated" the sound and style of others until his own distinctive mode emerged. This could be described in terms of Position 7, where the student "makes an initial commitment in some area". This will be discussed in greater detail later in relation to operation and versatile learners.

Let us return to our initial question. Can professional musicians approaches to learning new music be explained by current learning models? The evidence presented does indeed suggest that holist strategies and comprehension learners can be identified, and that Biggs' SOLO levels and Perry's intellectual development model can all encapsulate aspects of the learning of these comprehension learners. However can these models adequately account for all of the reported learning related behaviour of these musicians? Perhaps not. Despite the clear similarities between these comprehension learners

TABLE 12
PERRY'S LEVELS OF INTELLECTUAL DEVELOPMENT APPLIED TO MUSICAL
INTERPRETATION

<u>LEVEL</u>	<u>CONCEPTION OF NATURE OF KNOWLEDGE</u>	<u>CONCEPTION OF NATURE OF INTERPRETATION</u>
Position 1	we-right-good vs other-wrong-bad	Emphasis on playing correct notes, no consideration of interpretation.
Position 2	diversity and uncertainty perceived but not accepted as legitimate	Other styles of playing observed but considered ill-founded
Position 3	diversity and uncertainty perceived as legitimate but temporary	Other styles of playing observed and seen as legitimate, but as temporary
Position 4	legitimate uncertainty accepted, but within certain confines	Other styles of playing are perceived as acceptable but only within certain limits.
Position 5	All knowledge and values seen as contextual and relativistic.	All styles and interpretations accepted as legitimate and possible.
Position 6	Necessity of orientation towards personal commitment realised	Need to develop personal style and interpretations perceived.
Position 7	Initial commitment made in some area.	Initial commitment made in some area, perhaps by imitation of individuals eminent in the field.
Position 8	Student experiences implications of commitment	Implications of commitment experienced.
Position 9	Student realises commitment as an ongoing activity through which life style is expressed.	Own personal style of performance developed.

one important difference emerged. In spite of their shared emphasis on understanding the music, one having planned interpretation, will meticulously mark fingerings and bowings so that "it is not lost" and will rigorously adopt this plan in performance.

"If you have worked hard to achieve certain ideas, when you feel you have achieved them you write them down".

For him, this ensures the best performance. In contrast the other rarely specifies fingerings as he likes to maintain spontaneity. None of the current models of learning discussed addresses such issues.

Operation Learning

If two musicians clearly exhibited comprehension learning were there any instances of operation learning? Pask defines operation learning as "mastering operations and procedures which satisfy descriptions". Students relying on such an approach tend to adopt serialist strategies, e.g. focusing on one element at a time in a sequential manner. The interviews revealed that some musicians did indeed adopt an almost completely "serial" approach to interpretation, e.g.

"The musical aspects of a piece will take care of themselves towards the end of the build up to performance."

One described how "interpretation develops gradually", initial rigidity being avoided to allow for change when technical mastery is complete.

In contrast to the evidence from other subject domains operation learners in music seem to progress to the highest levels of intellectual development in terms of their approach to interpretation. One describes, how having acquired an initial overview through playing, she learns a movement at a time then concentrates on sections. Early decisions based on both technical and musical considerations concern fingerings. These are frequently reassessed because as greater understanding of the music is developed their appropriateness is questioned, particularly from the interpretative standpoint. There is a constant reassessment and development of interpretation, particularly after performances, demonstrating once again attainment of the highest SOLO level. The role of live performance in promoting the pursuit of ever higher conceptions of interpretation would seem then to be an area worthy of further exploration.

Similarly another musician describes how each relearning must be tackled afresh to "try new ideas". In direct contrast to the comprehension learners these operation

learners actively resist influence on subsequent interpretation by avoiding extensive listening, particularly of works currently being learned. One explained "I want to make it individual". However in the later learning stages a wider perspective may be adopted through examination of the score but from an egocentric position i.e. to examine how their own part relates to the whole. This demonstrates once again Level 9 on Perry's scheme of intellectual development but achieved by a vastly different route. It seems then that in music the comprehension and operation learning styles are two equally viable but different routes to a deep level of interpretation.

In contrast to Pask's operation learners, who are described as "focusing narrowly on the elements of the task presented, examining immediate logical connections and looking for evidence", most of the serialist strategists tend to reject an analytic approach to the interpretation of music. The data indicate that for these musicians interpretation is something intangible which they prefer not to analyse. They exhibit an "intuitive approach". One described how musical interpretation was based on "gut feeling not purist views" leading to variations in interpretation across performances. Another said

"the actual mechanism by which you get from not being able to play a piece to being able to play it reasonably to your satisfaction, I believe is a completely sort of unconscious and intuitive process. Musical interpretation is not consciously planned and is probably learned subconsciously as practice continues, because when it comes to performance it actually has been pretty carefully worked out. Very little is left to the last minute. I don't have any musical feelings, I don't use words to describe it, it's what I feel as I play and it develops as I know the piece, it is subconscious."

This clearly indicates then a "bottom up" approach where interpretation develops as the music is learnt. It also clearly indicates "unconscious" processing in marked contrast to Pask's serialists who adopted conscious analysis.

Versatile Learners

Given that comprehension and operation learners have been identified is there any evidence of versatile learning? The interviews showed that several of the musicians did indeed demonstrate strategy use exemplifying Pask's (1976) versatile learning, i.e. adopting holist and serialist strategies interchangeably utilising whichever is most appropriate. However preferences for either holist or

serialist strategies were still apparent. Those with a leaning towards holist strategies, in contrast to the comprehension learners, seemed to need the kinaesthetic and/or aural feedback derived from playing. However like the comprehension learners they defined the scope of the work and its main elements, speaking of establishing a framework by identifying the "salient" passages before being concerned with technically difficult sections. Another described finding a skeleton or backbone and building on that.

"Whatever you do there is an inner discipline about it and any rubato etc. that you do is there because you want to put it there, it is not covering up inadequacies. It has all been thought out."

The importance of planning fingering and bowing is stressed by this musician in order "to bring off the musical moments", in a manner similar to the second comprehension learner. Top-down planning then is evident but the need for aural feedback precludes a totally cognitive approach. Also much less emphasis is placed on listening as a source for developing interpretation.

Other versatile learners seem to lean more towards a serial approach, tending to develop interpretation as practice progresses, rather than planning everything at the outset, although they may examine the structure of the work

initially. For instance one subject described the development of interpretation as a process of "evolution rather than change". For this subject the beginnings of learning a piece are always technical.

"I cannot do justice to the music until I can play the notes"

Although he can see the structure of the music from examining the score he cannot successfully form musical ideas in this way. These develop as he works on the piece and "breathes life into the music". This could be conceptualised as a "bottom up" approach.

Some musicians seemed to be largely unconcerned with musical interpretation in their practice. For them it was essentially a technical exercise. The nature of their instrument and performance circumstances frequently accounted for this, e.g. the percussionist. For others interpretation required, spontaneity, a rapport with other musicians, a sense of occasion. As one put it "when everyone is together and the music comes together it will work, a performance will emerge." It seems then that whatever overall approach is adopted towards interpretation a spontaneity/planning dimension is also influential.

Intellectual development Model

What of the stages of intellectual development outlined by Perry (1970), which were discussed earlier with reference to the comprehension learners? Are such stages evident in all approaches to interpretation? If so are the higher stages related to particular approaches or can they be achieved by differing routes? Almost all the musicians whatever their mode of learning re-evaluated interpretation, particularly after a performance, some approaching each relearning totally afresh to develop new ideas. This demonstrates attainment of at least the pivotal stage five, where all knowledge and values are seen as contextual and relativistic. Many of the musicians also demonstrated higher levels having made a "commitment" to a personal style of performance (Position 9). Some musicians attempted to emulate interpretations or performers that they admired, failing to put a "personal" stamp on their performances. This ploy was adopted by several musicians early in their careers, where playing was modelled on "idols", later to develop into a distinctive personal style. This might be described as Level 7, where "an initial commitment is made in some area". Others while demonstrating considerable thought over interpretation still listened to recordings as it was

"reassuring to realise" that one was "on the right track and that others play at similar or even steadier tempos." This possibly indicates Position 8 where "the student experiences the implications of Commitment, and explores the subjective and stylistic issues of responsibility". These definitions, realised for the purposes of academic rather than musical intellectual development, need to be specifically redefined and further researched in a musical context for firmer conclusions to be drawn.

The evidence from listening to recordings revealed similar differences in development. While for some these were used to develop interpretation, for others, particularly where works were unfamiliar (or modern) listening was an important learning strategy. Acquiring an adequate schemata was the aim. This was especially applicable if it was a concerto, two subjects actually described how they played with a record to simulate the orchestral accompaniment. Others were interested in knowing "what was involved" or "what needs worrying about".

The use of a metronome also indicated differential levels of intellectual development. Those at an advanced stage in Perry's scheme tended to use the metronome as a technical learning aid e.g to ensure stability of speed or to uncover any technical insecurities. Those at lower stages were more likely to use a metronome to define the composers frame of reference.

One might also conceptualise these levels of intellectual development as a "surface" approach (see Entwistle and Waterson, 1985), later developing to demonstrate the personal integration and interrelationships outlined in the deep approach categories, although Perry's formulation provides a more detailed analysis and reflects a more general pattern in the arts where strong influences from single or multiple sources early on lead to the development of personal modes of expression. Throughout an artist's career external influences will continue to impinge upon development but their effects will be mediated by the artist's responsiveness. This responsiveness may also be affected by an underlying preference for serial or holist strategies leading serialists to review and evaluate their end product within a more insular framework while the holists, more receptive to "distant" ideas, may change their whole creative stance to produce new work in a style totally unrelated to their previous work. Could therefore a preference for serialist strategies be related to singlemindedness in pursuing a course of study or action, particularly when this course is contrary to contemporary opinion? This clearly is an issue which could be addressed by future research.

The literature introduced earlier also indicates an ongoing attempt to elucidate the relative importance in any

learning task of individual consistencies in approach as oppose to context related factors. The interviews provided an opportunity for this relationship to be considered in terms of musicians' approaches to learning modern as oppose to more traditional music. It is to this that we now turn.

Approaches to Learning Modern Music

Modern music is often atonal in nature and frequently deploys complex rhythms such that it presents a quite distinctive learning task from that of learning more traditional music. This therefore offers an opportunity to investigate whether the musicians' approach is identified more closely with the nature of the musical material to be learned or with a more habitual learning approach.

During the course of the interviews it indeed became clear that a number of the musicians had negative attitudes towards modern music. One for instance described how she found it difficult to play and musically unrewarding.

"It is more of an intellectual effort, which although satisfying makes me query whether musically it is worth the effort." When given the Rawsthorne violin concerto to examine she showed an immediate negative reaction describing it as "strident" music and added

"I suffer like most of us do from having been brought up on a purely harmonic basis and therefore this enharmonic

atonal music does not come easily and when it does come I wonder what it is all about. Yet intellectually I know that I ought to be able to find something in it. I do try."

Another after examining the Rawsthorne concerto said if performing it, once the notes were learned he would

"try to make more sense out of it musically. Not that I think much musical sense can be made out of Rawsthorne anyway. He is not one of my favourite composers, he is too mechanical."

These subjects who expressed such strong views both adopted intuitive approaches to interpretation. Another whose approach was "versatile" said of the same piece

"If given this to play I should sigh..... I don't think it looks much fun."

In contrast one of the comprehension learners said that learning modern music had moulded his whole approach to practising, encouraging an analytical approach, which he found mentally challenging and thoroughly enjoyable. Learning complex modern works for him is a pleasure. The other comprehension learner had a similarly positive attitude.

For the majority however learning modern atonal music is viewed with apprehension and can evoke fear and panic. Rhythmic difficulties are often cited, specific strategies being developed to assist, e.g. marking beats, using a metronome, seeking assistance from colleagues. Most musicians adopt a cognitive approach, working out the

rhythm "in their head" before trying to play it. To overcome difficulties with pitch a fixed pitch instrument e.g. the piano may be used, one musician describing this as "un-playing" practice. A violinist described how

"if it was very weird I would go over it many times an octave lower until the sequence of notes was established."

Another summed up the problem in this way,

"most music is based on harmony, when you come to contemporary music or serial music it is based on intervals and one needs relative pitch."

To conclude, it seems then that a more intellectual approach is required for learning atonal modern music and that those musicians adopting an intuitive/serial approach find it particularly daunting while the comprehension learners enjoy the intellectual stimulation. This seems then to indicate that overall learning styles tend to be consistent but that non-preferred strategies can be deployed when necessary albeit reluctantly and perhaps with less success than preferred ones. The musicians interviewed also appear to demonstrate considerable metacognitive skill, a factor which will be considered more fully in the next chapter.

Review of Professional Musicians' Approaches to Interpretation

How then has the research into learning styles,

intellectual development and outcomes of learning enabled us to better understand musicians' approaches to interpretation? As has been demonstrated the distinctions made by Pask (1976) regarding styles of learning seem to have particular relevance to musicians' approaches to interpretation. Comprehension learners and operation learners can be identified, the former adopting an analytic approach, the latter intuitive approaches. Those adopting serialist strategies are narrower in focus, deliberately resisting outside influences, while the comprehension learners have a broader conception of the task. The operation learners also adopt sequential processing, developing interpretation as work proceeds, while the holists begin by planning their "performance". Although some musicians were described as "versatile" learners, demonstrating the use of holist and serialist strategies, they nevertheless seemed to prefer one mode of functioning over the other. The data indicated that these approaches were adopted consistently. There was however evidence for task oriented strategy use, e.g. the adoption of holist strategies by the majority of musicians to initially gain an overview of the whole work. The evidence from learning modern music, which requires the adoption of a more "analytic" approach, also indicated task related strategy use. However changes in overall approach were not evident, the operation learners generally feeling "uneasy" playing this kind of music. This again supports the notion that overall approach to

interpretation may be relatively consistent over time.

The Structure of Observed Learning Outcomes (Biggs and Collis (1982) cannot, as was discussed earlier, be easily adapted to the outcome of musical performance. However the highest level, the "extended abstract" could be identified in the process of preparing interpretation, by those adopting holist and serialist approaches. The earlier levels however were less easily defined in musical terms and Perry's (1970) developmental scheme was found to be more relevant, with all of the professional musicians, who demonstrated a concern with interpretation, having attained Position 5, and many having attained level 9. Further Perry's Position 7 seemed to adequately describe behaviour where a favoured interpretation was "copied" and Position 8 accommodated those who in many respects had attained level 9, but nevertheless lacked confidence and wished to confirm being "on the right lines" by listening to a person of greater expertise for reassurance. The data from the students will provide additional information regarding the overall adequacy of Perry's formulation. Nevertheless specific details within the scheme would clearly need modification to adapt to the musical context.

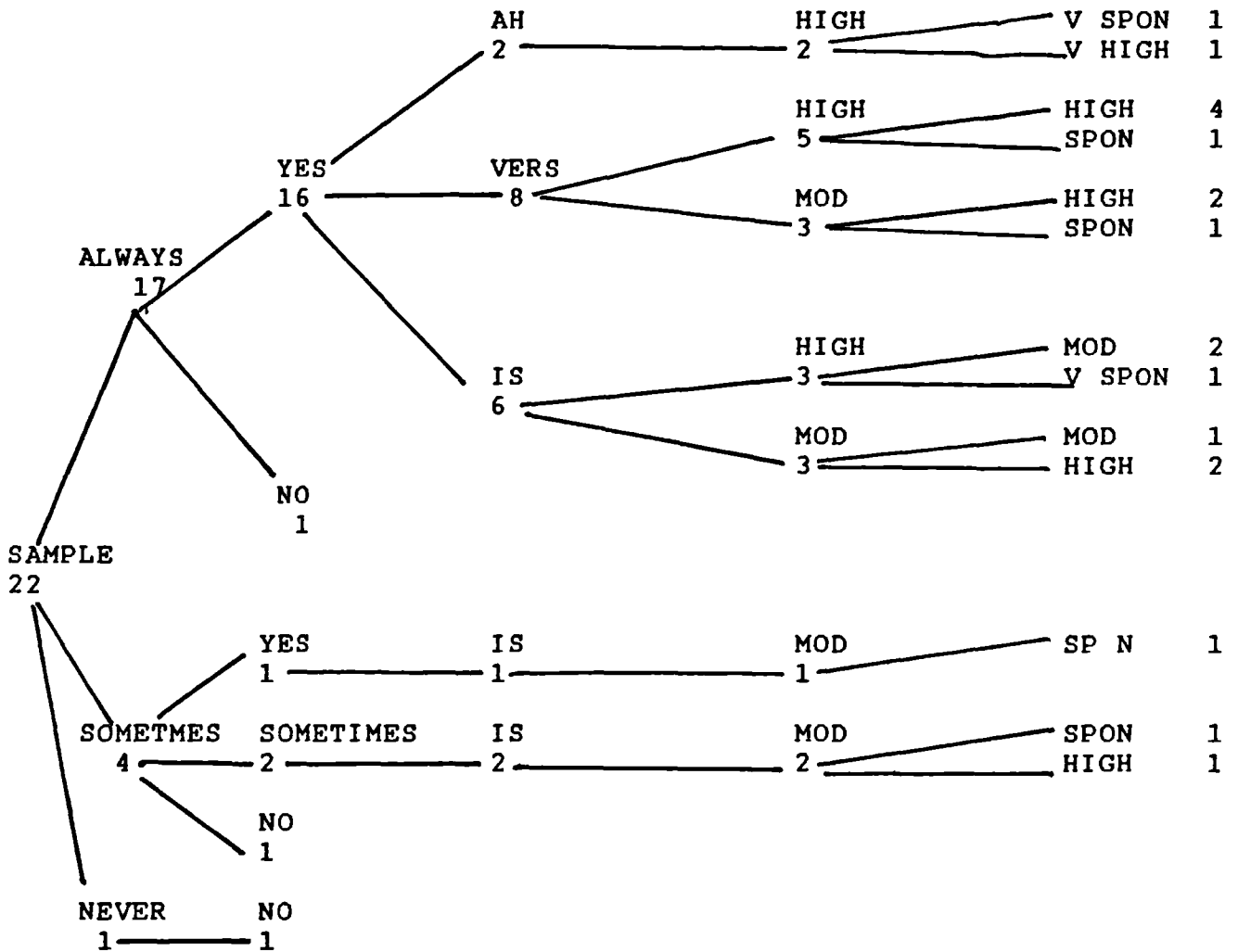
Is it then possible to categorise all the musicians on the basis of these findings? Table 13 outlines how this might be achieved although some categories were more clearly

defined than others. The approaches of the comprehension learners were particularly distinctive. These were characterised by the use of holist strategies, listening to a wide range of music, making wide use of analogy, attempting to understand the music and seeing the passage of time as an important element in learning. Only two musicians fell into this category, probably reflecting the nature of the musicians interviewed, i.e. performing instrumentalists. Such analytic approaches are more likely to be found in conductors, composers, academic researchers and possibly keyboard players, the latter having more information regarding the harmonic structure of the music. The two comprehension learners identified were an organist and conductor/violinist. In contrast the other musicians relied much more on aural processing. Those identified as operation learners adopted serialist strategies, resisted listening to recordings to avoid direct influence on interpretation and actively resisted cognitive analysis in favour of intuitive interpretation. Some fell between these extremes demonstrating versatile learning, although preference for either holist or serialist strategy use was still evident. Two musicians simply did not consider interpretation, hence it was impossible to categorise them. One initially adopted a holist approach, to get an overview of the work for technical reasons, while the other commenced practice on difficult sections immediately with a total emphasis on technique. Despite this however, both

TABLE 13

PROFESSIONAL MUSICIANS APPROACHES TO INTERPRETATION

<u>INITIALLY</u> <u>GAINS</u> <u>OVERVIEW</u>	<u>CONSIDERS</u> <u>INTERPRETATION</u>	<u>COMPREHENSION</u> <u>OPERATION</u> <u>VERSATILE</u>	<u>PERRY'S</u> <u>LEVEL OF</u> <u>DEVELOPMENT</u>	<u>PLANNED</u> <u>SPONTANEOUS</u>	
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KEY

Perry's levels 5 8 M d
 P rry's lev l 9 High
 Di i ns f planning, very high,
 high, m der t , pont neo s, very
 sp nt neo s.

still performed with great sensitivity.

High levels of intellectual development as described by Perry were identified in all groups who considered interpretation, and it was possible to indicate broadly where each musician fell on the scale. For the purposes of Table 13, those between levels 5 and 8 were defined as holding a moderate position, while those attaining level 9 were described as high. For future research however a scale more explicitly related to musicians' activities needs to be devised perhaps adopting a questionnaire approach to avoid weaknesses inherent in semi-structured interviews. These, while very effective in revealing in depth the salient aspects of each musician's approach, left some areas unexplored with individual musicians. In fact they seem to have elicited each musicians' personal constructs regarding practice (Kelly, 1955). It was also possible to identify dimensions of spontaneity and planning in performance but the parameters showed considerable individual variation. Two musicians for instance were prepared to change bowings and fingerings in performance, a number stated a preference for some level of spontaneity but within the confines of a well defined musical plan, while for others it depended on the nature of the music, e.g. concertos and chamber music. This planning dimension is not accounted for by Pask's model, although Entwistle and co-workers have within the strategic/organisational approach identified individuals

who plan their studying effectively. The variation in planning/spontaneity in these musicians however is spread across approaches to interpretation rather than being identifiable as a specific approach. Perhaps then a planning dimension needs to be considered as distinct from the actual approach to learning? Let us now turn to musicians' approaches to practice, which may shed further light on the matter.

PROFESSIONAL MUSICIANS APPROACHES TO PRACTISING AND
PERFORMANCE

Let us now consider our second research question. Do any of the current models of learning adequately explain professional musicians' approaches to practice? Three models will be considered in this respect. Firstly the technical/musical orientation described by Sloboda; secondly the phenomenological approach developed in Gothenberg; thirdly the motivational orientation approach of Entwistle and co-workers.

As we saw earlier Sloboda (1985) suggests that there are two quite separate activities necessary for the acquisition of musical skill. Firstly a performer needs to analyse, listen to and discuss a great deal of music so that he has a large store of knowledge available to help in planning musical interpretation. He also needs to spend many hours practising scales and exercises to ensure technical skill. Sloboda suggests that as these activities are independent, two types of musicians can be identified, "musicians" who play with great sensitivity but "falter" on technical passages and "technicians" who play with great skill but often lack sensitivity. "The master musician provides excellence in both these skills."

Does the evidence from the interviews support Sloboda's categorisations? Firstly it was necessary to operationalise the musical and technical descriptions in order to identify those statements from the interviews which belonged within each category. The operationalisation of the musical orientation includes statements which:-

- 1) emphasise the analysis of the piece.
- 2) emphasise comparison with other pieces.
- 3) emphasise the need to build up a store of musical knowledge.

The operationalisation of the of the technical orientation included statements which

- 1) emphasise the importance of scales exercises and studies.
- 2) emphasise the technical aspects of playing.
- 3) emphasise the importance of regular practice.

The definition of approach to practice was made on the basis of either the musicians' own description as evidenced from direct statements made in the interview or on the relative attention focused on each aspect in the description of practice.

Despite the fact that all the musicians interviewed exhibited great sensitivity in performance and had

considerable technical skills it became evident that there were indeed clear preferences of approach to practising. It was possible, as Sloboda indicated, to identify 12 of the 22 musicians who approached their practice from a technical point of view. Some indeed described how they regularly practised scales and exercises, ensuring that their technique was very secure. However in contrast to Sloboda's notion, this did not reduce the sensitivity of their playing. For instance one musician described the opening portion of her practice:-

"I start off with scales. I then go on to technical exercises. I do one finger exercise, one bowing exercise, then one in thumb position.....It's all pretty mechanical."

Another explained:-

"I do tend to have a set routine. I try and cover a bit of everything, every bit of technique when I practise because I find that if I don't, for instance, practise a bit of double tonguing for a few weeks and then suddenly I've got to use it I find it's a bit rusty so I try and do a bit of everything, long notes, lip slurs, extreme high notes, extreme low notes, even if I only manage up to half an hour. Then after I've done the routine I'll perhaps have a blow through something like a concerto."

A number of musicians categorised themselves in terms of a technical orientation to practice:-

"I think that the time when one is practising is the time to sort out the technicalities of it and that if you have that behind you then when you get together with everyone else and have the combined effect a performance will emerge."

Regularity of practice was demonstrated in a number of ways:-

"I practise on most days if I have time.....I miss it if I don't do it."

"I have to practice even to stay still, not to mention to go on and advance."

Only one musician, a comprehension learner could be categorised as approaching practice from a totally musical orientation as outlined by Sloboda. He never practised scales or exercises and only worked on technical passages within the actual music being prepared. He stated

"I'm a great listener....ever since 1939 I've collected gramophone records, simply because I've always been very keen to hear performance.....I heard the same piece played more than once and started to form opinions about interpretation and my own preferences through hearing A,B, and C."

With regard to scales and exercises he reported

"I think that you could teach the violin on repertoire

alone if you wanted to. You would have to be very selective about what you used as "study" material but there are from the great works of art, passages, sections that are long enough to be useful for practice material....You might get a page out of something which will help you enormously with certain technical points and at the end of it you've learnt a work of art. I'm very suspicious about studies. You've only got to look at the great players and you'll be amazed how they drop into two categories, those that are musicians and those that are technicians, very occasionally you get both."

Again emphasising the unimportance of technical matters he states:-

"I think fingering is very unimportant.....you've got to play the right notes but it doesn't matter a damn what fingering you use if you can play all the right notes. If you can play the Moto Perpetuo of Paganini without making a mistake by using only two fingers, well then go ahead. You know I don't think anybody can..but it doesn't really matter whether you start in the 1st position and move into the 3rd or start in the 3rd and move into the 1st. The public just want to hear you play all the notes."

Nine musicians, while they exhibited a preference for one approach gave due consideration to both aspects in their practising. However the data revealed considerable

complexities within this broad framework as we shall see.

Having established that there is indeed evidence for Sloboda's broad categorisations let us now consider individual cases in more detail. First the two musicians who in their approach to interpretation were described as comprehension learners. One exhibits characteristics very similar to those described by Sloboda. Everything is practised because it is to be performed. Interpretations have been developed from extensive listening over many years and the importance of sound is stressed.

"All practice is geared to performance and performance is essentially about sound. If one does not like the sound someone makes then you will not wish to listen anymore. Everything should be geared towards that, fingerings, bowings and so on."

Repetition alone cannot solve technical problems and hence his approach to practice is analytical "very, very definitely." Time is spent analysing difficulties rather than practising them.

"If something is wrong when you play a piece of music there is a very definite reason for it. It may be that your brain can't read the music fast enough, then you must go slowly; or you may have an inadequate fingering, intonation may be bad because of a fingering which is not good."

Mental analysis rather than physical activity is

stressed.

"If you can't play this passage, what do you do about it. You don't play it 60 times and people outside the door think "My God, that chap is really practising hard isn't he", because he's probably wasting his time. It's really like somebody hitting a nut 60 times when in fact you do not need a hammer."

In teaching, exams and technique are opposed for their own sake with the emphasis on performance.

"I'm anti exams and I'm anti technique for want of a better word.....in terms of studies and technical material....for the sake of it. But I do confess that maybe certain aspects, physical aspects of the fingers can be strengthened by exercisesI do concede that you maybe ought to do something repetitive for a while in order to develop but generally speaking I think that you could teach the violin on repertoire alone."

This musician himself supports Sloboda's distinction between "technicians" and "musicians" although "occasionally one gets both". For him musicianship is paramount and "small errors can be tolerated if they do not spoil the music".

The other comprehension learner while also emphasising musical factors in practice also takes account of technical factors and is therefore more accurately described as

having a mixed approach to practice. His description of how his approach to practice developed is instructive:-

"Nobody ever told you how to practice. Some people constantly sightread their way through concerts. But latterly when it became possible to understand some of the complexities of contemporary music.....even before one attempts to play notes, to actually analyse the work is so very, very important and quite a lot of contemporary music deserves this..... and so before you know where you are, you need not necessarily play a note. You spend most of your time delving into the reasons of it and then when you've virtually understood the reasons..... then comes the time when you actually put it to the instrument and more and more I find I spend far more time in dealing with construction and analysis.....and I learn quite a lot of my works without actually playing them."

Also practising for him often involves improvisation (at which he is a master), which he uses in preference to repetition, creating exercises in his improvisations which improve aspects of technique currently required. This he argues maintains a freshness which would be lost with excessive repetition.

"You can just sit down and create a composition that gives you spontaneous pleasure, so you don't have the mind bending experience of trying to perfect a piece. Through improvisation I've come to have greater freedom in

performance of repertoire. It helps me no end."

Scales are practised but inventively in "ways that will split the mind" e.g. in 9ths, 10ths, 12ths although he does believe in their importance for improving technique. Both comprehension learners agree however that

"It is not necessary to practise physically for hours on an instrument if you analyse and work on what you are going to play mentally."

Both then satisfy Sloboda's descriptions of "musicians", both denigrating repetitious practice and spending their time in the analysis and study of music. One however, stressing the importance of scales gives due attention to technical and musical factors, more properly being described as adopting a mixed approach.

Another musician, described as versatile in her approach to interpretation, nevertheless reports her priorities as "making a good sound, playing in tune and playing musically", wrong notes being seen as of secondary importance. The main thrust of her approach is clearly musical although not as conceptualised by Sloboda, since she does not listen extensively to music, or indeed analyse it. Perhaps then the issue is more complex than Sloboda suggests.

Phenomenological Approach

Let us now consider the second model of learning, the phenomenological approach in relation to musicians' approaches to practising? The main elements of this approach are the adoption of either a deep or surface approach to learning, i.e. an intention to understand or alternatively to reproduce. Are there any instances of musicians clearly adopting a "deep" approach? Certainly from the data considered earlier the comprehension learners stress the importance of "understanding" the music rather than undertaking repetitious practice. Could they be exhibiting "conclusion" oriented behaviour as outlined by Fransson, (1977) i.e. looking for the meaning of the music, as opposed to "description" oriented behaviour, where a neutral position is taken? They do seem to be exhibiting "deep" processing, attempting to understand, integrate or draw conclusions from the material, as outlined in the original research on qualitative outcomes of learning in Gothenberg (Marton and Saljo, 1976a).

Relationship of musical orientation and deep approach

Recent formulations by Entwistle and co-workers in terms of motivational orientations conceptualise the deep approach

in terms of not only intention to understand but also vigorous interaction with content, relating new ideas to previous knowledge, relating evidence to conclusions, intrinsic motivation and syllabus freedom. How might these then apply to approaches to practice? Let us consider then the operationalisation of the "deep" approach in relation to music (See Table 14).

TABLE 14

MUSICAL OPERATIONALISATION OF THE DEEP APPROACH

Intention to understand	Looking for meaning in the music rather than merely reproducing
Vigorous interaction with content	Analysis and/or intense concentration
Relate new ideas to previous knowledge	Use previous experience as a framework for learning new music.
Relating evidence to conclusions	Structural analysis of music.
Intrinsic motivation	Practising for its own sake.
Syllabus freedom	Own choice of repertoire.

