

DEVELOPMENT AND VALIDATION OF A RATING SCALE FOR  
WIND JAZZ IMPROVISATION PERFORMANCE

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by

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WIND JAZZ IMPROVISATION PERFORMANCE

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DEVELOPMENT AND VALIDATION OF A RATING SCALE FOR  
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ABSTRACT

The purpose of this study was to construct and validate a rating scale for collegiate wind jazz improvisation performance. The 14-item Wind Jazz Improvisation Evaluation Scale (WJIES) was constructed and refined through a facet-rational approach to scale development. Statements descriptive of wind jazz improvisation were collected through analysis of pedagogical materials, jazz educator descriptions, published interviews of jazz musicians, and research articles. Decisions to retain, combine, modify, or reject items were made largely based on input from accomplished jazz musicians and the knowledge and expertise of the researcher. Five wind jazz students and one professional jazz educator were asked to record two improvisations—two choruses of Bb blues and one chorus of *Killer Joe* accompanied by an Aebersold play-along compact disc. Sixty-three adjudicators with varying degrees of jazz experience evaluated the 12 improvisations using the WJIES and the Instrumental Jazz Improvisation Evaluation Measure (IJIEM; May, 2003). Reliability was good, with alpha values ranging from .87 to .95. Construct Validity for the WJIES was confirmed through the analysis of a multitrait-multimethod matrix (MTMM; Campbell & Fiske, 1959). The results of this study indicate that the facet-rational approach is an effective method of developing a rating scale for collegiate wind jazz improvisation performance. The findings also suggest that: (a) advanced jazz improvisation is closely related to elements associated with creativity and expression, and (b) adjudicators might benefit from structured training sessions prior to judging jazz improvisation performance.

## CHAPTER I

### INTRODUCTION

Improvisation is a complex term that can only be fully understood within the context of its application. Kenny and Gellrich (2002) have stated:

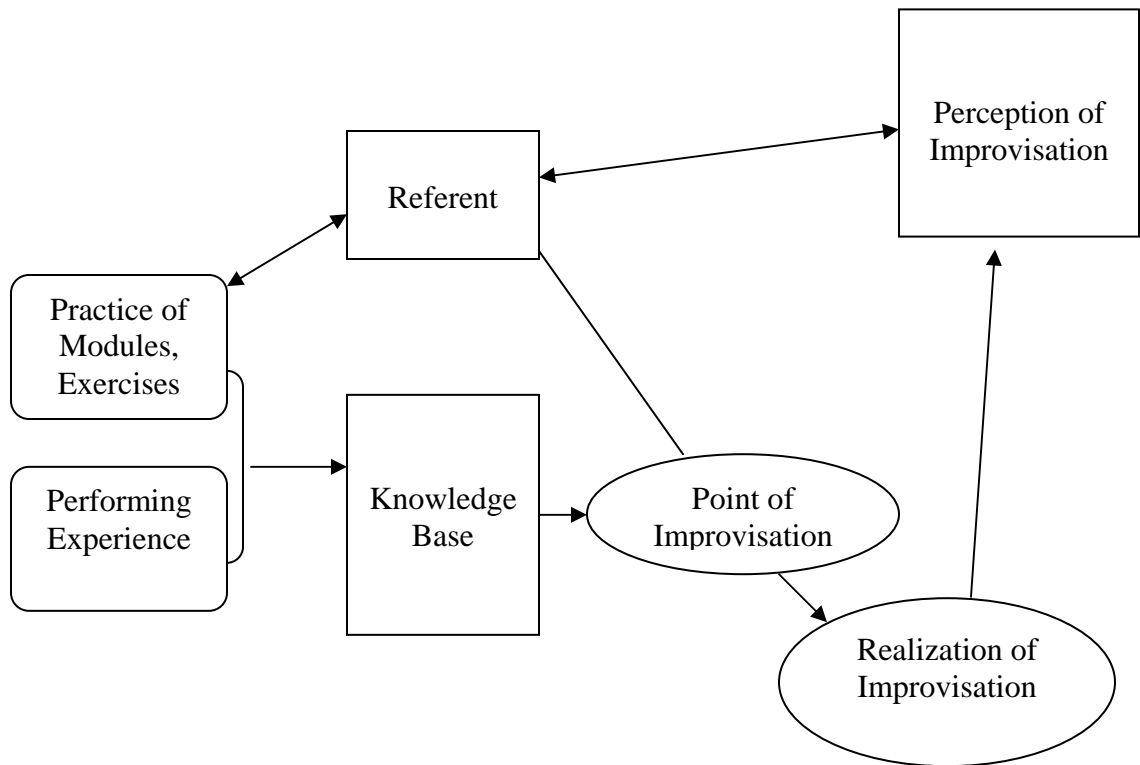
Depending upon its sociocultural function, the term improvisation incorporates a multiplicity of musical meanings, behaviors, and practices. A feature common to all improvisation, however, is that the creative decisions of its performers are made within the real time restrictions of performance itself. Improvisation is therefore considered to be a performance art *par excellence*, requiring not only a lifetime of preparation across a broad range of musical and non-musical formative experiences, but also a sophisticated and eclectic skills base. (p. 117)

Jazz has brought about a renaissance in improvisation, providing a style conducive to spontaneous creation (Coker, 1964). Improvisation can be found in every musical style and culture, but in jazz, it is the predominant and driving force (Kynaston & Ricci, 1978). Originating in the beginning of the 20<sup>th</sup> century, jazz has progressed from an American musical curiosity to an international phenomenon. This popularity has undoubtedly contributed to the increase in jazz instruction within schools and colleges.

In January 1994, the National Committee for Standards in the Arts announced America's first national voluntary standards for K-12 education in the arts (MENC, 1994). Standard Three, *Improvising melodies, variations, and accompaniments*, specifically advocates instruction in improvisation as part of a holistic music curriculum.

The core elements of jazz improvisation, however, have yet to be decided on by the aggregate of musicians, educators, and researchers. Many believe that spontaneous creation lies at the heart of the improvisational process (Coker, Casale, Campbell, & Greene, 1970; Gridley, 1991). Others, such as Berliner (1994), dispute the term *spontaneous*. He stated, "Performance without previous preparation is fundamentally

misleading. There is, in fact, a lifetime of preparation and knowledge behind every idea that an improviser performs” (p. 17). Coker (1964) identified five factors that chiefly determine the outcome of a jazz player’s improvisation: intuition, intellect, emotion, sense of pitch, and habit. Kenny and Gellrich (2002) suggested that “two key constraints of improvisation—knowledge bases and referents—work together to generate new music structures” (p. 119). The following figure represents a visual depiction of this conceptualization.



*Figure 1. The Improvisation Process*

Although music researchers have earnestly attempted to unravel the process of jazz improvisation, research on the subject continues to be sparse in comparison to other areas of music education.

## Rationale

Instruction in the art of musical performance remains at the core of any reputable music education curriculum. As a consequence, the issue of creating and maintaining reliable and valid performance assessment procedures is imperative to the success of the music education curriculum (Bergee, 2003). The obvious problem of assessment as it relates to music performance deals with the subjective nature of music. There are numerous possible approaches to a single piece of written music that may manifest themselves in variations of tone, articulation, vibrato, interpretation, and so forth. In a broad sense, differing approaches may be considered acceptable. The relevant issue is how music educators deal with evaluation in a manner that encourages reliability and validity. Until some form of computer-based assessment procedure is developed that successfully eliminates human bias, the best methods to date of evaluating musical performance utilize some type of rating scale. Rating scales improve evaluation, because adjudicators must use a common set of evaluative dimensions rather than develop their own subjective criticisms (Abeles, 1973).

Abeles (1973) attempted to create one of the earliest performance adjudication scales. The results of his study demonstrated that the technique of scale construction employed to evaluate music performance produced an instrument that was both reliable and valid. Although the Abeles' Clarinet Performance Rating Scale (CPRS) proved to be highly successful in evaluating junior high clarinetists, other questions arose. Would reliability remain as high if the scale was used to evaluate performers at a different ability level? Would including saxophone performances in the performance set affect reliability? Bergee (1989) explored some of these questions. The results of his study indicated that

the CPRS was a consistently reliable and valid evaluative instrument for university single-reed juries. These findings further support the use of empirically-based rating scales (Bergee, 1989). Because music performance is essentially subjective and “ephemeral,” mere measurement of reliability and validity may not fully address all aspects of performance criteria (Bergee, 2003).

Researchers have also attempted to fully describe the process of performance assessment. Mills (1987) investigated the extent to which assessment of solo musical performance can be explained. Her work reveals that it is possible to largely “explain” the overall marks given in an assessment in terms of characteristics, which can be understood by non-specialists, and which are not related to instrument-specific technique (Mills, 1987).

If it is indeed possible to explain the overall perception of a music performance, then any explanation should reveal additional aspects of musical performance that might influence an evaluator's perception of quality. Johnson (2003) explored the effects of rubato on the perception of musicianship in musical performance. Although his results in part indicated that a performance without rubato is not perceived to be as musical as one with appropriate variations in timing, his findings as a whole reflect a rather wide range of magnitude, which led him to conclude that perhaps the flow of the performance is more crucial than the specific timing in milliseconds. Up until this point issues have been discussed related to the development of music assessment scales designed to evaluate previously composed music from the Western Classical idiom. If these assessment procedures are applied to an evaluation of spontaneously composed music, (i.e., jazz improvisation), different issues of reliability and validity are likely to arise. Evaluation in

this medium is potentially problematic because objectivity is adversely affected. Jazz improvisation can be manifested in a virtually infinite number of acceptable musical outcomes. Another confounding issue is that music educators still do not fully understand the cognitive process associated with jazz improvisation.

Despite the difficulty associated with developing a rating scale for instrumental jazz improvisation, researchers have succeeded in constructing valid and reliable measures (Horowitz, 1994; May, 2003; McPherson, 1995; Pfenninger, 1990). If reliable and valid instrumental jazz improvisation measures presently exist, is it truly necessary to construct additional rating scales? Although the existing measures have proved to be reliable and valid, there are specific shortcomings that can be improved upon, thus potentially producing an evaluation that more closely reflects the construct of wind jazz improvisation. The measures developed by May (2003) (see Appendix G) and McPherson (1995) both contain a total of seven items. These small item pools may only partially describe the improvisational process. Horowitz (1994) created a scale that was specifically designed to evaluate jazz guitar improvisation. His measure, however, seems to contain several ambiguous items. The Jazz Guitar Improvisation Rating Scale also lacked descriptors that might specifically relate to wind instrument performance. Lastly, Pfenninger (1990) divided the improvisation construct into three distinct dimensions: (a) tonal, (b) rhythm, and (c) expression. A separate scale was developed to evaluate each of the three dimensions. Although both the tonal and rhythm scale proved to be reliable measures, the expression scale was shown to be unreliable. By drawing on and expanding the work of these researchers, I have attempted to develop a valid and reliable evaluation

measure that can be used by educators with varying degrees of expertise to rate a variety of wind improvisations.

### Purpose

The purpose of this study was to develop a valid and reliable summated rating scale designed to evaluate the improvisation ability of collegiate wind instrumentalists. Specifically, this research sought to answer the following questions:

1. What evaluative criteria should be used to describe instrumental jazz improvisation?
2. How should the evaluative criteria be categorized?
3. What are central factors in the evaluation of wind jazz improvisation?
4. Is it possible to develop reliable rating scale items related to such performance aspects as creativity and expressiveness?
5. What is the reliability of the resulting rating scale?
6. What is the validity of the resulting rating scale?
7. Ideally, who should adjudicate collegiate wind jazz improvisation?

### Theoretical Framework

The basic concept of summated rating scales rests in the theoretical foundation of classical test theory. Spector (1992) has described classical test theory as follows:

Classical test theory distinguishes *true score* from *observed score*. A true score is the theoretical value that each subject has on the construct or variable of interest. An observed score is the score actually derived from the measurement process. It is assumed that each subject has a true score on the construct of interest. These true scores, however, cannot be directly observed. Rather, they are inferred from the observed scores. If one had perfectly reliable and valid measurement, the observed score would equal the true score. According to classical test theory, each observed score is comprised of two components, the true score and random error. That is,  $O = T + E$ , where O is the observed score, T is the true score, and E is random error. (p. 10)

The basic formula for classical test theory is an oversimplification and does not truly represent all influences on the testing process (Spector, 1992). The basic formula can be extended to include an additional bias component,  $O = T + E + B$ . Bias comprises systematic influences on observed scores that are not random and do not come from distributions with means of zero. Although all sources of bias may never be known, scale developers assume that classical test theory represents a reasonably close approximation to the measurement situation (Spector, 1992). Therefore, the assumption that a musical performance can be evaluated within acceptable error variances is absolutely essential to the construction and validation of performance measures. This assumption also implies that certain constructs are compilations of separate items that when combined constitute a singular phenomenon.

