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Developing Tests of Music Performance Improvisation

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<A> Abstract

This chapter surveys research on the development and validation of a measure to assess instrumentalists' ability to improvise music. It begins by framing efforts to distinguish between visual, aural and creative forms of music performance, and the types of assessment tasks required to evaluate music performance improvisation. The chapter surveys a range of related measures that have been used to assess improvisational abilities in young developing musicians and provides a detailed description of the author's own *Test of Ability to Improvise* (TAI) that he has used with beginning, intermediate and advanced level school instrumentalists. Included also are examples of the instrumentalists' improvisations and a discussion of the implications of the research findings for conceptions of musical development and practical applications within music education.

<A> Key words

Improvisation, music performance, creativity, assessment, musical development, music psychology, music education, musical syntax, musical originality, musical appeal, musical expression

<A> Introduction

This focus of this chapter is on research aimed at developing and validating measures to assess instrumentalists' abilities to improvise music. The evidence discussed comes from my own teaching and research involving beginning, intermediate and advanced level instrumentalists. Over a number of decades, my research interests have sought to clarify interrelationships among visual (i.e., perform rehearsed music, sightread), aural (i.e., perform music from memory, play by ear), and creative (i.e., improvise) forms of musical performance (see Figure 1).

- Place Figure 1 about here -

Given the dearth of information on creative forms of music performance, the explanation provides a personal perspective on assessing improvisational abilities of instrumentalists and vocalists who are learning in the types of instrumental programs we see in Western schools throughout the world. The basic technique could be applied to assessing improvisational abilities of students who are specialising in jazz and popular forms of music but it is important to note from the outset that most of my research has been applied to students who are learning in traditional formal programs that emphasize learning notation and classical styles of performance.

It is therefore important to begin with a caveat. In providing my comments, I am aware that every teaching situation is different so devising appropriate ways of assessing students' abilities to improvise needs to begin with a thorough understanding of the context and the educational needs of the students. Devising appropriate music learning tasks that challenge students and which they find interesting and motivating, is essential in situations where teachers are attempting to assess growth and achievement in this area. Consequently, the examples I advocate may be entirely inappropriate in other situations. It is my hope however, that some of the techniques and the theory underpinning my ideas may prove beneficial for extending research and improving teaching practice. Thus, to make best use of the techniques suggested in this chapter, music educators would need to find or construct examples such as those identified in this chapter, but keeping in mind the age, instrument, and abilities of their students. This point is especially important given that much of the literature to date has focused on everyday practice rather than being grounded in theoretical frameworks which attempt to define the creative process more holistically.

The chapter describes the types of task that have been commonly used in research measures to assess improvisational abilities. This includes information on the types of evaluative criteria that are appropriate for assessing improvisation in research studies and the types of criteria used by the author in studies that have investigated stylistically conceived and freely conceived improvisation tasks. Included also is information on the reliability and validity of the author's *Test of Ability to Improvise* (TAI) and examples of responses from studies with high school instrumentalists (see McPherson, 1993 for a copy of the complete measure). The final part of the chapter discusses implications of the research for conceptions of musical development and the types of practical applications that arise from work within this area of research.

<A> *Test of Ability to Improvise* (TAI)

In the process of designing appropriate tasks to assess young musicians' improvisational abilities, I consulted a number of prominent music educators, music education researchers, composers and jazz improvisers, as well as reviewed available literature. I also pilot tested a number of techniques that I thought might be relevant to assessing improvisation with school aged instrumentalists who were learning in formal school and community performance programs, where learning to perform by reading notation dominated instruction.

Seven types of tasks were explored. The first, *Improvisation of a Closing Phrase*, appears in various forms in classroom teaching, jazz instruction, and traditional forms of organ/keyboard instruction, and in some forms of external evaluation of performance ability, such as the *Associated Board of the Royal Schools of Music* which requires candidates to improvise an answering phrase to a given opening phrase. Supplying a closing phrase has also been used in measures involving musical

creativity (see Figure 2a, b). We can even see this in some of the earliest forms of creativity testing, such as Vaughan's (1971) *Musical Creativity Test*, designed for young musically untrained children, where students were asked to improvise an 'answering' rhythm and 'answering' closing phrase using tom tom and bells respectively.

- Place Figure 2a and 2b together here -

I decided to incorporate two short opening phrases in the TAI, which asked students to perform and continue a given phrase in a way that would provide a well balanced melody comprising two phrases (i.e., antecedent - consequent structure). The task therefore, was to improvise a closing phrase which stylistically complemented the opening phrase, and which sounded finished. In this sense the stylistic requirements are set by the opening phrase, which finishes on the dominant and imposes a tonic to dominant - dominant to tonic structure for the two phrase melody. To create a suitable response, the student would need to 'feel' the shape and flow of the opening phrase in order to generate an appropriate closing phrase. There are numerous ways in which this could be achieved. For example, unity can be achieved by adopting a similar rhythmic pattern for the closing phrase; an ascending opening phrase might be mirrored by a descending answer; or repetition of sections of the opening phrase may form the basis from which a closing phrase is generated.

The second type of task, *Improvisation on a Rhythmic Pattern*, has been used to develop improvisational ability (e.g., Baker, 1969; Berkowitz, 1975; Campbell, 1990, 1991; Chase, 1988; Dean, 1989; Dickinson, 1964a, 1964b; Frazee, 1987; Harvey, 1988; Hunt, 1968; Moore, 1990; Rowley, 1955; Schlieder, 1927; Simpson, 1963; Stubington, 1940; Texter, 1979; Thackray, 1978). As for the first task, the basis for a simple, well balanced melody is pre-determined by the rhythmic pattern which students use to construct their own melody (see Figure 3). Of interest in this activity is the ability of students to shape their response by manipulating pitch in such a way as to fulfil the stylistic requirements of the task that will provide a musically interesting improvisation in an assigned key which finishes on the tonic. Of most concern was the ability of the students to orient themselves to the key, and to provide an interesting solution.