The evidence already presented suggests that the comprehension learners do intend to understand, exhibit vigorous interaction with the musical content in terms of musical analysis and clearly relate new ideas to previous knowledge in the way in which they develop interpretation and examine logical relationships within and between pieces of music. What of intrinsic motivation? Certainly the comprehension learners seem to be intrinsically motivated. However their motivation is not to physically practise, but rather to analyse, and increase their knowledge of music. One, when questioned about enjoying practice said "Yes, after the first 45 minutes" and later "a rest is really quite nice" but

"I improvise. You can just sit down and create a composition that gives you spontaneous pleasure, so you don't actually have the mind bending experience of trying to perfect a piece." The other admitted

"I enjoy practice and rehearsals more than concerts but without concerts I fear I wouldn't practise."

This additional external motivation in the form of an imminent concert seems to be necessary therefore to embark them on their task and contrasts with the more recent formulation of the "deep" approach. Svensson (1977) also showed that "deep" approach students were not only more successful in their examinations but also spent more

time in studying. The deep processing comprehension learners however report spending less time physically practising, emphasising the importance of intellectual understanding. Perhaps these intellectual musicians find the repetitive nature of physical practice unrewarding and therefore attempt to achieve the required outcomes by adopting more cognitive strategies. Evidence from outstanding virtuosi provide additional support for this. Kreisler, for instance said of excessive practising "It benumbs the brain, renders the imagination less acute, and deadens the alertness" for that reason "I never practise before a concert."

He cited the virtuoso Kubelik, who practised for 12 hours on the day of a concert giving a technically perfect performance which was "a blank" (Schwarz, 1983).

Why then do these musicians exhibit negative attitudes to physical practice? One explanation proposed has been in terms of extroversion/introversion, extroverts being viewed as requiring increased stimulation and thus finding the monotony of skill acquisition tedious, e.g. Kemp (1981a). However it may be that it is the level of intellectual stimulation which is crucial rather than a general level of stimulation.

As outlined earlier another important aspect of the deep

approach described by Entwistle and co-workers is "syllabus freedom" and both the comprehension learners have chosen career paths which give them considerable independent musical freedom again highlighting similarities with the "deep" approach. Both conduct, perform as soloists, and have dominant roles within chamber music groups. An initial examination at least then tends to indicate that the comprehension learners in their search for meaning are adopting a "deep" approach as outlined in the original Gothenberg work and may also exhibit some of the characteristics of the "deep" approach as outlined by Entwistle and co-workers. However their motivation to physically practise is extrinsic, what they enjoy is analysis and the study of music.

What of the musician, described earlier, who emphasised the musical aspects of practice but does not match the criteria outlined by Sloboda? She has a versatile approach to interpretation but does not approach the music in an analytic way, although she will try to examine the score of works she is performing. She may also listen to a recording, but only after she has developed her own interpretation. She constantly reassesses interpretation both as she is learning a work and after each performance, and in performance she wants to "do well for the composer and the piece". Her practice is daily and she is

intrinsically motivated, she enjoys it. Can she be described as adopting a "deep" approach? She certainly seems to be trying to "understand" the music and draw conclusions regarding its performance, which would satisfy the criteria for the Gothenberg definition, although her means of achieving this are vastly different from those of the comprehension learners. She also demonstrates intrinsic motivation although "syllabus freedom" is not important to her:-

"If I could choose I would prefer the orchestral scene."

Here repertoire would be constrained by orchestral programmes and she would have no syllabus freedom. By some criteria she is then adopting a "deep" approach, but her strategies are again sharply contrasted with the comprehension learners. This being the case is the notion of a "deep" approach useful in a musical context? The early Gothenberg research defines it as attempting to understand as oppose to trying to memorise facts without understanding. If we adopt this definition surely all of the professional musicians must be described as adopting a "deep" approach? All of them have to understand the written music and turn it into sound. The issue then seems to hinge on what we mean by "understanding" in musical terms and, as we have discussed there are two distinctive meanings, embodied and designative.

If we adopt the original formulation of the "deep"

approach, as drawing conclusions and trying to understand, we find evidence of its adoption in relation to technical practice by musicians who prefer an intuitive/serialist approach to interpretation. One, for instance, described how a passage will be

"broken down to a very small problem, taking in bits as one would learn a line of poetry at a time. The brain is then given a small problem to solve and can go into it in depth." The length of the section to be broken down will depend on what is felt to be manageable. This theme recurred.

"If you break things down and play them slowly they all become easy."

"The main thing is to pin-point the problem and then go over it slowly enough so that one can sort it out and then not practise the mistake and make it worse. Once you have sorted out the difficulty then you can speed it up."

An analytic, deep approach to technique therefore is not exclusively adopted by the comprehension learners and offers an alternative to repetition, although musicians adopting a strict "serial" approach, will initially ensure accuracy, usually by playing very slowly, before embarking on repetition to increase speed. Another interesting strategy adopted by a number of musicians from both the serial and mixed practising groups is to play a passage at an impossibly fast speed to "get into another gear". Those adopting an analytic

approach to technique, in contrast tend to alter rhythms, make up exercises, adopt different modes, e.g. staccato or legato, to vary the nature of the repetition. This illustrates that the strategy adopted may not be determined by broad individual differences but rather by preferences related to particular tasks.

Where does this leave us then with regard to the technician/musician formulation of Sloboda and the relevance of the deep approach in understanding the behaviour of musicians? One comprehension learner does indeed conform to Sloboda's criteria for classification as a "musician", although the other adopts a more balanced approach to practice. Another musician, a versatile learner with regard to interpretation, while emphasising the importance of musicianship in her practice, nevertheless does not meet Sloboda's criteria. With regard to the "deep" approach, all clearly intend to understand the music, are intrinsically motivated, although not always to practise but rather to analyse, and exhibit varying degrees of "syllabus freedom", in terms of initiating projects themselves. There is also evidence of the adoption of deep approaches to the technical aspects of practice by musicians identified as operation learners or versatile in their approach to interpretation. While there seem to be considerable complexities in the relationship of practising to the formulation of Sloboda

and the "deep" approach there do seem to be sufficient areas of agreement to pursue the relationship further. Let us now consider whether there is a relationship between Sloboda's technical orientation and the surface approach identified in Gothenberg and extended by Entwistle and co-workers.

Relationship of Technical Orientation and Surface Approaches

As outlined earlier there is indeed evidence of musicians whose practice emphasises technique. Can these musicians' approaches be adequately conceptualised within Sloboda's technical orientation? Or can their mode of practising be better explained in terms of a surface approach as outlined by the workers in Gothenberg or by Entwistle and co-workers?

Let us consider the case of one musician who clearly adopts a technical approach to practice as defined by Sloboda's criteria. She has established a daily routine which precedes all specific preparation for performance.

"I have an absolute regime of arpeggios and scales and if I don't start with that I feel absolutely there's something wrong".

Certain "tried and tested" studies are used because "they do me good. I need them." If time is available, these will be perfected before performance preparation begins. As

she practises, technique is "put under a microscope." Exercises are played slowly being gradually speeded up as practice progresses. Interpretation develops only as the technical aspects are mastered, a serial strategy being adopted with only a cursory overview being obtained. When examining orchestral music she would "not waste time on what was straightforward" but would go immediately to difficult passages. No information was volunteered about the musical aspects of practice until it was specifically requested, all the points raised were regarding technique. For her ideally "the musical and technical practice should be separate". She prefers to practise technically in the morning and then "play" musically in the afternoon. This terminology indicating a view of practice as work, a means of improving and consolidating technical expertise while musical interpretation constitutes play, being more enjoyable. For this musician, practice is a daily occurrence, even when no concerts are imminent. Nevertheless despite an apparent disinterest in musicianship the performances given by this musician are always extremely sensitive suggesting that musical outcome need not be affected by the approach adopted. This concentration on technique in practice, which does not exclude musicianship in performance, tends to undermine Sloboda's dichotomy.

What factors could account for this suprising finding? Perhaps "musicianship" is related to a separate dimension associated with "emotion" and "sensitivity", independent of approaches to learning and largely unconsciously controlled. Although all the musicians interviewed were sensitive musical players, insensitive playing in the manner described by Sloboda does exist and is identifiable not only in "technicians" who one might deduce adopt serialist strategies but also in "academic" musicians whose focus is the cognitive analysis of music. One might hypothesise that they are comprehension learners with low emotional/sensitivity. Kemp (1981) identified three stable traits common to musicians, "introversion, pathemia and intelligence". The feeling attitude of pathemia was described by Cattell (1965) as "living at the hypothalamus level" and this may encapsulate the emotional element inherent in sensitive performers.

Let us consider one other case in the light of Sloboda's musical/technical orientation, a musician who adopts a technical as oppose to musical approach to practice, while adopting a versatile approach to developing interpretation. Sloboda's criteria appear to be satisfied in that her practice is regular and begins with

"Slow things first of all. Ideally one should do long

notes, but it tends to be slow scales, listening carefully to the sound and the pitch and things like that followed by some more complicated scales.....If I had only an hour it would tend to be 20 minutes of that kind of thing followed by 20 minutes of maybe a study, which you can use for years and years and they are still useful, followed by something which one needs to perform."

Practice is regular being viewed not in terms of improvement but rather maintaining the status quo and preventing muscle deterioration. In learning new music, an overall conception of mood, tempi, etc is established with difficulties identified to be practised systematically with the metronome. Although technique is the focus of practice, the approach is not repetitive, problems are analysed, slowed down, broken into sections, rhythmically adapted and then speeded up. A score and recording may be used as a learning aid, but not to develop interpretation. Practising itself is seen as essentially technical, "the music will take care of itself in performance." In common with the other technically oriented musician however her performances are very sensitive and musical.

Do these technical approaches to practising then have any relationship to the "surface" approach to learning? Early work in Gothenberg on "surface" level approaches stressed

TABLE 15

MUSICAL OPERATIONALISATION OF THE SURFACE APPROACH

Obtaining facts and information	Intention to reproduce the correct notes.
Trying to memorise	Superficial processing without intense concentration
Effects of external factors	Anxiety or pressure of time lead to superficial processing
Less successful	Poor performance
Less time studying	Little practice
Extrinsic motivation	Only practises when it is required for performance
Syllabus-boundedness	Practises only pieces required for performance usually selected by others.
Fear of failure	Practises because of fear of playing badly
Operation learning	Adoption of serial strategy for interpretation.

their relationship to obtaining facts and information, trying to memorise, or the effects of external factors. e.g. anxiety, artificiality etc. Work by Svensson (1977) also suggested that those students adopting a surface approach were less successful in their examinations and spent less time in studying. Later work by Entwistle, Hanley and Hounsell (1979) extended the initial categorisations to further include, extrinsic motivation, syllabus-boundedness, fear of failure, and operation learning. Is it possible to operationalise these notions within a musical framework? Table 15 illustrates how this might be achieved.

To what extent then are the descriptions outlined in Table 15 compatible with technical approaches to practice? Certainly the first musician adopted a serial approach to learning new music, suggesting operation learning, although the second exhibited a more versatile approach. The level of processing in technical practice, depending on aural and kinesthetic feedback, could be described as surface, although in both cases, it was carried out with intense concentration to satisfy stringent criteria. What of motivation? The first technically oriented musician reported

"There is always something I should be practising.....apart from my own practice."

This notion of practising for herself suggests an intrinsic motivation. For the other technically oriented musician motivation to commence practice is mainly extrinsic although it can become rewarding, particularly when learning rather than skill maintenance is involved as there is the "challenge of mastery". What of fear of failure and performance nerves? The first musician asked about stagefright replied:-

"That's the last thing to worry about, I am deeply worried about the actual notes or rhythms."

Perhaps then fear of failure is an important factor in this approach to practice although the other technically oriented musician merely describes how:-

"I will make absolutely certain if I have to play something that I know it, that I feel I know it thoroughly and if I don't feel I know it thoroughly I will feel unhappy about it."

Is this really fear of failure as conceptualised in Entwistle's scheme? Probably not. More a pragmatic awareness of the requirements for professional performance. Cooper and Wills, (1989) interviewing popular musicians, found similarly self imposed high standards and a striving to get better. eg. "You are your only worthwhile critic." Playing badly produces extreme negative feelings.

Neither of the technical approach musicians demonstrated syllabus freedom, both contributing to groups where others have had a dominant role. Fransson's demonstration that a deep approach can be induced by making the material personally relevant may therefore be important. If one lacks "control" over interpretation in performance then a surface or superficial approach to practice may develop.

It seems then that there may be aspects of the deep/surface dichotomy which could be applied to practice, however, the relationship becomes untenable when one considers the observed outcome and the subsequent effects on study habits. These musicians practise more regularly and consistently than the analytical/holists. They are also both highly successful and sensitive musicians. Although the approach involves "surface" processing, in the sense of not adopting deep analysis, it is nevertheless an intense activity requiring considerable concentration although not of an intellectual nature, in fact "deep" but in a very different way from the "deep" processing of the comprehension learners. The problem then in part is the evaluative connotations which have become associated with these approaches. Therefore because of the relationship to outcome, the clearly intrinsic motivation, and the intensity with which the processing is

carried out, a technical approach to practice, cannot in major respects be equated with the surface approach as identified in other subject areas.

A further problem for equating orientation to practising with an overall approach to learning is the finding that of the 12 musicians who claim that practice is for them essentially technical, 8 do not practise regularly, neither do they systematically practise scales, exercises, or studies, although being professional musicians they do "play" on most days. A more detailed examination of the practising approaches of three who have been identified as operation learners in their approach to interpretation is revealing.

All consider their practice to be essentially technical, see interpretation as based on "gut reaction" or emotion, and use essentially an aural/serial strategy in learning new music. Some spontaneity in performance is to be expected because of the "emotional" rather than "analytic" approach although there are considerable individual differences in the extent to which spontaneity is pursued. For one it occurs only within planned technical bounds, while another will make risky changes of bowing to bring off musical moments in performance. The third considers contextual factors, in that chamber music is seen

as a far more spontaneous art form than concerto playing. All of these musicians need an incentive to practise, although they claim to enjoy the work if the music is interesting. However if there is no imminent concert they simply do not practise. One actively denigrates the practising of scales.

"I could never see the point of scales because I've never met one in a piece of music, ever."

Another may use them to warm up, while the third "would like to start every practice session with slow scales" but finds this level of self discipline impossible, so starts practice with a technical passage from a current project. If the piece is "going stale" (this often happens) he may work on a study. All use the metronome, practising technical passages at a very slow speed and then gradually speeding up. This clearly repetitive serial strategy contrasts sharply with the analytical approach. Thus use of serial strategies and a technical emphasis within practice may not mean excessive practice of scales or even technique for its own sake.

It might also be suggested that all musicians whatever their personal preference must take due account of technique to be able to perform the repertoire. This is of course the case and for some musicians a technical approach to practice was almost totally dictated by:-

- 1) the limited repertoire of their instruments
- 2) playing in orchestral situations where the scope for their own interpretation was limited
- 3) the relative unimportance of the part they were playing which again made independent musical considerations impossible. This however does not preclude sensitivity in their performance.

What overall comparisons can we therefore draw between the technical approach to practising, as identified by the musicians themselves (not Sloboda's formulation) and a surface approach? If we take the broad definition of "surface" approach (Entwistle and Waterson, 1985) there is certainly evidence of operation learning and in some cases a focus on discrete elements without integration, e.g. "I wouldn't waste my time on what I could see was straightforward". There is also evidence of extrinsic motivation and a desire to complete task requirements, although many adopting regular practising habits exhibited considerable intrinsic motivation. It does seem that the processing involved can be relatively superficial and involves sensory processes rather than cognition. While this level of processing in a normal learning situation would clearly be inadequate, in musical performance where a high level of technical expertise must be maintained routinely this "surface" approach can be appropriate.

However carried out with intense concentration on sound, intonation, and quality the word "surface" with its "second rate" connotations is clearly inappropriate. It seems that this kind of technical practice can in itself be carried out with a deep or surface approach. Those who find this level of processing undemanding, particularly when they are maintaining the physical skill rather than learning new music, are clearly adopting a "surface" approach, while those who listen intently and sustain concentration are adopting a "deep" approach.

Personal self discipline is also a factor here. One musician, described earlier likes to start practice with 30-45 minutes of slow scales but finds this kind of routine very difficult to maintain and will therefore resort to some alternative strategy. The horn player described earlier explained that time of day and mood could affect practice content and that to alleviate the relative boredom of technical practice he would simultaneously watch TV. Nigel Kennedy, one of today's virtuosos similarly describes his daily four hours of technical practice.

"Time has to be spent doing it, so I do it. You don't have to use a lot of grey cells to do most of that work, so I usually put a quiz show or hockey game on the TV and just hack my violin. Finger exercises mostly, physical

co-ordination stuff. Everyone has their own weaknesses and strengths, so I've made up my own exercises to deal with my problems."

This level of processing is clearly surface. The repetitive nature of some technical practice and the self discipline required to carry it out thus encourages some musicians to devise their own panacea.

Could perhaps the individual level of self discipline be the key factor in distinguishing between those who practise regularly and those who do not? Are sex differences important here? Perhaps it is no coincidence that, the two comprehension learners, the two operation learners who complain of lack of concentration and the horn player who watches TV while carrying out routine practice are all male. Certainly the imbalance of males and females learning musical instruments, while partially explained by social factors may relate to this. Experienced instrumental teachers will confirm that generally girls are more conscientious about practice whereas boys tend to hurriedly play through their pieces with little concern for "quality".

Or perhaps to return to the deep/surface distinction rewarding motivational factors, or fear of failure are more important? Of the 22 musicians interviewed 12

reported needing the incentive of imminent concerts to sustain practice, e.g.

"I'm very lazy. I only practise if I've got to. If I've got something difficult to work at then I'll practise it but otherwise I tend to leave it."

"I practise when I've got a carrot."

"I only practise if I've got something to practise for. I like to arrange to have something to practise for."

Five were totally intrinsically motivated, e.g.

"I've always loved blowing the trombone. I mean, I don't think there is anything I'd rather be doing than playing. If you don't feel like that then I don't think there is much point in doing it."

"I enjoy practising very much."

Do you like practice? "I love it."

The remaining 5 exhibited a combination of motives. e.g.

"I can just practise but its usually either I have to learn to play something by 10-00 the next morning or I'm finding a particular technical aspect causing trouble."

Or "Sometimes it's a chore but not usually."

"I like practising once I've started.....Most of the time now I don't need to practise to cope with demands, regular playing is sufficient and there are usually other more pressing things..... If I find that I've not been doing

sufficient playing and my own ability to play has slipped then I find I want to start practising more. And its a bit of a drag getting down to it but once I've decided to and actually started, when I perhaps intend to do twenty minutes....it will turn into 45 minutes without really noticing."

Some who practise regularly tend to feel that it is essential to maintain their standards because of physical factors, e.g. muscle deterioration, stiffness, rather like athletes needing to keep in trim, e.g.

"I find I've got to blow it (the trombone) every day otherwise my lip muscles just get flabby and won't work at all."

"I'm one of those unfortunate people who has got to practise....I regret it if I don't practise every day."

This could possibly be regarded as fear of failure but seems to be more based on acute self awareness of what is required to maintain standards. Some musicians, all adopting a technical or mixed approach, practise regularly because of sheer enjoyment, i.e. intrinsic motivation, whereas the comprehension learners enjoy analysis of music but not practice. These differences then seem to negate the findings of Entwistle and co-workers who related the deep approach to intrinsic motivation and the

surface approach to extrinsic motivation or fear of failure.

Having established that Sloboda's definition of "musicians" and "technicians" is an oversimplification, is it valuable to make this distinction at all? Certainly, as the previous section demonstrates, the musicians themselves adopt these terms in describing their own approaches to practice therefore it has face validity. However as of necessity they all have to prepare works for performance which clearly implicates technical practice perhaps it is really a question of the emphasis placed on each aspect. Having identified those stressing the extremes is it possible to identify musicians who within this framework adopt a more balanced view of practice? Also, continuing our examination of the deep and surface approaches outlined by Entwistle and co workers is the "strategic" approach applicable to the practising of musicians?

The Strategic Approach to Practice

How can we operationalise in musical terms the strategic approach to studying. Entwistle (1987) describes it as involving the intention to maximise grades, in part by the management of time, effort and study conditions but also by

manipulation of the assessment system. Also important are achievement motivation, intrinsic motivation and to a lesser extent the deep approach. Table 16 outlines how these might be operationalised in a musical context.

TABLE 16

Strategic Approach

Manage time, effort, study conditions	Practise efficiently
Manipulate assessment and maximise grades	Try to concentrate on what you do well
Achievement motivation	Want to perform well and be successful
Intrinsic motivation	Enjoy practice for its own sake
Deep approach	Intention to understand

We have already identified within the data frequent references to intrinsic motivation and an intention to understand. Is there evidence for the other elements? There were numerous references to organisational factors in practice, e.g.

"I wasn't a very efficient practiser."

"I try to be systematic about it so that I don't always start in the same place.....Right, today I'm going to do this chunk and work at this."

"If I don't have a routine its just a waste of time for me.... I fritter the time away."

Less common were references to performance factors in terms of manipulating the system, although one musician decribed:-

"I know that certain works I would not play in public..."
and also "I have had to play music because I thought I ought to play that, especially contemporary music.."

both suggesting some elements of at least playing the system if not actually manipulating it. Achievement motivation in terms of desiring successful performance underlies all musicians' approaches to practising but in terms of striving for career success did not emerge in the sample studied.

The data then indicates the possibility of musicians adopting a "strategic" approach to practice. Let us further consider this in terms of individual cases. First let us examine the approach of a performer who demonstrated versatile learning in interpretation, although exhibiting a preference for holist strategies. For instance in her initial examination of the music she describes:-

"It's a principle in my life that you have a backbone to something, it doesn't matter whether it's gardening, or m king a meal or practising. You have a skeleton, y u try

and find out what the skeleton is and you build onto the skeleton....whatever you do there is an inner discipline about it and however much rubato or anything you do in the end the skeleton is there and you are not doing rubato because it suits you because you can't actually play it very well. Everything, you've thought it all out."

Thus like the comprehension learners she adopts a holistic view of what is to be learned, establishing an overall framework within which to work. She also emphasises the importance of understanding in her physical practice.

"I can't do anything until I understand what it is about. For me I have to get my mind round it before my fingers will do it. Getting the mind round it, as far as I can see is the important thing. Once you've got your mind round it you can just do it. There's no problem once you've got your mind round it. Anything, it doesn't matter what it is."

However there is a fundamental difference between this musician and the comprehension learners in that she is unable to create an internal aural representation of the music.

"Music means nothing to me on the page. I have to have an instrument in my hand."

If she already has an aural schemata for what she is to learn then much of the work is done because "I think I play very much by ear". This is reinforced by the statement

that

"I don't like things I can't hear, so that is some modern things. I don't like having to find notes mechanically."

An aural rather than an analytic approach is therefore adopted and, because her instrument, the violin, is melodic rather than harmonic, processing tends to be serial. She rejects a technical approach to practice:-

"Any scales I do are with pupils. I never practise scales. I basically don't believe in scales. I don't believe in studies." Technique is seen as necessary only in order to be able to concentrate on the interpretation of the music.

"When you come to the show its got to work, it hasn't got to be something that you're going to be kind of at the peak of and you'll get it come the day. You've got to make it feel safe before that. So when it comes to the show you're thinking all the right thoughts and you can actually play music rather than thinking "Oh Christ, there's that terrible passage coming up..." Her motivation however is not intrinsic. When asked if she liked practising she responded

"I find that quite a difficult question to answer. I used to loathe it but nowI think I practise when I've got something to do. I regard it like getting a meal, it's something you do to get to a final result, and I think I enjoy it when I'm doing it but I don't like the idea of it." However in preparation for an important concert:-

"If I'm actually doing something, then I just spend every moment that I can at it, other things will go by the board." She also, like the comprehension learners stresses the importance of time in learning. "It has taken me years to reach these conclusions." Another major difference between her approach and that of the comprehension learners however is that she does not listen extensively to other interpretations of works she is to play, which given her aural processing initially seems suprising. However her very reliance on aural processing may lead her to fear undue influence from listening, possibly explaining its rejection as a means of developing interpretation. There are other fundamental differences. She is very concerned with the elements of planning in practice, in particular organisation and discipline. She describes herself as "a player who needs to be tamed and ordered," and indicates how the use of a metronome in practice can help achieve this. "Inadequacies should not be hidden by rubato". She also stresses the importance of helping her pupils to be organised in their practice. Organisation of practice is not mentioned by the comprehension learners, although one of the operation learners stresses its importance. There is also a concern with performance factors. Practice is always begun with a performance, from cold, of her current piece. This serves several functions, it simulates the actual performance situation enabling

her to see weaknesses and also gives her practice at coping strategies.

"I make myself recover from whatever morass I've got myself into so that I get used to doing that, should that terrible thing befall me."

In her detailed practice she plans fingerings and bowings that are safe and secure so that in performance she can concentrate on the music without worrying about technique. She also has concern for the audience:-

"I think the important thing if you are performing is to make your audience happy.....It's taken me many years to learn these things but however miserable you are feeling yourself, you've got to keep smiling.....If they're ill at ease (the audience) then the whole thing will be a grisly affair."

In direct contrast the comprehension learners make no reference to performance factors until specifically questioned. Only then does one indicate that practice should be for the end product of performance. They both stress that adequate preparation is essential, but neither have adopted any particular rehearsal strategies for facilitating performance per se. One has observed that when nervous "ones natural instinct is to run", or from a playing point of view "rush" and that this is an instinct to be resisted, "the danger should be confronted, but slowly". He also observes that successful performance makes

subsequent performances more relaxed and "easier". The other describes getting "excited" before a concert and needing a little quiet time so one does not get flustered, but no special preparations for performance are made beyond knowing the music thoroughly.

Does this emphasis on performance factors by the versatile learner described earlier constitute another approach to practising or is it a dimension which co-exists across approaches? Let us examine the evidence. It does seem as if much of her behaviour could indeed be subsumed under this heading. Her motivation to practise while normally low improves at the prospect of a concert and every spare minute is devoted to practice. She is clearly concerned to perform well. However, given the professional status of all the interviewees it might be expected that they would all fall into this category with performance deadlines, tight rehearsal schedules, and high standards to maintain. Evidence from the study of assessment suggests task demands have considerable effects on approaches to learning (eg. Marton and Saljo 1976b; Elton and Laurillard, 1979; Marton, Hounsell and Entwistle 1984) and would support this notion. However Entwistle (1987) describes the strategic approach as involving the intention to maximise grades, partly by systematic management of time, effort and study conditions, but also by manipulation of the assessment

system to the students' advantage. This view can be traced back to the work of Miller and Parlett (1974) on cue seeking. The Approaches To Studying Inventory typically produces four main factors, deep, surface, organised, strategic, (Entwistle and Waterston, 1985) the latter two representing the two main facets of the strategic approach although they are less stable. Could it be therefore that the "strategic" approach is merely an artefact of the factorial method? Subsequent studies have not always identified such a factor and its structure has been weak. For musicians to attempt to manipulate the assessment system in the musical world would not necessarily imply any effects on learning strategies. Certainly it could require a greater emphasis on the needs of the audience but would more likely require changes in behaviour external to the learning situation e.g. in dealing with agents, fixers, the media, etc. This seems more akin to Sternberg's (1985) "street-smart" or "external world" intelligence. This musician did indeed show greater concerns for the audience than those previously described which may indicate elements of "strategic" behaviour but in her learning she tended towards a holistic musical approach, which appeared distinct from any other strategic factors. The concern with performance factors may indeed have been more indicative of her knowledge of her own performance fears than a strategic ploy to manipulate the system. Strategic learners in higher

education have spoken in terms of examinations being fun and a challenge. None of the musicians have described performance in those terms.

Throughout the study there have also been difficulties with the relationship between motivational factors and deep and surface approaches. It seems that for professional musicians the distinction between intrinsic and extrinsic motivation may not be very useful nor very clear. Musicians exhibit a whole range of motives which may apply to one single practice session. For instance, there may be fear of failure or hope for success, intrinsic motivation encouraging the continuation of routine technical practice, intrinsic motivation in the challenge of a new work, and the extrinsic motivation of an imminent engagement. While some confess to finding technical practice unpleasant but necessary the rewards of successfully carrying out an unpleasant task can in themselves be great. The motivations described in higher education were all overlaid with one common motive, to acquire a degree. If this underlying incentive had been removed perhaps a more complex pattern of motives would have emerged as in these musicians.

To cast light on some of these factors and whether the strategic approach has relevance in this context let us

examine the practising of a french horn player. He, like the previous musician described, adopts a balanced approach to practice taking due account of musical and technical factors but his emphasis, possibly due to the nature of his instrument is more technical. For instance in direct contrast he practises daily to "keep in trim". "If I take a couple of days off then my playing just goes rocketing down.....My aim is to practise every day....two days missed is excessive."

His routine is however flexible and with imminent performances exercises are kept to the minimum necessary for "warming up". He then concentrates immediately on the works for performance. With no immediate pressing commitments he spends 30 minutes practising.

"A half hour slot means I don't get better, I stay where I am. It means I turn up to a concert and survive." This kind of practice is "not enjoyable but necessary". He does enjoy practising however when the music is interesting and there are no time pressures. The content of practice depends on mood and time of day, exercises being so automatic that they may be practised while watching the television, the added visual stimulus aiding concentration. The concert preparation schedule will be adapted according to the technical requirements of the work, (stamina and difficulty) and the amount of time required for memorisation. Although his general starting

point is technical he also does a lot of "un playing practice", examining or playing the score on the piano. This particularly facilitates the "fitting together" of parts and orchestral music may be learned exclusively in this way. Recordings are utilised as part of the learning process and he may play with them if he is learning a concerto. They are not used to develop interpretation as independence is preferred. While the initial thrust of his practice is technical he gives due consideration to the musical aspects of playing. Work schedules are devised for important concerts with carefully planned deadlines for learning and memorisation, which however are invariably not met. If a new piece was playable

"I would start working on it a month in advance and two weeks before the concert I would learn it from memory.....which never works out because it tends to be a week before.....I tend to do most of my practice when I'm learning it from memory."

It seems as if he is trying to compensate for some degree of natural disorganisation. Performance is simulated before a concert either informally as he rehearses with his pianist or by playing with a record to simulate the orchestra. If the piece is unaccompanied

" Well then I tend to do it before rehearsals when nobody's listening. I would try it out, but that would be to test my nerve. The Britten Serenade I went round for a

month beforehand every rehearsal playing... I knew I wasn't being listened to specifically but it was a performance as far as I was concerned."

He admits to getting nervous and stresses the importance of being well prepared.

"I never get mentally nervous, I've got no qualms about walking on stage whatsoever, but physically my hands will shake.... If I'm well prepared and I know there are no problems playing it then I won't worry about it in the slightest. If it is a sort of risky show, even if I'm well prepared....then I will get anxious.....I can't say backstage that I'm dying to get out there...except when I'm conducting." Again there is ambivalence. Despite the nerves, once on stage if it is going well he "would like to stay there for ever".

Can this subject be described as strategic? There is certainly evidence of organised study methods, achievement motivation in terms of wanting to play well and versatile learning. His attitude to studying is positive only when there is something interesting to learn and once again a variety of motives are in evidence. The performance simulation is to test his nerves, but not for the benefit of the audience, although clearly he behaves strategically in the sense of desiring good performance. However this does not equate well with the cue-seeking behaviour

described by Miller and Parlett (1974). Perhaps the term strategic then needs in the music profession to be applied to behaviour distinct from the actual learning situation, e.g. seeking publicity, making the right contacts, showmanship on stage. Such behaviour does exist but was not in evidence among these musicians and seems to have little relationship to practising per se. What does seem to be emerging however is an unconscious dimension related to "planning", which the individual can attempt to control through metacognition, in the same way as one might control stagefright.