## Definition of Terms

### Summated Rating Scale

A summated rating scale is an evaluation scale in which a total score is obtained by adding individual item scores. It is assumed that each item is monotonically (i.e., A increases as B increases) related to some underlying psychological trait, and that the total score is approximately linearly related to that trait (Boyle & Radocy, 1987).

### Wind Instrumental

Several scales have been developed that attempt to measure musical performance within a variety of media. The specific category of instrumental jazz performance potentially encompasses a wide variety of musical products. For the purpose of this study, the term *instrumental* refers exclusively to saxophones, trombones, and trumpets.



These instruments have been chosen because they constitute the most commonly used instruments in wind instrumental jazz improvisation. At the conclusion of the study, it might be plausible to utilize the resulting scale to evaluate other instrumental jazz improvisation, including clarinet, tuba, flugelhorn, flute, and all other wind instruments.

### Collegiate

Collegiate is defined as “of, relating to, or comprising a college: designed for or characteristic of college students (*Merriam-Webster’s Collegiate Dictionary*, 2003, p. 244). By limiting the scope of the rating scale to college-aged students, a more reliable and valid scale might be developed.

### Jazz

The genre of jazz is enigmatic and difficult to define, largely owing to the sheer magnitude of musical styles that fall under the broad umbrella of the term. Gridley, Maxham, and Hoff (1989) asserted that jazz is an evolving idiom containing all elements that have been previously associated with jazz. “In other words, jazz is not an all-or-none event, but is a continuum, a dimension: jazzness” (p. 527). Although many jazz fans might identify with the “jazzness” definition of jazz, scholarly research warrants a more strict interpretation of the term. Jazz has been generally described as any music containing three identifying elements: (a) swing feel, (b) syncopation, and (c) improvisation (Gridley, 1991). The term *swing feel* is loosely referred to as treatment of the eighth note values in relationship to an underlying subdivision of the beat. Consequently, the core elements of jazz improvisation should include the aspects of swing feel and rhythmic syncopation, regardless of style. For purposes of this study,

*swing feel* refers to ternary subdivision of the beat generally associated with Basie-style big band charts.

### Performance

Performance may be defined as “the execution of an action: something accomplished: a public presentation or exhibition” (*Merriam-Webster’s Collegiate Dictionary*, 2003, p. 920). Thus, jazz improvisation performance can be described as: the act of executing spontaneous musical action in the jazz style; accomplishing impromptu musical creation in the style of jazz; a public presentation or exhibition of spontaneously composed music incorporating the components of swing feel, and syncopation.

### Reliability

Boyle and Radocy’s (1987) explanation of reliability continues to be relevant. Reliability is defined as the consistency with which a measuring instrument measures. If such an instrument consistently yields the same result when it is used to measure the same thing, the instrument is reliable. A good thermometer will give a consistent reading for a given air condition, a good tape measure will give a consistent reading for a given table length, and a good musical aptitude measure will give a consistent reading for a given level of musical aptitude (Boyle & Radocy, 1987).

### Validity

Validity refers to how well an instrument measures what it is supposed to measure (Boyle & Radocy, 1987). Validation of a scale is akin to the testing of a theory in that it cannot be entirely proven. Instead, evidence is collected to either support or refute validity (Spector, 1992). There are in essence three forms of validity: (a) content validity, (b) criterion-related validity, and (c) construct validity (American Psychological

Association, 1985). Content validity is the degree to which a test measures an intended content area and requires both item validity and sampling validity. Criterion-related validity involves correlating a test with a second test or with one or more outcome criteria. Construct validity is primarily concerned with the extent to which a test reflects the construct it is intended to measure (Gay & Airasian, 2000).

*Content validity.* Content validity is the most logical means of justifying the validity of an achievement measure. The pivotal question is whether test items provide adequate coverage of the tested material (Boyle & Radocy, 1987). Content validity estimations seek to provide an answer to this question. Lawshe (1975) devised a method of determining content validity by gauging adjudicator consensus of scale items. This procedure is called the content validity ratio (CVR). A more contemporary method of determining content validity is the use of factor analysis (e.g., Horowitz, 1994).

*Criterion-related validity.* Criterion-related validity involves the testing of hypotheses about how a scale will relate to other variables. There are several types of criterion-related validity, all involving comparing scores on the scale of interest with scores on other variables, or criteria. Such comparisons involve correlating scores on the scale of interest with scores on other variables (Spector, 1992). A common method of determining criterion-related validity as it relates to performance measures is to rate a performance using two scales and then compare scores of the scale of interest to scores on the other scale.

*Construct validity.* A construct is an abstract concept or organizational perception of a psychological trait. Constructs may also be linked together in a theory. If a measure yields results as predicted by theory, that measure has construct validity (Boyle &

Radocy, 1987). To establish content validity a multitrait-multi-method (MTMM) matrix (Campbell & Fiske, 1959) was employed encompassing three different measurement methods and two distinct performance traits.

## CHAPTER II

### RELATED LITERATURE

The current literature related to jazz improvisation is diverse. This chapter is organized into two broad areas, (a) research-related literature, and (b) non-research-based articles. The research-related literature includes publications related to theoretical models for jazz improvisation, improvisation achievement and methodology, improvisation and musical achievement, jazz participation and gender, and evaluation. The non-research-based articles include literature related to descriptions of the jazz improvisation process, teaching beginning improvisers, melody as a basis for improvisation, advanced improvisation instruction, and ensemble-based improvisation instruction.

#### Theoretical Models

Over recent years, jazz as an academic discipline has grown in volume and stature. Indeed, jazz studies now play a significant role in a number of music programs within the higher education sector (Whyton, 2006). The anticipated result of research in the field of music education is the overall improvement of pedagogical strategy. Researchers hope to add to the understanding of a phenomenon, construct, or teaching method so that a more productive and efficient procedural approach may be implemented. In order to better understand the theoretical constructs that generate improvisation, an attempt has been made to model its salient features (Kenny & Gellrich, 2002). Pressing (1987) presented a highly developed cognitive model in which improvisation was construed as an ordered sequence of *event clusters*. Each event cluster may be associated with previous events but is also shaped by current musical goals. Through his computer-based model, Johnson-Laird (1991) suggested that improvisational

creativity should be computable, and that only three sorts of algorithms can be creative. The essence of this theoretical model is the internalization (long-term memory) and automation (readily accessible through practice and performance) of the knowledge base (previously learned material) (Kenny & Gellrich, 2002).

The phenomenon of improvisational creativity was addressed by Sawyer (1992) who conducted a series of interviews with professional jazz musicians. He identified five characteristics that differentiate group jazz improvisational performance from non-improvisational creative domains: (a) interactional influences, (b) conscious and nonconscious processes, (c) units of ideation, (d) the balance of structure and innovation in the domain, and (e) the balance of structure and innovation within the individual. Analysis of the five characteristics revealed that two characteristics stood out as distinctive—the presence of interactional influences during the creative process, and the parallel tensions between conscious/nonconscious and structured/innovative performance.

Clarke's (1991) model of improvisation is essentially a three-stage cognitive hierarchy. The three categories are Repertoire Selection (formulaic improvising), Hierarchical (song-form-generated improvising), and Motivic (chain-associative improvising). Each category is employed proportionately according to the level of structure demanded by the improvising genre, the artistic inclinations of the improviser, or both (Kenny & Gellrich, 2002). Although research has yet to provide an adequate description of what improvisers think about at the precise moment of creation, these models taken together not only account for the basic generative mechanisms of

improvisation, but also further illuminate current understanding of what constraints govern different improvising styles and forms (Kenny & Gellrich, 2002).

A theoretical model that delineated the constructs and subsumed variables of jazz improvisation performance was developed and tested by Tumlinson (1991). He sought to describe the specific performance variables related to single-line jazz solo improvisation performance and to discover the most cogent groupings of these variables. The study was conducted in two phases: (a) the development of theoretical constructs based on an analysis of the related literature, and (b) testing of the theoretical model. Thirty-three variables were identified from 14 different sources. The variables were grouped into seven hypothesized constructs: (a) Harmonic Appropriateness, (b) Rhythmic Usage, (c) Melodic Usage, (d) Jazz Style, (e) Individuality, (f) Expressiveness, and (g) Form. A performance tape containing 60 student and 60 professional jazz improvisation performances was created and judged relative to the 33 variables. Results of a factor analysis for the total sample indicated three main constructs: (a) Overall, (b) Use of Melody, and (c) Harmonic Divergence. The student sample yielded a five-construct solution: (a) Rhythmic and Melodic Variety, (b) Fluency, (c) Jazz Style/Time Feel, (d) Melodic Breadth, and (e) Melodic and Harmonic Congruity. The professional sample also yielded a five-item construct solution: (a) Jazz Style/Time, (b) Harmonic, Melodic, and Rhythmic Congruity, (c) Melodic Development, (d) Use of Rhythmic Repetition and Variety, and (e) Fluency. The analysis revealed that the hypothesized construct model for the combined sample was not confirmed.

## Improvisation Achievement and Methodology

In addition to defining the theoretical process of improvisation, researchers have sought to understand how certain factors and instructional methodologies influence improvisation achievement. May (2003) attempted to identify the underlying factors of instrumental jazz improvisation achievement and examined the extent to which knowledge of jazz theory, aural skills, aural imitation, and selected background variables predict achievement in instrumental improvisation. The participants of this study were undergraduate wind players ( $n = 73$ ) enrolled in college jazz ensembles at five Mid-western universities. Three measures, the Measure of Jazz Theory Achievement, the Measure of Aural Skills (MAS), and the Measure of Aural Imitation (MAI), were designed by May and utilized. Results indicated that objective measurement of instrumental jazz improvisation is possible on expressive as well as technical dimensions. Stepwise multiple regression revealed self-evaluation of improvisation as the single best predictor of achievement in instrumental jazz improvisation, with aural imitation ability as the second best predictor.

Greennagel (1994) explored the predictive nature of certain variables in terms of vocal jazz improvisation achievement. Participants were students ( $n = 30$ ) studying vocal jazz performance. The dependent variable consisted of the students performing two improvised choruses over a 12-bar blues form. Predictor variables included: (a) scores on the Gordon's *Advanced Measure of Music Audiation*, (b) ratings of subject creativity on a researcher-designed creativity assessment, (c) grade point average, (d) prior instrumental lessons, (e) prior experience performing with a jazz ensemble vocal or instrumental, (f) frequency of jazz listening per week, (g) hours of jazz listening per week, and (h) subject



self-rating as an improviser. The largest portion of the variance between the scores was accounted for by the variables of ratings of subjects' creativity as determined by a researcher-designed creativity assessment, and the subjects' self-ratings as improvisers. Greenagel also found high correlations for self-rating, hours spent listening to jazz, prior ensemble experience, creativity, instrumental lessons, and frequency of listening to jazz.

An introductory jazz improvisation sequence was developed and evaluated by Burnsed (1978) as a supplementary activity for the intermediate band class. Participants were seventh-grade, eighth-grade, and ninth-grade band students. One experimental group ( $n = 114$ ) and two control (combined  $n = 121$ ) groups were selected from two neighboring south Georgia school systems. The experimental treatment consisted of pentatonic scale study, call and response activities, and improvisation with a blues accompaniment limited to 20-minute sessions for a period of five weeks. The results of this study indicated that (a) the improvisation sequence was an effective tool for developing improvisatory skill, (b) differences did exist between seventh, eighth, and ninth grade students' ability to improvise, (c) improvisatory experience had a positive effect on student attitudes toward band, and (d) improvisation required learning at the fourth level (e.g., the adaptive level) of the psychomotor domain. The inclusion of improvisatory performance in the traditional band class, however, did not affect students' sight-reading skill achievement.