- Place Figure 3 about here -

The third task, *Improvisation on a Motif*, was designed to examine how young instrumentalists could extend and elaborate from a short introductory figure as they generated a balanced melody of at least eight measures in length (see Figure 4a, 4b). Again, this form of exercise is common in the literature (e.g., Baker, 1969; Berkowitz, 1975; Chase, 1988; Coker, 1964; Dale, Jacob & Anson, 1940; Dean, 1989; *Department of Education & Science*, 1990; Dickinson, 1964a; Frackenpohl, 1985; Frazee, 1987; Froseth & Blaser, 1980; Hunt, 1968; Judy, 1990; Kratus, 1990; Nicholls & Tobins, 1937; Rowley, 1955; Sawyer, 1923; Schlieder, 1927; Stubington, 1940; Thackray, 1968, 1978; Wittlich & Martin, 1989; Wunsch, 1972). Once again,

we also see this type of task in early creativity measures such as Gorder's (1976, 1980) *Measures of Musical Divergent Production*. In the items chosen for use in the TAI, stylistic requirements of the melody are pre-determined by the shape and rhythmic feel of the opening motif which can be modified and adapted using a variety of musical techniques. For example, the motif could be repeated, inverted, transposed, varied by augmentation or diminution, or developed by fragmentation or elaboration. The taped instructions and sample performance which I devised for this task alerted the student to techniques (i.e., repetition, variation and development) commonly used by performers when improvising on a motif.

- Place Figure 4a and 4b together here -

The fourth type of improvised response, *Improvisation to an Accompaniment*, is the basis from which most jazz and popular music is improvised (e.g., Coker, 1964; Baker, 1969; Dean, 1989). In addition, traditional forms of improvisation (e.g., Berkowitz, 1975; Chase, 1988; Dickinson, 1964c; Stubington, 1940; Rosfeld, 1989; Rowley, 1955; Sawyer, 1923; Thackray, 1978) and classroom/instrumental music instruction abound with examples of this form of improvisation (see Figure 5). Likewise, early creativity measures such as Vaughan's (1971) measure adopted this technique by asking students to improvise a melody over an ostinato accompaniment. For the purpose of the TAI students were asked to complement the style of the accompanying passage in order to create their own improvisation. Students were therefore free to choose their own rhythm, but encouraged to restrict their playing to diatonic notes of the C major scale.

- Place Figure 5 about here -

The final part of the measure was devised to investigate student ability to improvise in a '*freely conceived*' style. The development of this section was influenced by previous work by Gorder (1976, 1980), Flohr (1979), Priest (1985, 1988, 1989), Swanwick and Tillman (1986), and Webster (1977, 1979). Discussions with expert musicians and music educators suggested the need for this type of exercise as the most challenging component of the measure.

The first four TAI sections were labelled 'stylistically conceived' because these tasks provided models in the form of set criteria which dominated the range of possible solutions available. For these tasks, the instrumentalists responded to externally generated restrictions.

In the final task the instrumentalist were challenged to provide their own 'freely conceived' response by formulating their own set of internally generated parameters. The directions included the following statement:

For this task you are asked to perform an extended improvisation in any style or mood that you choose. You are free to play anything you like so let your musical imagination roam free. Your improvisation doesn't have to be in any

particular key or conform to any set criteria. Just play your most interesting musical ideas.

Before you begin take time to think of interesting ideas that you could use as the basis of your improvisation.

Remember, you are completely free to do whatever you like – you may play for as long as you want!

The directions cited above allowed scope for the component of creative thinking together with the opportunity to examine more closely facets of ability to improvise in a 'freely conceived' format. Incorporating this final item also allowed differences between 'stylistically conceived' and 'freely conceived' styles of improvising to be explored and investigated.

 Administering The TAI

The *TAI*, as used in my research studies, includes carefully constructed musical examples and vocal directions to enable the test to be efficiently administered within a standardized format. Before commencing the tape, which included voice directions and taped performances on clarinet (or trumpet), students read an introductory statement aimed at familiarizing them with what was to follow. Instrumentalists are also asked if they understood the directions or if they had any questions before commencing each task. Practice activities for the first three items were in the form of musical examples and a discussion of what is required for each of the test items. These introductory examples and taped directions aimed to familiarize each player with the form of each task. In the first two items, involving question-answer phrases, students were given an opportunity to perform improvisations according to well defined guidelines. The tasks were sequenced to allow for longer and more involved improvisations as the performer moves to each successive item (McPherson, 1993).

In my research, I typically asked students to perform a second improvisation for all but the final more extensive 'freely conceived' task. However, this is not necessarily needed when working with students in an educational setting.

 Scoring The TAI

The scoring procedure I developed for the *TAI* was based on a literature review, and discussions with academics, music educators and expert improvisers. At the time, no measures were available which specifically examined high school instrumentalists' ability to improvise in a 'stylistically conceived', traditional setting, so a new method of scoring had to be devised, one which incorporated aspects of measurement of creativity in music as well as the skills thought essential by authors and experts in the area of improvisation.

My first task was to adequately differentiate improvisational ability with that of creative thinking in music, and to ensure that the criteria used for assessing improvisation were consistent with how practitioners and researchers viewed this

form of performance. Here, my thinking was influenced by Gordon (1989), who believes that:

it is easier to create than to improvise, creativity is a readiness for improvisation. Creativity is easier than improvisation, because there are more restrictions on a performer when he improvises than when he creates. For example, when a performer knows that he is to perform two tonal patterns in major tonality without any restrictions, he can be creative. When a performer knows that he is to perform two tonal patterns in major tonality and also that the first pattern is to be a tonic function and the second a dominant function, then he must improvise. Other restrictions may be in keyality, form, and style. When a student is creating he imposes restrictions upon himself. When he improvises, he is student to externally imposed restrictions (pp. 71-72).

This view is consistent with methods researchers have adopted when assessing creativity and improvisation in music. It also contrasts measures of creative thinking, in which young untrained children are encourage to respond to open-ended tasks, with more 'stylistically conceived' measures of improvisational performance. For example, the original form of Webster's (1989) *Measures of Creative Thinking in Music*, devised for young untrained children, involved evaluations using both objective and studentive techniques. Scoring was according to four factors:

1. *Musical Extensiveness*: the amount of clock time involved in the creative tasks.
2. *Musical Flexibility*: the extent to which the musical parameters of 'high'/'low' (pitch); 'fast'/'slow' (tempo) and 'loud'/'soft' (dynamics) are manipulated.
3. *Musical Originality*: the extent to which the response is unusual or unique in musical terms and in the manner of performance.
4. *Musical Syntax*: the extent to which the response is inherently logical and makes 'musical sense' (p. 3).