Let us in this light consider the three musicians who were introduced earlier in respect of their operation learning approaches to interpretation and their technical approaches to practice. Given the similarities described earlier what is interesting is the wide variation they exhibit in terms of arousal levels in both practice and performance. One describes how before an important concert he will map out timetables, graphs and work schedules to instill some external discipline as he is extremely undisciplined. Another described how he used "to toy with this bit, then that bit," then realising this was inefficient now immediately practises the troublesome sections. A metronome is used to help maintain concentration otherwise "I give myself a concert" and each practice session is

approached with a specific immediate performance aim to aid efficiency. In complete contrast the third musician describes herself as very well organised and efficient at practising.

"I can achieve a lot in a comparatively short time." Could this be a reflection of an aspect of the "strategic" approach as outlined by Entwistle and co-workers? Or perhaps as was raised with regard to interpretation there are separate dimensions related to planning and arousal which are distinct from approach? There is indeed a model of brain functions proposed by Luria (1970; 1973) which outlines three principal functional units of the brain, one of which is concerned with the planning and regulating of behaviour, another being concerned with arousal. Perhaps then this would provide a better framework for understanding the learning of musicians?

These three musicians also demonstrated different approaches to performance. One believes that in performance "some kind of automatic response comes into operation". Playing to an audience "produces its own enthusiasm, spark, creativity" so there is no necessity to "psych" himself up.

"It is all a matter of being prepared, practice, technique, and the music will tend to come by itself."

Another described trying to simulate performance but realising one "cannot simulate that kind of concentration"

gave up confident that the concentration will "be there on the night". In complete contrast the organised practiser said

"I'm not a natural performer, I never was any good at it."

She now takes a beta blocker before any major performance to help cope with stage fright. Given that they all adopt an operational learning approach to interpretation and utilise similar practising methods, this would seem to provide a further indication that the dimensions of organisation and arousal may be independent of approach to both practising and interpretation. Although an arousal contrast was not evident in the comprehension learners there was a contrast in their level of planning/organisation particularly in allowing for spontaneity in performance.

What of these reported differences between the musicians in arousal? Kemp (1981) demonstrated considerable levels of anxiety among his sample of musicians at all levels. Further the patterns of anxiety were different for the sexes. Interestingly the pattern among the male musicians did include Low Self-Sentiment Integration (undisciplined, self-conflict, follows own urges) while in the female musicians High Ergic Tension (tense, frustrated, driven, overwrought) was in evidence. However the overall pattern of anxiety evidenced among his sample of musicians included

many divergent elements which subsumed under one single heading is misleading. However anxiety regarding performance and the ability to deal with it do seem to be important aspects of some musicians' repertoire of skills, while others seem to need to cope with too low levels of arousal in practice. Given the considerable differences between the three musicians described above in terms of both arousal and planning and yet the clear similarities in their approaches to interpretation and the technical aspects of practice it seems that some alternative formulation to an "approach" to learning is required. Perhaps planning and arousal need to be envisaged as separate dimensions distinct from learning styles. If this is so we would expect to be able to identify cases where musicians adopt a balanced approach to practice without necessarily emphasising either organisational or performance factors.

Let us consider two musicians who adopt "balanced" approaches to practice. The first, adopts a holist strategy initially, identifying the "salient" musical passages which he then learns to play first. Unable to create an internal aural representation of the music, he is precluded from the adoption of an entirely cognitive analytic approach.

"I must have something to hear. I can't hear very well

from the printed page." However in contrast to others who share this difficulty, playing by ear is also problematic. "I can't play well by ear." His starting point is musical but technical and performance factors are considered, e.g. bowings and fingerings are devised on the basis of practicality, musicianship and allowance for nerves. Performance is simulated in the later stages of practising "I'll get somebody in to listen to see what goes wrong."

Regular practice is required "to stay still, not to mention to go on and advance" in technical terms and consists of scales, exercises and studies, the latter often related to current pieces.

"I'll warm up on something like the first page of Schradiek...that takes about 5 minutes, but if I'm not pressed for time I'll spend a good half hour on technical things, scales, arpeggios."

Length of practice depends on time available, task demands and perceived personal weaknesses in technique.

"It could be anything from minutes to 2 or 3 hours."

Is this then "strategic" behaviour? It certainly demonstrates considerable metacognitive planning activity, and there was some concern for performance factors, although not in terms of audience perceptions, rather a desire to ensure optimum performance.

Let us consider one other musician who also adopts a

balanced approach to practice illustrated as follows:-

"I believe that you have to mix things you like doing with things that you do not like doing. I cannot pretend that scale practice is the most exciting thing in the world but we have to do it.....There are certain kinds of practice where one must pretend that one is a machine. I know the benefits of that. There is a great deal to be gained from that absolute rigid sort of either scale practice or finger studies etc. or bowing studies. But too much of that is bad for you, a little bit if necessary".

A similar balanced approach is used in his teaching. "I tell my pupils how different they are. Some are incapable of playing with any kind of freedom. They are so rigid. Their fingers go down like machines, so I encourage them to get away from that. Others are incapable of playing a simple melody with the right note values. They distort everything. These are the two extremes."

When learning new music he tries initially to get "an idea of the sheer scale of the work." Then playing, fingerings and bowings are inserted subject to later revision. Initial learning is always technical to master the "notes" then he can do "justice to the music". Musical ideas develop through playing as the cognitive analytic evaluation only uncovers the structure of the work "but to breathe life into the music, which a performer has to do, then one has to play it."

Interpretation derives from playing not listening, although he frequently attends concerts, criticising the artificiality of recordings. For technical problems an "analytical approach which encourages slow practice." is adopted however agility may also be encouraged by playing at speed with less concern for accuracy. His balanced view is summarised, "things must have musical interest as well as technical accuracy." What can we say about his motivation? Self discipline is evident in scale and exercise practice but he admits to greater enthusiasm when an interesting work is being prepared.

"I cannot pretend that every note, every bar of music I have played has been a pleasure, that would be nonsense, but I have had to play music because I thought I ought to play that, especially contemporary music and sometimes you are assigned certain things in your profession and you have got to do it. There have been times when I have come away from a performance feeling downhearted because I did not care for the music. I did not understand it. It was not very good music, and as a result I probably did not play it well. One does ones best."

How then can we categorise this musician? He has a balanced approach to practice, clearly operates at the highest intellectual position in Perry's scale, is a versatile learner. He also has an international reputation as a

performer. Performance factors are absent from his preparation and the issue of time pressure or organisation does not figure in his thoughts. Strategic behaviour is in evidence to the extent that there are certain works that he will teach but that he would not be happy to perform in public. This however seems to be a pragmatic professional acceptance of limitations rather than evidence of a strategic approach. It seems then that his behaviour is not strategic in Entwistle's terminology and although he could be described as adopting a "deep" approach this denies that his practice involves considerable elements of surface serial processing to maintain technique and also creates the problem of the differences between his approach and that of the comprehension learners. The other "balanced" musician described earlier has additional concerns regarding performance. Should we then describe him as "strategic"? He adopts deep and surface approaches for aspects of his practice, tends towards a holist approach to interpretation and maintains a balance between music and technique. Organisation is not alluded to in his interview but he is to some extent concerned with performance factors, although not in terms of manipulation of the system, or achievement motivation. This would seem then not to constitute a "strategic" approach.

As discussed earlier several reserchers have found the

"strategic" factor to be less clear than the "deep" and "surface". It has included elements of achievement, organisation, strategy and in some studies has been merged or combined with the other factors (see Entwistle 1988). Harper and Kember (1989) for instance were unable to identify a single dimension and described two factors as "narrow orientation" and "goal orientation". The data from these musicians similarly does not lend itself to a "strategic" categorisation. It is possible that Entwistle's dimensions are an artefact of the factor analytic methodology adopted, grouping together items which have differential bases. Similarly where previous research has related low understanding to a "surface" approach, perhaps inadequate intellectual development, insufficient expertise and prior knowledge in a subject area, may account for the lack of understanding, in turn leading to anxiety at not understanding, attempts to rote learn, and a perceived need to "get through the exam" as a main aim. Inadequately developed expertise for the course material being studied, would thus dictate the learning strategy adopted. Similarly the "deep" approach as outlined by Entwistle and co-workers may describe a student with sufficient prior learning to understand course materials leading to interest in the material, intrinsic motivation, and adoption of appropriate study habits. The focus on novice musicians later in the

chapter may clarify this issue.

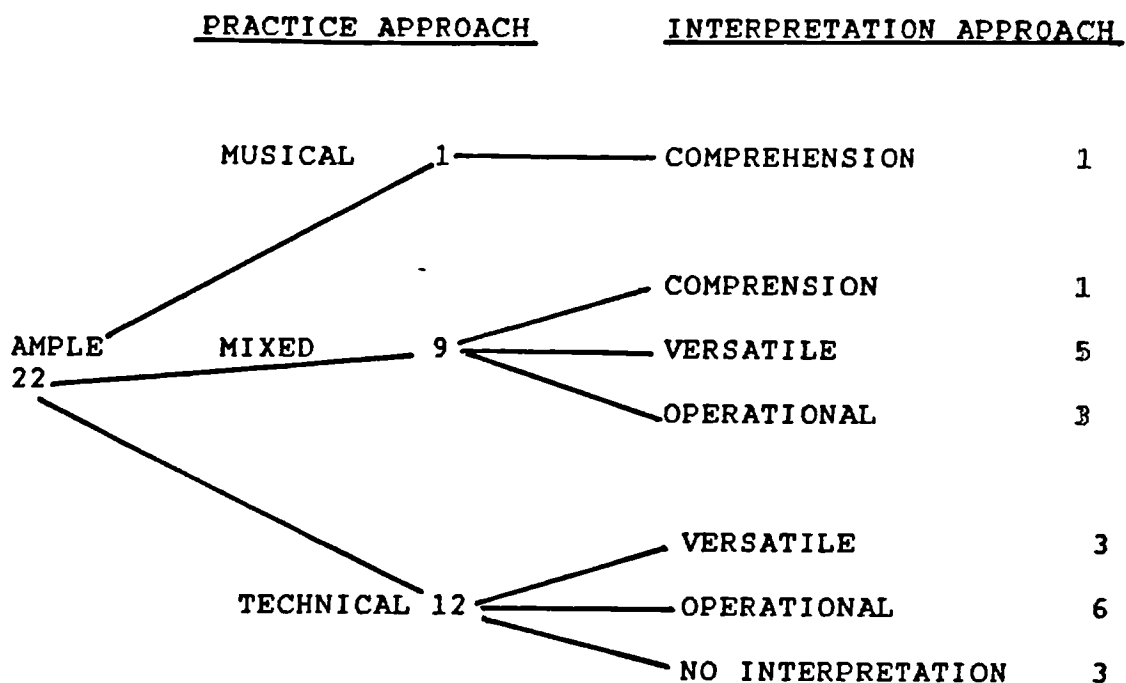
What does emerge clearly from the data is the extensive metacognitive abilities of musicians. Almost without exception they demonstrate acute self awareness of strengths and weaknesses and develop strategies to deal with them. This includes not only technical, musical and performance problems, which one would expect but also difficulties in concentration, planning and actual learning.

Review

On the basis of the data it proved possible to categorise each musician in terms of their approach to practice, either musical or technical. This was established from their statements relating to practice and their reported practising behaviour. Only one musician could be described as having an exclusively musical approach, nine adopted a balanced or mixed approach and 12 a technical approach. There was a close relationship between approach to practice and approach to interpretation although it was not a perfect match (See Table 17). There was a tendency for the musical and comprehension learning approaches to be related while the operation learning and technical approaches also demonstrated close links. Those exhibiting

TABLE 17

RELATIONSHIP OF APPROACH TO PRACTISING AND APPROACH
TO INTERPRETATION



The relationships can be summarised as follows:-

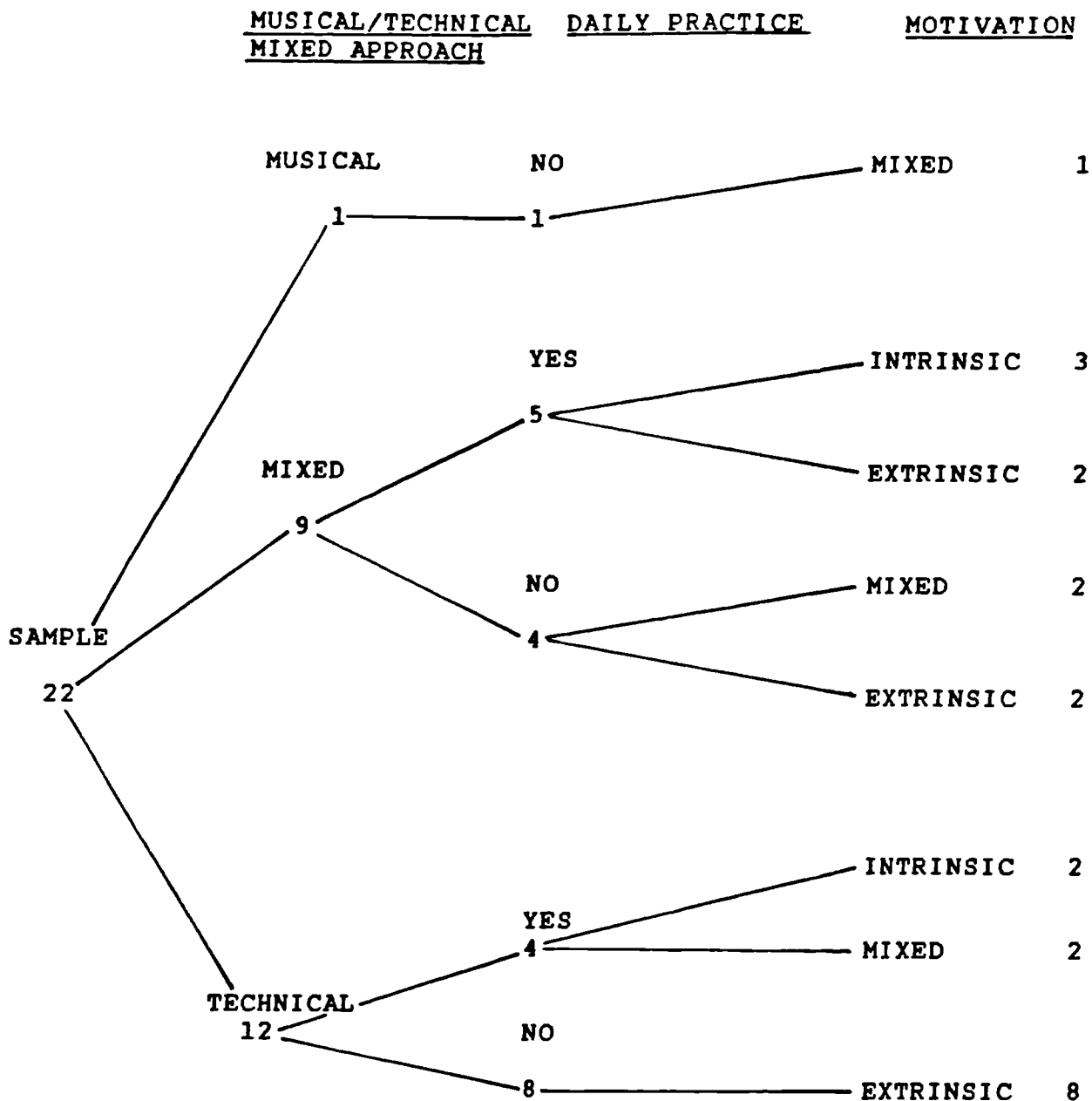
1) No comprehension learner adopted a technical approach to practice.

2) No operation learner adopted a musical approach to practice.

3) Versatile learners tended to adopt a mixed approach to practice.

The orientation of the learner seems to be reflected in the approach to practice.

TABLE 18
PROFESSIONAL MUSICIANS APPROACHES TO PRACTICE



Summarising the relationships it seems that:-

1) Daily practice is found predominantly with intrinsic or mixed motivation (78%), while irregular practice occurs mostly amongst musicians with extrinsic motivation (77%).

2) The data are less clear for the relationship between general approach to practice and the frequency of practice but there is a tendency for less emphasis on daily practice the more technical the approach adopted.

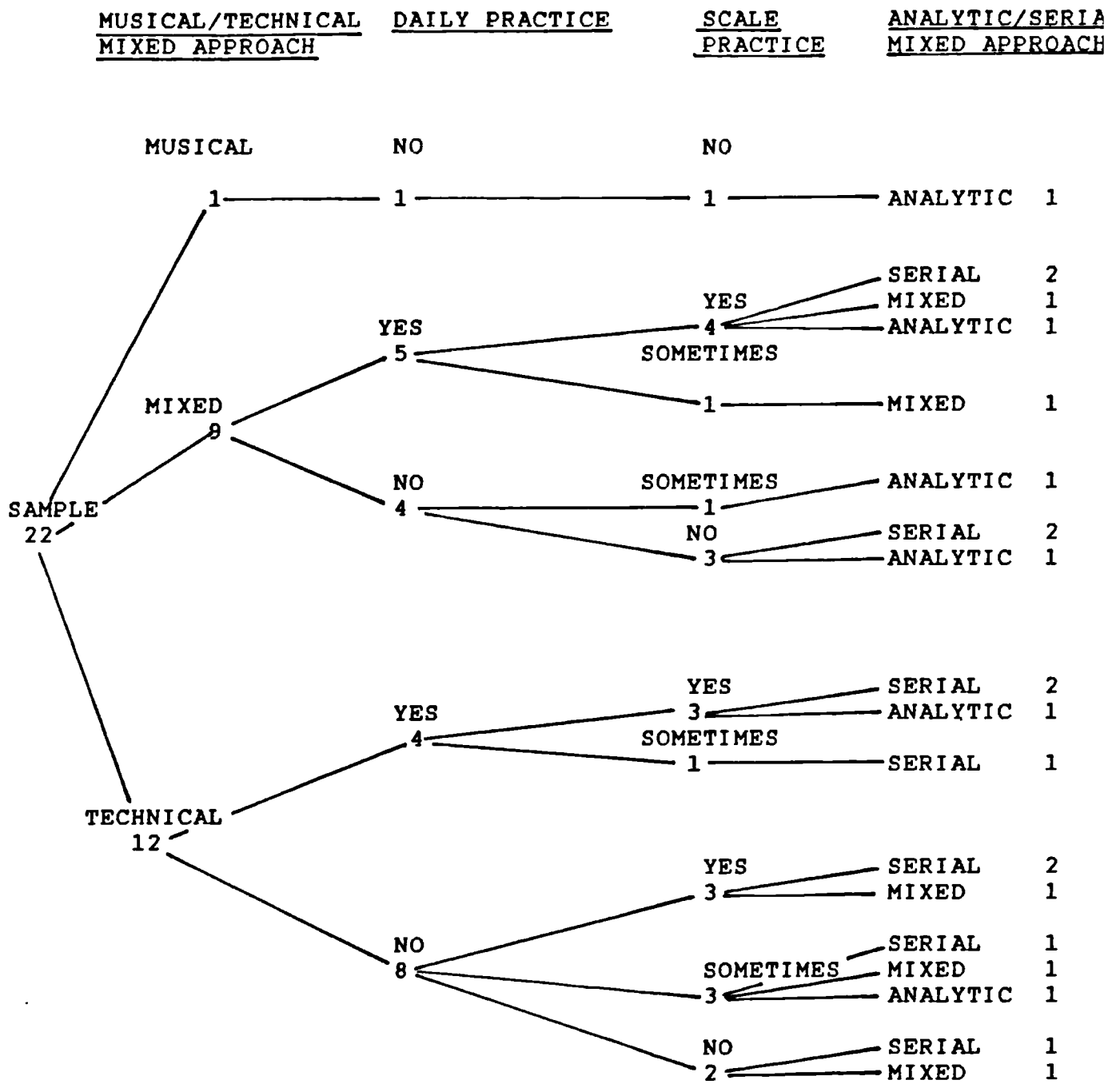
versatility in interpretation tended to consider both musical and technical factors in their practice.

Table 18 indicates the relationship between practice orientation, the regularity of practice and motivation. Only nine of the twenty two musicians report practising daily, the remainder practice more irregularly. Overall twelve demonstrated extrinsic motivation, practising exclusively in preparation for concerts, only five report totally intrinsic motivation, while the remaining five report mixed motives. The relationships between practice orientation, daily practice, scale practice and the detailed nature of practice i.e. whether it is carried out in a repetitious or analytic way are no less complex (See Table 19). It appears that the practising behaviour of musicians is governed not only by preferred approaches to practice but also by contextual factors.

Can we then describe the practising behaviour of musicians in terms of categories or would a combination of dimensions and approaches be more adequate? Given the advantages and disadvantages of using semi structured interviews discussed earlier the present data can only indicate directions for future research. However, it is possible to consider tentatively an all encompassing model. What elements would need to be included? The evidence

TABLE 19

PROFESSIONAL MUSICIANS APPROACHES TO DETAILED PRACTICE



regarding interpretation and practice indicates differential preferences for holist versus serialist strategies, perhaps indicating differences in processing. There is also evidence of preferences for analytic or intuitive approaches which may in turn indicate differential hemisphere activity. These may be adopted differentially by the same musician depending on both task requirements and situational factors but there may also be some over-riding personal preference for one mode of processing. In music the quality of the outcome of learning need not be effected by adoption of these approaches all of which can lead to learning at the highest intellectual level.

Overall then these findings support the paradigm shift toward orientation or some more composite concept in explaining learning. What is clear is that it is no longer satisfactory to account for learning or performance in terms of unidimensional factors. Dimensions of emotion, arousal and planning may co-exist alongside modes of processing effecting their functions and also interacting with each other. The "executive" metacognition oversees functioning of these processes and attempts to compensate and control perceived weaknesses, with varying degrees of success, as was indicated with regard to planning and arousal. When a more global view

is taken and other factors are considered, over arousal may not have a negative affect on performance. Although the findings show that musicians with higher overall arousal levels are more prone to stagefright, metacognitive activity may well compensate. One musician who clearly experiences great physiological arousal, and describes her relationship with performance as "love/hate" is frequently ill before performance. She has nevertheless been a successful performer for over forty years. There is also much anecdotal evidence of great artistes being overcome by stagefright, only to perform superbly. Anxiety alone then cannot provide an adequate account of musicians' performances, attention must be focused on the total pattern of individual functioning. This is further supported by the observation that anxiety can be both transient and unpredictable. "For a time I was afraid of being afraid". In addition increased level of arousal is essential for some musicians to increase concentration, prevent errors and give the performance "a spark", without which it could be "very dull".

At a theoretical level these findings not only reinforce the modern trend to explain performance as the composite outcome of ability, strategy, approach, and motivation, they also suggest that an important ingredient has been left out of the equation. The complete sequence of musical

learning including practice and memorisation, leading finally to public performance highlights the unique role of the latter on the learning process.

The final piece in the jigsaw of expert performance is concerned with performance from memory and the control of emotions. Are there differences in approach as discussed earlier? Does individual arousal level effect memory processes? Let us see.

PROFESSIONAL MUSICIANS' APPROACHES TO REMEMBERING MUSIC

This section will consider the third research question: Can any current models of learning explain professional musicians' approaches to memorisation? The models of learning selected as most appropriate for addressing this issue are those which account for the complexity and multidimensional nature of the phenomenon. Among these are the studies undertaken in Gothenberg, which have considered learning at differential levels of abstraction, and the elaborations of this research by Entwistle and co-workers. Marton and Saljo (1976a) demonstrated that deep level processing was related to better recall of detail, particularly over a five week interval. Later work has conceptualised the surface approach in terms of "reproducing" while the deep approach is defined in terms of "an intention to seek understanding" (Entwistle, 1981).

How can this then be operationalised in musical terms? A major difference between memorisation for musical performance and memorisation for recall of text is that the music requires verbatim recall, conveying "meaning" alone being insufficient. The analogy with text would be that of the actor or actress learning their lines. Musicians then if they are intending to memorise a piece

for performance will intend to "reproduce" the music note for note, although they will of course give their own personal interpretation. Perhaps then we should expect the adoption of a surface approach, with considerable repetition as in rote learning. Another important factor is the length and difficulty of the task. Concertos, which are usually performed from memory, are extensive works often lasting for 35 to 40 minutes, with only short non-playing passages, presenting almost unique learning tasks. The anxiety invoked by performance pressures should also increase the tendency towards a surface approach.

Is there then any evidence indicating the adoption of a surface approach to memorisation? The data showed that 64% of the musicians adopted rote learning to learn music from memory:-

"Well I've tried all ways.....repetition is the only one that really seems to have got me anywhere and then it's not safe."

"I think just playing it over and over again and then trying to play it without the music."

"bits you keep forgetting.....I tend to go back and play them a couple of times with the music and then try it again without."

"It's just the repetition of practising it."

A number of musicians do then adopt a repetitious

"surface" approach to memorisation.

Does the anxiety of performance also induce a surface approach? Certainly playing from memory in public induces anxiety:-

"It was a nightmare.....I had to play a little simple tune....and that was terrible. I didn't sleep for the two previous nights and it was like a parachute jump, I actually had to be pushed onto the stage...."

Another stated

"I never felt safe. I was so scared of forgetting it."

However in this musician the anxiety led to a search for an alternative approach to memorisation:-

"I have done it and I hated it....Well I knew that I wasn't going to manage just by knowing it in the fingers.....however much one practised it, that wasn't safe at all, to just know it that way. I remember sitting on the tube reading it, learning it like a book. Using it visually and trying to say see if a passage recurred, and then you say Ah! that's the second time that it goes from Eb to G, whatever, and having to almost take it to bits and analyse it, and know intellectually rather than just to play it."

Anxiety then seems to have led to a "deep" approach and a realisation that only "understanding" in terms of knowledge would assist in successful memorisation.

This deeper approach to memorisation was adopted by 50% of the the musicians. For instance one reported:-

"I have to understand what's happening harmonically, or if it's a melody with a definite sequence. But I wouldn't do it by just hoping it comes.....There are some things, which I have played so many times over the course of the years that I just know how they go and can play them. That's not analytical but I would hate to stand up in public and play them because I think probably the automatic memory would fail."

The data also suggest that the process of memorisation occurs unconsciously as practice progresses concurrent with the development of automaticity required for performance:-

"Through practice I learnt it anyway...I can't do it from memory just by ear....but through practice, hard practice. I've almost cracked it from memory by the time I've learnt it really. But if I was doing it for a specific thing, such as an exam, festival, concert, etc. I would take it to bed...quite a few nights before or maybe longer. I would just look through it at night time.. and the next day it would be that much easier to do from memory...I find that helps a lot."

It appears then that an "active surface" approach is adopted as the piece is worked on in the course of practice which enables much of it to be remembered

automatically. However a more analytic approach is adopted in the later stages to provide a cognitive framework into which the discrete sections can be placed.

"I have to consciously remember.....By looking at the accompaniment, by working out the key changes, by doing little bits at a time and by endless repetition, which is a very painful process."

Not all of the musicians believe that memorisation is more secure if it is carried out with deep cognitive analysis:-

"I think I can do it better if I just don't think about the music at all. I mean it's difficult to do, but just think, Right! I'm going to play the acrobat. Here we go! Listen to the introduction and then just start. If I start trying to remember what the notes are I tend to go wrong.....When I first tried to do this I used to sometimes close my eyes to try and concentrate and think how the next passage went....but now I think that you can concentrate too hard and make more mistakes that way. But you've got to have tremendous courage and confidence that you will be able to remember it when you come to it." This musician seems to be describing the detrimental effects of anxiety on memory performance in similar terms to those outlined in the Gothenberg studies. However within this musical context it is possible to clearly differentiate between the processes of learning and retrieval. If the

music can be performed adequately from memory in a rehearsal situation successful "learning" will have been demonstrated, the anxiety created by public performance will therefore be limited in its effect to interference with retrieval.

Is there any evidence of musicians adopting an exclusively "deep" approach with little reliance on repetition? There were two extreme examples where music was memorised without playing. For instance one of the comprehension learners always conducted from memory. However his description of this in relation to actually performing on an instrument is instructive:-

"Although I use repetition with scores, it's only when I've learnt it from memory that I then screw it down with repetition. I don't learn it by repetition and I don't think that the method that I use for learning scores.....would be of any use at all to an instrumentalist because I do it entirely by analysis, which is to me infallible. It never lets me down.....It's a little bit like those buildings, when you see them put them up and you just see the squares with nothing else. But then there's going to be floors and walls and then perhaps each one of those squares is going to be divided into three parts, or another square perhaps left as it is because it's a big room and so on.....A score is like that.....there's

a certain square there, you are in a certain section. It could be that the piece has got, you know, 16 bars and then it might have a 32 bar section and then it might have an awkward kind of 9 bar and a 7 bar section and then you might get onto something else and that's when he (the trumpet player) comes in. So that you know that when you get to that kind of music, it might be that the music has been very vivacious in the key of A major and it goes into A minor and it goes a little slower...and then a certain way through this the trumpets and timpani actually have something to play.....and it never lets you down. You always know."

This totally analytic and structural approach is seen as inadequate for performing on an instrument however because:-

"you literally have to account for every single note, whereas a conductor doesn't have to play anything at all."

This then seems to be analogous to the deep approach in the sense that it provides the framework, but because of the nature of the task the detail is omitted. Perhaps then task requirements dictate the approach adopted, although another musician did describe learning a horn concerto without playing:-

"I learnt Mozart two in a geography lesson. It was 40 minutes. It depends what it is. If it's one with set tunes then I can learn it in a day."

He had however already learnt to play the piece so a considerable amount of the memorising had already taken place leading to considerable automaticity of the "detail". His analytic memorisation related to the structure of the music, i.e. providing a framework. If the music is modern and without recurring patterns he describes how:-

"I start at the beginning, work through, and then that's where the practice comes in because without music I'd make sure I can actually play it. I'd go over and over it.....then I'd picture it in my mind."

Asked if he had a good visual memory he replied "only for music". This observation provides support for studies on expertise which similarly indicate the importance of contextualised learning. Additionally he reports

"I can learn from memory very easily on the horn, absolutely no trouble, but on the piano I find it very difficult."

The nature and context of the task are then important determinants of both the approach adopted and the outcome of learning.

It seems then that in memorisation of music surface and deep approaches can both be adopted with equal success, depending on the nature of the specific task, although the "verbatim" recall required

for public performance of major works, e.g. concertos, leaves musicians with no alternative but to adopt either a surface or mixed approach.

The nature of performing in public then clearly plays a significant role in the way musicians approach memorisation. In contrast to the evidence from other subject domains anxiety regarding memorisation seems, at least in some musicians, to induce not a repetitive surface approach but rather a search for more analytic conscious means of processing. What of those musicians who exhibit little anxiety regarding memorisation? What approaches do they tend to adopt? The interview data indicated that they too adopted either a surface or mixed approach. However they particularly stressed the importance of "overlearning". For instance one described how achieving the required level of automaticity was a "very painstaking process of building up" and continued:-

"The odd thing about memorising by rote and by ear as it were, is that even though you do come to sing it in the end, in other words you know it note by note, you do in fact, I find, retain a sort of photographic memory. And that very often when you learn something you'll suddenly find you need to know whereabouts it is on the page in your mind's eye according to which entry it is and it helps me tremendously to have a certain amount of

photographic memory."