A self-instructional audio-imitation method for teaching trumpet students jazz improvisation was successfully developed by Aitken (1975). His investigation dealt with pedagogy related to high school trumpeters. He separated audio-imitation and notated

exercises into two distinct instructional sequences. His method, however, was limited by the fact that it only focused on improvisation sequences within the major mode.

The primary purpose of Damron's (1973) study was the development and evaluation of a programmed sequence designed to teach jazz improvisation to wind instrument players in junior and senior high school bands. Students ( $n = 40$ ) were randomly selected from five secondary schools and assigned to one of two groups: an experimental group, which was given the treatment instruction, and a control group, which was not. Results of this study indicated significant differences between the performances of experimental group participants as compared to control group participants. These results imply that jazz improvisation can be effectively taught by a programmed method.

Berard (1998) developed and evaluated a self-instructional method for jazz guitar. The method was designed to give instruction in chords, scales, arpeggios, and improvisation. The participants were 14 jazz guitar majors studying at a Canadian university. Evaluation was done using a single group, pretest-posttest design. Results indicated that overall objectives were met, with participants expressing positive attitudes towards the instructional method. Analysis of dependent variable measures, however, revealed methodological weaknesses in certain areas.

The effectiveness of three improvisation instructional methods was examined by Bash (1983). Sixty high school instrumentalists were randomized into one of four groups: control group, method one group (technical treatment), method two group (aural perceptive treatment), and method three group (an historical analytical treatment). Statistically significant differences were found between the control group and the three

instructional methods and between the technical treatment and the two non-technical treatments. Overall results suggested the viability of the non-technical approach to improvisation instruction as a supplemental component of traditional improvisation instruction. Hores (1977) compared the effectiveness of two separate approaches to jazz improvisation instruction: an aural and a visual. The participants for this study were 42 secondary school instrumentalists. The treatment consisted of sixteen two-hour sessions, with the visual group receiving music information through conventional notation and the aural group taught through call and response. Surprisingly, both groups improved significantly in the area of improvisational skill, but there was not a significant difference between the groups.

Based on the research findings related to improvisation achievement and methodology, several conclusions can be presumed. Results indicate that it is possible to create an objective instrumental measure of jazz improvisation (Burnsed, 1978; May, 2003). Various instructional sequences have been shown to be effective methods of teaching improvisation, including non-technical, aural, and visual approaches (Aitken, 1975; Bash, 1983; Burnsed, 1978; Damron, 1973; Hores, 1977). Variables such as self-evaluation of improvisation skill and aural imitation were found to be good predictors of jazz improvisation achievement (Greennagel, 1994; May, 2003). In addition to effectively improving improvisation skill, instructional sequences related to improvisation may also result in improved attitudes toward improvisation and the particular instruction method utilized (Berard, 1998).

## Improvisation and Musical Achievement

Some researchers have examined improvisation achievement in relation to other factors including musical achievement in other areas. Azzara (1993) and Madura (1996) conducted studies along this line of research. Azzara sought to develop and examine an improvisation curriculum designed to improve the music achievement of elementary school instrumental music students. He specifically investigated the effect of improvisation study on the music achievement of fifth-grade wind and percussion students. Sixty-six fifth-grade students participated in his study. Students who received instruction including improvisation were found to perform at significantly higher achievement levels than students who did not. The results of this research support the notion that improvisation contributes to the improvement of instrumental music performance achievement in elementary students.

Madura (1996) investigated the relationships among various aspects of vocal jazz improvisation achievement and several predictor variables. Participants were 101 college vocal jazz students. The elements of vocal jazz achievement measured in this study included 18 tonal, expressive, and rhythmic items. Two improvisation tasks were performed by each student—one blues and one ii-V7-I progression. The independent variables were jazz theory knowledge, imitative ability, jazz experience, instrumental lessons, voice lessons, gender, and general creativity. The best order of predictors of the blues task was jazz theory knowledge, jazz experience, and imitative ability. The best order of predictors of the ii-V7-I task was imitative ability, jazz theory knowledge, and jazz experience. Jazz theory knowledge, imitative ability, and jazz experience constituted the best order for predictors of composite improvisation. Instrumental lessons, voice

lessons, gender, and general creativity were found not to be significant predictors of vocal jazz improvisation achievement.

Several conclusions may be drawn from research results related to the relationship between improvisation and general musical achievement. Instruction in improvisation has been found to contribute to the improvement of elementary instrumental music performance (Azzara, 1993). Jazz theory knowledge, imitative ability, and jazz experience were found to be predictors of jazz improvisation tasks involving blues and ii-V7-I progressions.

### Jazz Participation and Gender

One issue that should be of particular interest to jazz educators is the concept of gender as it relates to jazz studies participation. The underlying issue centers on the under-representation of women within the jazz idiom. This under-representation is manifested in the areas of performance as well jazz education. Although there have been and continue to be a number of female vocal artists who contribute significantly to jazz, there is still a deficient number of female jazz instrumentalists and educators.

As America's "classical music," jazz has become an accepted part of instrumental music programs in both high schools and colleges (Mark, 1987); nevertheless, research examining the gender of the participants in these programs continues to be minimal (McKeage, 2004). Barber (1999) studied 39 New Jersey high schools and found that although girls accounted for 48% of all band membership, only 26% of jazz ensemble members were girls. McKeage (2002) reviewed jazz ensemble enrollments at one Midwestern university and found that only 20% of the students were women. The lack of role models and mentors has been identified as one possible reason why women are

underrepresented in jazz (Cartwright, 2001). Further supporting Cartwright's assertions, MENC: The National Association for Music Education, in a 2001 review of active membership, reported that a mere 23% of teachers who identified jazz as a teaching area were women (MENC, 2001).

Although research examining the relationship of gender and jazz ensemble participation is by no means exhaustive, it clearly illustrates the obvious inequity of female membership within these organizations. According to Tucker (2002) the lack of women jazz instrumentalists can be attributed to three factors: (a) women do not play instruments common to jazz, (b) gender stereotypes confine females to only sexual roles, and (c) the limiting of women to performance areas more accepting of females, such as novelty or family acts.

Instrument stereotyping may also contribute to the smaller number of female jazz musicians. The instrumentation commonly found in jazz (trumpet, trombone, saxophone, and rhythm section) includes instruments generally associated with males (McKeage, 2004). Abeles and Porter (1978) studied instrument selection among 58 college students. Sex-stereotyping of instruments was found that placed eight instruments on a continuum from most masculine to most feminine: drums, trombone, trumpet, saxophone, cello, clarinet, violin, and flute respectively. More recently, Johnson (2004) conducted a study of the effect of sex identification on instrument assignment by band directors that contradicts earlier gender association findings. His results indicated that simply knowing the sex of the student did not have a significant impact on what instrument band directors recommended students play. This particular finding may indicate a lessening of the sex

stereotyping of instruments but significant differences between what males and females play in bands continue to exist.

Little research has been conducted that explores the relationship of gender and jazz improvisation; however, this issue was recently investigated by Wehr-Flowers (2007). She examined gender differences in the social-psychological constructs of confidence, anxiety, and attitude as they relate to jazz improvisation participation. One hundred and thirty-seven students participating in jazz programs completed a version of the *Fennema-Sherman Mathematics Attitude Survey* modified to measure attitudes relative to jazz improvisation. Participants included 83 males and 54 females; student ages varied. Survey data were analyzed using a multivariate analysis of variance procedure with gender, school level, and instrument choice as independent variables. A significant difference was found for the gender main effect, with post hoc analyses revealing significant differences between males and females on all three dependent variables—confidence, anxiety, and attitude. Female participants were less confident in their ability to learn to improvise, exhibited more anxiety in relation to jazz improvisation performance, and generally held negative attitudes relative to successful improvisation.

#### Evaluation

Instruction in any musical performance medium invariably calls for a valid and reliable method of evaluation. Abeles (1973) attempted to create one of the earliest performance adjudication scales, in his case, for the clarinet. The results of his study demonstrated that the facet-factorial technique of scale construction utilized produced an evaluation instrument that was both reliable and valid. Bergee (1987) was equally successful at constructing a valid and reliable rating scale for euphonium and tuba

performance. Zdzinski (2002) developed an assessment measure for stringed instrument performance, in which reliability varied from .873 to .936 for each judging panel. Dcamp (1980) applied a facet-factorial approach in the development of a rating scale for the evaluation of high school band performance.

An instrument that evaluates the vocal performance abilities of freshmen college singers was successfully constructed and validated by Pazitka-Munroe (2002). Her methodology consisted of four phases: (a) generation of statements based on research for the CCAI (College Choral Audition Instrument), (b) testing and refinement of the CCAI, (c) testing the revised CCAI for stability and reliability, and (d) examination of the criterion-related validity. The results of this study revealed 16 factors as central to the assessment of freshmen college choral singers. The factors explaining the largest percentage of variance were (a) breath control (b) posture, (c) freedom of facial jaw and tongue movement, (d) pattern imitation, (e) tone quality, (f) posture, (g) diction, (h) expression, (i) respiration, and (j) intonation.

The facet-factorial approach to scale construction was applied by Jones (1986) in the development of a rating scale for high school vocal solo performance. This study resulted in the creation of a 32-item rating scale based on a five-factor structure of vocal solo performance. The five factors consisted of: (a) Interpretation/Musical Effect, (b) Tone/Musicianship, (c) Technique, (d) Suitability/Ensemble, and (e) Diction. The Vocal Performance Rating Scale produced relatively high interjudge reliability estimates for the overall score (>.89). Collectively, these scales show that a variety of instrumental musical performances can be measured within acceptable ranges of reliability and validity.



The evaluation of jazz improvisation presents additional reliability issues. Nevertheless, reliable evaluation measures have been developed. May's (2003) study led to the creation of the Instrumental Jazz Improvisation Evaluation Measure (IJIEM), which produced a composite interjudge reliability coefficient of .97. The IJIEM was also evaluated under "real-world" performance assessment conditions (i.e., a single hearing) by Smith (2006), which produced a modest reliability coefficient of .75. Pfenninger (1990) constructed three rating scales that attempted to measure three separate dimensions of improvisation. Instead of defining jazz improvisation as a single construct, he segmented it into three distinct concepts: (a) tonal, (b) rhythm, and (c) expression. Ten "prominent jazz musicians and jazz educators" developed a 40-item list through content analysis of descriptions of student performance. Six judges using the three scales independently of each other rated 20 student performances. Test-retest reliability was .71. Composite interjudge reliability ranged from .67 to .79. Pfenninger concluded that the tonal and rhythm ratings scales functioned as valid measures of jazz improvisation achievement; however the expression rating scale was negatively affected by rater subjectivity.

A facet-factorial approach was employed by Horowitz (1994) to develop a rating scale for jazz guitar improvisation. An item pool of statements was gathered through content analysis of pedagogical materials, published interviews of established jazz guitarists, and descriptive statements from jazz educators. Twenty-eight judges used Horowitz's 30-item scale to rate 70 student performances. Factor analysis of the resulting data indicated that the scale should consist of three factors: Musicianship, Expression, and Overall Structure. The scale demonstrated high interjudge reliability coefficients for

the overall score (.96) and the three subscales (.94). The facet-factorial approach proved to be an effective method for developing a rating scale for jazz guitar improvisation performance.

McPherson (1995) evaluated the improvisational ability of high school instrumentalists. A sample of 101 high school clarinet and trumpet students was evaluated using the Test of Ability to Improvise (TAI). It consisted of seven items in which participants were asked to improvise in a variety of “stylistically conceived” and “freely conceived” idioms. The study attempted to clarify relationships between improvisational ability and other variables including performance proficiency, gender, and instrument. Performance proficiency was determined by results on the Australian Music Examinations Board (AMEB) test. Results indicated that improvisational ability was not significantly correlated with performance proficiency in the beginning stages of development (ages 12-15), whereas choice of instrument did seem to have some impact. Clarinetists scored significantly higher than trumpeters. For more advanced musicians (ages 15-18), improvisational ability was significantly correlated with performance proficiency, and improvisational skill appeared to be influenced by prior exposure and interest in singing, mental practice, and doubling on additional instruments, particularly piano. Participants’ self-reported frequency of improvising was also significantly related to improvisational skill.