Vaughan's (1971) *Musical Creativity Test* involves six activities, with each task being evaluated for fluency, rhythmic security, and ideation. Vaughan defines ideation as "the quality of variety and suitability within the given framework" (p. 65); for example, the manner in which a child improvises over an accompanying ostinato.

Gorder's (1976, 1980) *Measures of Musical Divergent Production* involves four short musical passages which are scored using a procedure influenced by Guilford and Hoepfner (1971). These are:

1. *Musical Fluency*: the number of phrases produced.
2. *Musical Flexibility*: the number of phrases that used different kinds of musical content.
3. *Musical Elaboration*: the extent of content character over that necessary to produce a varied phrase.
4. *Musical Originality*: the rarity of usage of specific types of content.
5. *Musical Appeal*: the overall quality of the improvisation (global indication) (Gorder, 1980, p. 36).

In this scoring technique Gorder (1976, 1980) deviates from the four basic divergent production abilities as explained by Guilford and Hoepfner (1971) by including a fifth factor (i.e., *Musical Appeal*), which he believes adds "a global musical ability that was in contrast to the specific divergent production abilities, and that enabled further profiling capability" (Gorder, 1980, p. 35).

An important contribution to the measurement of improvisational ability was documented by Webster (1979). His improvisation measure, administered to high school students involved in school music groups, involves four tasks. Activity one is a warm-up, while activity two involves free responses to a rhythmic and then melodic stimulus. Activity three asked students to perform *Twinkle, Twinkle, Little Star* and to then perform three variations on this melody. Activity four required students to improvise on an original melody, to create a transition from this improvisation to *Twinkle, Twinkle, Little Star*, and to conclude by again returning to an improvisation on the original melody. Like Gorder, (1977, 1980), Vaughan (1971) and Webster (1983a, 1983b), evaluative criteria were influenced by the theoretical literature of Guilford (1967) and Torrance (1966). In Webster's (1979) study improvisation was scored for fluency, flexibility, elaboration, and originality. However, each activity was scored for combinations of these factors, with no single task being designed to measure any one isolated factor (p. 232).

At the time I first started to devise assessment procedures for use in evaluating improvisational ability, a number of studies on jazz improvisation were also reviewed and considered (e.g., Aitken, 1975; Briscuso, 1972; Burnsed, 1978; Damron, 1973; Partchey, 1973; McDaniel, 1974; Pfenninger, 1990; Schilling, 1989). However, none of these techniques were considered relevant because of the distinctly different ways in which improvisations were performed, the low reliability estimates of some of the measures, the lack of information for some measures concerning the construction of the assessment criteria, or the tedious nature in which improvisational ability was assessed.

 Establishing The Assessment Criteria

Figure 6 shows the flow chart which acted as the basis from which directions were formulated to evaluate each of the six 'stylistically conceived' items on the *TAI*.

- Place Figure 6 here -

Instrumental Fluency: Ability to execute musical ideas clearly and accurately. This includes the ability of the improviser to respond freely to musical ideas and to perform with technical skill and musical expression and would be demonstrated by the extent to which the improviser can perform in a spontaneous manner, moving easily from one musical idea to another.

Musical Syntax: (Consistency of Style): Ability to organise musical material by adapting to the prevailing style and complementing set criteria. The task of the

improviser is to provide a response that is inherently logical and which makes musical sense. Musical syntax is demonstrated in the degree to which the improvisation demonstrates rhythmic feel, melodic sense, tonal organisation, and shape (i.e., phrasing and form).

Creativity: Ability to think divergently, as demonstrated in an original and imaginative product. This is evaluated through an analysis of:

1. *Musical Flexibility*: the extent to which the improviser can manipulate musical elements (e.g., pitch, rhythm, articulation) through an elaboration of the musical stimulus (i.e., phrase, rhythm, motif, accompaniment).
2. *Musical Originality*: the extent to which the improviser can provide a musically unique or unusual response.

A unique or unusual response might result from the manipulation and/or elaboration of pitch (e.g., use of sequence, diminution, inversion) or rhythm (e.g., augmentation, diminution, dotted versus nondotted, metric versus syncopated), or other musical elements (e.g., timbre, articulation, dynamics).

Musical Quality: (Overall Musical Appeal): Ability to perform fluently creatively conceived material to complement existing musical criteria or constraints. This is a global rating indicating your assessment of the overall musical appeal of the improvisation. It should indicate the extent to which a committed performance, played expressively and in a musically meaningful and creative manner, was achieved.

Figure 7 shows the flow chart which acted as the basis from which directions were formulated to evaluate the final '*freely conceived*' item on the *TAI*.

- Insert Figure 7 here -

For this item the directions for the *Instrumental Fluency* dimension were identical to that used for the 'stylistically conceived' items. The dimensions of *Musical Syntax*, *Creativity*, and *Musical Quality* differed to those of the 'stylistically conceived' items and were assessed as follows.

Musical Syntax: Ability to organise musical material in a 'freely conceived' idiom. The task of the improviser is to provide a response that is inherently logical and which makes musical sense. Musical syntax is demonstrated in the degree to which the improvisation demonstrates rhythmic feel, melodic sense, tonal organisation, and shape (i.e., phrasing and form).

Creativity: Ability to think divergently, as demonstrated in an original and imaginative product. This is evaluated through an analysis of:

1. *Musical Flexibility*: the extent to which the improviser can generate differing musical ideas, and manipulate/elaborate these ideas during the course of the improvisation.

2. *Musical Originality*: the extent to which the improviser can provide a musically unique or unusual response.

A unique or unusual response may result from the manipulation and/or elaboration of pitch (e.g., use of sequence, diminution, inversion) or rhythm (e.g., diminution, augmentation, dotted versus nondotted, metric versus syncopated), or other musical elements (e.g., timbre, articulation, dynamics).