Slips sometimes occur where passages are similar and he adopts conscious cognitive processing to assist:-

"Similar passages which repeat themselves several times, it's a matter of sort of thinking to yourself, this comes 4 times and on 2 of those occasions there is a sharp on that particular note which differentiates it from the others and you have to think of it sort of mathematically.....sort of non-musically identify their differences."

Similar procedures are adopted for bars rest. However:-

"Once you're into a moving passage that runs at speed or is a continuous flow of music then the ear tends to take over, the fingers, the movement, you get into the swing of playing the passage so that there is no time, no need for visualising positions or counting mathematical numbers, the music simply flows."

This indicates then a complex interplay between unconscious automatic processing and conscious executive control as the evidence from skill acquisition research has already proposed. Another musician who clearly is confident regarding memorisation also pinpoints the importance of both multiple processing and overlearning for automaticity to develop:-

"I suppose it's a question of time really..... There are one or two aids to memory I think, the physical side of memorising is very important, the fingering patterns and

the bowing patterns.... visual memory I find very useful sometimes, how the page looks.....My visual memory is not all that good. I have a very bad memory for paintings, sculpture, architecture....Of course the other aid to memory for a musician I think is purely music...how the melody goes, how the harmony progresses and the highlights of the music and the high points of the music."

For musicians then the structure and shape of the music itself can provide a framework to support the developing automatisation necessary for detailed memorisation. The very nature of the music also means that this structure can be acquired aurally by the adoption of a surface approach. This surface approach can be successful in performance providing that the level of anxiety is not high. As one musician explained:-

"I think that the most important thing about playing from memory is that I just enjoy playing and then it works. I think that once you start thinking about it and trying to manipulate the music, once it's been learned from memory that's when things start to fall down."

This was reiterated by others. One when questioned :- "Did you rely on your fingers?" replied:-

"What to go there without thinking about it?Yes. Sometimes. The only trouble was that that was a bit frightening in itself, because if you let yourself do it and allowed the fingers to do it in a mindless sort of way

and then for some reason your mind was triggered back into a sort of more conscious state that was enough to throw you out. It's very dangerous to learn I think without thinking about it."

This then raises some interesting questions regarding the relationship between approaches to learning as applied to music and anxiety. It may be that the nature of public performance and the necessity for overlearning exert a particular influence on the approach adopted. Certainly in a musical context anxiety does not appear to induce a "surface" approach, the reverse seems to be more prelevant. However if a surface approach is adopted and the musician is confident, then it appears to be successful. However those who were most confident tended to use both approaches in a manner analogous to versatile learners.

The data also revealed that prior successful performance from memory increased confidence and ease of learning:-

"I had to do quite a lot of memory workand it gradually got easier and I realised it was just a question of making yourself do it and it became easier and easier."

Task requirements thus can play an important role in motivating learning and, if the outcome is successful, overcoming anxiety. Where memorisation is not essential, it is often avoided.

"I could never play by memory.....but when do I need to

do it?" In music then there appear to be complex relationships between anxiety, approach to memorisation, learning outcomes and task requirements. The interview data also revealed that musicians' perceptions of the advantages of playing from memory are related to "emotional" factors, e.g. "the printed page is too much of an encumbrance" or "If I'm happy with knowing the work I don't really want to see the notes because that, I think, has been left behind." It seems then to give "freedom to enjoy the work."

Musicians also demonstrated considerable metacognition regarding their ability to memorise. For instance they are acutely aware of their limitations:-

"I'm hopeless, absolutely hopeless."

"I've always had a memory.....reliable.....I still do, but I have my limits. There are some pieces I cannot memorise to save my life."

"I was never very good at memorising."

As we have already seen there was an awareness of what would be "secure" in memory terms, many mistrusting a reliance on unconscious processing.

The interviews also revealed individual differences in strategy use. The automatisisation acquired as practice progressed appeared to rely heavily on aural and

kinaesthetic strategies but some incidental visual memorisation occurred. While there may be considerable individual variation in the facility with which these strategies are adopted verbal reports only differentiated between levels of visual memory. The layout of the page was often retained but some musicians reported more detailed retention of individual notes. Aural strategies alone were adopted by some for relatively short and simple pieces. One reported:-

"If you approach it like you are singing a tune in the bath and you just sing the tune, only the violin is singing the tune.....that is the way to do it."

Another said:-

"Sound! So that I know what it sounds like and I know the instrument well enough, so that what I would term busking comes into it an awful lot." Another said:-

"I put them on tape, straight away from the start and just keep listening to it and play by ear."

This then indicates prior memorisation of an aural schemata which is then used as a template for active processing based on already developed aural/kinaesthetic expertise. However this kind of strategy may be inadequate for memorising complex material. As we saw earlier there also appear to be differences in the level of cognitive processing utilised. While some musicians reported studying the harmony, the key changes,

adopting mathematical strategies, "reading it, learning it like a book", others reported no such activities relying solely on automated unconscious learning. These observed differences in strategy use may be relatively consistent individual differences which are evident across subject domains, or they may be exclusively adopted for musical purposes. What does seem clear however is that a number of different approaches and strategies can be adopted with equally successful outcomes. These issues could usefully be addressed within and across other subject domains to attempt to establish the degree of individual consistency, and the relative effects of contextual factors.

Do these findings then elucidate further our model of learning and performance? What is clear is that the nature of memorisation for musical performance is distinctive, firstly because recall must be "verbatim" and secondly because the performance itself is public. These task requirements exert considerable influence over the approaches to memorisation which musicians may adopt. Most musicians, as we have seen adopt a repetitious surface approach to memorisation, although this is "active" in that much of the memorisation occurs during the normal procedure of practising, the task often being complete by the time the work has been mastered. A deep approach can also be adopted for certain tasks, as

instanced by the musician memorising scores for conducting, although for actual instrumental performance the level of detail required means that some form of surface approach is also required. The nature of the task then dictates to some extent the choice of approach, only a surface or mixed approach being appropriate. However it may be that the association of verbatim recall with a surface approach is an oversimplification, each approach may satisfy a different objective. Certainly, the evidence from the interviews seemed to indicate that the two approaches lead to different outcomes, one providing a framework, the other the detail to fill in the frames. This seems to be conceptually related to Pask's comprehension and operation learning, but applied here to memorisation. Perhaps for "deep" memorisation both elements are required, i.e. versatile learning. This may also be applicable to other subject domains.

Certainly those musicians who exhibited the least anxiety regarding performing from memory seemed to adopt a mixed approach to memorisation, relying in part on highly automated motor programs for execution of the detail with additional executive cognitive control based on knowledge of the structure of the piece. Other musicians however were able to successfully perform from memory utilising

only automated motor programs, but this seemed to rely upon their maintaining low levels of anxiety. Perhaps then in considering memorisation within a musical context we need to distinguish levels of learning, not in terms of surface and deep approaches but rather in terms of degree of automatisisation and level of executive control. The level of learning necessary to successfully perform from memory in rehearsal for instance may be inadequate for public performance, there having been insufficient automatisisation. The fact that public performance requires a degree of certainty not usually necessary in other subject domains or tasks, seems also to increase the degree of learning undertaken by musicians, with extensive overlearning taking place. This process tends to be described with phrases such as "a very painful process", or "hard practice". If the performance demands were less it is unlikely that such work would be undertaken. Performance then as an integral part of the musicians' task adds a new, positive and influential dimension to learning and recalling.

The nature of the task to be undertaken then is clearly important, not only in determining the level of learning but also the approach adopted. The deep approach adopted for learning a score was inadequate for preparing for performance on an instrument, the level of detail

acquired being insufficient. The comprehension learners also reported "knowing" works from memory but retaining insufficient detail to be able to transcribe them verbatim. Differential levels of expertise in memorisation were also reported on different instruments. The complexity of the music also limited choice of strategy, "busking" or playing by ear being possible only for relatively simple music. In contrast concerto performance required considerable automation and a cognitive framework.

Individual differences in the patterns of strategies adopted were also exhibited. Available strategies included aural, visual, kinaesthetic, and cognitive but there were differences in the degree to which each were adopted. Aural and kinaesthetic strategies seemed largely to be deployed unconsciously to achieve automatisisation but some musicians also seemed to acquire a schema for the layout of the page, although the level of detail retained varied. Those exhibiting expertise in utilising visual strategies claimed that it was domain specific and not applicable in other areas. There were also individual differences in the degree and kind of conscious cognitive strategies adopted, and in ability to play by ear.

In relation to the memorisation of music then there appear to be complex relationships between preferred strategy

use, approach to learning, level of expertise, task demands and learning outcomes. These clearly need to be explored further. Perhaps our consideration of the learning and performance of the novices will elucidate these issues further.

STUDENT APPROACHES TO LEARNING AND PRACTICE

The research questions addressed in relation to the professional musicians were also considered in relation to a student sample. The questions were:-

- 1) Can student musicians' approaches to learning new music be explained by any current learning models?
- 2) Do any of the current models of learning adequately explain student musicians' approaches to practice?
- 3) Can any of the current models of learning explain student musicians' approaches to memorisation?
- 4) Do any current models have explanatory value in terms of musicians' approaches to performance?

Additional research questions were also posed:-

Does the current expert/novice paradigm have meaningful application within the context of learning a musical task?

In what ways are the approaches of the professionals and the students the same?

In what ways are the approaches of the professionals and the students different?

To address these questions a sample of 55 students, who played either the violin or the viola, were studied. These ranged in age from 6 to 18 and in achievement from beginner standard to post Grade 8 standard. There were 21 boys and 34 girls reflecting the proportions found learning musical instruments in the country as a whole.

The students were interviewed in a similar manner to the professional musicians but with particular emphasis on providing a relaxed, non-threatening environment. They were informed that because of the researchers position as Head of Upper Strings the interviews had implications for raising standards of instrumental teaching and playing throughout the authority and it was therefore imperative that they answer truthfully. This approach did seem to be effective in eliciting honest replies. Additionally, prior to the research, discussion regarding practising had been avoided within lessons. The interviews consisted of the same structured questions as those presented to the professionals but further questions were introduced relating to parental influence and the effects of examinations on practice. These were:-

- 1) Do your parents help you with your practice?
- 2) Do your parents insist on you practising?
- 3) Do your parents remind you to practice?
- 4) Are there times when you practice more often than usual?
- 5) Do you practice more regularly when you have an imminent examination?

In addition to the interviews each student was recorded practising a short piece of appropriate standard, for 10 minutes which they then performed. This procedure was operative within the authority as part of an examination

system and was therefore a realistic task although normally it would not have been recorded. The recording equipment itself was discreetly positioned but a number of students did notice it when the experimenter was absent from the room. The music for the task was selected to be of an appropriate standard for each Grade.

The taped performances were assessed by two independent judges, both with over 20 years of professional musical and teaching experience. Marks were allocated out of ten on a number of indices, to provide detailed information on several aspects of performance. This level of analysis was required to attempt to establish the nature of the acquisition of musical expertise. The marks were allocated in the following areas:-

Overall impression	Equivalent to a normal examination mark.
Rhythmical accuracy	Score for accuracy of translation of rhythmic notation into sound.
Steadiness of pulse	Score for the rhythmic steadiness of the performance.
Notational accuracy	Score for accuracy of translation of pitch notation into sound.
Intonation	Score for accuracy of intonation of individual notes.
Sense of tonality	Score for overall observation of the key signature.

Observation of marks Score for the level at which marks
of expression of expression, e.g. loud, soft,
 speed, were observed.

The correlations between the judges scores ranged from .82 to .96 ($p=.0001$), indicating high inter-rater reliability.

An examination of the data from the interviews and recorded practice/performance sessions revealed considerable qualitative change in the nature of expertise as it developed in the students. This was particularly marked at the advanced levels, i.e. those students who were at Grade 8 standard and above. It is therefore proposed to examine the data separately for this group of advanced students, prior to considering that of the younger and less experienced musicians.

ADVANCED STUDENTS

The data from the semi-structured interviews of the advanced students were analysed in terms of the protocols outlined earlier in the consideration of professional approaches to interpretation, practising, memorisation and performance. In addition it was possible to relate these data to scores obtained in the recorded practice and performance session.

These procedures indicated that the advanced students,

(Grade 8+), aged 15 -18, with an average starting age of 8, adopted similar approaches to the professionals. There were however some difficulties in identifying their approaches because their relatively undeveloped technical skills precluded totally independent learning. Nevertheless it was possible to identify pointers to future behaviour.

Before considering each individual case study let us examine the data from the whole group to ascertain their initial approach to learning new music. Do they in a manner similar to the professionals attempt to gain an overall conception of the work before detailed practice begins? The evidence from the interviews and the recorded practice suggests that they do:-

"If it's a new piece I play it straight through.....I would probably play it all the way through the first time."

"You have to get an idea of what the piece is like in the first place.....If you know that it's meant to describe something, or it's a particular mood or something, it's nice to know that by playing it through."

"I always try and play something all the way through to get an overall view of it and then take it to pieces, whereas if you just start and try and work at it, try and get things perfect from the beginning to the end, then it's very patchy."

There was only one exception. She described how:-

"I just play it through.....If I come to a bit I can't do,

I just go over it until I can do it, then carry on."

The data indicate then that the advanced students tend to acquire an overview of a new piece before commencing detailed practice, in a manner similar to the professionals. However they all physically played the music. None relied on cognitive analysis. After this initial holist approach there was considerable strategy diversification in a manner similar to the professionals. Let us consider each advanced student in turn in relation to their approaches to interpretation, practice, performing and memorisation.

The first student (aged 15) initially acquired an overview which provided musical ideas:-

"I usually play the piece through first so then I have a rough idea of what I want to do."

This description of a holist strategy also indicating considerable interest in "music" as oppose to "technique" suggested a "musical" approach. Further questions regarding his listening habits revealed extensive listening but a resistance to being influenced by other interpretations.

"I usually do something different, because I don't like doing what other people do because I'm awkward....If I played it through first and I thought it sounded good like I did it, then I wouldn't change it."

When questioned regarding the formulation of his ideas he

reported that:-

"They (the ideas) are inside me. If I've heard the piece before I start playing it then I'll probably play it like that but if I play the piece before I hear it then I'd rather do my own thing."

It is difficult to conclusively identify an approach from these statements. A further report again regarding listening to pieces that he is learning again indicates ambivalence:-

"Well, because then you are trying to do it like that person did in the first place anyway...Well, some of the bits that he would do on the tape wouldn't be the same as what you wanted to do."

It seems here that ideas are developing enabling the planning of interpretation based on a combination of previous listening and intuition. The emphasis on being different is analogous to one of the comprehension learners emphasis on being unique and there is clear evidence of the development of his own ideas suggesting at least Level 7 on Perry's developmental scale. Also in common with the comprehension learners he does not need to play the music to know what it will sound like, "I just look at it." He also comments that he tends to play by ear "Even when I've got the music there." This is also like the 2nd comprehension learner who improvises. There also seems a certain reluctance to carry out physical practice. For instance he admitted that in the recorded practice session, if he had not noticed the tape recorder he would

after his initial play through probably h v stopped playing and "messed about on the piano." This seems to reflect a less than positive attitude to physical practice again reminiscent of the comprehension learners who tend to prefer analysis to practice. Although intent on pursuing a career in music his practice is not excessive:

"I usually practise 5 days during the week, usually 30 to 45 minutes each night but over the weekend I d n't usually touch it."

Even for examinations he does little more:-

"I don't practise more in time, but I do scales more than I would usuallyImmediately after (an exam) I don't usually touch it for a week or so.....Beforehand, sort of a week, I'd probably practise quite a bit more....but not for concerts."

This perhaps then indicates a profile akin to that of the comprehension learners, supported by his attitude to physical practice. When asked if he liked practice he replied: "Yes, I'm alright once I've got it out."

He also does not like practising technique in isolation:-

"I don't like practising scales, I don't mind practising studies. I don't like practising exercises."

Taken together this profile is suggestive of a musical as oppose to a technical approach with interpretation based on a combination of holistic and serialist strategies, but with overall a seeming tendency to prefer a comprehension learning approach to learning music, although this could clearly be effected by subsequent circumstances.

What of his approach to memorisation? First there is an element of anxiety:-

"Because if I'm playing something that I've memorised then I'm more likely to go wrong than if I had the music."

In contrast to those professional musicians who in response to anxiety adopted a "deep" approach intending to analyse the music cognitively his strategy is repetitious:-

"I played bits over then tried to do it without the music."

When asked if this was successful he replied:-

"It was when I practised at home.....It just went when I tried to play in front of others."

This lends support to the hypothesis that in this musical context anxiety disrupts retrieval rather than learning.

His approach as was stated earlier seems to be aural/kinesthetic:-

"If I'm trying to play something I usually do it by knowing where my fingers have got to go." He further believes that he could learn to perform a work without ever having seen the music. Perhaps then this aurally biased mode of processing is severely disrupted by anxiety? Or perhaps it enables him to spend less time physically practising, hence "overlearning" does not occur and under stress performance breaks down? Some support for this comes from the recorded practice session where, firstly

his initial play though was outstanding and secondly he admitted that normally he would have ceased practice after it. Observation of his learning over a number of years has also demonstrated his lack of discipline in adopting consistent fingering. This for many violinists seems to be a crucial aspect of memorisation, and is clearly not available to him. It also indicates considerable spontaneity as observed in the "improvising" comprehension learner. What of performance? He actually communicated very little regarding this aspect of his playing merely saying:-

"I just sort of get up there and play." However as indicated by the discussion regarding performing from memory this does pose some problems for him. What of his prepared performance? His overall score was 8, with 8.5 for rhythm and steadiness of pulse and 9 for notational accuracy, intonation and tonality. Despite his obvious concern with musical interpretation he scored only 6 for observation of expressive markings. Why might this be? Perhaps in his overall intention to be "different" he does not always take due account of the composer's marking. Alternatively he may not be communicating his intentions. Given the discrepancies between feedback received by the performer and audience perceptions, e.g. Patterson (1974), this is a distinct possibility. However he demonstrates a position high on Perry's developmental scale, possibly as high as level 9, with his intention to be "different" although reassessing interpretation was not specifically

mentioned. He is however clearly aware of alternatives. There are similarities then with the professional comprehension learners in listening to music, reluctance to practise systematically, the aim to be unique, the ability to create an internal aural representation of the work and a high level of intellectual development. However there is a tendency for interpretation to be based on "what feels right" and also to develop as he plays indicating some tendency toward an operation learning approach. In addition there is considerable contrast in terms of his level of arousal and the subsequent disruption of memorisation.

The second student, aged 18, demonstrated in her approach to interpretation a concern with "emotional" factors. She described how:-

"Sometimes I look at things and wonder what they mean.....I'll look at a piece and think....I just get this feeling about the mood of it and I sort of think if I'm going to play it in front of somebody. I think well I've got to sort of get a mood over in this.....what do I want to make the audience feel, do I want to make them laugh? Do I want to make them cry? Usually I want to make them cry. I just get this feeling. It's almost like passing something on from the composer to the audience...."

To get the mood "I just play it and think about it and look at it."

There is clearly a concern here then with meaning and

understanding but of an emotional nature rather than of the structure of the music. This then would suggest that she adopts a "musical" as oppose to a "technical" approach. She does listen to a considerable amount of music of all kinds.

"I sort of go through phases. Before my exams I was listening to nothing but Radio 3 all the time and now it's all Radio 1, so it varies widely."

In addition she will also use literary sources for ideas.

"There's loads of books on him (Beethoven) so I could find out when he wrote it and what he was doing when he wrote it and perhaps who he wrote it for...if he was writing it for such and such then maybe I ought to play it like this...or if it was for that great occasion... I don't know that I'd like to listen to itlistening to somebody else playing it tends to ruin it if you listen to it before you play something 'cos then you try and play like them, rather than letting yourself play it...."

This then indicates an approach based on "building descriptions of what may be known" as in Pask's comprehension learners but it is distinctive in an absence of analysis of the structure of the music and an emphasis on emotion and an attempt to "emulate the composer" when she plays. However this aspect of planning is accompanied by intuitive approach:-

"I don't decide to play something...it just happens."

This approach was preceded by a phase when "perfection" was the aim. Now attention is focused on the audience with a desire to communicate emotional experience.

"I think it's come in recently since I realised that composers wrote different things, they wanted different things. At first I just wanted to play a piece right. I just wanted it to sound perfect but I didn't know why and I didn't know what kind of perfect. But now it's more, I want it to be perfect but I want it to sound like the composer wanted it to sound as well."

Could this concern for the audience indicate a "strategic" approach? There do indeed seem to be similarities between this student's approach and one versatile learner who considered the audience in her practising scheme. However the definition of strategic as defined by Entwistle and co-workers fits this student no better than the professional musicians. This is confirmed by an examination of her practising habits which exhibit no particular efforts to manage time or effort. Initially acquiring an overall conception she aims to identify the mood and the difficult passages, after which the details of interpretation "just happen". Practice of technical passages tends to be automatic:-

"Well usually I leap in and find I can't play it.....and

then I take it to pieces...How do I take it to pieces? Well I don't do this consciously... first of all you try to play it slowly, as slowly as you can stand....sometimes I try and analyse things.... Quite often I find that if I think about things for too long before I play them, then I can't play them, whereas if I just do it, it works."

This then clearly demonstrates a relatively non-analytical approach to the detailed aspects of practice which appear to proceed largely at an automated level. Scales are hated and practised exclusively for examinations:-

I don't like them (scales)....Since I've done my Grade 6 I've practised scales so that I do them properly. Because in my Grade 6 violin I didn't practise them. I absolutely hated them so much. I got into the exam and mucked them up and so I decided that they were necessary evils and I practise them now properly."

This indicates extrinsic motivation, but hardly strategic behaviour where the system is manipulated to one's own ends. This is confirmed by her description of her scale practice which is essentially repetitive and serial:-

"I usually just play them through and I know them in a certain order. That is dangerous though because you tend to get a bit confused when the examiner starts asking you in a different order."

This is clearly not strategic behaviour. Studies are seen as useful and often worked on over long periods e.g. 6

months:-

"I can play that now so I'll find something else to do 'cos there's this one that you started me on, ages ago, it was in September when I first came here, and I just couldn't play it in the lesson at all and I've been fighting with that now for nearly two years. I can get through it now but it still doesn't sound right. But it might take me 6 months to get one of them right just plodding away at it."

This demonstrates considerable intrinsic motivation, particularly as these studies will not even be heard in lessons. Again the strategic approach seems inappropriate when one considers her irregular practising habits:-

"I don't think I've ever practised regularly.....I used to practice things until I got them right and then not bother with them anymore but now because things are harder I have to keep working at them steadily.....So I have to practise more often."

While there is, as has been demonstrated, clear evidence for intrinsic motivation other reinforcement is also necessary, i.e. practice is enjoyed as long "as it has positive results."

"If the music is really hard but you make progress with it then that's nice but if it's really hard and you go at it for a week and still can't play it then that's not nice.....and it's tedious if your parents tell you to

practise."

The importance of extrinsic motivation is demonstrated, with more practice for exams and concerts:

"Exams seem a bit more daunting.....I think there is a lot more resting on it, 'coz you are going to get something back. You get a result back, whereas you do a concert and that's it, or hopefully that's it if the people aren't going to see you again. Exams are more important because you've paid for them, I suppose and you can't do the next one. I don't know, you are working towards something..... I'd be more worried about it."

It seems then that this student adopts a musical orientation towards practice with essentially an operation learning approach to interpretation, although she is also concerned with building up a knowledge base but related to emotional expression rather than the structural aspects of analysis.

When asked "How do you go about memorising?" She answered:

"I don't! Well, yea, I think if you practise a piece enough you know it anyway." Retrieval requires no conscious effort.

"Sometimes, I have like a map. I can see the bars going along....I can sort of see it, but you can't really sort of see it physically, just, I don't know it's like a comforting principle really. It's just sort of there in

front of you and you can see, perhaps if you did make some marks on it, then you can see them all go past, and you can remember where you changed a fingering or you can see that..."

There is also an aural schema:

"I always have the sound, I always know what it should sound like. It doesn't mean I can play it like that.....I know what I want it to sound like."

Some kinaesthetic memory in addition:-

"It's like a pattern really. I don't know how they (the fingers) do it.....they just sort of know where to go. If I think really hard about where they are meant to go, they can't do it. If I just let them go or if I get angry with myself they tend to work better than as well."

This again highlights the importance of unconscious processing which seems to be actively disrupted by conscious processing. The anger which improves her facility presumably increases arousal and thus speed. It is also in stark contrast to the first student described who experienced considerable difficulties with performing from memory. Why should this be? The student with a comprehension learning approach seemed to rely heavily on aural processing, playing by ear, with little multi-processing. Perhaps this then makes it comparatively more difficult for him? In addition this student experiences problems with performance per se. She does get nervous but

it is more excitement:

"I'm concerned, but not feeling sick or get butterflies.....I look forward to it, but it doesn't really bother me."

Clearly she adopts a musical as oppose to a technical approach and in her emphasis on emotion, and her style of learning is operational. However her cognitive approach to establishing the composers wishes, decisions taken about mood portrayal and her extensive listening tend to suggest that her approach is versatile. In her prepared sightreading, she gave a very musical performance, with 8.5 for observation of expression, perhaps indicating her ability to "communicate" her intentions. However in all other respects it was less accurate than the student described earlier (See Table 7). This could be interpreted in terms of prior learning and level of expertise, particularly in sightreading, the first student having had considerably more orchestral experience.

The third student, in contrast described in the recorded practice trying to "get through" the prepared piece, assessing the speed, working out difficult rhythms and then practising the difficult passages. In the subsequent interview he admitted that he had paid little attention to the interpretative aspects of performance and that this was his normal mode of practice.

"I don't really notice doing anything. I just play it how I think it should be played."

This then indicates a technical approach to practice, which is supported by his routine which emphasises technique, beginning with scales, studies and then pieces, the latter divided into sections.

"I do something to warm up. I do a few scales and I play an old piece I know quite well, just play it through to get the fingers moving...that takes about 10-15 minutes. Then if I've got a study I'll go through that."

Pieces and studies will be broken down into defined elements to simplify problems.

"I'd play it through first then I'd go through it in sections. Then in each section I'd go over the hardest bits and then make sure I could play that. Then I'd start off and do a line, then a line and half, then two lines..."

Also

"If it's like a set pattern, like a trill or something I'll practise the trill or perhaps one set of notes and then I'll sort of apply it to the study."

This indicates a somewhat analytic technical approach although repetition, in various guises, and also with the metronome is used to improve playing. Technical problems are broken down in an analytical way into manageable proportions but he also has a range of learning strategies, both analytic and serial, which he uses to

assist in practice. In addition his practice seems to be carefully structured indicating a high level of planning.

"I use my metronome, if it's got a setting at the top I'll do it at half and then build up from there."

As with some of the technical approach professionals practice is regular, although it increases prior to examinations indicating elements of extrinsic motivation.

"I do about an hour.....Sometimes it's difficult to fit it in with school work but when I've got something like a Grade coming up I make sure that I do at least an hour and then sometimes I'll have quite a long time perhaps over two hours. I did before grade 8."

Recordings if available, are utilised as aids to learning but not for developing interpretation which receives scant attention in his interview. He also admits to being nervous "about going wrong", using the same terminology as the professional "technician" identified earlier, but performance is not disrupted and no strategies are adopted to help. Memorisation is carried out systematically adopting a surface approach and is successful, although he prefers to play with the music. His performance scores are consistently 9 or 9.5, except for the observation of expressive elements, where it fell to 7, although the performance was not without sensitivity. There are indeed remarkable similarities between the profile of this student and the professional technician

described earlier, who also played with considerable sensitivity. His reference to playing it "how I think it should be played" indicates the possibility of a developing intuitive approach to interpretation, but with the core of his work being technical.

Student 4 in comparison to the other students found it difficult to verbalise her learning activities and the interview was subsequently shorter and yielded data which was less rich in content. She, as student 3 demonstrated no conscious interest in interpretation, but she did adopt a serialist approach to practice, with considerable repetition and no analysis. She was also the only advanced student not to adopt an initial holist approach. Unlike student 3 she described hating scales, avoiding playing them when possible:-

"If I'm trying to play scales I get really annoyed with them.....I hate them. They're OK on the piano. The notes are there on the piano."

The difficulty is not aural in that she has an internal representation of the scale and is also able to detect bad intonation. Despite appropriate schemata and adequate monitoring however she fails to produce a sufficiently accurate motor programme. Perhaps some specific aspect of motor/aural co-ordination is necessary for accuracy at this critical level. She is however able to memorise

effortlessly and performs from memory competently.

"I don't really try to (memorise) but it just comes after a while. I just remember it after a while."

Interestingly, although she suffers from stagefright which often mars her performances, her memory is unaffected by this increased arousal. This once again questions the relationship between anxiety and memory. If memory performance is not always impaired by high arousal, under what specific conditions is it affected? Perhaps individual differences in processing are responsible? Or perhaps some kinds of processing lead to higher levels of overlearning with subsequently less disruption when arousal is high? Or possibly it is anxiety, not arousal per se which interferes, i.e. fear of forgetting. A number of musicians have commented that conscious retrieval seems to interfere with unconscious retrieval in music. Perhaps this relates to the Gothenberg studies where anxiety led to conscious attempts to memorise, which were less successful than approaches aimed at understanding. Their findings suggested interference in learning while the musicians suggest interference in retrieval processes. Complex interactions of a number of these factors are likely to be responsible for differential success in memorisation and subsequent performance.

When we examine the performance scores of this student we find that despite her lack of consideration for the musical aspects of performance she scores 7.5 for observation of interpretative markings, a higher score than the comprehension learner student described earlier, although her overall performance mark is lower. This tends to confirm the finding from the professional musicians that sensitivity in playing is not necessarily related to conscious decisions regarding interpretation and also suggests that this student is an intuitive/serialist. Her profile, in particular with her success at memorisation, and the problems she experiences with scales suggest that in examining musical learning and performance global assessments are inappropriate and detailed analyses of abilities, preferred strategies, approaches and the level of expertise achieved all need to be considered.

The remaining two students while emphasising technique and musicianship equally are nevertheless very different. Student 5, initially adopted a holistic strategy:-

"I always get through it.....It's not finished if you finish it in the middle." While practising "pieces, studies and scales" she also stresses the importance of sound:

"I want it to sound like it sounds on the record but I can't make it like that. They (my fingers) won't move. You can hear every time I change my bow. You can't hear them

changing their bows. I can't tell, even when it's marked in the music."

This indicates concerns beyond mere technique and also indicates level 7 on Perry's developmental scale. However she exhibits some preference for technical excellence in her preference for pieces of music:-

"I like pieces that sound impressive. I can't play them but I like the things that sound really good."

In learning a new work she adopts an initial holist strategy followed by intense technical practice, more "holistic" work and in the later stages concentration on problematic sections. She does not carry out any musical analysis, neither does she attempt to acquire knowledge of the composer and his wishes. Her concern for interpretation is based solely on emulating sounds on the record. However the evidence from the professionals suggests that this is an early stage in the development of acquiring a personal style and the concern with sound suggests a versatile rather than a technically oriented approach. Practice is irregular dependent on her mood and whether she likes the music, although it is more consistent before examinations.

"I do it (practice) when I want to play something. That is quite a lot of the time. It depends what pieces I'm playing. If I like a piece I play it more.....I do it every day when I'm coming up to an exam.....about two weeks before."