#### Descriptions of the Jazz Improvisation Process

In an attempt to further clarify the process of jazz improvisation, alternative descriptions have been offered. Prouty (2006) examined the role of the oral narrative tradition in the context of jazz history and improvisation. His descriptions resulted from a

re-reading of historical and contemporary texts as well as interviews with jazz musicians. His work illustrates jazz music's position as a cultural and musical system that departs significantly from the practices of the Western art music tradition. In conclusion, Prouty proposed:

Neither "oral" [transcriptions and/or imitation] nor "written" [written theory-based methods] can adequately describe the complex processes that have given jazz [and specifically jazz improvisation] its unique character in both performance and pedagogy, and that reflect its history of assimilation and transforming myriad musical and cultural practices. (p. 317)

He suggested a shift from the current conceptual framework of jazz as primarily an oral tradition to an "aural-written" paradigm in which jazz and improvisation exist as an amalgam of both aural and written systems.

The process of learning to improvise in the jazz medium may be a three-pronged process. The three prongs can be classified as two internal and one external, aimed at gaining control over the elements of, mind, body, and emotions (Galper, 2003). Within each element, Galper highlighted several subordinate concepts. Practicing and performing was described under the external behavior heading. Internal processes such as aural imagination, concentration, sense of musicality, musical vocabulary, rhythmic syncopation, and inspiration, were discussed under internal behaviors. Galper advocated Hoffstrader's theoretical model of improvisation, which includes a combination of three elements: (a) predictable elements, (b), semi-predictable elements, and (c) unpredictable elements. Galper's summation of the learning process is as follows:

Learning how to become a jazz improviser is a life-long task. There isn't enough time in life to practice everything. You'll always miss something and have to go back to learn it. It takes dedication and patience, and you're never done with the process. (p. 70)

Fischer (1994) described a holistic view of jazz improvisation. Three separate methodologies were discussed. The "Whole Brain Approach" advocated the formulation of jazz knowledge by utilizing the four quadrants of the brain and their specific functions. The "Practice Approach" focuses on students' "spatial" (right brain) element of improvisation. Lastly, the "Goal Note Method" emphasized listening and imitation in order to aid development of jazz vocabulary. Fischer concluded that learning to improvise is a process characterized by a constant influx of new ideas. He stated, "Teach people how to be creative and draw on their own resources, and they'll make music all their life." The development of improvisation skill can also be described as a two-step process: (a) the preparatory work of assimilating the jazz vocabulary, and (b) the actual act of improvisation (Reeves, 1992). At the core of Reeves's conceptualization is the use of performance to further develop the jazz vocabulary and the assimilation of alternate applications.

### Teaching Beginning Improvisers

A few jazz educators have disseminated ideas concerning teaching improvisation specifically to beginners. Zentz (1992) discussed strategies for introducing and incorporating improvisation into the elementary music curriculum. Her suggestions ranged from pre-kindergarten song play to fifth-grade blues scale instruction. Stamm (2001) explored a method of introducing young musicians to the art of improvisation by utilizing the language analogy. He proposed that in order to learn to improvise, an adequate "jazz vocabulary" must be developed. This vocabulary is acquired by listening to other more advanced jazz performers and imitating their style, articulation, phrasing, and note choice. According to Stamm, "As musicians tire of imitating others, they use

more of their newly acquired skills to express their own ideas and feelings.” Mack’s (1998) method of introducing and teaching young instrumentalists to improvise emphasized elements of style, articulation, note choice, use of patterns, and solo development. He also suggested that students begin with good style and simple ideas before expanding their jazz vocabulary. Antonelli’s (1997) teaching strategy was developed through years of jazz ensemble instruction and featured warm-up exercises designed to develop some of the basic skills used in improvisation. One particular exercise utilized the blues progression as a vamp in order to facilitate individual improvisation within each section.

A “beginners guide” aimed at introducing jazz improvisation to novice musicians was developed by Meadows (1991). His approach featured several systematic steps. The first step involved listening to many approaches to improvisation on a specific tune. Meadows predicted that this step would effectively “open the ears” of novice jazz musicians. The next step involved listening to a myriad of compositions based on a single harmonic structure or chord progression such as a “rhythm changes” (rhythm changes are a modified form of the chord progression of George Gershwin’s song *I Got Rhythm*, which forms the basis of countless (usually uptempo) jazz compositions) or a specific blues progression. By listening to improvisations based on a specific harmonic progression a musician’s knowledge of both the creative and melodic possibilities could be expanded. Teachers should then introduce scale study. Jazz musicians routinely employ various scales when improvising, and these scales become storehouses of musical ideas. The last step in Meadows’s guide called for the teacher to demonstrate the relationship of chords and scales to improvisation. Dust (2003) advocated improvisation

instruction based on jazz forms and chord progressions. According to Dust, “Improvisation becomes much easier when players can identify basic jazz forms and progressions.”

Five ideas for beginning exploratory improvisation were discussed by Volz (2005) and included: (a) one-note solo exercises, (b) duet improvisation, (c) use of concept flash cards to initiate improvisation, (d) use of character assumption to initiate improvisation, and (e) the use of exquisite corpse (i.e., a musical game whereas students take turns improvising) to explore collective improvising. Volz also detailed methods of moving beyond mere exploration. He highlighted three listening activities to assist student development. Listening for structure involved students identifying performance structure. Listening for intent to match mental performance involved performers attempting to perform what they hear in their heads. Lastly, listening for tonal center involved the ability to hear performances within a musical context.

#### Intermediate Jazz Improvisation Instruction

Once students have mastered the foundational elements of jazz improvisation in which they use the right scales and correctly follow the chord changes, more advanced instruction can then be implemented. Some jazz educators have explored intermediate jazz improvisation instruction designed to help students overcome the “plateau” stage in their development. Bash’s (1991) intermediate teaching strategy can be segmented into six distinct areas: (a) assessment, (b) range, (c) spacing, (d) repetition and planning, (e) rhythm and melody, and (f) form and finality. In the assessment area, students compare their solos to more sophisticated improvisations and pinpoint the differences. In the second area of instruction the young soloists learn appropriate use of extreme range

within an improvisation. Students must also learn to use “space” or rests within a solo, in order to create cogent ideas that communicate effectively. The fourth area deals with repetition and planning. Novice soloists must be taught that repetition is a useful tool in the construction of sophisticated jazz improvisations and can be planned. Bash also discussed the elements of rhythm and melody. Students are taught to specifically exhibit pulse within their improvisations and to consciously relate solo material to the melodic material made available by the tune. Finally, form and finality refer to creating improvisations that open, progress, and end logically.

Knox’s (2004) pedagogical approach advocated a reorganizational method for improvising. According to Knox, jazz musicians learn to improvise much like people learn to talk. Listening and imitation is paramount to developing a good jazz vocabulary. The first step of Knox’s instruction strategy involves instructing students to transcribe a high quality solo. Once transcribed, the solo should be memorized and performed flawlessly. After the solo is learned, students should then take specific melodic lines from the solo and learn them in all twelve keys, primarily around the cycle of fourths. This method is labor intensive, and the process may take anywhere from three to six months depending on the student’s ability and the difficulty of the solo chosen for transcription. Knox’s underlying premise is the belief that it is far better to use a smaller amount of acquired jazz vocabulary well as opposed to misusing a larger cache of licks and riffs.

#### Melody as a Basis for Improvisation

Melodic material has also been discussed as the foundation for the improvisation process. Meehan (2004) discussed the strategic use of melody as the basis for improvisation. Quoting the melody, paraphrasing, and using smaller portions of the

melody within improvisations are specifically advocated by this approach. Meehan also outlines student exercises aimed at developing the skills utilized in melodic improvising. These exercises included: (a) having students use an embellished paraphrase, (b) having students intersperse fragments of the melody at the ends of improvised phrases, and (c) having students play a fragment of the melody throughout the form of song, transposing the fragment in order to coincide with the chord changes.

Hynes's (2000) melodic approach to jazz improvisation instruction echoed some of Meehan's strategies. This method functioned as a supplement to the traditional vertical/harmonic mode of improvisation instruction. His three-step process required students to begin with an exhaustive study of the melody of a particular tune. After learning the melody, students would then interpret it expressively with added embellishments. The final step allowed the students to vary the original melody until it dissolved completely and an original improvised solo emerged. As the students' expressive needs eclipsed strictly melodic considerations, vertical/harmonic material was introduced. Jarvis and Beach (2003) also suggested a melodic approach to teaching beginning improvisers. They recommended that students begin with simple melodies, progress to embellishment of those melodies, and finally move from melodic embellishment to the creation of purely improvised lines. A key component of this approach is the development of a linear concept of improvisation wherein scales are the primary building blocks for material.

#### Advanced Approaches to Improvisation Instruction

In addition to basic and intermediate improvisation instruction techniques, jazz educators have explored and developed advanced methods of instruction designed for



more experienced musicians. Corpolongo (1995a, 1995b, 1996a, 1996b, 1997) produced a series of articles aimed at advanced improvisation pedagogy. The first article in the series featured the utilization of the bebop scale within the 12-bar blues structure. Several variations of the scale are discussed in terms of application. Exercises aimed at developing greater use of chord tones were also illustrated. Corpolongo's (1995b) second article in the series dealt with chord substitutions related to the I-ii-V-I progression. The mediant and submediant chords were highlighted as suitable substitutes for the tonic. In addition, the subdominant (IV) and subtonic (VII) were deemed appropriate substitutes for the supertonic (II). Exercises utilizing the several variations of the diminished scale were also described in detail. In subsequent articles, Corpolongo discussed improvisation techniques utilizing variations of the whole-tone and augmented scales. Common substitute chords for the basic blues progression were also presented. The information built on previously explored strategies related to the 12-bar blues progression and chord/scales. Corpolongo's (1997) final article in this series dealt with advanced improvisation strategies related to the various turnaround progressions. Theoretical properties of each variation were discussed in relationship to chord/scales and possible chord substitutions. Various major modes were also examined in relation to specific chord progressions.

Anderson (1995) approached advanced improvisation from a psychological perspective. The first suggestion aimed at improving improvisation was labeled "silence your inner critic." In order for students to progress beyond perceived limits, they must quiet self-doubt. Secondly, progressing improvisers must learn to relax. While performing, students should enjoy the moment and the music. Jazz musicians should also

listen intently to their feelings. Anderson then suggested that students attempt to express the emotions they experience during performance. His fifth suggestion involved being in the here and now. Musicians must be focused on the music at a specific point in time in order to fully tune in to emotional responses; past performances and successes should be blocked out and the present musical environment should command the musician's total attention. Risk is always involved in any attempt to play in a manner that thoroughly communicates emotion. Anderson also advocated making music as opposed to displaying technique. Advancing musicians sometimes confuse technique, the tool by which some music is expressed, with the actual music. Finally, the distinction between practice and performance was presented. Performance is the culmination of the previously discussed suggestions, wherein practice occurs during a time allotted to work out unfamiliar chord progressions and techniques.

Berliner (1994) described how advanced musicians use experience and musical knowledge in order to respond to unpredictable musical ideas. His concept of "Composing in the Moment" is accentuated by challenges presented by musical error. Jazz improvisation is an exercise in playing from the "known to the unknown." Musicians routinely try to create melodies, phrases, patterns, and so forth, that are truly original. In attempting to produce original music during an improvised solo, errors invariably occur. According to Berliner, these errors can be characterized as musical problems, and it is the way in which great improvisers find solutions to these problems that create truly memorable improvisations.

Computer technology has been found to be an effective asset to jazz improvisation pedagogy (Boiling, 1993). Advantages of MIDI-based accompaniment

were contrasted with professionally produced play-alongs such as the Aebersold collection and the Jazz Workshop series (MIDI = musical instrument digital interface). Some of the advantages of MIDI-based accompaniment involved independent control of tempo and pitch, control of instrument sounds, control of instrumental balance, control of swing feel, custom tracks, and pattern playback. Dalby (1995) also highlighted the benefits of MIDI accompaniment, but concluded that students may become dependent on the accompaniment to successfully navigate chord progressions. Dalby's remedy was to develop a vocal-based approach to improvisation instruction aimed at teaching students to learn to improvise without accompaniment. Students learn first to sing the scales associated with a particular chord progression before attempting to play through the changes on their respective instruments.