Musical Quality: (Overall Musical Appeal): Ability to perform fluently creatively conceived material in a 'freely conceived' idiom. This is a global rating indicating the assessment of the overall musical appeal of the improvisation. It should indicate the extent to which a committed performance, played expressively and in a musically meaningful and creative manner, was achieved.

Final Scoring Method

In my original research studied, I adopted a five point rating scale to assess each of the essential criteria on all seven items of the *TAI*, but for teaching contexts and added discrimination I would now recommend that this be expanded to a seven point scale or even a percentage as follows:

	Hesitant & Laboured					Spontaneous & Confident	
Instrumental Fluency	1	2	3	4	5	6	7
	Illogical					Logical	
Musical Syntax	1	2	3	4	5	6	7
	No Uniqueness					Marked	
Uniqueness							
Creativity	1	2	3	4	5	6	7
	Unappealing					Appealing	
Musical Quality	1	2	3	4	5	6	7

 Reliability and Validity

During the period of analysis evidence of convergent and discriminant validity for each of the three new measures was sought using the *Multitrait-Multimethod (MTMM)* approach formalised by Campbell and Fiske (1959). This method aimed to determine the extent to which the attributes measured by the three judges predicted the specific trait in question (i.e., each individual item on the test). A separate matrix was computed for each of the measures according to scores for each of the three independent judges on each of the test items. Results for each of the measures show a consistent pattern which satisfy the four criteria established by Campbell and Fiske (McPherson, 1993, 1995, 2005).

In addition, since few measures have been developed to assess improvisational ability, particularly with high school age instrumentalists, it was considered

necessary to establish the validity of the four evaluative criteria (i.e., *Instrumental Fluency*, *Musical Syntax*, *Creativity* and *Musical Quality*) used in the *TAI*. Using the *MTMM*, indications of convergent validity were obtained to gauge the level of agreement between each of the four separate criteria used to evaluate the seven items on the *TAI*, and the three separate evaluations by the judges for each of these criteria. Discriminant validity estimates were obtained to assess the level of correlation between each of the four criteria with the other three. Results showed a consistent pattern of correlations when analysed according to each of the seven test items. As would be expected, the global evaluative dimension of *Musical Quality* tended to be more highly correlated with the other three evaluative criteria than correlation patterns between the other three dimensions (see further, McPherson, 1993, 1995).

The inter-judge correlations for the three judges who scored the *TAI* range from .71 to .94 for the four separate item assessments, and from .89 to .97 for the composite marks for each individual task on the measure. The Cronbach alpha indication of internal consistency was .90 (.90 standardised item alpha).

 Original Study Sample

In the original study (McPherson, 1993), average scores for the *TAI* when used with students who had between 2 and 6 years of instrumental learning, revealed a good spread of marks from about 5% to 95% on the total measure. The sample were split into two groups. Group 1 included clarinet and trumpet students who had been learning between 2 and 4 years who were undertaking Australian Music Examination Board (AMEB) externally assessed examinations at Grade 3 and 4 level of the AMEB syllabus. They were in school years 7 to 9. Group 2 included clarinet and trumpet students who had been learning between 4 and 6 years who were undertaking AMEB examinations at Grade 5 and 6 of the same syllabus. These students were in school years 10-12. As would be expected the more experienced musicians in AMEB grades 5 and 6 performed much better than their younger less experienced counterparts. Inter-item correlation coefficients for the *TAI* were all significant ($p < .01$) and ranged between .46 and .68.

<A> Test of Ability to Improvise

 Repeated Attempts on the *TAI*

During the administration of the *TAI* students were given an opportunity to perform a second improvisation for each of the six 'stylistically conceived' items on the test. A second attempt was not allocated for the *Freely Conceived* item, as this would have been too time consuming considering the time limitations of the sessions and the concentration span of the students.

To assess whether these second attempts were significantly better than the first attempt, the second responses for 46 students participating in the study were combined with the first 101 performances of the combined population. During the analysis period judges assessed a total of 147 improvisations for each of the six 'stylistically conceived' *TAI* items, without any knowledge of the student, or whether it was their first or second attempt.

Analysis using the Scheffé multiple comparisons procedure reveal no statistically significant difference between the first and second responses for each of the six 'stylistically conceived' improvisational tasks. The means for the first and second attempts of each item were very similar. However, the item which shows the greatest improvement for the second attempt was the *Rhythm* item. In this item students were shown a rhythmic pattern and asked to improvise a melody to complement the notation (see McPherson, 1993, 1995).

<A> Analysis of Transcriptions of Student Responses

 Closing Phrase 1 and 2

The improvisations required for the two *Closing Phrase* items were the shortest tasks on the TAI. In these items students were asked to improvise a short closing phrase which complemented the given opening phrase. Because this task requires only a four measure response, the resulting improvisations were somewhat pattern bound. The performer is restricted to a four measure closing phrase in F major which ends on F. This stimulus therefore allows little scope for an improvisation to deviate far from the norm.

At the time of constructing the TAI it was considered important to include these items, so that a full range of improvisation, from the simplest and most restricted, to those which were more challenging and freely conceived, could be analysed. It was hoped that restricting the possibilities for response on the first two items of the test might allow the researcher to analyse essential performance characteristics which may be more difficult to observe in longer, more complex improvisations. In addition, the short period of 15 to 20 second allocated for each student to contemplate the requirements before commencing offered an opportunity to investigate how gifted students prepared their response and thereby were able to plan their improvisation. From the outset it was assumed that a good improviser could provide an interesting and creative response no matter what the restrictions.

The most important question to be considered in the analysis of the closing phrase responses concerned the ability of students to provide a response that complemented the opening figure. The best responses came from students who had mentally prepared at least part of their response before commencing to play. Although it could be argued that this is more 'composition' than 'improvisation'. However, as experienced improvisers understand, improvisation often involves some form of planning prior to the performance because the process of improvising includes the ability to translate a preconceived idea into the movements necessary to perform correctly this intention on a musical instrument. A study by Hargreaves, Cork and Setton (1990) confirms these observation by highlighting the different strategy use of novice and expert jazz pianists. A distinguishing characteristic of expert improvisers in this study was their ability to start their performance with an overall strategy or plan.