Once again we see evidence of mixed motivation. Scales and exercises are only practised in preparation for examinations and technical work tends to be based on repetition indicating a serial approach although she does not use a metronome. Rhythms are identified as particularly difficult, cognitive strategies being adopted to assist and metacognition is demonstrated in an awareness of a tendency to play at speed before things are really mastered.

"What I do, I always want to play it straight the way, you see, so I always try and play it well and then of course I start practising it like that and it's always wrong.....because I've been practising trying to get it up to speed straight the way." Nervousness is apparent immediately before a concert but excitement precedes that leading to excellent performances.

"In the morning I usually feel more excited than nervous....I get more excited, then it comes to the actual thing and then it turns to nerves."

It is note worthy that the two students who report excitement at performing, are both excellent performers, play faultlessly from memory, and tend to practise erratically. For this student memorisation poses no difficulties.

"I don't usually think about it. I usually just play it with the music and then when I say I've got to memorise it I just take the music away and see how far I can get. Then

I do from where I couldn't get any further and I play that again and again and then I try that bit and then I put them together. If I can link it together."

This is clearly rote learning and develops automaticity.

"I sing it in my headmy fingers just go to where the sound is in my head."

However she unlike the other competent performer does not rely on visual memory indicating once more the way in which different strategy preferences may have equally successful outcomes.

In her prepared sight-reading she attempted to "get through" the piece initially, then concentrated on difficult sections "en route" in subsequent play throughs. It is interesting that her highest mark is for overall impression, 8, while the remaining marks vary between 6.5 and 7.5, suggesting that her ability to "perform" may be her greatest strength.

In contrast student 6, a viola player, gave a remarkable performance of his prepared sight-reading, with no score less than 9, making only one small rhythmic error and demonstrating expert judgement in controlling the tempo to ensure maintenance of speed in the technically difficult passages. In his preparation, some time was spent in cognitive analysis and he was heard to whistle and count. An easy section of two bars he simply did not

rehearse. The use of this strategy was supported by the interview data:-

"In pieces there are generally certain easy bits that you can play the first time."

Initially he acquired an overview practising some sections en route but then focused his attention on the difficult passages. His approach seemed highly planned and well organised. This was confirmed by his description of preparation for an exam:-

"If I'm doing an exam I'd be doing 10 minutes of scales, then the studies and pieces, but if I wasn't then I'd be unlikely to do much other than the pieces. The odd scale to warm up."

On length of practice

"Just practice until you can play it. It depends how hard it is, but normally if you can aim to do a section say, or half a movement say, until you can play that. Then the next day the second half. If I say I'm going to play it until I can play that bit, and slow it all down, really slow, speed it up a notch at a time with the metronome..... until you can play it, and then you feel you've achieved something." This level of organisation in the professionals indicated a high level of planning, which was clearly demonstrated in the way in which the prepared sightreading was attempted, combined with a high level of arousal, indicated by increased nervousness. In response to the

question: Do you get nervous when you have to play in public? There was a very emphatic "Yes!". He continued:-

"I just know that I am going to get nervous and I just have to sort of forget about it and play anyway. I mean occasionally you don't. I don't understand why but there are certain times when I am not as nervous, by any means at all.....I think I play worse because I can get to the point where my hands are actually shaking.....I'm always nervous but sometimes it's worse."

In spite of these high levels of arousal and their perceived detrimental effect on performance no coping strategies are adopted except playing for parents. Given the high level of metacognition demonstrated in the prepared sightreading this is suprising. This further supports the notion that arousal and planning are totally independent of approach to practice. This student develops interpretation from listening to a lot of music, particularly works which he is currently learning.

"It's nice to hear them.....It's very helpful. It shows you a style of doing it in the person who has done it. But preferably you can get more than one recording of it. You can then listen to how two different people have interpreted it and then that can often help you to make an idea of what you think it should be like."

This seems to be indicative of a holist approach to interpretation, although there is no mention of analysis of

the work. It also demonstrates level 7 on Perry's scale of intellectual development but is not matched by his description of developing interpretation on the piano, where he comments that he is "not good enough to be concerned with interpretation" being more worried about accuracy. Intellectual development in the musical domain then appears to be very context specific. Learning from memory is also viewed as "fairly easy" again achieved usually with little effort after the piece is learned although sections not secure will be rehearsed by rote.

"I mean, you just really have to play it several times and then say, well lets see if I can go up to letter A without the music and if you can then often you suprise yourself, you don't realise that you know it."

However he is reluctant to perform from memory possibly because of the difficulties he experiences with nervousness.

While these two students both demonstrate developing versatility in interpretation and balanced approaches to practice they are very different performers in a public arena. Student 5 can convey her intentions to the audience, plays from memory easily, is confident and "sparkles". Student 6 in contrast, is reluctant to play from memory, experiences considerable stagefright and does not do justice to his considerable musical talent.

Conclusions

What can we learn from consideration of this group of advanced students?

Firstly regarding approaches to learning the findings from the professional sample were generally supported. All of the advanced students with one exception initially adopted a holist strategy to learning new music, and all played the music through, none relied on cognitive analysis alone. After the initial examination of the music there were individual differences mirroring those of the professionals in the approach adopted. Holist, serialist, analytic and intuitive orientations could all be identified, although overall the distinctions were less clear in these advanced students, perhaps because of the constraints of the school environment. Pask's (1976) model thus provided guidance in understanding the advanced students' approaches to learning but could not explain all the complexities of that behaviour.

A similar scenario emerged with regard to approaches to practice. Current models concerned with orientations to studying offered a framework within which the issues could be considered but just as they were unable to account for all aspects of the professionals' behaviour they were

similarly unable to account for all aspects of the advanced student's behaviour. The additional information provided by the recorded performance of the students was particularly important enabling comparison of learning outcomes with approaches to learning and practice. This revealed that different approaches to learning and practice can lead to equally good, but perhaps different performances (See Table 20).

In considering approaches to memory current models were less illuminating because they failed to take account of the unique influence of live performance itself. This appears to have a direct influence on the nature of the learning undertaken. Levels of arousal are also clearly important, although the data indicated that arousal alone may not be responsible for the disruption of musical memory. Other factors seemed to be implicated. Examination of the scores from the recorded performance also suggested that performance may be "more than the sum of its parts", this being well demonstrated from the marks of student 5.

Taken together these findings suggest that there is a need for complex multidimensional models of learning and performance, which integrate ability factors, approaches and orientations. Such models as currently exist neglect

TABLE 20

ADVANCED STUDENTS PERFORMANCE MARKS

Student	1	2	3	4	5	6
Approach	Musical holistic	Musical realist	Technical	Technical realist	Versatile performer	Versatile
Overall impression	8	7	9	7.5	8	9
Rhythmical accuracy	8.5	7.5	9	9	7.5	9
Steadiness of pulse	8.5	6.5	9.5	9	7.5	9
Notational accuracy	9	7	9	8.5	7	9
Intonation	9	7	9	8.5	7	9
Monality	9	8	9.5	9	7	10
Observation of expressive marks	6	8.5	7	7.5	6.5	9

aspects of arousal and planning.

Comparison of the data from the advanced students with that of the professionals also enabled a consideration of the relevance of the expert/novice paradigm in this musical context. As described above there were a number of similarities between the expert and student musicians. There were also a number of differences. It was for instance more difficult to identify distinctive approaches to learning, practice, memorisation and performance, in part perhaps because in the normal learning environment, lack of technical expertise making independent learning impossible.

Also there was less specific preparation within the advanced student group for performance itself. There was a rather "taken for granted" conception of performance. Although a number of the students were aware that their performance would be marred by nervousness they adopted no specific strategies to improve the situation. Regarding practice similar findings emerged. There was no mention of lack of concentration or of organisational factors specifically, although there were clear differences in behaviour. This reflects a lack of self awareness and perhaps a rather passive approach to learning. One student in particular experienced great difficulty in

verbalising her learning activities, a feature not observed in any of the professional group. So while there was evidence¹ within the student group of metacognitive activity with regard to the specific learning task this did not seem to extend to performance or practice itself.

Within the advanced student group it was possible as with the professionals to identify positions on Perry's developmental scale, a number of students achieving the highest levels. Also within the student group itself the importance of level of expertise and experience in task completion was demonstrated. Student two, while the eldest, had the lowest marks in the prepared practice, but had considerably less experience in orchestral playing which encourages fluent automated cognitive processing and skill in "getting round the instrument".

Overall then the data from the advanced students seems to indicate individual preferences in approaches to learning while also reflecting changes occurring as the result of developing expertise. Let us now turn to a consideration of the younger and less expert students who had not yet attained grade 8 standard to further explore the relationships between expertise and approaches to learning, practising, memorisation and performance.

NOVICES

As outlined earlier the methodology adopted to study the novice musicians was identical to that for the advanced students, consisting of a recorded ten minute practice and performance session followed by a semi-structured interview. Exceptions to this were 9 beginners who had been learning for only a few weeks. These were required to perform two pieces previously practised at home. Six of the nine then went on to perform a piece attempted for the first time in their lesson immediately prior to the recording. On the basis of these short pieces they were awarded one overall performance score marked out of ten. The other students were awarded marks out of ten on the same basis as the advanced students for: overall impression, rhythmical accuracy, steadiness of pulse, notational accuracy, intonation, sense of tonality, observation of marks of expression.

Let us then return to our original research questions and ascertain whether an investigation of the practising behaviours of the novices will indeed assist in answering them.

Novices approaches to learning music

Firstly, we must consider whether student musicians' approaches to learning can be explained by current

learning models? In relation to this, the model adopted to address this question was that of Pask. Adopting this framework, it was possible within the groups of professional musicians and advanced students to identify comprehension, operation and versatile learners adopting analytic and intuitive approaches. Can such individuals be identified within the novice group?

This question raises a particular problem in relation to the novices. The analysis of the learning behaviour of the other groups concentrated on their approaches to interpretation. In the novice group only one out of the forty nine students (2%) reported any activity which might be construed as a consideration of interpretation. Similarly only four (8%) made noticeable attempts in the recorded practice to observe the dynamics in their prepared sightreading.

Different criteria then need to be established in order to consider the efficacy of Pask's model within this group of students. Perhaps one could consider the question in relation to the adoption of holist or serialist strategies during practice? How would one then operationalise these within the novice group? Holist strategies might be indicated by demonstration of the acquisition of an overview of the whole piece before beginning detailed practice on sections while serialist strategies might be represented by practice of small sections "in route".

Adopting these criteria the data from the recorded practice were analysed. The analysis revealed that in the early stages of developing expertise most of the students tended to "play through" their piece, 60% consistently doing so. Can this actually be described as a "holist" strategy, given that the word "strategy" implies some form of intention? This was clearly not a deliberate initial strategy followed by detailed practice on sections, it was simply a question of merely playing the piece through in a repetitive manner. In fact using these criteria the adoption of holist strategies was not apparent in the recorded practice of any of the novices only emerging in the recorded practice of five of the advanced students.

If we consider serialist strategies, once again adopting the criteria described earlier, nine (20%) of the novices did adopt this mode of practice, playing the material through but practising large sections "en route". For the majority of students (67%), the material was simply repeated, starting at the beginning and proceeding to the end. There were three students (5%), who were exceptions to this. They adopted a deliberate strategy of practising a line at a time, which was particularly maladaptive as they did not complete task requirements.

It seems then that Pask's conception of serialist and

holist strategies is inadequate to describe the learning behaviours of these novice musicians. Or is it? In the interviews 34 of the novices (69%) reported that they practised in sections, including two beginners. Also 27 (55%) were able to identify aspects of playing that they found difficult, this percentage including one student at Preliminary Grade. Ten (20%) also reported practising sections slowly, implying not only identification of difficulties but also use of appropriate practising strategies to overcome these difficulties. In fact only 13 (26%) reported that their practising consisted entirely of playing through the music. In addition 17 (35%) reported sometimes looking at the music to "work things out".

How can we explain these differences between reported behaviour and observed behaviour? Possibly the somewhat artificial nature of the practising task led to atypical behaviour. Or perhaps the novices articulated what they perceived to be their mode of practising when in fact the reality was somewhat different? What is clear however is that using the data from the interviews rather than the recorded practice it is possible to identify the adoption of holist and serialist strategies in the practice of young and inexperienced students. However this is not related to interpretation, which does not seem to become a concern until Grade 8 and above. The data from the recorded practising sessions seems however to indicate a more gradual development of strategy use. Let us consider

this in more detail.

Although as we have seen there are differences between reported strategy use and observed usage in the recorded practice sessions, with the former indicating better developed strategy use, it is still possible to trace emergent themes. Initially students tended to "play through" their piece 60% adopting this strategy in the recorded practice, although this percentage fell to 26% in the data from the interviews. However it is debateable whether this a conscious strategy, it is perhaps better conceptualised as simple repetition. Nevertheless it is effective, particularly in the early stages of developing expertise as it promotes automaticity in motor and reading skills and the establishment of aural schemata. Only when these have been acquired and co-ordination and reading skills are fluent does the identification and practice of "difficult" passages become possible, the approach adopted by the professionals and advanced students.

At what stage does this become possible? The data from the interviews revealed that at Grade 5 and above all the students claimed to be able to identify difficulties. No beginners made this claim, while 57% of the novices between Preliminary and Grade 4 did so. There were also marked individual differences. Strategies of slow practice, followed by a speeding up process also emerged, 70%

reported following this procedure from Grade 5 and above, while prior to this only 5.2% did so. Some of the novices were observed to adopt a deliberate strategy of rehearsing "a line at a time" in the recorded practice, although this largely disappeared after Grade 2. This strategy often proved maladaptive in that "lines" did not always make musical sense and as time was limited in the set task the end of the music was not always reached. This occurred in 6% of the novices. There does seem then to be a gradual development of appropriate strategy use but this seems to occur integral to the increase in expertise.

Why should this be? Clearly appropriate schemata must be acquired for difficulties to be identified and for errors to be corrected. The data from the recorded practice revealed that sixty percent of the students consistently left errors uncorrected. Were they unaware, unable or unwilling to do so? Probably the former, inadequately developed aural schemata being responsible. This seems particularly likely as this phenomenon disappeared after Grade 7, although it may be that performance was inadequately monitored. Once errors were made they tended to be "practised in". This tendency has been demonstrated in the memorisation of text (Kay 1955) and has important implications for teaching.

Once adequate schemata have been acquired how are errors corrected? Are there differences between the experts and novices? Within the novice group when errors were recognised they were corrected initially by repetition of the single wrong note. This was observed in 63% of the sample. As skill acquisition progressed a small section of approximately half a bar would be repeated, perhaps indicating the development of chunking in reading music, or the application of a more generalised cognitive strategy. At Preliminary Grade no students repeated half bar sections, but by Grade 1, 85% did. Later in addition to the correction of errors in chunks, whole sections would be practised, in like manner to the professionals. This emerged at Grade 1, where 21% of students adopted this strategy, rising to 83% by Grade 5 and 100% by Grade 8. However the increase did not follow a smooth pattern, only 25% demonstrating this behaviour at grade 6 and none at Grade 7. However usage may depend on need.

The single Grade 7 student, aged 13, learning for only 6 years and achieving an overall performance score of 8.5, did not rehearse whole sections. His recorded practice revealed immediate corrections, rehearsal of half bar segments and an almost perfect initial play through. The

task was mastered with ease. Extended practice of sections was simply unnecessary! Similarly a Grade 1 student adopted the "line at a time" strategy, consequently not completing the piece during the allocated time. When persuaded to perform the piece in its entirety however all of it was performed well. Prior acquisition of the appropriate skills and information about the style, tonality, rhythm, etc. derived from work on the first section was sufficient. Advanced strategy use is therefore not necessary for good performance.

It seems then that strategy development is irrevocably intertwined with developing expertise. Strategy use of itself is of little value without an appropriate knowledge base and if skills are sufficiently automated strategies may be unnecessary for successful performance.

Summary

In contrast to the professional and advanced student groups the novices did not consider the interpretation of music, in fact most even ignored the dynamic markings of the music. The adoption of holist and serialist strategies therefore had to be reinterpreted for this group, distinguishing between the music being played through (serialist) or an attempt being made to identify and

rehearse "difficult" passages (holist). While the interview data revealed differential adoption of holist and serialist strategies the recorded practice demonstrated a tendency to merely play through the work.

A gradual development of appropriate strategy use was indicated but this seemed to occur integral to the development of expertise. Appropriate schemata must be acquired for error detection and subsequent correction and this therefore limits the effectiveness of strategy use. Errors once made also tended to be "practised in". As adequate schemata were acquired changes in the way in which errors were corrected were observed, from single note correction to half bar sections.

Strategy use also seemed to depend on need. Where ability levels were high or processes were sufficiently automated strategies were often not necessary but where lower levels of ability were evident strategy use could compensate.

Novice practising strategies

Having discussed the expert/novice distinction in terms of holist and serialist strategy use let us now turn to approaches to practice. Are there individual

differences between novices in the way that they approach practice? Do some adopt musical as oppose to technical approaches to practice as identified in the professionals and the advanced students? It would appear not. As was mentioned earlier none of novices considered interpretation in their practice, their concerns were simply to play correctly, indicating a technical approach to practice. However none exhibited the kind of behaviour described in Sloboda's definition of a "technician", i.e. constantly practising scales, technical exercises or studies. The content of practice was largely determined by task requirements, with the consistent practice of scales and technical exercises only occurring in most cases in the period prior to examinations, e.g.

"I just play what I've got to play.....I play it straight through two times."

"I practise what I've got to practise."

"I practise what needs playing."

"I don't really do my scalesonly when I'm desperate...about a week before the examination."

Given that these approaches are purely technical were there any other observable differences within the novice group? For instance was practice merely a question of repetition or was there evidence of analysis? The data from the recorded sessions revealed no technical analysis of sections of the music but there were periods of

non-playing in the recorded material. Perhaps these demonstrate the use of cognitive analytic strategies? Some 22% were clearly devoted to cognitive processing as note names were spoken, or rhythms clapped. This was supported by the interview data where 36% claimed to adopt some kind of non-playing analysis.

"I usually look through for a minute or two.....well I'm seeing if there are any difficult parts in it."

"Sometimes I look at it first."

"First of all I read it in my head."

Some silences however were accompanied by audible sighs which may have indicated difficulties in carrying out the task, boredom or simply a wish for the ten minutes to end.

Within the groups of professionals and the advanced students there was also evidence of differential processing, some individuals preferring aural as oppose to cognitive strategies. As we saw some of the professionals relied heavily on aural strategies for learning new music and "playing by ear", even when reading the music, was reported by one advanced student. In the novices the adoption of a cognitive as oppose to an aural approach was illustrated by one child who, when a 4th finger appeared over an open E string duly played the 4th finger but on the wrong string. This ignored information from aural schemata previously developed,

seeming to demonstrate a preference for cognitive as oppose to aural processing. Where information was misleading the former was relied upon as oppose to the latter. There was also evidence of extreme use of an aural approach. One 12 year old who exhibited considerable aural abilities totally ignored the notation on a repeated phrase, playing the same ending twice, although the text indicated otherwise. Such differences are evident in many young instrumentalists, some play naturally by ear and experience great difficulties learning to read music, while others rely heavily on cognitive processing and conversely often experience difficulties playing by ear. Indeed there may be a trade-off between the two.

The evidence from the interviews regarding the perceived usefulness of listening to recordings of music to be learned, which may have indicated aural processing preferences showed that only 10% of the novices reported this activity. However this finding is misleading as recordings are not generally available of the relatively simple music learned in the early grades. 42% of the novices listened to some classical music, the proportion increasing through the grades. Can we then describe reliance on either aural or cognitive processing as strategy use? Perhaps in some cases, e.g. where a cognitive strategy was adopted for analysing a rhythm.

However if a consistent preference was demonstrated for one form of processing then perhaps the notion of learning style might be more appropriate.

Although the nature of this study has been essentially exploratory it seems to indicate that there are complex relationships between the development of expertise and the appropriateness of the adoption of particular strategies. There also seem to be individual differences in learning styles.

Let us now consider if we can attempt to identify, within the framework of developing expertise, the way in which strategy use develops. An attempt was made to draw up a schedule of strategy levels based on the data from the recorded practice and the interviews, the highest levels being observed in the activities of the professionals (See Table 21). At the lowest level, subjects did not complete task requirements in the time allowed. At the second level they merely played through the material making no corrections, indicating either inadequate monitoring or inadequately developed musical schemata. At the third level single notes were corrected, while at the fourth level short sections of half a bar were repeated, indicating through these levels the development of schemata against which to monitor performance and make corrections.

TABLE 21

LEVELS OF LEARNING STRATEGIES

Number of
Students = 47

Level 1	Task requirements incomplete	3
Level 2	Material played through, no corrections	1
Level 3	Material played through, single notes corrected	4
Level 4	Material played through, short sections repeated.	24
Level 5	Material played through, large sections practised en route.	10
Level 6	Material initially played through, difficult passages identified and practised in isolation.	5

The increase in size of the sections may be a reflection of chunking occurring in processing or perhaps an awareness of the importance of placing the correction within a larger framework. More research would be needed to clarify this issue. At the fifth level a serial strategy was adopted, larger sections being practised en route. Some professionals worked in this way, either consistently or under certain circumstances, e.g. when preparing an orchestral piece, so it could also be described as an approach. At the sixth level a holist strategy was adopted initially, difficult passages were identified and practised in isolation, in one case easy bars not being played until performance.

There are clearly links to be made here with the musical operationalisation of SOLO (Biggs and Collis, 1982) as discussed earlier, where in the early stages, pre-structural to multi-structural the students' concerns were seen as related to accuracy in portraying notation. Only at the relational and extended abstract levels was a concern with style and interpretation envisaged, which would require a more holistic conception of the work.

The scheme of strategy development levels proposed also reflects the acquisition of increasingly complex schemata, the development of the two appearing to be

irrevocably intertwined. Thus while students may have acquired strategies from other areas of expertise they cannot be usefully applied to practice unless sufficient musical knowledge has been acquired. For instance isolating and practising difficult sections may be an effective strategy but it will not be possible unless sufficient expertise to adequately identify what is difficult has been acquired in addition to appropriate musical schemata to ascertain if one is playing correctly. Support for this comes from correlations between Grade, overall recorded performance score and the strategy level attained. The correlation between strategy level and Grade was .69 ($p=.001$). This indicates a close relationship between developing expertise as represented by the Grade achieved and strategy level. The correlation between the recorded performance score and strategy level was .44 ($p=.01$). Here the pieces to be practised took account of level of expertise so the correlation reflects the relationship between strategy use and actual performance irrespective of level of expertise. If strategy use was implicated in relation to specific performance then we would expect the correlation here to be higher than that for Grade and strategy use. The correlation between age and strategy level was also lower .56 ($p=.001$) than that of strategy level with grade suggesting a closer relationship with developing expertise than cognitive development,

although of course correlational data alone is insufficient to clarify this issue.

Further evidence for the relative importance of expertise development as opposed to strategy use in performance was the evidence of a concentration on differential aspects of the task at different Grade levels. For instance in the early Grades there was a particular preoccupation with notation at the expense of rhythm, this being particularly marked in the Preliminary grade. Comparison of mean performance scores for rhythmical accuracy and notational accuracy at Preliminary to Grade 5 are illustrated in Table 22. It was as if limited processing capacity restricted attention, and pitch was selected as the priority. This phenomenon was also noted in a scheme for teaching theory through composition and lends support to the Swinwick-Tillman model of musical development (1986). Similarly attention to dynamics does not appear until approximately Grade 5 when presumably pitch, rhythm and tonality are sufficiently automated. It may also explain the lack of consideration for interpretation until the advanced grades.

Developing expertise, rather than strategy use per se seems then to account for improvement in performance. This is also supported by positive correlation between recorded

TABLE 22

COMPARISON OF MEANS OF RHYTHMICAL ACCURACY AND NOTATIONAL ACCURACY
FROM PRELIMINARY GRADE TO GRADE 5

Grade	Rhythmical accuracy	Notational accuracy	Number of subjects	Value of "t"	Probability
Prelim.	2.58	6.92	6	4.8	.01
Grade 1	4.25	6.86	14	4.5	.01
Grade 2	5.63	7.5	4	3.6	.025
Grade 3/4	4.5	7.2	5	3.6	.025
Grade 5	6.42	6.92	6	.75	NS

TABLE 23

CORRELATIONS BETWEEN GRADE AND PERFORMANCE

	Correlation	Significance
Overall impression	.74	.001
Rhythmical accuracy	.79	.001
Steadiness of pulse	.78	.001
Notational accuracy	.39	.05
Intonation	.39	.05
Tonality	.64	.001
Expression	.86	.001

TABLE 24

CORRELATIONS BETWEEN TIME LEARNING AND PERFORMANCE

Overall impression	.55	.001
Rhythmical accuracy	.57	.001
Steadiness of pulse	.61	.001
Notational accuracy	.29	NS
Intonation	.29	NS
Tonality	.39	.05
Expression	.72	.001

performance scores and Grade ranging from .64 to .86 (See Table 23). However notational accuracy and intonation have considerably smaller correlations, .39, ($p = .05$) indicating possible differences in the nature of their development. Examination of the correlations between performance indicators and age, time learning and strategy levels indicates similar differences (See tables 24, 25, and 26). Why should this be? The relationship between notational accuracy and the other development/expertise factors could be explained by an increase in the difficulty of the music, the chance of playing wrong notes therefore remaining fairly constant. Intonation however may be a special case. Perhaps good intonation is dependent on motor/aural characteristics which are more difficult to train than other skills? Further support for this comes from the correlations between intonation, and practising strategy level, .17 (not significant), age, .13, (not significant) and time learning, .29, (not significant) and also the difficulties of one of the advanced students described earlier.

As was discussed earlier there was also considerable discrepancy between reported strategy use and actual strategy use. The correlation between practising sections slowly and actually doing so being .41 ($p = .002$) and between reporting practising in sections and doing so .36 ($p = .007$). This may be partially a product of the artificial nature of the recorded practice although this

TABLE 25

CORRELATIONS BETWEEN STRATEGY LEVELS AND PERFORMANCE INDICATORS

	Correlation	Significance
Overall impression	.44	.01
Rhythmical accuracy	.6	.001
Steadiness of pulse	.49	.001
Notational Accuracy	.17	NS
Intonation	.17	NS
Tonality	.46	.001
Use of expression	.58	.001

TABLE 26

CORRELATIONS BETWEEN AGE AND PERFORMANCE

	Correlation	Significance
Overall impression	.48	.01
Rhythmical accuracy	.58	.001
Steadiness of pulse	.51	.01
Notational accuracy	.13	NS
Intonation	.13	NS
Tonality	.36	.05
Use of expression	.72	.001

kind of discrepancy is common in the literature and is described as a "production deficiency" (Flavell et al., 1966).

In our consideration of the ways in which professional and novice practising differs another difference to emerge was the phenomenon of "false starts", where the student played a few notes, stopped, and then repeated the same notes, although there had been no audible error. This only occurred at obvious starting places, e.g. the beginning or a double bar. Sometimes two or three false starts followed each other consecutively. The phenomena emerged at Preliminary Grade and disappeared at approximately Grade 6 standard. How can we explain this behaviour? Although there was no audible mistake perhaps the students were dissatisfied with some aspect of the performance, or checking some aspect of the text, e.g. the key signature? Or did they stop because they had just become aware of some problem? Whatever the cause 36% of the students made at least one "false start". This is clearly worthy of further research.

Summary

The novices then adopted a totally technical approach to practice, with the thrust of their work being determined by task requirements. Evidence from the recorded practice indicated that some adopted cognitive analytic strategies, while others preferred aural strategies. There also

appeared to be a trade off between the two, strength in one leading to an excessive reliance on that form of processing to the detriment of the development of the other.

Further examination of the development of practising strategies confirmed the close relationship with developing expertise, indicating that strategies cannot be successfully applied until sufficient musical knowledge has been acquired. There was also further confirmation of the mismatch between reported and actual strategy use. An interesting phenomenon, labelled "false starts" was also observed.

The data also revealed that there was a preoccupation with different aspects of the learning task at different levels of expertise, with an initial concentration on pitch, followed by rhythm and tonality with attention to dynamics occurring only after Grade 5. Most of the outcome measures of the recorded practice improved as expertise developed with correlations of between .64 to .86. The exceptions to this were notational accuracy and intonation. The former may be explained in terms of the differential difficulty of the works to be performed while the latter may reflect a qualitative difference in the attributes necessary to play in tune and those necessary for the acquisition of other aspects of musical skill.

Having considered the relationship between experts and

novices in terms of strategy development in practice let us now turn our attention to more global approaches to practising.

Novice approaches to practice

In our consideration of approaches to practice in the professional sample we examined the notions of motivational orientations as outlined by Entwistle. The evidence from the professionals and the advanced students indicated that motives were often complex and simplistic conceptions in terms of extrinsic or intrinsic motivation were almost certainly misleading. However in the advanced students it was evident that practice was more consistent and organised in the weeks preceding an examination indicating external influences on motivation. This phenomenon was also apparent in the novices with 92% exhibiting an increase in practice when examinations were imminent. They were also better organised, concentrated on technical aspects, e.g. scales, often neglected at other times, and often memorised their pieces. At other times, the amount of practice depended on what was necessary to satisfy task requirements. Not even those advanced students contemplating a career in music felt that daily practice was essential to maintain standards. Further evidence for this comes from the correlations between Grade, age and the number of days practising, .12 and -.02 respectively, both non-significant. However the total

amount of practice undertaken did increase, the correlations being with age, .56 ($p=.0001$) and with grade .51, ($p=.001$). The length of the individual practice sessions therefore must have increased. This can partly be explained in terms of the increasing length and amount of materials to be learned, giving further support to the evidence from the professionals that practice is often determined by external factors, although motivations are often complex.

Also in relation to motivation the attitudes of the students towards practice mirrored those of the professionals although only one student above Grade 2 reported unreservedly enjoying practice. Below Grade 2 this rose to 41%, possibly because of less emphasis on scales and technique in the early stages. However 76% above Grade 2 standard enjoyed practice "sometimes", 48% below Grade 2 falling into this category. Typical comments were:-

"Somedays I can't get in the mood and I don't like practising."

"I like practising quite a lot."

Or "Do you like practising?" "Not particularly."

Surprisingly 10% of pre Grade 2 students exhibited totally negative attitudes to practice, e.g. "Oh no, it's boring."

Given that within the school curriculum the activity is voluntary and lessons are provided only if the students

wish to play this raises some interesting questions. Why, for instance, do they continue to play if they so dislike practice? Does parental pressure play a part. It seems so. As one put it:-

"I didn't want to play the violin, but now she's (Mum) told me that I won't have to bother at the weekend."

For some of the students, it is "the thought of practising" which leads to procrastination. If this conceptual barrier is overcome, involvement leads to rewards through challenge and the positive reinforcement of success. This then is similar to the professionals. An area where differential behaviour occurred was parental interference in practice, which was viewed negatively.

"My dad often nags at me.....when he nags me I don't really enjoy it much because I know I have to do it, if I do it of my own accord I enjoy it more."

"Reminding" offspring to practise tended then to create resentment and annoyance. This was supported by those professionals who, coerced into practice in childhood believed this to be responsible for their current negative attitudes. One of the professionals married to a musician also commented on her resentment at being told to practise by her husband. In fact 16% of the student sample were made to practise.

In the professional sample it was also possible to identify individual differences in planning. These could be observed in the degree of spontaneity seen as acceptable

for performance, the manner in which interpretation was approached, either consciously planned or "intuitively" (unconsciously) planned, and in actual practice where the individual level of automatic planning was on occasion itself over-ridden by executive conscious control. As the novice group did not consider interpretation other criteria were necessary to identify individual levels of planning.