#### Ensemble-based Improvisation Instruction

Although most improvisation instruction procedures have been focused on one-on-one instruction, some jazz educators have developed procedures for improvisation instruction in the ensemble setting. Maud's (1997) practical ideas for incorporating composition and improvisation within instrumental ensemble rehearsals included the activities of collective composing, improvisation of warm-up scales, and collective blues improvisation. Mixon (2003) advocated the sound-before-symbol principle in his approach to teaching improvisation within the ensemble setting. Simple activities of rhythmic and melodic call and response are used to introduce students to improvisation. According to Mixon,

The biggest advantage of using this approach is that beginning bands can improvise after only a few sessions. Not only do they get a more complete music education, but they also begin to see improvisation as one of the most enjoyable parts of band rehearsals. (p. 54)

## Non-specialist Improvisation Instruction

Instruction in improvisation usually occurs within the jazz idiom by jazz educators. Although jazz and improvisation are inexorably linked, improvisation can be taught utilizing other musical idioms. Tomassetti (2003) introduced a method for teaching blues improvisation that does not require previous jazz experience. His method was comprised of three steps: (a) student exploration of two types of phrases; question and answer, (b) student development of solo shaping; (c) and student use of basic compositional techniques for thematic development. Tomassetti believed that by using the concepts of phrase structure, musical energy and dramatic shape, and thematic development, any student could be effectively taught to improvise a musically meaningful solo. Bitz (1998) discussed a method of introducing improvisation instruction within genres outside of jazz. His suggestions utilized various musical idioms, including bluegrass, blues, ska, reggae, rap, klezmer, and rock. In addition, Campbell (1991) introduced a jazz improvisation method that provides the novice or non-jazz specialist with strategies and instructional tactics specifically designed to demystify jazz and improvisation. Her method emphasized recorded models, imitation, development of performance facility, and instructional pace.

## Overall Conclusions

Compared with other music education areas, scholarly inquiry into jazz improvisation continues to be limited. Holistic consideration of the current research in the area of improvisation does, however, reveal an increase in inquiry. Jazz educators continue to think critically about the process of jazz improvisation and how better to organize instruction for beginning, intermediate, and advanced improvisers. Although

many different pedagogical strategies have been developed, few research studies validating specific strategies have been completed.

Technological advances continue to provide jazz educators with powerful improvisation instructional aids, such as *Smartmusic* and *Band-in-a-Box*, yet a small amount of research has been conducted evaluating methodologies that utilize these programs. In addition, several valid and reliable rating scales have been developed for instrumental jazz improvisation achievement. It is questionable, however, whether these measurements can be effectively utilized for a variety of instruments in real-world applications. Further research should include attempts to validate different approaches to jazz improvisation instruction so that a comprehensive instructional method may be developed. Furthermore, researchers must evaluate present-day technology in the context of improvisation instruction. Critical evaluation of these instructional aids should help improve upon their design and application. Finally, because theoretical frameworks for jazz improvisation, spontaneously composed music, or both together, have yet to be agreed upon by researchers, educators, and musicians, further research related to defining this enigmatic construct is warranted. Because the creation of an improvisation rating scale must involve defining improvisation, further research in this area may be beneficial.

Based on the empirical research related to the evaluation of jazz improvisation achievement, several conclusions can be drawn. Although evaluating music performance is a difficult endeavor, several researchers have shown that reliable measures can be developed (e.g., Abeles, 1973; Bergee, 1987; Zdzinski, 2002). Jazz improvisation presents additional reliability challenges, however, despite the potential for added subjectivity, several researches have succeeded in developing reliable and valid

improvisation measurements (Horowitz, 1994; May, 2003; McPherson, 1995; Pfenninger, 1990). If music curricula are to offer instruction in jazz, methods of evaluating improvisation must be developed that more accurately account for all the factors that define improvisation. By more specifically defining jazz improvisation, pedagogical approaches can be developed that target student deficiencies, thus facilitating improvement in specific performance areas.

Historically, learning to improvise in the genre of jazz encompassed an individual exploratory process of listening and imitation. Evaluation of improvisation was essentially limited to either praise or admonition by an audience or by one's peers. Consequentially, the inclusion of jazz studies within the structured environment of the school curriculum demands that the methods utilized to evaluate jazz improvisation be reliable and valid. Students must be provided with appropriate feedback in order to improve performance. Likewise, jazz educators must employ measurement tools that adequately measure the intended phenomenon in order to provide appropriate instruction. Accordingly, the present study is an attempt to develop a reliable and valid measure that more thoroughly defines the wind jazz improvisation construct.

## CHAPTER III

### METHOD

The purpose of this study was to develop a rating scale for collegiate wind jazz improvisation. The investigation involved several major phases: (a) the development of an item pool of statements descriptive of wind jazz improvisation, (b) construction of the Wind Jazz Improvisation Evaluation Scale (WJIES), (c) selection of performers and performance material, (d) selection of adjudicators, (e) rating of instrumental jazz improvisation performances using the WJIES, (f) determination of the reliability and validity of the WJIES.

#### Facet-Rational and Facet-Factorial Approaches

The facet-rational approach to rating scale development was first discussed by Butt and Fiske (1968) within a research study involving the development of a rating scale to measure the construct of dominance. Butt and Fiske discussed the approaches of facet-rational, facet-factorial, rational-trait, and factorial-trait. A rational strategy involves the test constructor developing and/or choosing items based on his or her own rationale or preconceived ideas related to a particular subject. A factorial method involves the utilization of factor analysis to select items from a large amalgamation of descriptors. A facet approach assumes that a construct is composed of various facets. These facets in turn contain elements. A global trait strategy assumes that a construct is composed primarily of a single defining component. A facet-factorial approach involves the development a rating scale composed of subscales by factor-analyzing a large group of items descriptive of a particular construct (Horowitz, 1994). A facet-rational approach to

scale construction assumes that the construct of interest is multidimensional, but items would be chosen based on the rationalizations of the researcher. It differs from a facet-factorial approach in that factor analysis is not employed to initially determine the item pool. Factor analysis may then be employed as a method of content validation. This approach was used in the present study.

### Development of the Item Pool

Email solicitations were sent out to a variety of jazz musicians, educators and advanced jazz students (Appendix A). Each was asked to write down descriptors for either a good or poor wind instrumental improvisation. By including a variety of jazz musicians at varying stages of development in the process, a diverse, comprehensive item pool was generated. Additional descriptors were produced by the examination and analysis of interviews of jazz wind instrumentalists published in *Downbeat*, *Jazzed*, the *Jazz Educator's Journal*, and other jazz-related publications. Pedagogical materials related to the teaching of jazz improvisation were also reviewed and analyzed for additional improvisation descriptors. This material existed in the form of books, guides, or audiovisual instructional aids. The final source for improvisation descriptors came from the research literature. A few improvisation scales have been previously developed that exhibited acceptable levels of both reliability and validity (Horowitz, 1994; May, 2003; McPherson, 1995; Pfenninger, 1990). Relevant items were borrowed from these measures and added to the initial item pool. A complete list of the initial items gathered from the email solicitation can be found in Appendix B. Items compiled from examining books, interviews, and research literature can be found in Appendix C.



Once all of the items were collected, the pool was examined for clarity and redundancy. Redundant items were combined or eliminated. Some items were reworded to enhance lucidity or were discarded because of ambiguity. Each of the 85 items were placed into one of 14 item groupings. These groupings represented 14 distinct evaluation areas. The items within each group were combined and/or modified in order to produce one concise descriptor for each of the 14 groupings. Table 1 is an illustration of how each scale item was refined from the initial item groupings. The resulting item pool was reviewed by a panel of jazz educators who provided feedback related to the clearness, appropriateness, and conciseness of the items.

*Table 1. Initial Item Groupings and Resulting Descriptors*

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1. Soloist demonstrates a knowledge of theory.

- 1. Keeps flavor of tonality
- 9. Solo makes musical sense
- 30. Plays with hood harmonic concept
- 34. Plays with a deep understanding of the song
- 39. Plays wrong notes for certain harmonies

2. Soloist plays with uncharacteristic tone quality.

- 18. Plays with a great sound
- 19. Vibrato sounds natural
- 25. Full sound
- 25. Sound has no core
- 26. Tones speak clearly
- 27. More breath support
- 28. Too much vibrato
- 46. Captures the essential tone of song
- 47. Sings through the horn
- 48. Not enough support behind the sound
- 51. Tone is sweet
- 52. Vibrato is lush

3. Soloist uses melodic motifs and/or sequences.

- 6. Uses melodic motifs or sequences
- 9. Plays off melody well
- 21. Creating melodic lines
- 27. Repetition/sequencing
- 44. Use of sequencing ties in enharmonic tones.

4. Soloist plays with a lack of confidence.

- 8. Plays without confidence
- 11. Exhibits musical attitude
- 42. Sounds unsure

5. Soloist plays with appropriate time feel and/or rhythm.

- 20. Soloist has good rhythmic feel
- 23. Rhythmic creativity and use of space
- 30. Plays in the pocket
- 32. Steady rhythmic concept
- 55. Plays "on top" of the time

6. Soloist plays with good technical facility.

- 17. Soloist plays with good technique
- 20. Sounds effortless
- 24. Facility on the instrument
- 33. Jazz articulation is clean
- 35. Performed with ease
- 49. Technique but no soul

7. Soloist expresses ideas with a lack of certainty.

- 5. Builds to make a statement
- 15. Ideas are fluently expressed
- 21. Play don't think
- 31. Phrases don't flow

8. Soloist plays with poor intonation.

- 50. Intonation is bad in the upper register

9. Development of solo is logical.

- 2. Solo contains logical phrases
- 5. Solo doesn't end well
- 10. Melodic lines are not logical
- 15. Solo makes no sense
- 22. Hitting key arrival points
- 29. Ends of phrases are logical
- 41. Solo is intuitive
- 53. Plays with a certain thoughtfulness

10. Soloist performs with emotional expression.

1. Solo climaxes
2. Solo communicated
4. Expresses feelings
6. Plays with personality
7. Plays with fire
11. Plays with feeling
12. Soloist tries to express something
12. Attempts to speak to the audience musically
13. Conversational; sounds like he is playing just for you
14. Communicates with the audience
19. Plays soulful
22. Plays with one dynamic level
28. Energetic and emotional playing
36. Plays with no spirit
37. Plays with excitement and joy
40. Solo is emotionally moving
54. Solo has something that grabs you

11. Soloist plays with appropriate style.

3. Plays in a convincing manner consistent with the style
10. Creates a unique mood
13. Plays with good style
14. You got to swing
18. Plays in the style

12. Soloist's performance lacks imagination and/or creativity.

3. Plays with imagination
16. Sounds like licks over chords
17. Playing sounds unique
23. References the "jazz language" without sounding stale
29. Soloist tries to create something new and different
38. Solo has a dramatic quality
45. Plays with a fresh approach

13. Solo lacks interaction and fails to dialog with accompaniment.

- 7. Plays with awareness of what other musicians are playing
- 8. Connects with the band

14. Soloist effectively uses chromatic approach tones.

- 4. Wrong notes are not effectively resolved
- 16. Use of voice leading
- 24. Makes wrong notes sound right
- 26. Voice leading/tension and release
- 43. Plays outside the key too often

---

At the conclusion of the refinement process, remaining items then were randomly phrased positively and negatively to avoid acquiescence bias (Spector, 1992). Each item was then paired with a seven-point Likert-type scale. Responses included disagree strongly, disagree moderately, disagree slightly, neither agree nor disagree, agree slightly, agree moderately, and agree strongly. Below is an example of how a typical item is represented in the scale.

*Table 2. Sample Item*

---

1. Soloist performs with emotional expression.

1	2	3	4	5	6	7
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

---

Prior to finalizing the Wind Jazz Improvisation Evaluation Scale, the measure was piloted by two faculty members at a large Midwestern university. Both adjudicators

possessed extensive jazz experience, one as a distinguished performer and the other as a performer/educator. The judges were given a packet containing two copies of the WJIES and a compact disc recording of two improvised jazz solos. The adjudicators were asked to evaluate each solo using the WJIES and to provide feedback related to its usability. Feedback was positive. Items were seen to be concise, easy to understand, and relevant. One pilot adjudicator also commented on the need to carefully read each item in order ascertain whether or not the item was negatively or positively worded. Based on the resulting feedback provided by both evaluators, the wording of one of the items was slightly modified (item # 2), and the 14-item WJIES then was finalized (see Appendix G).