The range of improvised closing phrases for the first two items on the TAI was extensive. They ranged from incomplete, hesitant statements of a couple of notes, to well-shaped, innovative phrases which adequately complemented the opening phrases. The lowest scoring improvisers were characterised by a lack of ability to adhere to a four measure statement, poor control of rhythm and pitch, and a dearth of ideas. Close observation of the players during the sessions followed by careful listening to the taped performances indicated a serious lack of ability by these students to coordinate ear and hand. It seemed that many of these improvisations were 'accidental'. These students seemed unable to prepare an improvisation in any 'holistic' sense, and to thereby show evidence of an ability to 'think in sound'. It was as if these performers had prepared the opening note or group of notes, but were unable to maintain the flow of ideas throughout the four measures, and played what instinctively had been ingrained, rather than what was being mentally conceived. Because the lowest scoring improvisations show a distinct lack of ability by the performer to audiate sounds as they are being played they fit into the category described by Kratus (1990) as 'exploration'. These improvisers worked at a conscious level, not yet having assimilated the technical, aural, kinaesthetic and theoretical aspects of their playing.

The majority of improvised responses showed evidence of the players intentions, however unsuccessful. It was clear that most of the players could provide a four measure closing phrase, perform in correct tempo and key, and pick up the essential characteristics of the opening phrase by providing a well shaped response incorporating a similar rhythm and/or pitch pattern to the opening. Many of the better improvisers performed confidently and spontaneously, were capable of using the exact rhythm of the opening phrase, or subtle variations of it, displayed a good sense of direction and overall phrase shape, used appropriate articulations, maintained the flow of their ideas, easily conformed to the prescribed criteria and provided a musically satisfying response.

The highest scoring responses displayed one further characteristic. These improvisations not only displayed technical control and theoretical understanding of the requirements, but a clear element of originality as evidenced in their ability to stretch out and take risks. It was as if these improviser had assimilated the technical, theoretical, aural and kinaesthetic aspects of their playing into one, and were thereby able to reach out beyond the norm to provide something unique or novel. Examples of 'stretching out' can be seen in the wider choice of starting notes (one student started on top A of the trumpet), the more sophisticated sense of shaping (i.e., use of sequences, inversion of opening figures, rhythmic disruption through use of dotted rhythm and eighth notes, and wider range), greater use of expression and tone colour, and an intuitive feel for the harmonic implications of the closing phrase. These techniques helped make the improvisation more interesting for the listener.

 Rhythm

The *Rhythm* item allowed the study of a different dimension of an ability to improvise. Unlike the other items, where the improviser translates an aural

conception into the physical movements necessary to perform this conception on a musical instrument, this item requires the performer to process music visually at the same time as improvising a response based on this rhythmic pattern. Essentially, the task required in the *Rhythm* item of the *TAI* was to translate the rhythmic pattern, comprising familiar rhythmic patterns in $\frac{4}{4}$ time into an interesting six measure melodic response. For this to be possible, the performer must first be able to read and aurally comprehend the rhythmic pattern. The improviser must also be able to integrate this aural image with appropriate pitches to construct an interesting solution.

The highest scoring improvisers were able to continue their response and perform the rhythm pattern correctly. These improvisers were clearly able to bring meaning to the notation and to conceive of the pattern holistically (rather than in individual notes or small patterns). They were more likely to start on a note other than F, use more leaps in their melody, provide a strong sense of key by outlining the tonic triad in the first measure, and provide a strong feeling of finality (e.g., by approaching the tonic from above and below). The ability of these improvisers to audiate the rhythmic pattern enhanced their skill to organise the music into logically conceived patterns. Because these improvisers could comprehend the rhythm on which to improvise they could work with a more definite aural orientation. Because of these features high scoring improvisers demonstrated the most sophisticated working styles. In summary, they seemed more capable of working at a more global level, of working in larger rhythmic units, and of maintaining the flow of their ideas throughout their improvisation.

The highest scoring improvisers were plainly not as efficient processors of the rhythm as their older more experienced colleagues. They were more likely to make errors in pitch (e.g., B natural instead of B flat), and to provide a less key oriented response. This was evident in the stepwise motion of the opening measures and the weaker sense of finality (as evident in those responses which approached the tonic by stepwise movement, repetition, or inappropriate leap).

Analysis of the tapes and transcriptions also showed that many of the performers were not able to improvise an interesting melody using the assigned rhythmic pattern. It was as if the visual orientation involved when processing the notation made it difficult for the improviser to think aurally. Many of the improvisations used stepwise movement and repeated pitches, and many were poorly shaped. This gave the impression that many students improvised by focusing their attention on the individual notes within the notation. These improvisers lacked an ability to comprehend the pattern as a whole, or to anticipate the flow of the rhythm as they performed their response.

In many cases the process of translating the visual notation into an aural image clearly impeded fluency and spontaneity. Low scoring improvisations were characterised by a dearth of ideas which were often unconnected. It was as if these students were trying to force the rhythmic pattern to fit their own conception rather

than complement the existing framework. Above all, the improvisers worked at a conscious level and the resultant products largely centred around the physical and theoretical aspects of playing (e.g., scalewise movement, repetition). There was little evidence that they were able to respond to the demands of divergent thinking to explore the range of possibilities which existed for providing an interesting solution, or worked far enough ahead to ensure fluency and an interesting response. Ability to think divergently was therefore stifled as these students tried to adjust to the requirements. Many of these students performed B naturals and other incorrect notes in F major. They were also more likely to hesitate, stop, or restart their performance.

The lowest scoring responses were incapable of performing the rhythm fluently and used repetition or stepwise movement throughout. In addition, they made numerous pitch errors. Also evident was a weak sense of key and a poor sense of the harmonic implications of their response. For these improvisers, processing the visual information and then coordinating the aural conception with the physical movement necessary to perform the improvisation on an instrument was a major problem. This was the least efficient working style.