Given the exploratory nature of the study and the diversity of replies in the semi-structured interviews it proved difficult to classify the novices. However two sets of criteria were proposed, the first based on the recorded practice (see Table 27) and the second based on the interview data (see Table 28). These would clearly be tapping two different aspects of planning, the first related specifically to task requirements, which one might expect to be largely automated and the second relating to the organisation of practice which one would expect to be based on more conscious processing. Of course in the novice sample the latter may have been largely influenced by external factors, e.g. parental pressure. All the students would additionally be constrained by the requirements of their learning situation, e.g. lessons requiring regular preparation, examinations, etc., factors not influencing the professionals.

What is apparent from the data however is that the

TABLE 27

NOVICES APPROACHES TO PLANNING IN PREPARED PRACTICE

Prepared practice criteria	Novices	Advanced Students
Total of novices 40		
High planning		
Completes task requirements.		
Makes full and effective use of time.	5 (12.5%)	6 (100%)
Carries out activities in the most efficient order.		
Integrates sections into performance.		
Moderate planning		
Completes task requirements.		
Is on task but time is not used effectively.		
Strategies not employed in most efficient order.	28 (70%)	
Learning not integrated.		
Low planning		
Does not complete task.		
Concentrates on beginning of music at expense of the rest.	7 (17.5%)	
Not all time spent in productive work.		

TABLE 28

NOVICES APPROACHES TO PLANNING IN DAILY PRACTICE

Total novices = 40	Total advanced students = 6	
Organisation of practice criteria	Novices	Advanced students
High planning		
Specified aims of practice.		
Consistent order of practice.		
Self imposed organisation of when practice occurs.	4 (10%)	2 (33%)
Tends to mark things on the part.		
Evidence of systematic work.		
Moderate planning		
Some organisation of when practice occurs.		
Planned order of practice when taking examination.	26 (65%)	4 (66%)
Evidence of some time organisation.		
Low planning		
Practises when has time.		
Constantly has to be reminded to practice.	10 (25%)	
Wastes time practising unnecessary material.		
Practice is disorganised		

TABLE 29

COMPARISON OF NOVICES AND ADVANCED STUDENTS OVERALL APPROACHES TO PLANNING

Total = 46	<u>Planning in recorded practice</u>		
<u>Organisation in daily practice</u>	High	Moderate	Low
High	2 (4%)	3 (7%)	1 (2%)
Moderate	7 (15%)	18 (39%)	5 (11%)
Low	2 (15%)	7 (15%)	1 (2%)

advanced students demonstrated considerable automatic planning in their prepared sightreading, regardless of their normal planning of practice. This level of automaticity in planning may therefore be a feature of increased expertise, or is perhaps a characteristic necessary for becoming an "expert" at playing a musical instrument, which these advanced students, 2/3 of whom will be pursuing a career in music, possess. If we consider the level of conscious organisation it is interesting that the two with the highest planning level are those not considering music as a career. Among the novices the distribution is not dissimilar for the two proposed dimensions of planning. However as can be seen from Table 29 individuals may exhibit different levels of each. In fact as we saw in the professional group there may be a need for one mechanism to compensate for the other. Based, as these data are, on semi-structured interviews and interpretations of behaviour exhibited during recorded practice sessions, caution is needed in drawing conclusions. However, it is suggested that planning can be both highly automated requiring no conscious control, and also act as a metacognitive executive exerting conscious influence over behaviour.

Novice approaches to performance

Let us now examine the question of approaches to performance. As we saw in the professional group and the

advanced students performance factors were not well accounted for by current models of learning. Approaches to performance were determined in the professional group by their need to adopt coping strategies to deal with inappropriate levels of arousal. In the advanced students a similar range of behaviours was exhibited from those who were excited at the prospect of performance to those who realised that nervousness marred their performance. This group however unlike the professionals had not developed successful coping strategies, although later follow up data did reveal their emergence within the context of higher education. In the novices a similar wide range of arousal levels was also exhibited. For instance moderate levels of arousal were exhibited by remarks like:-

"I did get nervous for the first one (exam) but the second one I wasn't really nervous. I was a bit."

"Were you nervous?" "Not too much."

"I was a bit nervous."

Ninety percent reported being nervous on the day of the examination, but a minority of these (38%) reported nervousness occurring for several days in advance, some experiencing extreme headaches:-

"I get really nervous..... I sometimes get really bad headaches."

Others (10%) reported no nerves at prospective performances some reported excitement and one said:- "I was nearly laughing."

69% adopted some kind of strategy (or more than one) to overcome nerves. Six students arranged to be tested on scales, 21 played to their parents, 7 undertook a mock examination at home, 3 tried to avoid thinking about the exam, 3 tried to treat the examination as if it was a lesson, 9 played immediately before the examination to give them confidence, 1 attempted to reduce nervousness in the examination by concentrating actively on the music and 8 when they felt nervous did some practice (See Table 30). Arousal therefore figures greatly in performance and preparations for it in the novice group. Examinations are considered more important and therefore more stressful than concerts, one student suggesting this is due to their concrete outcome, which is often vitally important. Although stagefright was recognised as a factor affecting the quality of performance, strategies seemed to be adopted to reduce the fear rather than as a positive means of alleviating detrimental effects. It had clearly not developed the same significance as for the professionals. Also, lack of concentration in practice was not reported. How can we interpret this? Are the students less aware of their own internal states? Perhaps stagefright is the exception because of physical symptoms, which are hard to ignore? Perhaps lack of concentration is perceived as "boredom", a reason for terminating practice rather than a study problem, an option not available to professionals with deadlines to meet and standards to maintain. This is clearly an issue which needs to be addressed by future

TABLE 30

STUDENT STRATEGIES ADOPTED TO REDUCE NERVOUSNESS

	NO OF STUDENTS
	ADOPTING STRATEGY = 38
Arranging to be tested	6
Playing to parents or other	21
Doing a mock exam	7
Avoiding thought of it	3
Treating exam like lesson	3
Playing immediately before for reassurance	9
Actively concentrating on the music	1
When felt nervous did some practice	8

NB 69% of the students adopted some kind of strategy. Some adopted more than one.

research.

Novice approaches to memorisation

What of approaches to memorisation? In the novices memorisation occurred through largely automated and unconscious processes. 63% of the novices reported that once a piece had been learned, memorisation would be almost completed.

"My fingers were just used to it."

"It just happened ...sort of....It sort of came....I didn't have to do anything."

Further improvement tended to be through repetition, "rote " learning sections, testing, and then putting them together, 59% adopting this method:-

"Before I practised it without the music, I practised it with the music, then I tried to do it without music."

"I just played it bit by bit and remembered each line, say I did a line each night and remembered it. I played the line a few times and then I just tried to get each note, bit by bit."

None adopted the breadth of analytic strategies demonstrated by the professionals. There was however diversity in the preferred mode of processing. When questioned regarding retrieval, 47% reported a reliance on aural memory, i.e. knowing the sound, 36% spoke of "fingers remembering where to go", kinaesthetic memory, and 22% claimed to visualise, i.e. see the actual music in

front of them, supporting findings from the professionals and the advanced students.

Patterns of learning behaviour

Having outlined overall the novices approaches to learning, practice, performance and memorisation and compared them with those of the advanced students and the professionals let us examine in greater detail individual cases utilising the data from both the interviews and the recorded practice sessions to see if we can ascertain the relationships between the development of expertise, strategy use, ability, motivation, and arousal levels. First let us consider the data from the 9 beginners, who had been learning for only a few weeks. All performed two pieces previously practised at home. Six then went on to perform a piece attempted for the first time in their lesson immediately prior to the recording.

The recordings revealed that for some students the multiple processing involved in performing was excessively demanding even after several weeks of practice. Although reading only a finger pattern, not actual notation, turning this into motor "action" posed enormous problems, even though the unprepared task had been simplified by requiring the children to pluck rather than play with the bow. The three who were considered unable to attempt the new piece unaided scored 2.5, 3 and

3.5 on their performed piece. Why were their performance scores so low? The interviews revealed that for two lack of practice was the problem, one never practising at home:-

I don'tI always forget.... I have once."

The other only once a week:-

"Sometimes I practise, mainly I practise on the Saturday."

Both experienced difficulty in following the finger pattern, tended to lose their place, showed inadequate motor co-ordination and played slowly with many hesitations. The third exhibited a different pattern of behaviour. He enjoyed playing:- "I like music" and practised regularly about 4 times a week. He also read fluently but motor co-ordination problems, particularly in bowing marred his performance. So although achievement level was similar for these three students the patterns of behaviour underlying the outcomes were quite distinctive.

Differential patterns of behaviour also emerged in the six students attempting the "new" piece unaided. The highest score, 9, was obtained by a 9 year old girl who demonstrated considerable musical expertise already learning three instruments. Her aural schemata were sufficiently developed for her to be able to correct bad intonation, she could read music fluently and described identifying errors and attempting to eliminate them:-

"First I play it plucking, then I play it with my bow. If

I go a little bit wrong then I go back to that little bit, play it, then play it all the way through to make sure I've got it right. I do about twice through each song that we do."

This suggests a well developed level of expertise and also the adoption of appropriate strategies.

What of those students whose marks clustered in the middle of the range, 5.5, 6, and 6.5? One aged 8 played slowly and accurately, but with poor intonation and a scratchy sound. She was well motivated and received considerable parental encouragement:-

"I practise about once a day for about half an hour, because I do one piece for about 3 times and then my mum comes up and listens to me and then I do another piece for three times and she comes again."

From her performance, aural, motor and cognitive skills seemed to be progressing at a similar rate, but her level of expertise was considerably lower than the student described above.

The second, a boy age 6, played fast, fluently and in tune, but from memory. When required to perform the new piece his deficiency in reading skills was immediately apparent, with hesitant slow playing. Well motivated, he practised every day and reported enjoying it "a lot". He also reports remembering to practise without his mother reminding him. His description of his practice does not

reveal extensive strategy use:-

"I just play what I've got to play....I play it straight through two times." This student then appeared to have good aural and motor skills, which compensated for his less well developed reading skill.

The third student, similarly confident about notation in the well practised pieces, was also hesitant in the unprepared piece, finding playing on different strings particularly complex. He demonstrated motor co-ordination and intonation difficulties and in his interview revealed that his mother constantly reminds him to practise indicating low motivation. Each child then seems to demonstrate an individual pattern of developing expertise, although overall performance marks were unable to distinguish between them. Of the remainder, one expressed strong negative attitudes towards playing, doing little practice:-

"I didn't want to play the violin." His performance was nevertheless superior (4 marks) to the non-practiser described earlier. Reinforcement was low as he disliked playing with the bow:-

"Well, it doesn't seem good."

This reduced the time spent practising with the bow, with subsequently less opportunity for improvement, and a consequent lack of progress in comparison with the rest of the group.

Within a few weeks of commencing playing substantial differences in performance had emerged, based on a number of skills: motor, reading, and aural. Prior learning was clearly implicated, the student with expertise in three instruments already showing marked superiority to the others. Also critical was level of interest, effecting subsequent time spent practising. Innate differences in cognitive, aural, and motor abilities and their current level of development may also be implicated. Outcomes of learning as we have seen are similar whether the causes relate to effort or individual differences in skill level. This distinction is rarely clear, indeed one of the professional musicians insists on memorisation of music by his advanced pupils, to eliminate lack of practice as the source of technical inadequacy.

"If one of my pupils can stand up and play a movement from memory I know that he has practised that.....It is a good way of judging whether they have done the work."

Educationally this is clearly an important issue, the teacher needing to identify the underlying reasons for success or failure in order to instigate appropriate future learning. As mastery of basic skills is a prerequisite for further learning attempts at remediation must be undertaken early to avoid the child falling behind. The problem is further exacerbated because playing which is inaccurate, out of tune, and of poor tone quality distorts aural feedback providing less opportunity to build

adequate schemata, while also providing little positive reinforcement. A downward spiralling process thus commences.

What of the more advanced students? Are similar patterns of behaviour in evidence? At preliminary grade the best mark, (7.5) was obtained by a nine year old, with three years experience, who also played a keyboard and had recently obtained a distinction in her violin examination. In the recorded practice she demonstrated accuracy in reading notation, although her rhythm was insecure, a phenomenon common at this level, as discussed earlier. Errors were immediately corrected, indicating not only adequately developed musical schemata, but also monitoring of performance. Cognitive strategies were adopted to assist in understanding notation, reading being insufficiently automated.

"First of all I read it, in my head. Then I play it."

She practises "once a week.....twice a week for the exam." So ability rather than effort would seem to account for both her successful recorded performance and examination result. In contrast the lowest mark (2) was awarded to a girl also recently achieving a distinction at Preliminary Grade. However the recorded practice session revealed gross deficiencies in her reading skills, which were exacerbated by her adoption of the strategy of learning a line at a time. Unaided she could not replicate her excellent examination result, which must have

been achieved through aural processing and memorisation. The other low scorer, a partially sighted boy of eight years, also demonstrated inadequate reading skills, although he too had passed his earlier examination. In addition he exhibited poor aural ability and undeveloped motor co-ordination. How then was it possible for him to pass the examination? Through help and support from his parents, who supervised daily practice.

"Mum helps me when I can't get them (the notes) quite right."

He also reports difficulties when learning new music:-

"I really get annoyed. I like playing the bits I know. I don't want to go on to a new piece. Those pieces are easy and I don't want any hard pieces.....because it means I have to work hard."

Without assistance, in his recorded practice he achieved and attempted little. There was almost no playing and he performed only a small segment of the music. Perhaps then lack of ability in one skill can be compensated for by strength in another, while multiple deficiencies can be overcome by intense support, although the effects will be task specific with limited generalisation. This student despite his examination success did not enjoy practising, "It's boring " and ultimately gave up playing.

Let us now consider two students at Grade 1 standard, both scoring 6.5 one male, aged 8 learning for a year, the other, female, aged 11, learning for 4 years, indicating

differential ability, motivation or both. The girl exhibited inadequate reading skills, adopting cognitive analysis and task simplification (plucking not bowing) to assist. Adequate aural schemata and monitoring were demonstrated by the correction of single notes and repetition of small segments. This latter, given her poor reading skills, suggesting that chunking of notation may not be responsible for the repetition of small sections of music. The boy corrected in larger whole bar sections and demonstrated greater awareness of tonality. He reported practising 5 times weekly, usually enjoying it although

"Sometimes I kind of can't play it so well as normally.....but then I'm feeling alright to play it....." The implication here was that he enjoyed it more when he could do it. The girl practised once weekly :-

"Sometimes I practise on Sundays but sometimes I don't practise at all."

When asked how much practice she did on Sundays she replied "Not much.....about ten minutes."

She also did not enjoy practice. When asked do you like practising she replied, "A bit". Even when examinations were imminent she only increased practice to twice a week for ten minutes. Previous experience for both of these students was recorder playing. How can we account for the substantial differences in the time taken to reach their current standard? A number of factors may be responsible, but from the available evidence motivation and

ability would seem to be implicated. While deficiencies in cognitive processing may explain the girl's poor reading of music, her utilisation of strategies indicates considerable metacognition. Perhaps then it is lack of practice which has precluded the development of automatisisation.

What of the low scorers at this grade? One aged 12, playing for two years scored only 3.5, with poor rhythm, tonality and intonation, although having achieved a merit at Grade 1. Strategy utilisation was similar to those gaining higher marks, repetition, plucking, and cognitive analysis. She also played the recorder and reported regular practice which she enjoyed. Error detection depended on recognition of it "sounding funny". Why then did she perform relatively poorly compared to her fellow students given that the time taken to achieve this standard is not indicative of undue lack of ability? Perhaps anxiety played a part? She reported being anxious "for about a few days" before her examination and once embarked on the exam:-

"I felt a bit better, I still felt nervous...I was all shaky."

Subsequent to the research she suffered from debilitating nervousness for a considerable period of time prior to examinations. The prepared sightreading task, a normal part of the examination procedure may therefore have induced considerable anxiety, which may have interfered

with aural monitoring and/or the ability to respond to feedback in terms of an action plan. The other low scorer, aged 10 (2 marks) had also passed Grade 1, taking three years to attain that level. He accurately processed pitch notation but rhythm and intonation were very poor. Regular practice of 20 minutes 4 times each week was reported increasing to 30 minutes daily prior to examinations. He also reported enjoying practice, although his description indicated considerable concentration on preparation. When asked what do you do when you practise he replied:-

"I put the rosin on the bow, get the music stand out and start practising."

He reported appropriate strategy use:-

"I play it through, and then I do the bits that I can't do again, then I play it through again."

He was also able to identify things that he found difficult, i.e. fast sections, high notes and slurs. He also played the piano but no examinations had been taken. Perhaps then his difficulties stem, not from inadequate strategy use, but lack of ability, inadequately automated reading skills, and possibly, although the evidence is limited, insufficient time on task.

Why do such large differences in prepared performance occur when examination results and progress in class are similar? Perhaps anxiety is a factor? Or maybe inadequate strategy use, although there was little evidence

of differential behaviour in this respect. As we saw, the earlier research demonstrated the applicability of Carroll's (1963) model of learning to the tuition of stringed instruments, where degree of learning was a function of time spent learning and time required for learning, the former relating to both opportunity and motivation, the latter to specific aptitudes, ability to understand instructions and the quality of instruction. Although all these factors contributed to learning outcome with a multiple R of .888 ($p=.0001$), accounting for some 79% of the variance, the single best predictor of achievement was time learning. However this was in relation to examination performance, with teacher aided learning. How can we explain the differences in unaided performance? Perhaps as the level of expertise is relatively low, innate cognitive, aural and motor abilities are implicated? Certainly the research described earlier demonstrated that measured musical and intellectual ability were influential in students continuing to play an instrument and their attendance at music school. Davou, Taylor and Worrall (1991), studying adult learners in an academic setting also showed that ability compensated when schemata were inadequate for task completion. Perhaps for these music students with low levels of expertise that is what is occurring. If this is the case then the marks awarded for unaided work should improve as expertise develops. This does seem to be the case with a correlation between grade and overall recorded

performance scores of .59 ($p=.0001$). However we cannot conclude that increasing expertise alone is responsible. Why? The data is drawn from a biased sample in that there is a substantial drop out rate. Of the 6 advanced students all but two have pursued a career in music, hardly a random sample. Given the earlier findings regarding the role of musical and intellectual abilities in persistence on an instrument, those remaining are likely to be of higher ability in addition to their greater level of expertise.

What of strategy use? Can it explain differences in marks obtained for prepared sightreading and Grade examinations? Let us analyse the behaviour of two Grade 2 students. The first, aged 11, passed Grade 2 with merit and achieved an overall performance mark of 7. Her initial play through was good, although there were rhythmic errors, intonation was carefully checked, corrections made immediately suggesting careful monitoring of performance, and there was evidence of attention to detail in her observation of staccato notes. Motivation was not high, neither was there evidence of strategy use.

"I play it through, if it goes wrong I play it again."

However her home environment proved supportive, music being widely listened to within the family. In contrast another girl aged 12 scored only 3.5., although she had been learning 4.5 years, only achieving a pass at Grade 2. In the recorded practice session she also played

through the music, although some repetition of sections was evident. Performance was poor. She reported practice as "boring and hard work" with mother "nagging" her to do it. However in normal practice she did adopt numerous strategies, e.g. dividing the piece into sections, working on a section, putting the whole together again, utilising the recorder to check pitch. This however did not improve her performance either in the recorded practice or in examinations. Her score could be accounted for in terms of lack of ability, this being supported by the length of time taken to reach this standard, lack of motivation, or perhaps the acute anxiety she experienced, leading to severe migraine before examinations. From the evidence presented this student would also seem an unlikely candidate to persist in playing. However she has, the more able student giving up. Why? In both cases for social reasons, particularly friendships. Motivation then appears to be dynamic and multifaceted. It also seems that strategy use per se does not contribute either to developing expertise or to specific task performance.

Let us make one final comparison. The two students are both female, one aged 15, who reached Grade 5 in 8 years and scored 4.5 on her overall performance, the other aged 13 who took 6 years to gain a distinction in Grade 6 and scored 9, giving an almost flawless performance. Both adopted similar strategies, playing through the piece and repeating short phrases. For the first student

tonality and rhythm were inaccurate from the start and were not corrected while the second student, now studying music at university, immediately corrected mistakes, seemed to focus on what needed practising, and attempted to speed up the performance to match musical requirements. She reported enjoying practice:-

"I like practising pieces but not scales." received support at home and listened to a great deal of classical music. Overt strategy use was similar for both but clearly the intensity of concentration, monitoring of performance, development of appropriate schemata, effort, enthusiasm and ability were very different and it seems played a more important role in learning outcome than strategic activity.

The question of intensity of concentration and subsequent monitoring of performance is also highlighted by a 12 year old student, who had taken 4 years to reach grade 4 scoring 6.5 in his recorded session. Describing scale practice he commented:-

"There is an element of playing it a couple of times and then saying, I've done it."

He admitted generally to being unaware of errors merely "playing the thing through". This level of processing, which might be described as a "surface" approach would seem unlikely to lead to improvement in the quality of performance. However the adoption of a "deep" approach would require the development of adequate aural schemata to

enable monitoring of outcome in terms of this template. If aural ability is deficient as seems likely in the case of this student the schemata will be inappropriate and "deep" processing will be problematic.

Conclusion

This detailed examination of a sample of the students enables us to draw some conclusions. Firstly, comparisons of examination results with performance scores indicate that what students can achieve unaided is, for some students particularly in the early stages of developing expertise, considerably less than they can achieve when learning is supported, even when the material is of an appropriate standard. However as expertise increases unsupported learning improves, although the extent of this is difficult to assess as self-selection dependent partially on musical and intellectual ability is also a contributory factor. There also seems to be a trade off in terms of ability level and time required for learning as indicated by Carroll's (1963) model of learning. Motivation is implicated here, although the precise relationship needs to be clarified. Are there ability levels such, that the time required is so great that motivation cannot be sustained, perhaps as instanced with the partially sighted student described earlier? Or perhaps level of interest independent of ability is the key? These issues will need to be addressed by future

research. The comparisons also indicated that similar levels of achievement measured either in terms of examination results or scores obtained in the prepared sightreading could be reached by individuals with apparently different patterns of behaviour. The interplay between ability, level of expertise, strategy use, learning styles, motivation and arousal factors is clearly complex and requires further investigation in a setting which is more controlled than the present research has been able to provide.

In this section the approaches of the novices to learning, practising, memorising and performing were considered in relation to the models which had been previously identified as appropriate for explaining the behaviour of both the professional musicians and the advanced students. The nature of developing expertise was also examined in the light of the data from the novices recorded practice sessions and their interviews.

COMPARISON OF PROFESSIONAL, ADVANCED STUDENT AND NOVICE APPROACHES TO LEARNING AND PERFORMANCE

Let us now attempt an overall comparison of the three groups in relation to approaches to learning, practice, memorisation and performance to see if we can further elucidate the nature of developing expertise. As the study was in itself exploratory and the data were based on semi structured interviews this posed some difficulties of interpretation. The problem was particularly acute with the novices where their level of self awareness often reduced their ability to verbalise regarding their strategy use. In addition much of the processing is "unconscious" and automated precluding conscious awareness.

Firstly let us consider approaches to learning. In the professionals this was exemplified by their approach to interpretation and was best explained in terms of Pask's distinctions between operative, comprehension and versatile learners. Such approaches were also emergent in the advanced students. However in the novices this issue of interpretation was not addressed, their attention was focused on playing accurately. It was nevertheless possible to identify holistic and serialist strategy use, although reported strategy use was not always consistent with that adopted in the recorded practice sessions. Table 31 outlines the progression from novice to expert. It was also possible to outline the progression through

Perry's developmental scale and that of Biggs (See Table 32). The percentages indicated in these sections based as they are on unequal sample sizes are not intended as definitive measures but rather as guides to likely trends in the development of expertise.

If we consider approaches to practising (See Table 33) we see a similar shift from a totally technical orientation to one where some advanced students and professionals consider the musical aspects in practice. There are also differences in strategy use, in terms of the degree of analysis carried out or how much repetition is used. Here however the differences seem to cross the groups rather than demonstrating changes as expertise is acquired. Perhaps what is exhibited here are preferences in this learning task for automated processing and conscious processing. If we consider motivation as demonstrated by the regularity of practice and whether it is enjoyed we again see individual rather than developmental differences.

What of approaches to memorisation? Here both developmental and individual difference elements are apparent. The professionals adopt more conscious analytic processing doubting the reliability of automated processing, but there is also evidence of individual differences particularly in visual memory. Similar individual differences may occur in other facets of

TABLE 31

SUMMARY OF APPROACHES TO LEARNING

	Profe si nals	Advan d stud nts	Novices
C mprehension learners	9%	17%	0
Operation learners	41%	50%	0
Versatile learners	36%	33%	0
No approach to interpretation	14%	16%	98% (reported) 100% (actual in practice)
Adoption of holist strategies initially	95%	83%	63% (reported) 22% (actual in practic)
Adoption of serialist strategies	5%	16%	26% (reported) 65% (actual in practic)

TABLE 32

COMPARISON OF NOVICES, ADVANCED STUDENTS AND PROFESSIONALS ON
PERRY'S SCALE OF INTELLECTUAL DEVELOPMENT AND BIGGS' SOLO
SCHEME.

Biggs' SOLO	Perry's developmental levels	Professionals	Advanced students	Novices
Prestructural (Inability to read music)	Position 1			24%
Unistructural (Some aspects of translation correct)	Position 1			42%
Multistructural (Score of 6 or over on all but attention to dynamics)	Position 1			26%
Relational Level	Position 2) Position 3) Position 4)		33%	8%
	Position 5	14%		
Extended Abstract	Position 6 Position 7 Position 8 Position 9		17% 33% 45%	

TABLE 33

SUMMARY OF APPROACHES TO PRACTISING

	Professionals	Advanced students	Novices
Musical	4%	33%	0%
Technical	55%	33%	100%
Mixed	41%	33%	0%
Repetitive strategy	50%	50%	27% (reported) 80% (actual in practice)
Analytic strategy	27%	16%	35% (reported) 16% (actual in practice)
Mixed strategies	23%	33%	
Daily Practice	41%	33%	39%
Enjoyment of Practice			
Always	23%		27%
Sometimes	68%	100%	55%
Generally disliked	9%		14%

memory but are possibly less easy to access by means of verbal report. Table 34 outlines strategies adopted and the reported mode of processing. The nature of memorisation for performance on a musical instrument clearly encouraging aural and kinaesthetic strategy adoption in an automated fashion. Similar individual differences were found in the arousal levels affecting public performance (see Table 35). These again seemed to indicate individual differences as oppose to developmental trends. As we saw earlier the levels of planning and organisation identified in the novices had to be based on somewhat different criteria to the professionals. Overall however the evidence suggested that there may be individual differences in conscious and unconscious planning in addition to increases in automated planning as a result of the development of expertise. This is clearly an area deserving of considerable research in the future.

Is it then possible to find a framework, within which these many facets of learning and performing on a musical instrument can be encapsulated? Luria (1970; 1973) proposed a model of brain functions which does indeed take account of a number of the emergent elements. Three principal functional units of the brain are described, whose systems are concerned respectively with regulating tone or waking; obtaining, processing and storing information; and programming, regulating and verifying mental activity.

TABLE 34

SUMMARY OF APPROACHES TO MEMORISATION

	Professionals	Advanced students	Novices
Visual	45%	33%	28%
Aural	100%	100%	86%
Kinaesthetic	100%	100%	92%
Conscious analytic	50%	0	5%
Repetitious automated	73%	100%	100%

More than one strategy was adopted by many musicians.

TABLE 35

SUMMARY OF APPROACHES TO PERFORMANCE

	Professionals	Advanced students	Novices
Level of Arousal			
Excited or unconcerned by performance	18%	33%	9%
Moderately aroused	36%	17%	54%
Very nervous for performance	41%	50%	37%

The first, Block 1, concerned with arousal, regulates the tone and working state of the cortex. It includes the brain stem, the reticular formation and the hippocampus. It has the structure of a non-specific nerve net which performs its function of modifying the state of brain activity gradually step by step. The functioning of this block would then account for the reported differences in arousal levels in performance and also differences in levels of concentration in rehearsal. In addition if arousal levels are inappropriate the functioning of Blocks 2 and 3 may be impeded.

Block 2 is concerned with the obtaining, processing and storage of information and is situated in the posterior divisions of the cerebral hemispheres, including the occipital (visual), temporal (auditory) and parietal (general sensory) regions. This block is hierarchically arranged and the individual neurons obey the all or nothing principle. The tertiary overlapping areas, which are responsible for the concerted working of the various analysers and the production of symbolic schemes, are particularly important as they receive information from all modalities. Luria suggests that simultaneous and successive scanning occurs in both hemispheres and on verbal and non-verbal tasks perhaps therefore relating to Pask's holist and serialist strategies. Also subsumed within this information processing block would be

mechanisms related to learning styles and strategy preference. Differential functioning of right and left hemispheres in conjunction with Luria's suggestion of simultaneous and successive scanning in both hemispheres may account for the behavior of the comprehension learners processing simultaneously in the left hemisphere and the perception learners, processing successively in the right hemisphere. Research on brain damaged musicians attempting to establish the hemisphere responsible for musical processing eg. Wertheim and Botez (1961); Souques and Baruk (1930); Dorguelle, (1966); Benton (1977); Finkelnburg (1879); Luria, Tsvetkova and Futer (1963) has had mixed results, in part due to a lack of clarification and definition of the complex sub skills involved in musical activity but also perhaps because of considerable individual differences. This is supported by the research of Bever and Chiarello (1974), who found differential hemisphere processing in expert and novice musicians, the experts performing best when a musical recognition task was presented to the left hemisphere. Gaede, Parsons and Bertera (1978) also found left hemisphere advantage with high musical aptitude subjects and Peretz and Morais (1980) with non musician who consciously adopted an "analytic" strategy. These studies although confined to listening do indicate the possibility of differential individual processing based on conscious and unconscious processing in the left and right hemispheres respectively.

Block 3 is located in the anterior regions of both hemispheres and is responsible for the planning and programming of behaviour, receiving input from both the other blocks, setting goals, planning strategies and actions and evaluating feedback. It seeks to regulate Block 1 arousal but is also affected by it. The outlet for this unit is the motor cortex. Luria (1970) suggests that the tertiary portions of the frontal lobes be viewed as a super structure performing a universal function of general regulation. Animals where the frontal lobes have been removed or destroyed exhibit no disturbance to the work of the sense organs but do respond to irrelevant stimuli, are unable to assess or correct errors and plans, and programmes of behaviour are disturbed making it fragmentary and uncontrolled, e.g. Pavlov (1949a).

Luria has argued persuasively that these three blocks cannot act independently. All conscious activity is part of a complex functional system requiring their combined working. Let us now attempt to draw together the findings from this research and assess the overall adequacy of the considered models for explaining the learning and performance of novice and professional musicians.

OVERVIEW

Where then does this lead us in our consideration of expert and novice musicians' approaches to learning, practising, memorisation and performance? As was stated at the outset, all of the professional musicians interviewed perform sensitively and have considerable technical skills. However the data revealed that despite these consistent high standards of performance their approaches to learning were very different. The data from the advanced students elucidated this further. Performances of equal quality in terms of an overall performance score nevertheless showed differing patterns of strengths and weaknesses in the marks given to the elements, the quality of performance itself sometimes compensating for other inadequacies. While current models of learning have drawn attention to the issue of the quality of learning in terms of understanding there has been no attempt to present detailed analysis of learning outcomes or to take account of performance factors, for instance in examinations.