## Participants

### Collegiate Instrumentalists

Five wind jazz students and one professional jazz educator were asked to record two improvisations (five males and one female). Five of the six performers self-described their improvisation ability as either moderate or advanced. Four of the six performers reported from one to five years of piano experience. In addition, four of the six participants also reported one to three hours of jazz listening per week, with the remaining two reporting listening for four or more hours. The students were purposively chosen based on their improvisation ability (two saxophonists, two trumpeters, and one trombonist). Student improvisers consisted of three juniors, one senior, and one graduate. The professional musician (trombonist) provided improvisations at a high level of sophistication. The improvisers were sorted based on improvisation ability into one of three descriptive categories: (a) intermediate, (b) advanced, or (c) sophisticated. The

placement and determination of student improvisation ability was decided by the collaborative observations of the researcher and the jazz studies director at this university. Delineation was done in such a way as to create three groups of two. Each potential performer was also given an informed consent letter detailing the procedures of the study prior to the recording sessions (see Appendix E).

### Adjudicators

Because factor analysis was used as part of the content validation process, the ideal ratio of adjudicator-to-scale items should be about 5 to 1, according to procedures outlined by Gorsuch (1983). Therefore, the 14 items on the WJIES called for an adjudicator panel of about 70 members. Over 70 adjudication packets were compiled and presented to potential evaluators. Sixty-three of the adjudicator packets were returned, resulting in an adjudicator-to-scale ratio of 4.5 to 1. Adjudicators consisted of university jazz students enrolled at a large Midwestern university, college jazz students enrolled at a small rural university, and, in addition, various jazz educators and experienced jazz performers. These evaluators were selected to represent a variety of age groups, improvisational ability, and jazz instruction experience. The intent was that the Wind Jazz Improvisation Evaluation Scale could be utilized reliably by a wide spectrum of jazz educators, performers, and students.

In order to generate global evaluation scores, an advanced jazz musician was asked to listen to the 12 recorded improvised solos and rate them based on two traits, Performance Skills and Creative Development (extensively discussed in chapter 4). A 5-point scale with five being the high score was employed. The descriptive items of the WJIES categorized under both Performance Skills and Creative Development were read

to the evaluator in order to provide a definitive explanation for the two traits. Six of the 12 improvised solos were randomly chosen and evaluated twice so that test-retest reliability coefficients for both traits could be calculated.

### Procedures

The 12 improvisations from the six participating performers were digitally recorded. Each performer was asked to complete two tasks. The first consisted of an improvisation of two choruses of Bb Blues (quarter note = 197 bpm) performed with a Jamey Aebersold (1981) play-along recording. Written chord changes were provided. The second improvisation task consisted of each player performing one chorus of Benny Golson's *Killer Joe* (quarter note = 115 bpm), also accompanied by an Aebersold (1979) play-along recording. One chorus of the Bb Blues accompaniment was played for each participant prior to the improvisation. The A section of the *Killer Joe* song form was also played for each instrumentalist prior to the second improvisation task. A lead sheet with chord changes was provided for *Killer Joe*. Some participants chose to play along with the recorded accompaniments prior to recording each task in order to further familiarize themselves with the specific chord progressions. All improvisations were recorded using a Sharp IM-DR 420HS 1-bit MiniDisc recorder along with a Sony ECM-MS907 stereo microphone. The accompaniment was played on a Technics SL-PG340 compact disc player utilizing a set of Paradigm Performance Series speakers. The recordings were made in a small, acoustically treated studio office. At the conclusion of each improvisation task, the recordings were played for each participant in order to determine acceptability. If a performer judged an improvisation to be unacceptable, additional takes were recorded until the performer was satisfied with his or her improvisation.



Once the improvised solos were successfully recorded to MiniDisc, the stimuli were uploaded to computer via Apple's *Garage Band* program and then burned to compact disc. In order to provide the best possible stimuli to the adjudicators, minor balance effects were added to each recording prior to burning the disc. The improvisations were arranged on each disc according to improvisation ability. Instrumentalists at the intermediate level performed solos one through four. Advanced level performers recorded solos five through eight. Lastly, instrumentalists with sophisticated skill performed solos nine through twelve. At the conclusion of each recording session, participants were asked to complete the Subject Experience Survey (SES; May, 2003) (see Appendix F). This survey was designed to collect background information, including school classification, major instrument, piano experience, jazz listening per week, improvisation class experience, and self-described level of improvisation skill on a three-point scale: (a) beginner, (b) moderate ability, and (c) advanced. The data collected by the SES were used to describe the improvisation performers.

### Assessment

Before evaluating the stimuli, each judge was asked to listen to two anchor examples representing a strong and a relatively weak performance on the Bb Blues task. Each adjudicator was asked to read and adhere to the following instructions prior to evaluating the stimuli:

The "anchor" recording is provided so that each evaluator will have a reference point in order to judge each solo within the ability range of the samples. In the same way that you would not judge beginners with the same criteria as professionals, concentrate on judging each solo within the range of skill illustrated by the two anchor recordings. Anchor recording number one is an example of a relatively strong solo based on the items found on both evaluation scales. If I were

to evaluate this performance, each item would receive a 5 or higher. Anchor recording number two exemplifies a relatively weak performance. The majority of my scores for this performance would fall towards the lower end of the scale. Please take into consideration these examples and score your evaluations accordingly.

Adjudicators were given a packet containing one Wind Jazz Improvisation Evaluation Scale as well as one Instrumental Jazz Improvisation Evaluation Measure (IJIEM; May, 2003) for each recorded solo. Each evaluator was provided detailed instructions by the "Directions For Evaluators" letter within each packet (see Appendix D). The IJIEM was included for validation purposes as described in Chapter Four. Along with the evaluation forms, a compact disc containing both the recorded improvisations and the anchor recordings was also provided. The adjudicators were asked to evaluate the improvisations accordingly and not to discuss the scores until all forms were returned to the researcher. The completion time for the adjudicator packet was estimated at approximately 60 minutes. The majority of evaluators returned the completed packets within three weeks.

### Reliability and Validity

Several procedures were utilized in order to determine reliability of the WJIES. Internal consistency was determined using Cronbach's coefficient alpha. A separate alpha coefficient was calculated for each subscale and the total scale. Guttman's lower bounds for true reliability and item-total correlations were also calculated. To determine interjudge reliability, Kendall's Coefficient of Concordance and the Intraclass Correlation Coefficient were used.

Three forms of validity were examined: content validity, criterion-related validity, and construct validity. Content validity was determined via two methods: (a) a

careful development of the initial item pool, and (b) a later examination of the structure by means of factor analysis. To determine criterion-related and construct validity, scores on the WJIES were compared to scores on an existing instrumental improvisation evaluation measure—May's (2003) Instrumental Jazz Improvisation Evaluation Measure (IJIEM). WJIES and IJIEM subscale scores also were compared with the global evaluations of a single highly experienced jazz musician. Construct validity was explored through the development of a multitrait-multimethod (MTMM) matrix (Campbell & Fiske, 1959). This matrix was developed encompassing the three different measurement methods and the two distinct performance traits identified through the content validation process.

## CHAPTER IV

### RESULTS

The purpose of this study was to construct and validate a rating scale for collegiate wind jazz improvisation performance. The results are presented in three main sections: (a) development of the Wind Jazz Improvisation Evaluation Scale (WJIES), (b) reliability of the WJIES, and (c) results of the content, criterion-related, and construct validity analyses.

#### Development of the WJIES

##### Content Development

The 14 items that were retained for the WJIES were selected from the perspective of a facet-rational theoretical framework. Consistent with a facet-rational approach to scale construction, decisions to retain, combine, modify, or reject items were made largely based on input from accomplished jazz musicians and the knowledge and expertise of the researcher. A majority (64%) of the items were adapted from descriptions of wind jazz improvisation written by knowledgeable jazz performers and educators. Other items (36%) were modified from books and magazines related to jazz improvisation and items found in the jazz improvisation research literature. The final 14 items of the WJIES are found in Table 3.

##### Determination of Reliability of the WJIES Items

A variety of procedures were utilized to determine the reliability of the WJIES. Cronbach's coefficient alpha was calculated to measure the internal consistency of both the Instrumental Jazz Improvisation Evaluation Measure (May, 2003) and the Wind Jazz

*Table 3. The Wind Jazz Improvisation Evaluation Scale Items*

---

1. Soloist demonstrates a knowledge of theory.
  2. Soloist plays with uncharacteristic tone quality.
  3. Soloist uses melodic motifs and/or sequences.
  4. Soloist plays with a lack of confidence.
  5. Soloist plays with appropriate time feel and/or rhythm.
  6. Soloist plays with good technical facility.
  7. Soloist expresses ideas with a lack of certainty.
  8. Soloist plays with poor intonation.
  9. Development of solo is logical.
  10. Soloist performs with emotional expression.
  11. Soloist plays with appropriate style.
  12. Soloist's performance lacks imagination and/or creativity.
  13. Solo lacks interaction and fails to dialog with accompaniment.
  14. Soloist effectively uses chromatic approach tones.
- 

Improvisation Evaluation Scale. Table 4 reports these outcomes. Alpha indexes the degree to which scale items measure the same underlying variable ( DeVellis, 1991).

Alpha outcomes for the WJIES were generally high, ranging from .87 to .95 (Table 4, WJIES  $\alpha$  column). Alphas for the IJIEM also were high, ranging from .85 to .94 (Table 4, IJIEM  $\alpha$  column). Guttman's procedure ( $\Lambda$ ) for estimating the lowest possible "true" reliability is also found in Table 4 ( $\Lambda_1^a$  column). These coefficients, found under Lambda sub-1, demonstrate an acceptable lower bound for true reliability, ranging from .81 to .88.

Table 4. Reliability Analyses for the Instrumental Jazz Improvisation Evaluation Scale and the Wind Jazz Improvisation Evaluation Scale

Improv.	IJIEM		WJIES							
	$\alpha$	$W_4$	$\alpha$	IC	Avg.-IC <sub>6</sub>	SD	IC-Single	$\Lambda_1^a$	W	$W_4$
1	.85	.79**	.87	.87	.81	.18	.33	.81	.39	.71*
2	.91	.56**	.90	.90	.80	.14	.40	.84	.42*	.37**
3	.93	.63**	.91	.91	.90	.06	.42	.84	.48*	.56**
4	.93	.70**	.93	.93	.89	.08	.47	.86	.52*	.23**
5	.94	.63**	.92	.92	.90	.06	.44	.85	.53*	.82**
6	.91	.62**	.95	.95	.84	.06	.57	.88	.66*	.77**
7	.91	.56**	.90	.90	.87	.10	.40	.84	.51*	.24*
8	.93	.42**	.95	.95	.95	.03	.59	.88	.65*	.53**
9	.93	.85**	.94	.94	.92	.06	.53	.87	.64*	.86**
10	.92	.88**	.93	.93	.91	.08	.50	.87	.60*	.89**
11	.89	.71*	.93	.93	.90	.07	.50	.87	.56*	.86**
12	.91	.86**	.95	.95	.95	.02	.56	.88	.62*	1.00**

Note.  $\alpha$  = Cronbach's Coefficient Alpha; IC = Intraclass Correlation Coefficient ( $n = 63$ ); Avg.-IC<sub>6</sub> = average intraclass correlation of six random extractions (average of ten runs); SD = Standard Deviation; IC-Single = estimate of intraclass correlation assuming a single adjudicator;  $\Lambda_1$  = Guttman's Lambda for lower bound reliability; W = Kendall's Coefficient of Concordance ( $n = 63$ );  $W_4$  = Kendall's Coefficient of Concordance with  $n = 4$ .

<sup>a</sup> Guttman proposed several measures that estimate the lower bounds for true reliability, that is, the reliability of the hypothesized population of adjudicators. In this study I used the first estimate, which is the simplest and most conservative.

\*  $p < .05$ . \*\*  $p < .01$ .