The findings cited above parallel observations by jazz educators (e.g., Baker, 1979) who suggest that improvisation by sight stifles creativity and instrumental fluency. Improvisers who rely on 'reading' the chord progression as they improvise are often hampered in their ability to feel the flow of the accompaniment. They are also more likely to think and work in small units rather than 'holistically'. This type of improvisation can lead to a disjointed approach without a clear sense of organisation. It can also lead to a rigid focus on only one element (i.e., pitch or rhythm) without an ability to remain open to other ideas or to work with other players. Improvisers who have not memorised the chord progression and therefore need to read the changes by sight are often more restricted in what they play compared to those of similar ability who have memorised the changes and improvise without the music (Baker, 1979). In this sense, improvisation by sight as opposed to improvisation by ear can have a stifling influence on the ability of the performer to create an effective and well-shaped improvisation. Clearly evident in the performances on this task was the impression that spontaneity and creativity was impeded for each performer who was unable to fully audiate the rhythmic pattern.

 Motif 1 and 2

For both *Motif 1* and *Motif 2* students were asked to use the prescribed opening melodic figures as the basis of an improvised performance of at least eight measures in length.

As for the preceding items there was a wide range of responses, showing a diversity of skill and ability levels. The lowest scoring responses were typically short statements of less than eight measures. These improvisations tended to use a restricted range with mostly stepwise movement and occasional leaps of thirds and fourths. Clearly, these improvisers were unable to manipulate, elaborate or extend the given opening figure. Consequently, the improvisations also displayed a poor sense

of phrase balance, and were performed in a hesitant manner leaving the impression that the player was unable to maintain a flow of ideas. These improvisations also tended to be unimaginative, random like melodies which lacked musical logic and which were stylistically inconsistent with the requirements expected. The improvisers were also unable to construct a string of ongoing two or four measure phrases, and to improvise a suitable second phrase, preferring instead to repeat ideas expressed in the first phrase. When break-downs occurred, they typically gravitated back to the opening figure, with meaningless repetition, not knowing how to move beyond their opening ideas. Consequently, for these students, an ability to think divergently and creatively was lacking; they seemed oblivious to the possibilities that existed for providing an interesting solution. These features can be seen in the responses for *Motif 2*, shown in Figures 8 and 9.

- Insert Figures 8 and 9 here -

In contrast, high scoring students were able to provide an intelligent and musical response. An essential difference between students, as determined length of time spent learning their instruments was that the older more experienced musicians typically provided a longer and more interesting solution.

Figures 10, 11, and 12 are examples of some of the responses. High scoring students easily maintained a steady pulse, seemed to have an intuitive feel for four, two measure phrases, and an eight measure response, were capable of using the exact rhythm of the opening phrase or employing subtle variations of it, used range to enhance the shape of their response, moved easily within the key displaying a strong kinaesthetic feel for G major, provided a strong sense of cadence, finished on the tonic, mirrored patterns of the opening phrase or constructed logical sequences, used inversion and repetition, constructed logical balanced phrases using antecedent - consequent phrase relationships to enhance structure, varied, manipulated and elaborated the opening motif, maintained the flow of ideas, sustained the response throughout the entire improvisation, and dealt with melody, phrase and rhythm in a spontaneous and confident manner. It was obvious that these elements had been assimilated technically, aurally and kinaesthetically. Examples of these improvisations are given in Figures 10, 11 and 12 below.

- Insert Figures 10, 11 and 12 here -

Interestingly, analysis of transcriptions shows that the majority of performances for both items in this section were exactly eight measures in length. Discussions with students after their performance revealed that many were not consciously trying to perform an eight measure response. Most were unaware of the length of their improvisation, frequently expressing surprise that their performance had been exactly eight measures. For these students an eight measure response resulted from the four two measure phrases they had used to structure their improvisation. This aspect had been felt intuitively and was not consciously pre-planned.

 Accompaniment

An accompaniment figure was performed using an electronic keyboard and copied onto a recording device that could be used with the students (see Figure 5). Students were asked to improvise an interesting melody using only notes of the C major scale which captures the style of this accompaniment (i.e., based on chords I - ii - V).

Many of the poorest responses on this item showed a surprising lack of ability by the musicians to coordinate their playing with the accompaniment. These students tended to force their ideas to fit the existing framework with the result that their improvisation seemed totally at odds with the chordal progression with which they were performing. Low scoring responses also displayed a limited repertoire of rhythmic devices, often repeating the first idea over and over again. They tended to use mostly stepwise movement, with occasional leaps of thirds and fourths. These responses also lacked a sense of key, despite being in the key of C major and were typically rambling, disjointed melodies often without a logical formation. The majority of these improvisers were unable to use sequences, rhythmic changes, or other devices to shape and enhance their response. Often they were unable to improvise a suitable second phrase, preferring instead to repeat ideas expressed in their first phrase, restricted their performance to the middle register, and performing unimaginative improvisations with little insight about what the accompaniment was 'saying'. These students displayed a lack of coordination between ear and hand, as if their improvisation was 'accidental' rather than intuitive. Typical examples of these responses are shown in Figure 13 and 14 below.

Insert Figures 13 and 14 here -

The finest improvisations from both groups, showed mature playing from innovative, skilled musicians. Many of these responses were musically very satisfying, and displayed a strong sense of personal involvement in the performance. There was also evidence of a strong kinaesthetic feel for the instrument, and an ability to make sense of the ideas and requirements. These students were also capable of sustaining their response throughout the entire phrase and of providing an improvisation with delicate expression (see Figure 15, 16, and 17 below).

Insert Figures 15, 16 and 17 here -

 Freely Conceived

Unlike the first six 'stylistically conceived' items, the final task on the TAI asked students to perform an extended improvisation in any style or mood which they chose. Of interest in this item was the ability of students to define their own style and to construct an improvisation which was both tastefully and logically conceived.

Analysis of transcriptions and master tapes shows that many of the characteristics identified for the preceding items were also pertinent for this item. However, since

this item allowed more freedom for response, and typically involved a much longer improvised performance, there are a number of additional comments which can be made.