Approaches to learning

The work of Pask (1976) provided guidance in elucidating the professional musicians' approaches to interpretation. It was possible to identify the adoption of holist and serialist strategies and operation, comprehension and

versatile learners but there were substantial aspects of the musicians' learning which were unexplained. The top down approach of the comprehension learners was essentially analytic, while the bottom up approach of the operation learners was essentially intuitive, both however appeared to involve planning, the former conscious, the latter unconscious. There is no current model of learning which can account for these aspects of the findings. There was also considerable variation in the degree of spontaneity preferred in performance, which was independent of strategy use. Luria (1970) in his model of brain functions refers to a planning element, while Entwistle and co-workers have identified an approach to learning, the strategic, which clearly requires planning. However this constitutes the main element of the approach and the evidence from the musicians tends to suggest that it is a separate dimension. Future models of learning then need to take account of both conscious and unconscious planning.

The data from the professionals also indicated differential ability to create an internal aural representation of the music which in turn appeared to be an important factor in the approach which could be adopted. This was reinforced by the data from the advanced students. The novice sample also exhibited individual differences in their preferences for the use of aural or cognitive strategies in the learning of music. Current models of learning although multidimensional in nature need to take greater account of

diversity in learning style and strategy preference considering the notion of pattern of behaviour rather than overall approaches.

The models of intellectual development outlined by Bigg and Collis (1982) and Perry (1970) also provided a useful framework for encapsulating aspects of musicians learning, the highest levels of each being attained by comprehension, operational and versatile learners. Combining the data from novices, students and professionals, a clear progression through the levels could be observed. Some professional musicians did not consider interpretation at all, often, although not always for contextual reasons. This was also true of the novices, who initially appeared to concentrate on the acquisition of basic skills, and learning pitch, rhythm, tonality and later dynamics. While preferred strategies could be identified, e.g. cognitive vs aural, generally strategy development was integral to the development of expertise, as the acquisition of appropriate schemata was necessary for the strategies to be operationalised. Changes in the nature of processing notation also occurred as expertise developed and automaticity increased. There was also a trade off between level of expertise, ability and strategy use, each being able, in part to fulfil a compensatory function, where necessary.

To account for these first future models of learning will

need to include a dimension relating to planning, while allowing for the complexities of individual learning styles and strategy preferences, which may lead to outcomes of equal value achieved by different routes.

Approaches to practice and performance

The professionals' approaches to practice could be usefully subsumed under the technical and musical headings outlined by Sloboda (1985) although his detailed descriptions were over simplified and the suggested relationships to performance untenable as all the professional musicians exhibited great sensitivity in their playing. This indicated that an additional dimension relating to emotional sensitivity may be necessary to account for musical performance. Many musicians also adopted a mixed orientation to practice, considering technical and musical aspects equally. While the relationships between practice orientations and approaches to learning were close they were not perfect. Motivation to practice, regularity of practice, the content of practice and the approach adopted, i.e. analytic or repetitive varied within orientation and also in relation to contextual factors.

Deep, surface and strategic approaches were equally problematic, in part because the nature of practice requires some "surface" level processing. This however

was often carried out with intense concentration and intensity, i.e. deeply. The degree of organisation of practice also appeared to be independent of approach, depending on individual arousal levels, which not only affected concentration in practice but subsequently performance itself. However compensatory metacognitive strategies were utilised to overcome problems. Such metacognitive activity was not in evidence in either the advanced students or the novices indicating perhaps that the distinctive feature of expertise is the ability to do whatever is necessary to deliver expert performance. With regard to the strategic approach, this was not evidenced in actual practising behaviour although much practice was indeed geared towards performance. The novices in particular practised more before examinations, exhibiting greater organisation and orientation towards the task.

Approaches to memorisation

The evidence from the study indicated that the nature of the particular memorisation task dictated the approach to be adopted. The deep/surface distinction was of limited value in this context because memorisation of music requires verbatim recall therefore constraining musicians to adopt a surface or mixed approach. The process of memorisation occurs largely unconsciously as practice progresses with extensive overlearning leading to

automatisation. This is however mistrusted by many musicians who acquire more structured cognitive representations to support the automated memory. This occurs because of an awareness that anxiety can interfere with retrieval in performance, although for those with sufficient confidence unconscious processing and subsequent retrieval can be successful. Individual differences in processing were evident across the whole range of expertise, with aural and kinaesthetic strategies being consistently adopted while visual and cognitive strategy use was variable, the latter being restricted largely to the professional sample. Once again there appeared to be complex relationships between preferred strategy use, approaches to learning, levels of expertise, task demands, levels of arousal and learning outcomes.

Conclusion

While the data lends considerable support to current multidimensional models of learning in preference to earlier single construct models there appear to be a number of inadequacies in accounting for the learning and performance of musicians. The unique nature of public live performance has highlighted in particular the importance of a number of dimensions which future models should incorporate, i.e. planning, emotion, and arousal. The model proposed by Luria may therefore

provide the most encompassing overall framework, given that it considers planning, arousal and information processing. In addition the complexities of individual learning may perhaps better be viewed in terms of patterns of behaviour rather than overall orientations which may obscure interactions between learning styles, strategy preferences, levels of expertise, specific abilities and contextual factors.

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PROFESSIONAL INTERVIEW

SUBJECT 3

FEMALE

AGE 45-55

Can you please tell me very briefly about your musical career?

I won a scholarship to the Royal College of Music and because I was a scholar, right away I went into a chamber Music Group, a quartet, which was performing that term. That was the first term for me. I was only the second violin and people like Margaret Major were in it. That was only because there happened to be a gap. It was called the Scholars Quartet or something like that, I can't remember. But that set me off on the chamber music path, although I had done a lot of chamber music before that. But are you interested in what happened before college?

Yes, whatever you think is relevant to your present experience. This is obviously going to effect the way you practice and approach playing music.

I went to this Grammar School at Clapham. I went into the violin class, simply because at home we had an old violin and I just used to sort of pick it up and squeak on it. I went into this violin class and there were 5 of us in this class. And the teacher, a wonderful Jewish lady was there for one year and was leaving that very term. She was leaving at Christmas as I went in September. So she only had me in that class for this one term, and by the end of this term she said "I'm leaving, but you're staying with me." and I used to travel up to Russell Square every week and have a lesson, from her. The really marvellous stroke of luck was that she had just been learning with Rostal and had been with the.....the whole of the Amadeus had also been over there learning with him, and she had also before that... she'd actually learnt with Sevcik and Carl Flesch. But of course, right from the start, right from the start I was doing Sevcik exercises and things. Right from the start.

How old were you when you started? You were quite old?

Yes I was quite old. I'd never touched the violin before then, although I had played the piano. But I had this very, very fine teaching you see, straight away. Which I think made...there is no doubt about it... and she was also a great character and would flaunt me around Festivals and of course because of this she insisted, I told you about this, deportment. Well of course, bless her heart. I think in some ways she did a lot of good, although it went too far. I think she carried it too far. She was very possessive. Have I got time to tell you the funny story of what happened when I went in for the scholarship?

Yes, do tell me.

I was actually learning the piano at school with another possessive piano teacher. But I couldn't be bothered to practise the piano. I was about Grade 6 or 7, but I never practised because I wasn't interested. Now this piano teacher insisted that for the scholarship...It did actually say play your second study.....and she said "Oh yes, we must play your second study". My violin teacher was so fanatical, she was such a perfectionist that not only did she insist on the best accompanist in the whole country, well according to her. But I have lessons in how to walk into the scholarship and she said "You are not playing your piano. You are not going to tarnish the image. You are not going to do anything like that." So I didn't know what to do, because the music mistress at the school and the piano teacher insisted "Of course, you're not going to get a scholarship if you don't play a second study." So I thought "Well alright. I'd better play it and not tell her." So I get ready to go into this scholarship, in the waiting room. Violin teacher turns up, of course, fanatical about everything there. I put my piano music underneath, at the side of the violin and go along down the corridor. We had to wait outside and the violin teacher, after about three minutes came to see where we were and she said "What have you got there? Give it to me" and snatched, just as the door opened, and she snatched the piano music, and I walked in. Then when they said "Well, what about your second study?" I said "Well, I've been advised not to play". I still got the scholarship. I shall never know whether she was right or wrong..... but I mean.... I was in a terrible state. But that was what she was like.

What happened when you finished College? You went straight into a quartet?

Yes, I did, because Helen Just had been the chamber music coach and Head of Chamber Music at the College and she had just decided to form another quartet, just as I was leaving and I went straight in. And in the September we were doing Wigmore Halls and did auditions for the BBC straight away. They liked us and I think we suited them because we just did odd works and odd things that they wanted us to do. I spent quite a lot of time doing that sort of thing and all the time I did teaching in London. First of all for ILEA or the LCC as it was then, and then for a very good job from the Latimer Girls School in Hammersmith and another girls school. I had two Primaries where I did some lovely teaching. I really enjoyed that. I combined that with quartet playing and always string orchestras and chamber orchestras in the London area.

Now can I ask you about practising? Do you like practising? You've already said that you didn't like practising the piano. Do you like practising the violin?

Yes I do.

And you've always hated the piano and liked the violin?

Well I suppose I don't hate piano. I never have got time for it. It is always my violin I should be practising.

What do you do when you practise? Do you have regular times or.....?

No

Do you practise every day?

Yes

At some point?

Yes, hopefully.

For a long time?

No. Sometimes it is just impossible. I do try. Sometimes it's only half an hour.

What would you consider..... given that it is a fairly normal day and you are not rushed off your feet, how long would you try and do?

Well....

Or don't you set yourself a time?

No I don't. I get through as much.....I don't even look at the clock really. If I've got a morning I start practising and get going and there is always something I should be practising because I still do quite a lot... I do about 4 chamber groups and there is always something apart from my own practice.

Supposing you had a long holiday and nothing was coming up? Would you still practise?

Yes definitely.

What do you practise?

I always have an absolute routine, an absolute routine of basic arpeggios and scales.

You start with scales and arpeggios?

Yes and if I don't start with that then I feel absolutely, you know, that there is something wrong.

You don't set yourself a time for that?

No. No.

How do you decide when you think that you have done enough of those.

When I think I've begun to play in tune ,and whether shifts are where I'm going, straight up to 5th position, more or less, where it was instead of... and whether it sounds nice..cos first thing in the morning you think "Oh, God, this sounds awful." So I carry on until I've got slow, slow bows, good sound, good intonation, at a slow speed, in more or less the same scales and arpeggios..... Mmmm..... and then I start on

Do you do many different scales? Half a dozen?

Probably about half a dozen.

Do you do them in double stops? or inversions?

No, this, this is just warming up, which is nothing to do with anything. I haven't even got chromatics. I'm just trying to play in tune. Then after that, which might be about twenty minutes I suppose, a quarter of an hour, if I've only got five minutes to do it in then I do it in five minutes. Then I always do some double stops and chromatics. And I also keep high up on the Sul G going, because I find that goes very quickly and if one has to play solo bits high up on G string, this is very exposed. So that and the E string. I do a lot of the Carl Flesch and I haven't even got as far as studies.

If you just tell me what you do, that is what I want to know.

So this so called routine, might take me half an hour, might take me three quarters of an hour. If I've got lots of time I'll do it. And then I get on to.....either I do studies next, or bowing. Now I am flexible about that. I either decide I'll do some left hand studies, which again I stick to certain ones. If I've got..... It's a real luxury to me to have the time to do a study that I haven't done for some time but the reason why I stick to the ones I do, is that in the limitations of time I know they, they do me good. I need them. So I have a set pattern. Another thing I'm fanatical about is the Sevcik 40 variations, simply because I went through a stage, which all violinists go through, questionable stage, Menuhin being one of them, when he was asked how do you do spiccato and when he asked himself he found he couldn't do it. But I mean ...these are essential I find to keep the sort of bowing under control and I really do put it under a microscope and very, very slowly examine Sevcik's exercises at the heel and the middle and then speed them up. And I find that if I don't do those my bow arm just goes.... spiccato

wise.....it just loses, what I call good control and it might be acceptable to some other people, I don't know, making a splashy scratchy sound, but I don't like doing that.

Do you think you are a perfectionist?

Well, I don't know. I don't know whether this also goes back to the fact that when we used to broadcast quartets the 2nd violin parts were so often(sings)..... which were very, very, very, nasty exercises and studies and these were being broadcast. So, I mean, I had to get, I had to make a nice sound of them all. And I suppose it might go back to that, I don't know.

If you're learning a work which has got particular problems do you try and find a study that relates to those or do you sort the problems out in relation to the piece of music.

Sort the problems out in relation to the piece of music. Because if they were problems....No no definitely I would do that, definitely.

Now can you put yourself in the position, which is probably quite hard because it probably doesn't happen very often, where you are playing a completely new piece of music that you have never ever seen before, really new. Can you try and imagine what you would do to start with?

I can tell you that because when I play with the Sinfonietta they always give me pieces of music I've never seen before and that'sWell the first thing I try to do is to understand the rhythm of it. Visually, even not with the violin. I just sort of sit down in a chair and think "Can I understand what this rhythm is?" and with great relief, if I understand the rhythm, I then pick up my fiddle.

You're talking about a modern piece now?

Yes, I suppose I am. When the rhythmic difficulties are predominant and then I find it very much easier to relate to the violin, if I can understand it in my head.

Do you skim through the whole piece first, or do you ...

No, I wouldn't waste time on what I can see is fairly straight forward but I would go straight to a lot of leger lines, that I don't even know what notes they are, and work it out an octave lower, if it's a weirdy semitone business all in the leger lines, I go over and over it an octave lower, I wouldn't dream of playing it up there until it's..... and it's nothing to do with the rhythm, it's just to get the actual sequence of notes, which sometimes are so odd.

If this was a solo piece, something you were doing, not necessarily modern, lets say somebody had unearthed a piece that you had not come across before, not necessarily modern, would your approach be very much the same or would it differ slightly if you were going to play a concerto? Or if it was in a chamber group rather than in an orchestra? Does it make any difference, whether it is solo, or orchestral?

Yes. It does make a difference if its going to be solo. Yes it does definitely.

So what would you do then?

I would go through it all.

Would you look at it first?

Yes. I would look at it first, sit down and I'm saying sit down because I always stand up when I'm practising seriously and when I sit down to do something like that I think that I'm in a different sort of mood. I don't know why. Whether that makes any sense, but that is definitely so. And I sit down, because that I consider playing, not practising. Then the next day if I've found I can't play certain areas of it that goes into my practice, these certain bars.

That's technical practice?

Technical practice.

So the musical practice.... you would sort out the musical things as you're actually playing?

Yes

Or would you look at them first?

No. I would look at them first, but I would gradually ...and I would try and dissociate...ideally if I had a whole day to practise I would do technique in the morning, which would involve the technical aspects of this work you are talking about, and then in the afternoon I would be more in the mood to play it, musically.

Do you try and get an overall conception first or don't you usually bother with that?

Not too much.

If you were talking to a non-musician what would you say were the kind of passages that cause problems? What sort of things? You said high passages and you said rhythmic things, what other sort of things are difficult?

Well of course fingering. Now if it is a tricky passage usually, it's not an obvious one to finger, or and that is all related to the sort of awkward accidentals or note sequences. The more obvious a melodic phrase is, usually the easier it is to finger, it would be. I think fingering comes into this.

You work out your fingerings with the violin under your chin playing it?

Yes. And I never mark them in because I find that I might decide next day.....I find that I don't know a fingering unless I've learnt it in my head and I can do it. It doesn't make the slightest difference if I do put a fingering in because..... It doesn't make any difference, it doesn't help me.

So you've actually got to learn it?

Yes.

Do you find that you learn fingerings quickly?

Much quicker that way.

That's interesting. If it was a piece of music that you hadn't come across before, would you bother buying a score or a record?

A score. If someone I know has got a record and they say "Oh, I've got the record of that." I would be interested, but I wouldn't dream of going to buy it.

But you would be interested in a score?

Yes.

As you get nearer a concert, you said that in the morning you would do technical practice, in the afternoon you would play, do you try and set up the thing in your mind? Especially if it is a very important concert. Do you sort of have performance things that you do? Well, imagining what the hall is like. Or are you so hardened to this that you don't need to bother?

It's not that I don't need to bother. It's just that I'm too worried about actually playing the right notes. That's what I'm worried about, the rhythm.....

The audience and things like that?

That's the last thing to worry about. I am deeply worried and concerned about the actual, you know.....notes or rhythms.

You were talking about, if something was very high you

would play it down an octave and you said you would repeat it again and again.

That's if it is a modern work and I don't even.....

How do you go about.....let's say you've got a difficult passage which is very fast, do you practise that with a metronome, starting slowly and speeding it up?

Just now and again. It is.....now and again. That's quite rare. It often is necessary, yes. In a pretty tricky situation, but that might only be about 4 times a year.

And when you were talking about sorting out your rhythm, do you actually write things on the music, where the beats come?

Yes, if necessary. Yes, because sometimes I haven't got it in my head and I find I keep on making the same mistake, so that I definitely....

Do you ever resort to playing on the piano, if you are finding it particularly hard to pitch something?

No, I try and stick to doing it down an octave.

And you mark in accidentals, do you?

Oh yes, oh yes, oh yes. Or a semitone sign because again, that modern idiom.....

Some people have suggested that they sometimes use enharmonic changes, thinking of a Gb as an F#. Do you do that?

No, I don't think I do. No. Only if after long time I still can't play the thing in tune. I think "What on earth is wrong?" and then possibly, I suppose, discover that an Ab is easier than a G#.

Do you ever practise the piano now?

No. I enjoy playing the piano.

But you don't like practising it?

No, I don't have time to practise it. One day, my dream is, when I retire, I shall actually sit and play Bach preludes and fugues and actually practise them.

When you were at College did you practise the piano?

I should have done, but my piano professor and I were in absolute agreement that it was better to play violin and piano sonatas, and so we spent our time doing that.

Have you had to play things from memory?

Yes, I had to do a concerto from memory.

How did you go about memorising it?

I think sort ofmore or less, passage by passage rather than page by page. I think most concertos do go into passages, don't they?

Did you sort of play it over and over again? After you had learnt it in the first place, you are suddenly confronted with "OK, you can play this, but you've got to memorise it." What did you do?

I think I played it through with the pianist and tried to do it in front of one or two people.

And you didn't find yourself getting stuck?

Well.....

Or going round bits again?

Yes, I did.

Can you remember what you did to help?

I can remember the famous occasion from my diploma. It was a Bach unaccompanied and I know I played the first part of it three times, but they never said a word and I know I'd gone back and I thought "Oh, well. I've gone back so I'll just carry on." So I tried to stay calm, as there was nothing I could do about it. I'm just trying to think in the orchestral situation..... I found when I played concertos with an orchestra, in some ways the orchestra seems to give you a lot of confidence, because they're making such a loud noise that you almost think that you could get away with anything.....and that in itself seems to boost one's morale. So I think, in fact, it's harder to play well things like Bach, when if anyone is following the music you can't take any wrong turnings, can you?

I've found a concerto by Bach which isn't terribly well known. Can you look through this? Talk me through what you would do if you were given it to play in a concert in a few weeks?

I'd sit down and play it through. I'd go through that musically. Playing the tutti so I got to know it. Even if I played some wrong notes I would try and keep going. And that's the sort of thing (rhythm) that I would try and work out in my mind before I started to play it. And I would probably play through without the chords, then I would work out the chords later. Then I would not take any notice of their fingerings to start with, I would just get by and

get through it and then I'd think "Well, I don't like that sort of thing." and then sort out what would suit me..... fingerings. Then I would do the same thing with the slow movement. Until I can understand it I don't try and do it on the violin. And if I still can't understand it I think "Well, why can't I understand it?" and I do it on my fingers, counting 8 or whatever it is until I can. I wouldn't worry about ornaments. I would worry about those later.

ADVANCED STUDENT PERFORMANCE AND INTERVIEW

SUBJECT 7A

SEX Male

AGE 15

STANDARD AND BACKGROUND Started violin age 7. Has recently obtained a good mark in Grade 8. Plays piano, started age 11 is now Grade 6. Has decided to make music his career in some way or other.

PREPARED SIGHTREADING ASSESSMENT Rawsthorne, Concerto for violin. 1st page of 1st movement. Embarked on 9 playings during the 10 minutes.

1) Tp 10. Started at the beginning. In bar 9 played a B flat instead of a B natural which was corrected immediately. In bar 11 the A sharp was a little flat. In bar 20 not all the semiquavers were accurate. In bar 23 the A sharp was flat. Rhythmically a perfect reading and almost perfect notation.

2) Tp 48. Starts in bar 15 and stops in 22. Starts 19 slowly and practises 19 and 20 using different fingerings, checks top note with a low F.

3) Tp 76. Starts in bar 5, bar 11 the A sharp is still not in tune. Stops in bar 22

4) Tp 92. Starts at the beginning. In bar 9 plays B flat and immediately corrects. In bar 11 the A sharp is still out of tune. In bar 23 plays a G natural, has not done this before.

5) Tp 118. Starts at the beginning. Hesitates in bar 9 over the B natural. Plays to the end accurately.

6) Tp 141. Starts at the beginning. B natural wrong in bar 9. Does the accelerando in the middle section. Plays a G natural again in bar 23.

7) Tp 163. Starts bar 6 and practises the quintuplet at the end of the bar slowly. Continues, in bar 9 still B flat at the beginning of the bar. Stops in bar 10.

8) Tp 173. Starts at the beginning. Does the accelerando in bar 7 and later. Bar 9 is still inaccurate. Bar 22 is out of tune. In bar 23 plays G natural and A flat instead of the correct notes.

9) Tp 193. Returns to bar 8 and is stopped almost immediately by me entering the room.

PERFORMANCE OF PREPARED SIGHTREADING Tp 198. In bar 9 the B natural is dubious and in bars 10 and 23 the A sharp was not in tune. Otherwise an accurate performance which was also notable for its observation of dynamics and tempo

ADVANCED STUDENT PERFORMANCE AND INTERVIEW
markings. A "musically" good performance as well as
accurate notation.

INTERVIEW

How often do you practise the violin?

A week?

Honestly.

Usually five days during the week, about half an hour, 45 minutes a night but over the weekend I don't usually touch it.

What about the piano?

I don't.....I just play it when I feel like it.

Kirsty said that it varied quite a lot depending on what homework she'd got and things like that. Is your practice as regular as that or does it vary quite a lot?

Well if I've got a lot of homework I don't practise. But I don't usually have that much homework.

So you do really practise that much?

Yes.

And the piano you said you just play when you feel like it.

Yes.

How often do you feel like it?

Well, I play it more over the weekend, because there's nothing on the television really.....

Do you have a regular time when you practise?

No.

It's just when you feel like it?

Yes.

So you sound as if you practise the violin more than the piano?

Mmmmmm.

Do you have your violin packed away in its case, or does it stay out?

It's packed away in its case.

Other people have said they find it quite hard.....actually the effort to get it out.....You don't?

Once I've got it out I'm alright.

It is an effort to get it out?

Yes.

Do your parents nag you to practise?

No.

So they leave it all up to you?

Right.

When you do your practice what do you do first?

Usually the pieces.

Does this pattern of practice change? I mean if you've got an exam coming up do you practise more?

I don't practise more in time, but I do the scales more than I would usually.

So you always practise like that? Or after an exam is it less?

Immediately after I don't usually touch it for a week or so, but beforehand sort of a week I probably practise quite a bit more.

Or a concert? Or is it just exams?

No. Not concerts.

Just more before an exam?

Yes.

And you practise your pieces first?

Yep.

And you leave your scales until last like everybody else?

Sometimes.

Sometimes you don't do them at all?

Yes.

What do you like practising most? Do you like practising?

Yes, once I've got it out.

It's the thought of it?

Yes.

What about the piano?

Well, that's already out. So I just sit down and sort of play it.

Everybody says that.

Do you like the violin more than the piano?

I like the violin more.

So once you've got it out of the case you quite enjoy practising?

Yes.

Is that dependent on what you're practising?

Well, if I'm practising a boring bit like the Bach, I don't like it much.

So what do you like practising?

Exciting pieces.

Like what?

Well, the Mozart was alright.

What sort of pieces do you like practising?

Loud pieces.

Loud pieces?

Loud pieces that.....I don't know.....

Give me an example of a piece that you liked practising?

Well the Mozart was alright.

That's not particularly loud.

No. I mean the Bach's boring. I don't like boring pieces.

Not everyone finds the same things boring.

I mean the Mozart's got a sort of tune to it most of the way through. The Bach.....It's just a load of notes.

What about Praeludium and Allegro? Did you like practising that?

That was good. That was alright.

What don't you like practising apart from the Bach?

Scales.

Studies?

They're alright. I don't mind practising studies.

What about exercises?

I don't like practising exercises.

So you just like practising nice tunes, almost that you like?

Yes.

Given that you've got a new piece, let's say we've just started playing a new piece, what do you do? You've decided you're going to practise, you've put the music on the stand, what do you do next?

Play it.

Straight through?

If it's a new piece I would.

You'd play it straight through to start with?

Yes.

All the way through or just as far as we had got in the lesson?

I'd probably play it all the way through the first time.

So you'd go over even parts we hadn't done?

Yes.

Then what would you do?

And then I'd go back over the bit we had done in the lesson.

Just play it through?

Probably to start off with. Then I'd go over the bits that I couldn't play.

How do you go over them? What do you do?

Do them slowly. Speed them up. Then I put them all together with the bits round it.

What bits do you find difficult? What are the difficult bits?

High bits and fast bits.

That's straightforward. What do you do to practice high bits? Is it because you don't know the sound?

No. I don't know. I just play them through.

So you must know what they sound like?

Yes. It's just a matter of getting it in tune.

So you practise it slowly to get it in tune?

Yes.

And the fast bits.....Its just a question of what?

Doing them slowly and speeding them up.

Anything else you find hard?

Don't think so.

What about the piano?

Fast bits.

So you do the same thing?

Yes.

Anything else that's difficult on the piano?

Don't think so.

Do you use a metronome?

When I can be bothered to get it out.

What do you use it for?

Speeding things up.

What if you've got a passage with lots of accidentals? Do you write things over the notes?

No.

You don't have a pencil at the ready?

Well, there's usually a pencil there so if I forget any flats or anything I can put them in.

Anything else you use to help you?

No.

What about listening to music? Do you listen to a lot of music?

Well, you mean the piece we're playing or just in general?

Anything.

Yes. I listen to quite a lot.

What sort of music?

Anything.

Pop music?

Yes.

Classical music?

Yes.

Anything?

Anything.

And when you've listened to music that you're actually learning does that help? Does it help to make it easier?

I don't know. I don't think that it does.

Why?

Well, because then you're trying to do it like that person did it, in the first place anyway.

What's wrong with that?

I mean some of the bits that he does on the tape wouldn't be really the same as what you wanted to do when you were playing.

Does it help you to get the sound in your head?

No, because I just look at it.

So you don't need that?

No.

So it's not helpful to listen because you might want to do something different?

When he slows down and speeds up.....you might want to in different places.

How do you work out what you want to do?

Well, just what sounds right to me.

What you feel?

Yes.

So do you sometimes listen to things and think that is the way you want to do it? Or do you usually want to do it differently? Or does it vary?

Well, I usually play the piece through first and then I sort of have a rough idea of what I want to do and then when you listen to the tape it might be totally different.

Then does it make you think, well, perhaps I could have done it like that, even if it doesn't make you change your mind. Does it ever make you change your mind?

It doesn't usually make me change my mind.

That's interesting. You just get your ideas from playing it through or are your ideas formed from listening to other people play? You said you listened to quite a lot of music, do you get your ideas from there, or do they well up from inside you?

They're inside me, I mean if I've heard the piece before.....before I start playing it, then I'll probably play it like that. But if I play the piece before I hear it, then I'd rather do that.

And do you ever listen to things and think "I wouldn't do it like that"?

Yes.

Or I would do it like that, I like that. Or do you try and do something different?

I usually do something different. I don't like doing what other people do, because I'm awkward.

It's not because you think that musically it sounds better?

Well I mean if I'd played it through first and I thought it

sounded good like I did it then I wouldn't change it.

So you've got quite definite musical ideas. Or is it just that you want to be different?

No. It's not just that I want to be different.

It's that you've got quite definite musical ideas?

Yes.

Do you think that your musical ideas come from listening to lots of different things?

Yes.

Do you listen to a lot of violin music?

Probably more than anything else.

What about piano music?

I don't listen to anything much for the piano, because I don't like the piano much.

What about memorising things? As your teacher I have the distinct impression that you don't like memorising things?

No.

You don't?

No. Because if I'm ever playing something that I've memorised I'm more likely to go wrong than if I had the music.

So you worry about it?

Yes.

What did you do when I asked you to try and memorise something? How did you go about it?

I just played bits over and then tried to do it without the music.

Was that successful?

It was when I practised at home.

So what happened was that when you tried to play it in front of other people you were nervous?

Yes. It just went.

That's fairly normal. And you didn't have any tricks for

helping you?

No.

You simply went over it if you forgot it and practised that bit?

I mean, I play most of it by sound anyway.....rather than.....

So explain. What do you mean by sound?

Well, if I'm trying to play something I usually do it by knowing what it sounds like and knowing where my fingers have got to go.

So you sort of play by ear?

Even when I've got the music there.

You do that with the music?

Yes.

If I played you something and you knew the sound of it, you could play it from memory, without ever having seen the music, do you think?

If it wasn't too long. You mean.....?

If you had a month to learn it could you learn a piece just by ear?

Yes. I think so.....unless it was very hard.....with a lot of weird things in the middle.

Bowings might be a problem. Do you get quite nervous when you've got to perform?

Not when I've got the music in front of me.

What about exams? Do you get quite nervous for exams?

The night before I might, but when I'm just about to go in I'm not that nervous.

Do you do anything to prepare yourself for having to perform?

Don't think so. I just sort of get up there and play.

I was thinking of having a trial run before at home. Perform it to other people?

No.

Before the exam do you imagine it is the exam?

Well, when I'm waiting to go in I probably would.

But not at home. And you don't get your family to listen to you or anything?

I don't like doing that.

Why not?

I don't know.

What about your scales? Do you ever get people to test you on your scales?

I'd rather do them by myself.

Do you test yourself?

Yes. I test myself a little.

Before the exam?

Before the exam.

Right is there anything else you think you ought to tell me about your practising?

No.

You're going to do music aren't you?

Yes.

At university or music college?

I want to go to university.

If you're going to do music as your career, which you have pretty well decided you are, in some shape or form, does the thought of having to do about 4 hours practice a day fill you with horror.

Not really. Well if I've decided to do music as a career anyway, then there's not going to be much else going on at the same time. So I'll probably have the time to do that.

NOVICE PERFORMANCE AND INTERVIEW

SUBJECT 10A

SEX Female

AGE 10

STANDARD AND BACKGROUND Started when age 8. Now reached Grade 1. Achieved a merit for Preliminary Grade. Also plays piano and recorder. Started playing piano before violin and learnt recorder from age 7. Attends Music School on Saturday morning.

PREPARED SIGHTREADING ASSESSMENT Piece was Fiddlers Fancy by S. Nelson. The practising seemed to be divided into 9 sections.