Item-total correlations were calculated and can be found in Table 5. An item-total correlation indexes the extent to which an item correlates with the total score minus that item. Correlations ranged from .25 to .86. Generally, alphas remained consistently high with the given item removed. The relationships between an individual item and the total scale minus the item strengthened as the performances improved in quality.

Technique, development, and style, seem to be the items most closely related to the total scale.

In order to obtain reliability estimates related to adjudicator consistency, the Intraclass Correlation Coefficient and Kendall's Coefficient of Concordance ( $W$ ) were calculated. An intraclass correlation coefficient measures the agreement of values within a set of cases, in this instance the agreement of the 63 judges within the set of 14 items. This correlation is calculated as an average of all judges; however, an estimate of a single judge also can be obtained. Intraclass correlation scores were comparable to alpha estimates and ranged from .87 to .95. Estimates of the intraclass correlations in the case of a single adjudicator (IC-Single) were much lower, ranging from .33 to .59. Because of the large number of judges, an average intraclass correlation (from ten runs) of six randomly chosen adjudicators was calculated for each improvised solo (Avg.-IC<sub>6</sub>). Resulting coefficients ranged from .80 to .95 and compared favorably with correlations from the entire set of 63 judges. Kendall's Coefficient of Concordance ( $W$ ), a more common but more conservative index of judge agreement, was calculated for each of the 12 improvised solos. One advantage of  $W$  is that it can be tested for statistical significance. The resulting coefficients ranged from .39 to .66 ( $ps < .05$ ).

In addition to examining the interjudge reliability of the WJIES and the IJIEM for the entire adjudicator population ( $n = 63$ ), interjudge reliability was examined with only the four most experienced jazz musicians (Table 4,  $W_4$  column). These four judges were chosen based on 10 or more years of jazz performance or jazz education experience. Among these four, coefficients were comparable to those from the full panel. Coefficients for the IJIEM ranged from .42 to .88, while those for the WJIES ranged from .23 to 1.00.

Table 5. Item-Total Correlations for the WJIES Evaluations

Improv.	Theory	Tone	Motif/seq	Confid.	Feel	Tech.	Fluid.	Inton.	Dev.	Expr.	Style	Creat.	Inter.	Chrom.
1	.40	.54	.55	.51	.51	.70	.74	.48	.65	.52	.70	.61	.38	.25
2	.56	.29	.57	.68	.80	.70	.68	.26	.68	.65	.68	.41	.68	.62
3	.44	.51	.69	.71	.67	.67	.64	.65	.73	.66	.74	.64	.67	.39
4	.60	.61	.58	.63	.75	.80	.59	.59	.68	.77	.71	.68	.72	.56
5	.61	.39	.76	.57	.67	.69	.48	.65	.66	.70	.83	.78	.72	.65
6	.57	.68	.74	.65	.75	.73	.79	.78	.84	.72	.81	.87	.60	.81
7	.53	.55	.78	.42	.53	.57	.74	.33	.74	.75	.78	.65	.66	.47
8	.74	.71	.80	.83	.83	.77	.77	.65	.66	.84	.83	.86	.72	.67
9	.80	.72	.56	.79	.72	.75	.68	.85	.70	.76	.72	.74	.61	.59
10	.67	.51	.73	.68	.79	.80	.72	.47	.60	.76	.69	.83	.64	.83
11	.72	.51	.61	.60	.70	.64	.76	.77	.85	.74	.81	.70	.66	.69
12	.62	.72	.84	.66	.85	.81	.77	.72	.67	.75	.80	.72	.59	.69

55

Note. Motif/seq = motifs/sequences; Confid. = confidence; Tech = technique; Fluid = fluidity; Inton. = intonation; Dev. = development; Expr.= expression; Inter. = interaction; Chrom. = chromaticism



## Determination of Structure of the WJIES

Butt and Fiske's (1968) facet-rational approach calls for a grouping of items into subscales based on the researcher's a priori conceptions. Hence, I initially grouped items into four broad areas: (a) Technique/Tone Quality, (b) Structure/Development, (c) Rhythm/Style, and (d) Expression. The decision for this grouping was based on a combination of my assumptions related to the structure of wind jazz improvisation and a perusal of various musical performance adjudication forms including both classical and jazz formats. The various evaluation methods reviewed seemed to support a four-area delineation of wind improvisation performance. Table 6 depicts the WJIES items organized into my a priori structure. A factor analysis of the WJIES scale items for each of the 12 improvisations was then conducted for content validation purposes. Rotation matrices (orthogonal, using varimax) for each of the 12 analyses can be found in Appendix J.

Initial factor analyses of the 12 solos suggested various solutions ranging from one to three factors. Seven of the 12 improvised solo evaluations produced factor solutions with three primary factors. Improvisation 8 produced a solution with a single factor. Table 7 presents the names I assigned to the initial factor structures for the 12 improvisation evaluations. Based on an examination of the scree plots and rotation matrices for each of the 12 improvised solos, a two-factor structure was determined to be the best overall descriptor of collegiate wind jazz improvisation. I subsequently forced a two-factor solution for each of the 12 improvised solos, all of which yielded logical item groupings.

Table 6. Four-Area A Priori Structure

---

I. Technique/Tone Quality

1. Soloist demonstrates a knowledge of theory.
2. Soloist plays with uncharacteristic tone quality.
6. Soloist plays with good technical facility.
7. Soloist plays with poor intonation.

II. Structure/Development

3. Soloist uses melodic motifs and/or sequences.
9. Development of solo is logical.
13. Solo lacks interaction and fails to dialog with accompaniment.
14. Soloist effectively uses chromatic approach tones.

III. Rhythm/Style

5. Soloist plays with appropriate time feel and/or rhythm.
7. Soloist expresses ideas with a lack of certainty.
11. Soloist plays with appropriate style.

IV. Expression

4. Soloist plays with a lack of confidence.
  10. Soloist performs with emotional expression.
  12. Soloist's performance lacks imagination and/or creativity.
-

Table 7. Factor Structure Names for the Initial Factor Analysis

Improvisation	Factor		
	I	II	III
1	Performance Skills	Development of Ideas	Creativity
2	Performance Skills	Development of Ideas	Intonation
3	Performance Skills	Development of Ideas	Chromaticism
4	Development of Ideas	Performance Skills	Fluidity
5	Creativity	Performance Skills	Tone
6	Creative Development	Performance Skills	_____
7	Performance Skills	Chromaticism	Confidence
8	Wind Jazz improvisation	_____	_____
10	Creativity	Performance Skills	Idea Development
11	Performance Skills	Creative Development	_____
12	Creative Development	Performance Skills	_____

I named the two factors (a) Performance Skills and (b) Creative Development. Table 8 illustrates how the WJIES items best fitted within the two-factor solution. The two factors changed place in amount of variability explained as the quality of the performances improved. For the intermediate performances, Performance Skills generally emerged as the first factor. As the performances became more sophisticated, Creative Development became Factor One in the analyses. All factor loadings and scree plots for the two-factor analyses can be found in Appendix K.

Although the a priori structure was not supported by the factor analyses, a logical reconciliation of the resulting two-factor solution is possible. The majority of the items that make up the Technique/Tone Quality and Structure/Development factors within the a priori structure emerged as elements of Factor One, Performance Skills. Likewise, most of the items that constitute the Rhythm/Style and Expression factors within the a priori structure loaded on Factor Two, Creative Development. Factor One, Performance Skills, essentially represents items related to technique and musical structure. Factor Two, Creative Development, is made up of items specific to musical expressiveness, creativity, and style.

#### Criterion-related Validity

Criterion-related validity for the WJIES was explored by comparing the total scores obtained from the WJIES ratings and the IJIEM evaluations. Because of the generally good interjudge reliability results of the experienced adjudicators subset ( $n = 4$ ), the criterion-related validity was examined using only these evaluation scores.

Table 8. WJIES as a Two-Factor Structure

---

I. Performance Skills

1. Soloist demonstrates a knowledge of theory.
3. Soloist uses melodic motifs and/or sequences.
4. Soloist plays with a lack of confidence.
5. Soloists plays with inappropriate time feel and/or rhythm.
6. Soloist plays with good technical facility.
8. Soloist plays with poor intonation.
9. Soloist development of solo is logical.

II. Creative Development

2. Soloist plays with uncharacteristic tone quality.
  7. Soloist expresses ideas with a lack of certainty.
  10. Soloist performs with emotional expression.
  11. Soloist plays with appropriate style.
  12. Soloist performance lacks imagination and /or creativity.
  13. Solo lacks interaction and fails to dialog with accompaniment.
  14. Soloist effectively uses chromatic approach tones.
- 

A total score for each of the 12 improvisations was calculated for the judges and these totals were analyzed using the bivariate correlations procedure. Only the Pearson's correlation ( $r$ ) coefficient was utilized. This coefficient is a measure of linear association. The summated total score of improvisation one as measured by the WJIES was correlated with the summated total score for improvisation one as measured by the IJIEM. Solos 2-12 were correlated likewise. Coefficient scores varied and ranged from .24 to 1.00. Table 9 reports the results.

*Table 9. Correlation Coefficients (r) Between the Wind Jazz Improvisation Evaluation Scale and the Instrumental Jazz Improvisation Evaluation Measure*

Improvisation	<i>r</i>
1	.71
2	.97*
3	.91
4	.79
5	.97*
6	.89
7	.99**
8	.24
9	.89
10	.99**
11	.30
12	1.00**

\*  $p < .05$ . \*\*  $p < .01$ .

#### Determination of Construct Validity via Multitrait-multimethod Assessment

Construct validity was examined by the development and analysis of a multitrait-multimethod (MTMM) matrix encompassing three distinct measurement methods and two unique performance traits. The three measurement methods included: (a) May's (2003) Instrumental Jazz Improvisation Evaluation Measure (IJIEM), (b) the present study's Wind Jazz Improvisation Evaluation Scale, and (c) a global rating by an advanced jazz musician using the two distinct improvisation performance traits (Performance Skills and Creative Development).

## The MTMM Matrix

First proposed by Campbell and Fiske (1959), the MTMM matrix constitutes one of the most advanced means for assessing construct validity. The matrix represents an integrated multivariable platform by which information relative to convergent and discriminant validity is gathered and evaluated. With this procedure, assessments of two or more traits using two or more measurement methods are intercorrelated (Bryant, 2002). Campbell and Fiske's approach produces four different types of correlations: (a) monotrait-monomethod, (b) heterotrait-monomethod, (c) monotrait-heteromethod, and (d) heterotrait-heteromethod.

### Monotrait-monomethod Correlations

Monotrait-monomethod (MM) correlations are between the same trait measured using the same method. These values are equivalent to the correlations between A1-A1, B1-B1, A2-A2, and so forth. Rather than place 1.00 in the MM diagonal, however, coefficient alpha or test-retest reliability values usually are substituted (Campbell & Fiske, 1959). In the MTMM matrix reported in Table 10, MM values of A1 through B2 are averaged coefficient alpha values, whereas A3 and B3 represent the test-retest correlations of the single-judge evaluations. Performance Skills ratings produced a test-retest coefficient of .50. Creative Development ratings produced a test-retest coefficient of .76.

### Heterotrait-monomethod Correlations

Heterotrait-monomethod (HM) coefficients are correlations among different traits measured using the same method. In the matrix, these values are the correlations between A1-B1, A2-B2, and A3-B3.

### Monotrait-heteromethod

Campbell and Fiske referred to the correlations between the same trait measured using different evaluation methods as monotrait-heteromethod (MH), or validity coefficients. Within Table 10, these values correspond to the correlations between A1-A2, A2-A3, A1-A3, B1-B2, B2-B3, and B1-B3.

### Heterotrait-heteromethod Correlations

The fourth set of correlations described by Campbell and Fiske, heterotrait-heteromethod (HH), are the correlations between different traits measured using different methods. Within Table 10 these coefficients are reported as the correlations between A1-B2, A1-B3, A2-B1, A2-B3, A3-B1, and A3-B2.