The poorest responses display an almost total lack of ability by the performer to start with an appropriately conceived opening motif which could be used as the basis for an interesting improvised performance. Figure 18 shows the transcription of one performer, who, devoid of ideas, was unable to elaborate or extend his opening figure and to use it as the basis for his improvisation. For this performer, a lack of coordination between ear and hand was evident in his playing. It was as though this player's improvisation centred around the technical and physical aspects of producing a response which was a secure part of his repertoire. Because of the stepwise movement and lack of elaboration and manipulation of musical parameters there is a feeling that the student's fingers were 'walking' between notes without a clear impression that he had really planned what to do. Above all, this improvisation lacks a suitable preconceived idea which could provide the basis or 'spark' to ignite the imagination and provide coherence to the rest of the improvisation.

- Insert Figure 18 here -

At a slightly higher level of performance were improvisers who were more capable of moving beyond their opening phrase, and who displayed some sense of phrasing and shape. Figure 19 is an example of this type of response. Unfortunately, however, these students were limited in their ability to sustain their response throughout the entire improvisation and to extend or elaborate their ideas. Improvisation for these students was limited to a short, predictable response with few distinguishing characteristics or sparks of imagination or inventiveness.

- Insert Figure 19 here -

Low scoring improvisers who provided a longer response than the ones shown above were typically unable to respond with a clearly defined and shaped performance. These improvisations were often disjointed and fragmented, and lacked a coherent conception. Low scoring students displayed a limited repertoire of rhythmic devices, tending to repeat the same rhythm over and over again. They were also more prone to use a restricted range, and where leaps occurred, they were often illogical and typically at points where the response broke down or where the student hesitated. In addition, these improvisers often performed rambling and disjointed pieces and tended to limit their response to a repetition of their first basic idea. They were also unable to control their performance as seen in the number of notes performed outside the key or tonal centre in which they were improvising.

In contrast to the limited improvisational ability of some of the students, many of the improvisations were musically satisfying and noteworthy. Economy of means was a characteristic of the better improvisations, especially for less experienced players. Many performers did not employ an extensive range of rhythmic devices but

nevertheless performed an effective and original improvisation. Of prime importance to an effective performance was the ability of the improviser to sustain the flow of ideas, to connect ideas, and to end their performance effectively and musically.

A distinguishing characteristic of the best improvisations was the quality of the first basic idea chosen for performance. It was often the case that the better the quality of the opening statement the better the overall performance. Some students opened with an idea which was more technically than musically conceived. These improvisers chose a scale-like run, a tongued (or slurred) passage in thirds, or some other figure which had limited use as an opening motif for an extended improvisation. The best improvisers were those students who chose an interesting opening figure which allowed development and extension, and which acted as a 'spark' to ignite their musical imagination.

Another characteristic of the better improvisations was the degree to which the performer displayed an intuitive feel for improvising in a freely conceived idiom. This could be seen in a number of ways. First, there was the degree to which the performer had control of the instrument, and the quality of the ear-to-hand coordination. This was indicated in how well the player could finger the notes which they were thinking, without making errors in accidentals or hesitating during their performance. It was also evident in the way in which an improviser restricted their options. The best improvisers were those students who manipulated, elaborated and extended a few basic ideas, without 'overplaying' or trying to do too much during their improvisation. These improvisers performed coherent improvisations which displayed an intelligent sense of shape.

Overall, these performances were rarely rushed. The performance moved naturally and effectively from one idea to another only when the music demanded a change of direction. The best performers were also the musicians who made themselves aware of the possibilities before commencing their performance. These characteristics have been cited in other discussions (e.g., Hargreaves, Cork & Setton, 1990; Pressing, 1988) as essential for a well conceived and presented improvisation. Pressing argues that competent improvisation is a decision-making process in which an improviser begins with a musical idea which is then extended or elaborated using features inherent in the opening conception. This was clearly evident in one of the better improvisations (see Figure 37) where a female trumpeter extends and elaborates her opening motif in G minor and uses this to provide coherence and to shape her whole improvisation.

In general, the shorter improvisations displayed a clearer sense of shape than did the longer responses. Many of the longer responses for Group 1 students were described by one evaluator as 'rambling soundscapes'. Shorter responses from both groups were more likely to exhibit a clearer sense of form and overall shape.

When the three evaluators met approximately eight months after the initial evaluative period to discuss the performances on tape, they showed an uncanny ability to tell

whether the improvisation they were listening to was performed by a male or female student. This was especially true of the most experienced musicians. Although no significant difference was found for gender in terms of the scores given for each section of the test, there were qualitative difference in the responses which were evident in many, but not all, of the improvised performances for the ‘freely conceived’ section of the *TAI*, especially for students in Group 2. Female students tended to play moody, atmospheric improvisations which were often slower and had more space and rests. Some were free in style, displaying a sophisticated sense of phrasing and time. Consequently, they were less ‘busy’ with their choice of notes, and the ways in which they expressed their ideas. For Group 2, 22 of the sample of 25 female students were electing school classroom music (in comparison to 14 of the 23 male students). The ‘freely conceived’ improvisations of female students in Group 2 typically demonstrate the influence of prior exposure and experience of composing in elective music classes.

Male students of Group 2, on the other hand, tended to provide more outgoing, faster and busier improvisations than females. Many of these performances used a jazz or pop idiom and were more like the improvisations one would expect in a stage ensemble performance of a jazz or rock arrangement. However, these characteristics did not result from an increased exposure by males to jazz/pop ensembles. On the contrary, for the sample chosen for this study there were identical numbers of Group 2 males and females (i.e., eight) who were performing with jazz ensembles on a regular basis.

Figure 20 and 21 show two examples of high scoring responses in this section of the battery. The first is by a female and the second by a male.

- Insert Figure 20 and 21 here -

There were other aspects between groups which were also worthy of mention. First, an analysis of starting notes in the *Freely Conceived* item reveals only a slight difference in the choice of starting notes according to musical experience with more than 50% of the students starting their improvisation on C. Analysis of the tonal centre used for the improvisations was also unremarkable. Almost three quarters of the improvisations used a tonal centre of C, with far few adopting G and E and a very small percentate (around 3%) displaying a total lack of tonal centre.