1) Tp 27. Makes 2 false starts on the wrong string, corrects this to start on correct string but still makes another false start. Plays through very slowly and tentatively with some hesitations but basically correct. Makes errors in bar 9, stops and repeats bar 9 slowly but correctly. Repeats the end of bar 13, then continues to the end.

2) Tp 75. Starts at the beginning. Plays slowly but the crotchets in bar 4 are rushed. Repeats the beginning of bar 5 and then continues to the end.

3) Tp 108. Starts at bar 4, beginning now to get a little quicker. Stumbles on the 1st note of bar 5. Hesitates on the last note of bar 6. Repeats the beginning of bar 9. Doubles the speed of the crotchets in bar 12. Makes 3 attempts at bar 13 before it is correct.

4) Tp 133. Starts bar 9, bar 11 corrects error, goes on to the end with several hesitations.

5) Tp 149. Starts at the beginning, stops at the end of the first line after having made a false start. Rehearses bar 3 several times.

6) Tp 165. Starts bar 9. Makes error in bar 11 and rushes bar 12. Repeats bar 13 then goes on to end.

7) Tp 178. Starts at the beginning. Makes errors in bars 2 and 4 which are both corrected. In bar 6 the 1st 2 crotchets are very rushed. There are several hesitations. Repeats the 1st 2 crotchets in bar 12. Very hesitant.

8) Tp 202. Starts at the beginning. Rhythm is rather erratic. Repeats the 1st 2 quavers in bar 5. Wrong note in the last beat of bar 6 corrected. Rhythm rushed at the beginning of bar 6. In bar 12 the crotchets were rushed and then repeated correctly.

9) Tp 226. Starts at the beginning and makes a false start. Several errors made and corrected. Notices the repeat at the end of the first section and does it. Stops as I enter the room.

PERFORMANCE OF PREPARED SIGHTREADING Tp 242. Several false starts. Rushes crotchets in bar 2. Stops to ask if she is to do the repeat. A slow hesitant but accurate performance.

INTERVIEW

How often do you practise at home?

Well, this week, I only practised once but usually I practice about 5 times.

Do you practise the piano about 5 times as well?

I practise the piano about 6 times.

More than the violin. Do you like the piano more than the violin? Be honest.

No, not really, I like them both the same.

Do you? What about the recorder? Do you practise that as well? As much? Less?

Less.

So you mainly practise the piano and the violin?

Yes.

Do you have to be reminded? Does Mum remind you?

Well, sometimes she does, but sometimes she doesn't have to.

Sometimes you do it all on your own. Does she like you to practise? And dad?

He keeps giving me this little book with things to play on the violin. And Carolyn bought it and there was a recorder piece, it's got lots of slurs in it and quick notes and things like that

And can you play it?

Well, yes. I said to Dad that I'll have to have about half an hour practice to get it really perfect. And he said "Oh, you don't need to do that.

And how much practice do you do when you do it? Do you do 10 minutes, 20 minutes, or.....?

Well...usually....

Or don't you have a time?

Well I sometimes do it for 20 minutes and then sometimes..... I play the pieces I have to do about five times and then stop. And then go and do my piano for about half an hour.

Now when you've got an exam coming up do you practise more?

Yes. A lot more. I usually practise twice a day.

Twice a day? What in the morning and then in the evening?

When I get home until about 4 o'clock , then at about 5-30 to 6-0.

So you do more. When you are practising for an exam do you have any particular order of practice? What do you do?

Well, I've got this little book in piano that I have to practise all the way through.

What about the violin, because you have exercises on the violin as well as your pieces, and scales and things? So what do you practise first?

The first thing that comes in the book.

So it's pieces first?

Yes.

Then do you do your exercises at the end, do you?

Mmmmmmm.

When do you do your scales? Or don't you do your scales?

I sometimes do my scales.

Not very often? What happens when the exam is coming up? Do you practise them then?

Yes I do.

Where do you practise them? At the end? The beginning?

Well I practice them at the beginning and the end, actually.

Do you like practising?

Some days I can't get in the mood and then I don't like practising and then I go GRRRRRR! And then I start and play it lovely.

So sometimes you like it more than others! Does your Mum, if you don't practise for about two or three days remind you?

Yes, she does.

Does she have to do that very often?

Well it's usually three or four days. It's about once she's ever said that. Usually I've left it about two days.

Generally you like practising?

Yes.

What do you do when you've got a new piece to learn?

When I've got a new piece to learn I do that the most.

If you don't know what it sounds like what do you do?

I read the notes. See if they are fast or slow. See whether I can work out the time signature.

And then what do you do?

I start off playing it kind of slowly and stopping to see if I've done that bit right. Then I go and do it again.

Until you've got it right. What, that bit? Or the whole thing or.....?

That line.

So you do it a line at a time?

I do it a line at a time, and then I do it two lines, then I do 4 lines, then I do the whole lot.

Do you do that on violin all the time? Do you always practise like that? And on the piano?

Yes. When there is something new, if I know how to do it, then I practise it for about two weeks.....then I can play it. I can just do it. Go through and if I'm going wrong I can stop and start again.

Right. And if you've got a very difficult little bit that you can't get right, what do you do with that little bit?

I go over it until I do get it right.

So you sort of practise that little bit. What sort of things do you find difficult?

Well, if I don't see the slur marks I find that a bit difficult.

So you find slurs difficult?

No, not really. I sometimes forget that they are slurs. I just think that it is a little pencil mark.

What else? Anything else you find difficult?

No, that's about it.

Do you ever have a pencil and write things on the music when you are practising?

Yes I sometimes write "p" and then I rub it out as soon as I.....

A "p"? Do you mean a "p" for soft?

No, a "p" for practise.

I see. Do you have a metronome?

No.

Do you listen to lots of music at home?

Oh yes. I've got lots of tapes with music on. And I had these new tapes for Christmas that have got piano tapes and I've got some violin things that I sometimes listen and think "How do I play this?"

Do you listen to pop music?

Well, my mum doesn't really like me listening to pop music. I don't really want to.

Do you find it easier to practise the piano than the violin or doesn't it make any difference?

Well actually I think that violin is easier than piano.

So you are more likely to go and practise the violin than the piano when you get home, are you?

Yes.

You are?

Yes

What do you find difficult on the piano?

Well I've got.....I've got this piece for my piano exam and its the kind of thing where you play two notes, then it's a rest, then its a little note and its a bit out of tune in that way. I get stuck on that.

When you did your violin exam, did you play some things

without the music? How did you go about doing that? What did you do to make yourself learn them?

Well, I just kind of.....when in I started playing it a little bit and I kept on doing that.

That's what you did on the violin, just kept on playing it until you knew it? What happens if you forget it? What do you do then?

I have to think in my head, "How does that go?"

So you don't look at the music again. I didn't mean what happens if you forget it in the exam, I meant when you were practising it.

I think about it.

You don't look at the music?

Oh no, the music is down flat and I'm sitting on it.

So you can't look at it?

No, I don't really want to. It's like cheating.

You just try and remember it until you've got it right?

Yes.

Do you get very nervous?

In exams. Yes. I was a bit nervous coming in here.

What do you do to help yourself stop getting nervous?

I think about what I'm going to have to do. And then I think about what I'm going to do, then I'm alright.

So you just concentrate on the music and things like that and that makes it alright.

Yes.

Do you do anything at home? Do you have a practice exam with your parents?

No, I don't.

When do you get nervous before the exam? At home or is it immediately before?

At home.

Days before, or just.....?

A few hours before.

And you just concentrate on the music and it goes away. So you don't try practising in front of Mum or Dad, or get them to test you?

No, I don't really like my Mum and Dad to test me. I test myself.

Is there anything else you do?

Well I concentrate on the music, getting it right and being nice. In ballet I have to smile.

ATTITUDE MEASURE

NAME.....

DATE OF BIRTH.....

In the questionnaire that you are about to fill out there are questions which use a rating scale of 7 places. You are asked to put a cross in the part which best describes your opinion. For instance if you were asked to rate how you felt about games, the question would look like this:-

Playing games is

good _____ bad
extremely quite slightly neither slightly quite extremely

If you think that playing games is extremely good, then you would place your cross as follows:-

Playing games is
good X _____ bad
extremely quite slightly neither slightly quite extremely

If you think playing games is quite bad, then you place your cross as follows:

Playing games is
good _____ bad
extremely quite slightly neither X slightly quite extremely

If you think playing games is slightly good, then you place your cross as follows:-

Playing games is
good _____ bad
extremely quite X slightly neither slightly quite extremely

If you think that playing games is neither good nor bad, then put your cross as follows:-

Playing games is
good _____ bad
extremely quite slightly X slightly quite extremely

Some rating scales have different end points, for instance, foolish/wise, pleasant/unpleasant. Please use them in the same way. If you think that playing games is extremely foolish, then mark your cross as follows:-

Playing games is
foolish X _____ wise
extremely quite slightly neither slightly quite extremely

Place your marks in the middle of the spaces like this

_____ X _____
NOT on the boundaries like this

_____ X _____
Be sure you answer all the questions. Never put more than one cross on a single scale.

1. I intend to practise playing my violin every day.

likely _____ unlikely
extremely quite slightly neither slightly quite extremely

2. My practising playing my violin every day is

good _____ bad
extremely quite slightly neither slightly quite extremely

3. My practising playing my violin every day is

foolish _____ wise
extremely quite slightly neither slightly quite extremely

4. My practising playing my violin every day is

pleasant _____ unpleasant
extremely quite slightly neither slightly quite extremely

5. My practising playing my violin every day is

rewarding _____ punishing
extremely quite slightly neither slightly quite extremely

6. My family thinks I should practise my violin every day

likely _____ unlikely
extremely quite slightly neither slightly quite extremely

7. My school teachers think I should practise my violin every day

likely _____ unlikely
extremely quite slightly neither slightly quite extremely

8. My friends think I should practise my violin every day

likely _____ unlikely
extremely quite slightly neither slightly quite extremely

9. Generally speaking I want to do what most members of my family think I should do.

likely _____ unlikely
extremely quite slightly neither slightly quite extremely

10. Generally speaking I want to do what most of my teachers think I should do

likely _____ unlikely
extremely quite slightly neither slightly quite extremely

11. Generally speaking I want to do what most of my friends think I should do

likely _____ unlikely
extremely quite slightly neither slightly quite extremely

Subject number	Sex	School	Age in months	Time learning in months	Weekly average practice
1	M	1	89	10	0
2	F	1	97	22	-
3	F	1	105	22	27.5
4	F	1	105	10	30
5	M	1	112	10	-
6	M	1	111	10	30
7	M	1	125	22	62.5
8	F	1	133	26	120
9	M	1	141	55	57
10	F	1	143	50	130
11	M	1	129	51	55
12	M	1	107	10	17.5
13	F	1	83	10	-
14	F	1	80	8	35
15	F	2	109	18	-
16	F	2	109	18	57.5
17	F	2	108	18	-
18	F	2	109	18	40
19	F	2	113	26	30
20	F	2	122	26	120
21	F	2	113	26	120
22	F	2	124	26	120
23	F	2	119	26	70
24	F	2	124	26	-
25	F	2	138	26	65
26	F	2	122	11	90
27	F	2	134	26	-
28	F	3	119	15	55
29	M	3	116	34	90
30	F	3	110	21	65
31	F	3	112	17	27.5
32	F	3	110	17	65
33	F	3	117	17	42.5
34	F	3	115	17	35.5
35	F	3	118	17	62.5
36	M	3	120	17	0
37	F	3	122	22	277.5

Subject number	Sex	School	Age in months	Time learning in months	Weekly average practice
38	F	3	130	21	52.5
39	F	3	123	22	75
40	M	3	126	17	-
41	F	3	134	38	72.5
42	F	3	123	17	57.5
43	F	3	132	14	32.5
44	F	3	138	25	52.5
45	F	3	138	26	70
46	M	3	136	21	-
47	F	3	146	21	85
48	M	3	121	4	25
49	F	3	112	17	62.5
50	F	3	116	17	-
51	M	3	133	6	-
52	F	3	100	10	45
53	F	4	102	4	47.5
54	F	4	114	8	-
55	F	4	100	4	-
56	M	4	108	22	0
57	F	4	101	8	27.5
58	M	4	108	22	45
59	M	4	113	22	0
60	M	4	108	8	28.5
61	F	4	135	22	127.5
62	F	4	129	22	76
63	M	4	101	8	-
64	M	4	107	8	-
65	M	4	95	8	10
66	F	4	113	22	89
67	M	4	134	8	46
68	M	5	86	6	30
69	F	5	97	26	80
70	F	5	91	6	86
71	M	5	91	6	45
72	F	5	111	26	42.5
73	F	5	109	6	52.5
74	M	5	116	26	55
75	F	5	129	14	57.5

Subject number	Sex	School	Age in months	Time learning in months	Weekly average practice
76	F	5	129	26	90
77	M	5	129	6	65
78	M	5	134	22	55
79	F	5	126	38	67.5
80	F	5	136	22	-
81	F	5	138	22	92.5
82	F	5	141	22	87.5
83	M	6	143	42	65
84	F	6	150	26	-
85	F	6	154	26	-
86	M	6	150	7	65
87	F	6	151	26	58
88	M	6	146	37	-
89	F	6	159	50	-
90	M	6	170	74	-
91	M	6	164	49	52.5
92	M	6	161	50	-
93	M	6	171	66	-
94	F	7	147	34	-
95	M	7	145	22	20
96	F	7	149	38	-
97	M	7	158	26	97.5
98	F	7	141	14	30
99	F	7	161	11	57.5
100	M	7	170	62	-
101	F	7	148	11	40
102	F	7	167	12	105
103	F	8	187	74	72.5
104	F	8	179	90	-
105	F	8	180	78	0
106	M	8	178	74	97.5
107	F	8	181	35	85
108	M	8	196	8	-
109	F	7	168	62	-

Subject number	Teachers rating music	Pitch	Tunes	Chords	Rhythm	Total score	Music grade
1	6	13	6	2	8	29	B
2	6	10	5	7	6	28	B
3	3	10	2	1	6	19	D
4	7	18	5	11	7	39	A
5	2	15	10	8	4	37	B
6	5	15	10	14	6	45	A
7	5	14	10	3	1	28	C
8	7	17	9	14	10	50	A
9	7	16	10	16	10	52	A
10	6	17	8	9	10	44	A
11	6	20	8	1	8	37	C
12	5	14	6	6	8	34	B
13	6	12	3	2	6	23	B
14	4	13	-	-	-	-	-
15	4	10	4	12	3	29	B
16	4	12	6	11	7	36	A
17	4	14	6	7	8	35	B
18	4	11	9	13	5	38	A
19	3	17	7	2	3	29	C
20	4	15	9	10	4	38	B
21	7	16	9	13	4	42	A
22	5	16	8	13	10	45	A
23	7	18	8	8	7	41	A
24	6	14	4	9	6	33	C
25	5	7	8	12	5	32	C
26	3	7	0	4	2	13	E
27	4	15	5	1	4	25	D
28	5	8	9	9	4	30	C
29	7	18	10	13	10	51	A
30	3	9	5	2	3	19	D
31	5	15	8	5	6	34	B
32	5	14	7	11	2	34	B
33	5	15	5	3	6	29	C
34	5	13	2	6	5	26	C
35	6	15	8	8	4	35	B
36	4	9	6	2	4	21	C
37	5	17	7	10	8	42	A

Subject number	Teachers rating music	Pitch	Tunes	Chords	Rhythm	Total score	Music grade
38	5	13	9	11	5	38	B
39	4	9	9	10	4	32	C
40	6	13	3	6	2	24	C
41	3	7	7	10	7	31	C
42	5	16	8	8	8	40	B
43	5	8	6	15	6	35	C
44	5	18	10	10	8	46	A
45	6	14	7	15	9	45	A
46	4	16	8	8	7	39	B
47	7	14	8	13	10	45	A
48	2	9	0	2	5	16	E
49	3	4	4	4	5	17	D
50	1	7	5	4	5	21	C
51	2	13	5	5	6	29	C
52	5	14	10	0	5	29	B
53	2	7	3	0	5	15	D
54	5	12	9	10	7	38	B
55	2	8	5	0	7	20	C
56	3	8	5	10	8	31	B
57	2	8	2	0	1	11	E
58	4	15	4	9	5	33	B
59	3	11	2	8	4	25	C
60	1	7	2	9	1	19	D
61	4	12	8	11	9	40	B
62	5	14	8	14	7	43	A
63	4	14	5	8	5	32	B
64	5	15	9	8	10	42	A
65	3	10	2	5	4	21	C
66	5	17	5	10	3	35	B
67	5	14	9	14	6	43	B
68	3	9	4	3	0	16	D
69	6	6	6	8	4	24	B
70	4	10	4	15	4	33	A
71	6	10	6	7	5	29	B
72	6	16	9	14	6	45	A
73	6	6	3	8	2	19	D
74	6	15	7	5	6	33	B
75	7	17	8	4	9	38	B
76	5	16	9	9	3	37	B

Subject number	Teachers rating music	Pitch	Tunes	Chords	Rhythm	Total score	Music grade
77	6	13	6	6	2	27	C
78	5	14	4	10	10	38	B
79	6	18	6	13	5	42	B
80	4	13	9	16	7	45	A
81	6	15	10	10	8	43	B
82	5	14	8	10	8	40	B
83	4	17	6	6	7	36	C
84	3	10	9	9	5	33	C
85	4	15	6	15	9	45	B
86	6	17	10	11	10	48	A
87	5	15	7	14	9	45	B
88	3	14	6	12	7	39	C
89	4	19	10	15	8	52	A
90	5	19	5	12	7	43	C
91	5	18	8	15	10	51	A
92	5	20	9	11	9	49	B
93	6	18	9	17	10	55	A
94	5	16	10	13	8	47	A
95	6	20	8	15	8	51	A
96	5	17	8	6	10	41	B
97	5	16	8	17	10	51	A
98	5	16	9	12	6	43	B
99	5	16	10	15	8	49	A
100	5	18	10	9	10	47	B
101	3	15	6	6	9	36	C
102	5	15	7	12	6	40	C
103	6	20	8	18	10	56	A
104	6	19	10	15	10	54	A
105	5	18	10	13	10	51	B
106	6	20	10	17	10	57	A
107	4	17	7	17	9	50	B
108	6	19	10	19	9	57	A
109	5	-	-	-	-	-	-

Subject number	Children given up	Associated Board Grade	Associated Board Mark	Overall achievement score	Music school attendance
1	G	-	-	17	N
2	G	-	-	48	YG
3	G	-	-	46	YG
4	L	-	-	48	Y
5	G	-	-	17	N
6	L	-	-	46	Y
7	L	1	122	122	Y
8	L	2	132	264	Y
9	L	6	117	702	Y
10	L	5	111	555	Y
11	G	2	112	224	YG
12	L	-	-	46	Y
13	L	-	-	17	N
14	L	-	-	17	N
15	L	-	-	45	Y
16	L	-	-	45	Y
17	L	-	-	45	Y
18	L	-	-	44	Y
19	L	-	-	44	Y
20	G	-	-	43	N
21	L	-	-	56	Y
22	L	1	108	108	Y
23	L	1	123	123	Y
24	L	1	120	120	Y
25	G	1	112	112	YG
26	L	-	-	44	Y
27	G	1	100	100	YG
28	L	1	120	120	YG
29	L	2	130	260	Y
30	G	-	-	50	YG
31	L	-	-	54	YG
32	L	-	-	50	YG
33	L	-	-	54	Y
34	L	-	-	54	Y
35	L	-	-	50	Y
36	G	-	-	50	N
37	L	1	106	106	N

Subject number	Children given up	Associated Board Grade	Associated Board Mark	Overall achievement score	Music school attendance
38	L	1	126	126	Y
39	G	1	113	113	YG
40	L	-	-	50	Y
41	L	2	101	202	Y
42	L	-	-	55	Y
43	L	1	120	120	Y
44	L	2	118	236	Y
45	L	2	116	232	Y
46	G	1	112	112	YG
47	L	2	125	250	Y
48	L	-	-	5	N
49	L	-	-	23	N
50	G	-	-	5	N
51	G	-	-	23	N
52	L	-	-	50	Y
53	G	-	-	7	N
54	L	-	-	30	N
55	L	-	-	7	N
56	G	-	-	55	N
57	L	-	-	17	N
58	G	-	-	58	N
59	L	-	-	55	N
60	L	-	-	7	N
61	G	-	-	126	N
62	L	1	123	123	N
63	G	-	-	30	N
64	L	-	-	30	N
65	G	-	-	17	N
66	L	1	115	115	N
67	G	-	-	30	N
68	L	-	-	23	N
69	L	1	115	115	Y
70	L	-	-	23	Y
71	L	-	-	23	Y
72	L	1	127	127	Y
73	L	-	-	23	N
74	L	1	126	126	N
75	G	1	120	120	YG

Subject number	Children given up	Associated Board Grade	Associated Board Mark	Overall achievement score	Music school attendance
76	L	2	110	220	Y
77	L	-	-	23	N
78	L	2	105	210	Y
79	L	3	112	336	N
80	G	-	-	90	YG
81	L	1	121	121	YG
82	L	1	114	114	YG
83	L	1	122	122	N
84	G	-	-	100	YG
85	L	-	-	100	YG
86	L	-	-	100	Y
87	L	2	110	220	N
88	L	1	117	117	YG
89	L	2	111	222	N
90	L	2	98	196	N
91	L	2	110	220	N
92	L	2	112	224	N
93	L	6	114	684	N
94	L	2	115	230	Y
95	L	2	134	268	N
96	L	2	110	220	Y
97	L	2	126	252	N
98	G	1	110	110	YG
99	L	-	-	100	N
100	L	5	108	540	YG
101	L	-	-	80	N
102	L	-	-	100	N
103	L	6	107	642	N
104	L	6	112	672	Y
105	L	5	111	555	N
106	L	6	116	696	Y
107	L	4	107	428	N
108	L	-	-	150	Y
109	L	2	110	220	N

Subject number	Vocabulary Score	Vocabulary Grade	Matrice Score	Matrice Grade	Teachers rating understanding
1	19	ii+	29	i	6
2	23	ii+	25	ii+	4
3	22	ii	17	iii-	4
4	25	ii+	31	i	7
5	28	i	26	ii	6
6	25	ii	28	ii+	6
7	25	ii	29	ii	5
8	27	ii+	31	ii+	6
9	40	i	36	i	7
10	32	ii	33	ii	7
11	37	ii+	36	i	6
12	28	i	29	i	7
13	19	i	16	iii	4
14	19	i	25	ii	4
15	25	ii+	31	i	4
16	32	i	28	i	4
17	28	i	30	i	4
18	21	ii	28	i	4
19	22	iii	24	iii	5
20	27	ii+	20	iv	3
21	26	ii+	27	ii	6
22	30	i	28	ii	4
23	29	i	35	i	5
24	24	iii	34	i	4
25	24	iv	28	iii	4
26	10	v	16	v	2
27	29	ii	32	ii	4
28	23	iii	33	i	5
29	32	i	36	i	5
30	22	iii	19	iii-	5
31	25	ii	35	i	6
32	25	ii	31	i	6
33	28	i	29	ii+	6
34	29	i	33	i	5
35	28	i	27	ii	7
36	27	ii+	23	iii+	2.5
37	25	ii	27	iii+	5

Subject number	Vocabulary Score	Vocabulary Grade	Matrice Score	Matrice Grade	Teachers rating understanding
38	33	i	29	ii	5.5
39	32	i	32	i	5
40	29	ii+	29	ii	6
41	26	ii	31	ii+	5
42	28	ii+	34	i	4
43	29	ii	29	iii	4.5
44	30	ii	33	ii+	6
45	31	ii	36	i	5
46	38	ii+	32	ii	6
47	35	ii+	33	ii	6.5
48	19	iv	19	iv-	2
49	20	iii	24	iii	4
50	21	iii	27	ii	3
51	33	i	27	iii	3.5
52	23	ii+	26	i	5
53	14	iv	14	iv-	3
54	19	iv	32	i	5
55	19	iii	18	iii	5
56	26	i	26	i	3
57	17	iii	23	ii	4
58	21	ii	28	i	2
59	30	i	27	ii+	6
60	14	iv-	18	iii	2
61	26	iii	30	iii	3
62	25	ii	32	i	5
63	18	iii+	23	ii	2
64	30	i	34	i	6
65	21	i	23	ii+	4
66	25	ii	31	i	6
67	29	ii	32	ii	6
68	15	iii	20	ii	7
69	18	ii	34	i	7
70	25	i	22	ii+	7
71	26	i	25	i	7
72	27	i	33	i	7
73	19	iii	27	i	6
74	25	ii	32	i	5
75	29	i	35	i	6
76	32	i	33	i	6

Subject number	Vocabulary score	Vocabulary Grade	Matrice Score	Matrice Grade	Teachers rating understanding
77	27	ii+	32	i	5
78	34	ii+	36	i	7
79	38	ii+	35	i	7
80	35	ii+	32	ii	7
81	32	ii	33	ii	7
82	27	iii	29	iii	7
83	27	iii+	40	iii+	5
84	31	iii+	34	iii-	4
85	27	iii-	45	iii+	4
86	45	i	52	ii+	7
87	48	i	50	ii+	7
88	38	ii	42	iii+	4
89	31	iii-	51	ii	3
90	39	ii	51	ii	5
91	48	i	51	ii	6
92	37	iii+	38	iii-	5
93	48	ii+	54	ii+	7
94	38	ii+	48	ii	6
95	39	ii+	53	i	7
96	36	ii+	49	ii+	6
97	37	ii	51	ii+	7
98	27	iii-	38	iii-	5
99	41	ii	43	iii-	6
100	60	i	56	i	7
101	15	v	38	iii+	3
102	17	v	36	iv	4
103	57	ii+	59	i	7
104	38	iii-	48	iii+	7
105	63	i	56	i	7
106	56	ii+	49	ii	7
107	40	iii	46	iii+	6
108	51	ii	52	ii	7
109	26	iv	38	iii-	3

Subject number	Intention to practise	Attitude	Parents attitude	Parents influence	School teachers attitude	School teachers influence	Friends attitude	Friends influence
1	-3	0	3	1	0	4	-2	4
2	-2	6	0	5	0	4	1	7
3	2	10	-2	7	-1	7	-1	7
4	2	7	2	6	0	5	1	7
5	2	5	3	7	2	4	1	6
6	3	2	3	7	0	1	-3	5
7	2	8	2	6	1	4	0	4
8	2	4	3	3	0	5	-1	4
9	3	12	3	7	3	7	3	7
10	3	9	3	6	2	6	2	6
11	-3	1	3	1	3	5	-3	1
12	2	9	3	5	0	1	1	5
13	3	5	3	7	3	7	3	7
14	2	12	2	7	3	7	0	7
15	1	2	3	5	1	7	2	7
16	-2	6	3	7	1	6	-3	6
17	2	9	3	7	3	6	2	6
18	2	2	3	7	-2	6	3	7
19	2	5	3	5	2	7	-3	1
20	2	4	3	6	2	6	2	6
21	2	1	3	7	-2	7	2	6
22	2	4	3	6	2	6	2	7
23	2	10	3	7	2	6	1	5
24	3	4	3	7	3	6	2	5
25	2	6	3	7	-2	6	2	7
26	3	12	3	7	3	1	3	2
27	2	10	2	7	2	7	2	6
28	2	7	3	6	0	5	0	4
29	2	3	3	5	0	4	0	4
30	1	-3	-3	7	0	4	2	4
31	-1	9	0	6	0	4	0	4
32	1	-2	2	6	0	4	1	4
33	2	11	2	7	0	6	0	7
34	2	11	3	7	3	7	2	7
35	-2	3	3	2	-3	1	-3	1
36	-3	8	2	7	-3	4	-3	1
37	2	8	2	5	0	4	0	4

Subject number	Intent- ion to practise	Attit- ude	Parents attit- ude	Parents influ- ence	School teachers attitude	School teachers influ- ence	Friends atti- tude	Friends influ- ence
38	2	8	3	7	-3	7	-3	1
39	2	8	2	5	0	4	0	4
40	-2	7	3	7	-3	4	-2	7
41	2	8	3	4	1	4	1	4
42	3	11	1	7	1	7	0	4
43	1	5	3	6	0	4	0	5
44	1	0	3	5	0	4	-1	3
45	2	8	3	3	0	4	0	6
46	-2	0	3	2	-3	4	-3	1
47	2	5	3	6	0	4	0	5
48	3	12	3	7	0	7	3	7
49	2	6	3	6	2	7	1	6
50	3	12	3	7	0	7	3	7
51	2	7	1	5	1	7	-3	6
52	-1	-1	2	6	-1	4	2	4
53	1	8	1	4	0	6	0	4
54	2	10	1	6	3	7	2	6
55	2	11	2	6	2	2	3	1
56	-3	-12	3	1	-3	1	-3	1
57	1	7	3	4	0	6	0	4
58	-1	6	2	6	0	4	0	6
59	-3	-1	-3	7	-3	2	-3	1
60	3	12	3	7	0	1	3	1
61	2	8	3	7	2	6	3	5
62	2	6	3	7	0	6	0	7
63	-3	6	3	7	0	6	2	7
64	2	6	3	7	3	6	0	4
65	3	10	3	7	0	6	0	7
66	-2	10	3	7	0	7	3	7
67	-2	3	3	6	1	1	0	4
68	3	8	3	6	3	6	-2	2
69	3	8	2	7	0	4	-2	1
70	3	9	3	7	3	7	-2	4
71	3	10	3	6	3	6	-2	5
72	1	4	3	7	2	6	1	5
73	3	9	3	6	3	7	2	5
74	0	5	1	3	-3	5	-3	7
75	-1	5	2	4	-2	6	-3	7

Subject number	Intent- ion to practise	Attit- ude	Parents attit- ude	Parents influ- ence	School teachers attitude	School teachers influ- ence	Friends atti- ude	Friends influ- ence
76	2	5	3	4	0	5	0	6
77	3	11	3	7	3	7	1	6
78	0	7	2	4	0	4	0	4
79	2	7	2	5	0	6	0	5
80	2	9	3	6	0	4	2	4
81	2	8	2	6	0	6	0	3
82	2	9	2	6	1	4	2	4
83	2	10	3	7	0	7	0	6
84	2	10	2	6	3	7	2	6
85	1	7	3	7	3	6	3	6
86	1	10	3	4	2	4	-3	4
87	1	7	2	6	1	6	-1	2
88	2	10	3	6	0	6	0	5
89	-1	5	3	5	1	4	0	5
90	1	2	1	4	0	3	-3	5
91	1	4	3	5	1	5	1	5
92	1	3	2	6	3	5	-2	3
93	1	10	3	1	3	6	0	1
94	1	4	2	6	1	7	0	4
95	2	3	3	5	3	6	0	5
96	2	8	3	5	2	6	1	5
97	2	9	3	5	3	6	0	4
98	-3	-5	3	6	2	2	-3	2
99	1	4	0	6	1	5	0	4
100	-2	4	2	4	0	3	-2	4
101	1	10	2	6	2	6	1	7
102	1	7	0	6	3	7	0	6
103	-1	7	0	7	0	6	0	5
104	-1	11	2	6	0	7	0	6
105	-3	3	3	7	0	7	-3	6
106	0	7	-1	5	-2	2	0	1
107	-2	6	0	5	3	6	-3	2
108	2	10	0	7	3	7	-3	7
109	1	-1	2	5	1	4	-3	1