Although not as obvious, there were subtle differences between instruments in the extent of idiomatic devices used by the soloist. Clarinetists were more likely to use a wider range, employ wide leaps and use other idiomatic devices typical of performance on this instrument. Likewise, trumpeters compensated for the difficulty in playing in the upper register by using idiomatic devices such as glissandi, trills, flutter-tonguing, and double and triple tonguing.

Finally, although some of the finest performances by less experienced musicians were similar in standard to the better responses of the more advanced musicians,

there was one further dimension which was mentioned by all evaluators. More experienced students were more likely to ‘stretch out’ during their performance, to take chances and to attempt things which may not have been possible by their less experienced counterparts. The best performances were more ‘catchy’ and memorable and consequently, there was a feeling that the older, more mature students had a richer vein of prior experiences from which to tap during their performance. It was only the highest scoring students who were able to reach out beyond the notes, and to perform with expression and the highest technical control. It was as if these performers had fully assimilated the technical, aesthetic, theoretical and kinaesthetic dimensions of their playing into one.

<A> Conclusions

The main points discussed in this chapter can be summarised as follows:

1. Second performances on the six ‘stylistically conceived’ items of the TAI were not statistically significantly better than first attempts.
2. For the shorter improvised tasks (i.e., *Closing Phrase 1* & *Closing Phrase 2*) the best responses came from students who had mentally prepared their response before commencing to improvise. In this way, the better improvisers were characterised by their ability to commence a performance with an overall strategy or plan.
3. The worst improvisers worked at a conscious level, not yet having assimilated the technical, aural, kinaesthetic and theoretical aspects of their playing.
4. Better improvisers performed with technical control and theoretical understanding of the requirements of the task. However, a distinguishing characteristic of the very finest improvisers was their ability to reach out beyond the norm to provide a response which was unique or novel. Examples of ‘stretching out’ can be seen in the wider choice of starting notes, the more sophisticated sense of shaping, greater use of expression and tone colour, and an intuitive feel for the harmonic implications of their response. The integration of each of these aspects helped to make these responses unique.
5. There was evidence in the *Rhythm* item that translating the visual notation into an auditory image clearly impeded fluency and spontaneity. This is similar to observations by jazz educators (e.g., Baker, 1979) who comment that improvisation by sight stifles creativity and instrumental fluency.
6. The best responses for the *Freely Conceived* item came from students whose first idea provided the basis or ‘spark’ to ignite their imagination and provide coherence to the rest of the improvisation. Typically the better the quality of opening statement the better the overall performance. Also of critical importance to an effective performance was the ability of the improviser to sustain the flow of ideas, to connect ideas, and to end their performance musically and with a sense of finality.
7. Some gender differences were evident in the responses on the *Freely Conceived* item, especially for the more proficient students. Typically, female students tended to play moody, atmospheric improvisations which were often slower and had more space and rests. Some were free in style, displaying a sophisticated sense of phrasing and time. Some of these responses suggest the influence of

prior exposure to composition experiences in classroom elective music classes. Male students on the other hand, were likely to provide more outgoing, faster and busier improvisations than females. Many of these performances used a jazz or pop idiom and were more like the improvisations one would expect in a stage ensemble performance of a jazz or rock arrangement.

8. Differences were also observed between the instruments studied in this investigation. Clarinetists were more likely to use a wider range, employ larger leaps and use other idiomatic devices typical of performance on this instrument. Likewise, trumpeters compensated for the difficulty in playing in the upper register by using such idiomatic devices as glissandi, trills, flutter-tonguing, and double and triple tonguing.

In all of my work across the past 25 years, I have argued that a ‘balanced’ approach to the development of ‘musicianship’ on a musical instrument can be defined by the ability of a musician to perform music visually (sightreading, performing rehearsed repertoire), aurally (by ear and from memory) and creatively (improvising).

These orientations can be seen in Figure 22 which shows multiple ways in which a teacher can introduce new material and approach the teaching of a range of performance skills. Such an approach is bound to be quite different from normal ‘traditional’ styles of training, and is used here to describe some alternative strategies which could form the basis of teaching at all levels of instruction. For example, moving around the cycle anticlockwise a teacher could introduce a new melody by ear, ask students to improvise their own version of the melody by embellishing and varying it, and then teach them how to read the original melody or their own version using musical notation. After class the student could use the notation as the basis from which to transpose the melody to other keys. The sequence of activities suggested here would be visual to aural to creative (and with the out of class activity), visual to aural.

- Insert Figure 22 here -

Examples of moving clockwise around the cycle would be activities such as the following. As a warm-up activity at the beginning of a lesson a teacher could start with a rhythmic pattern which is introduced using notation. Students would be encouraged to improvise in a specified key using only the durations of the rhythm pattern, to teach their own version to their classmates, and then to notate their own improvised composition using notation. Likewise, a short melodic motif could be introduced using notation, used as the basis from which to improvise an appropriate melody (by extending, elaborating and embellishing the motif), and then refined into a final replicable composition which could be notated during the students' daily ‘music time’ and transposed to different pitch levels. There are an infinite variety of ways in which the cycle shown in Figure 12 could be used to construct enjoyable and educationally valuable activities. Most of all, these activities would help strengthen a range of skills, and foster musically independent instrumentalists. Fundamentally, these activities would also encourage students to ‘think in sound’ before comparing their reproduced version with their internalised model (Schleuter, 1984; p. 26). The sound, therefore, precedes the symbol.

Of course, in any teaching there will be lessons in which students work predominantly from notation, but as suggested here, there should always be opportunities for aural and creative activities at some point in a lesson. These strategies are clearly of more benefit than teaching which stresses only one type of performance, and in which a student's progression is governed by what the next tune in the book happens to be. In this way, improvisation is a key skill for all musicians to learn and experience (see McPherson, Davidson & Faulkner, 2012).

Finally let me conclude by stating suggesting that the ultimate challenge for music educators is to nurture talent so that all students are capable of reaching their full potential and thus better equipped to cope with the demands of music making in a wider sense. In particular, the human need to improvise and learn by creating music, rather than just reproducing music, can be used as a powerful force to drive and motivate musicians during all stages of their development.

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