Table 10. Multitrait-Multimethod Matrix

---

		A1	B1	A2	B2	A3	B3
Method 1	A1	<b>.76<sup>a</sup></b>					
	B1	.98*	<b>.82<sup>a</sup></b>				
Method 2	A2	.96*	.98*	<b>.89<sup>a</sup></b>			
	B2	.98*	.99*	.97*	<b>.87<sup>a</sup></b>		
Method 3	A3	.78*	.81*	.76*	.73*	<b>.50<sup>b</sup></b>	
	B3	.79*	.84*	.83*	.79*	.80*	<b>.76<sup>b</sup></b>

---

Note. Methods: 1 = IJIEM, 2 = WJIES, 3 = Global rating; Traits: A = Performance Skills subscale, B = Creative development subscale. The monotrait-monomethod diagonal is in boldfont.

<sup>a</sup> Averaged Coefficient Alpha for the 12 evaluations    <sup>b</sup>Test-retest correlations

\*  $p < .01$ .

### Forms of Construct Validity

There are essentially two main forms of construct validity found in MTMM designs, convergent validity and discriminant validity. Convergent validity is the degree to which multiple measures of the same construct agree, or converge (Campbell & Fiske, 1959). Valid measures of the same underlying concept should correlate highly.

Discriminant validity is conversely related to convergent validity and is the degree to which multiple measures of different concepts are shown to be distinct. Measures that purportedly assess different traits should not correlate as highly as measures that assess

the same trait, if indeed they are valid measures of those traits and if the traits indeed are distinct.

Campbell and Fiske (1959) proposed four criteria for the evaluation of convergent and discriminant validity. They recommended that the researcher visually examine the MTMM matrix and confirm the presence of the four criteria. The first of these criteria deals with convergent validity. Convergent validity exists when the correlations among multiple methods of measuring the same construct (monotrait-heteromethod coefficients) are "significantly different from zero and sufficiently large" (Campbell & Fiske, 1959, p. 82). The corresponding coefficients found in Table 10 of .96, .99, .84, .76, .78, and .79 confirm this criterion. Therefore, convergent validity of the WJIES is confirmed.

The next three criteria are concerned with assessing discriminant validity. First, the correlations among multiple methods of measuring the same trait (monotrait-heteromethod, MH) should be higher than the correlations among multiple methods of measuring different traits (i.e., heterotrait-heteromethod, HH). This criterion is not supported by the correlations found in Table 10.

Second, correlations among different measurement methods for the same trait (monotrait-heteromethod, MH) should be higher than correlations among the same methods of measuring different traits (i.e., heterotrait-monomethod, HM). Again, correlations found in the matrix fail to confirm this. Lastly, correlations among the different concepts should be about the same value, regardless of whether the same or different evaluation methods have been utilized. That is,  $A1-B1 \approx A2-B2 \approx A3-B3$ . The correlation between A3 and B3 is decidedly different from the other two correlations. For these data, the method of measurement seemed to override trait distinctiveness. Multiple

judge evaluations were equally consistent across traits and measurement methods, that is, were equally consistent between the IJEM and WJIES. The single-judge evaluations, however, were systematically unreliable. The distinction appears to be between the measurement methods rather than between the two traits. Therefore, discriminant validity was not demonstrated among the two WJIES traits, which appear to be highly interrelated.

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

#### Summary

The present study explored the construction and validation of a rating scale for collegiate wind jazz improvisation. The collected data were analyzed in order to provide answers to the following research questions:

1. What evaluative criteria should be used to describe instrumental jazz improvisation?
2. How should the evaluative criteria be categorized?
3. What are central factors in the evaluation of wind jazz improvisation?
4. Is it possible to develop reliable rating scale items related to such performance aspects as creativity and expressiveness?
5. What is the reliability of the resulting rating scale?
6. What is the validity of the resulting rating scale?
7. Ideally, who should adjudicate collegiate wind jazz improvisation?

Statements descriptive of instrumental wind jazz improvisation were collected from interviews of jazz performers, evaluation forms, previous research, and prose written by jazz musicians at various stages of development. Consistent with a facet-rational approach, this information was analyzed for redundancy and clarity and reduced to 14 total items. The statements were randomly phrased positively and negatively and paired with a seven-point Likert-type scale. Two experienced jazz educators then piloted the initial scale. After minor modifications, the WJIES was finalized.

Five instrumental jazz students enrolled in jazz performance courses at a large Midwestern university each recorded two jazz improvisations, (a) one Bb blues task, and (b) one *Killer Joe* task, accompanied by an Aebersold play-along compact disc. One professional jazz musician also recorded both improvisation tasks resulting in a total of 12 improvisations. The performances were recorded via MiniDisc and burned to compact disc. At the completion of the improvisation tasks, each of the six performers completed the Subject Experience Survey (May, 2003). Sixty-three evaluators with a variety of jazz experience used both the 14-item WJIES and the 7-item IJIEM (May, 2003) to evaluate the recorded jazz improvisation performances. One highly experienced jazz musician also evaluated the solos on a 5-point scale.

## Conclusions

### Evaluative Criteria for Describing Collegiate Wind Jazz Improvisation Performance

Content analysis of interviews, prose descriptive of instrumental jazz improvisation, jazz education research, and previously composed evaluation measures yielded 85 distinct statements. These statements were translated into items and grouped under an a priori structure of four distinctive categories which included: (a) Technique/Tone Quality, (b) Structure/Development (c) Rhythm/Style, and (d) Expression. The researcher refined the initial item pool with the assistance of a panel of experienced jazz educators. The finalized Wind Jazz Improvisation Evaluation Scale contained 14 items and is located in Appendix G.

### Factors Central to Rating Wind Jazz Improvisation Performance

The decision for this grouping was based on a combination of the researcher's assumptions related to the structure of wind jazz improvisation and a thorough examination of various musical performance adjudication forms including both classical and jazz formats. The various evaluation methods reviewed generally supported the four-area description of instrumental jazz performance specified above. Factor analyses of the WJIES scale items for each improvised solo were then conducted for corroboration purposes. From one to three factors were rotated orthogonally. The number of factors that emerged was consistent with previously conducted research utilizing factor analysis (Horowitz, 1994; May, 2003). An examination of the data indicated that a rotated solution of two factors provided the most logical and clearly interpretable solution. This result corroborates McPherson's (1995) two-factor structure for improvisation evaluation. Seven items loaded highly on each of the two factors, Performance Skills and Creative Development. In terms of the data generated by the present study, the two areas of Performance Skills and Creative Development represent the two areas most central to wind jazz improvisation performance evaluation, although the study also provided evidence that they are strongly interrelated.

### Reliability of the Creativity and Expressiveness Subscales

Consistent with previous research results (Horowitz, 1994; May, 2003; McPherson, 1995;), it seems possible to develop reliable improvisation scale items related to performance and creative aspects. The WJIES as a whole was more reliable as a measure of the Performance Skills trait. Performance Skills are easier to recognize and evaluate, and are less influenced by subjectivity. Further, better improvisations may

represent a more unified entity where the Performance Skills and Creative Development traits begin to converge.

### Reliability of the WJIES

Two adjudicator panels were employed for the reliability procedures conducted within the present study. A large panel of 63 judges was primarily composed of students enrolled in two separate university jazz performance programs. The students possessed a wide variety of jazz performance, jazz education, and jazz instruction experience. A second, much smaller adjudicator panel consisted of the four most highly experienced jazz musicians among the original 63. A variety of strategies were used in order to determine the reliability of the WJIES. Cronbach's alpha ranged from .87 to .95, with 11 of 12 evaluations producing a coefficient score of .90 or better. These high reliability coefficients indicated a substantial level of internal stability in the WJIES structure.

Adjudicator consistency was calculated by an application of the Intraclass Correlation Coefficient and Kendall's Coefficient of Concordance (*W*). The intraclass correlation coefficient measured the agreement of the 63 judges within the set of 14 items. Intraclass correlation scores were comparable to the high alpha estimates, ranging from .87 to .95. The more conservative *W* was calculated both for the panel of 63 and for the smaller panel of four. Both procedures yielded mixed results. In reference to the panel of 63, coefficients ranged from .39 to .66 for the 12 improvisations. The panel of four produced marginally better coefficient scores, ranging from .23 to 1.00. The high coefficient alpha values produced by the WJIES suggest that low interjudge reliability may owe to adjudicator unreliability, rather than to structural flaws within the WJIES. The reliability statistics also indicated that the adjudicators more reliably evaluated the

solos at the advanced and sophisticated levels. These outcomes suggest that adjudicators seem better able to agree on what constitutes skilled rather than developing improvisation performance.

#### Content-related Validity of the WJIES

Content validity was determined via two methods: (a) a methodical development of the initial item pool, and (b) a later validation of the structure of the items by factor analysis. By incorporating the expertise of a wide variety of authorities in the development of the initial item pool, a comprehensive description of wind jazz improvisation was produced. The resulting 14 items of the WJIES were factor analyzed, resulting in two distinct factors that subsumed the four-area a priori structure.

#### Criterion-related Validity of the WJIES

Criterion-related validity was examined by comparing total scores obtained from the WJIES and the IJIEM evaluations. Pearson's  $r$  was used to analyze relationships between each pair of summated scores. Results were mixed (Table 9). Six of the 12 comparisons produced low to moderate correlations ranging from .24 to .89, while the remaining six comparisons yielded high correlations ranging from .91 to 1.00. While the highest three correlations (.99, .99, 1.00) occurred between improvisations at the advanced and sophisticated level, there does not seem to be a discernable pattern to these results. Perhaps variability in adjudicator experience is responsible for the inconsistent outcomes. Although the correlation outcomes were mixed, the 1.00 found for arguably the best of the 12 performances is encouraging.



### Construct Validity of the WJIES

Construct validity was determined by the analysis of a multitrait-multimethod (MTMM) matrix encompassing three measurement methods (the IJIEM, the WJIES, and a global rating) and two performance traits (Performance Skills and Creative Development). Two forms of construct validity (convergent, and discriminant) were examined via the MTMM matrix. Because the validity coefficients found within the MTMM ranged from .78 to .99, convergent validity of the WJIES was confirmed.

Discriminant validity suggests that measures assessing different traits should not correlate as highly as measures assessing the same trait. All three criteria for discriminant validity failed.

### Ideal Adjudicators for Collegiate Wind Jazz Improvisation

The reliability and validity procedures conducted in the present study were done in part to help determine who might best serve as wind jazz improvisation adjudicators. Reliability analyses were conducted with two distinct panels of adjudicators. One large panel included judges with a variety of jazz experience ( $n = 63$ ), while the other consisted of a small sub-panel of the four most highly experienced jazz musicians. While coefficient alphas were high for both evaluator groups, interjudge reliability coefficients were slightly better for the panel of experienced adjudicators. Even among the panel of four, however, there seemed to be a question of what precisely constituted a "good" solo. One interesting observation occurred after all of the evaluation packets were returned to the researcher. One of the judges from the panel of four commented that he believed the anchor recording representing a relatively "weak" improvised solo was the "best of the

bunch." Clearly, this was not the intent, but it does support the idea that wind jazz improvisation is a complex construct influenced by a variety of factors.

Test-retest reliability correlations for the single global evaluator (Table 10, .50 and .70 respectively) coupled with the intraclass correlation outcomes with the assumption of a single adjudicator, suggest the inherent unreliability of single-judge adjudications. The best interpretation of the data compiled in the present study relative to judge selection is as follows:

1. Wind jazz improvisation adjudicator panels should be multi-member entities.
2. These adjudicators should be experienced jazz educators or performers, or ideally both.
3. When evaluating developing improvisers, the performers may benefit more from the use of items that focus on Performance Skills. When evaluating advanced improvisation performance, however, performers may benefit more from items that focus on expression and creativity.

## Discussion

Jazz education in America has progressed steadily since its beginnings in the mid 1940s (Abeles, Hoffer, & Klotman, 1995). Over recent years, jazz as an academic discipline has grown in volume and stature. Indeed, jazz studies now play a significant role in a number of music programs (Whyton, 2006). Horowitz (1994) successfully predicted that, "As this growth continues, there will be a concomitant increase in the need for objective methods of evaluation." A multimillion-dollar industry has emerged that supplies a large quantity of pedagogical materials to jazz educators as well as to students of all ages. Jazz theory books, play-along materials, and various audio-visual methods are

assessable to aspiring jazz musicians. Unfortunately, the ready availability of pedagogical materials has not led to the development of valid and reliable methods of assessing improvisation. In spite of this, evaluations of jazz improvisations must continue to take place (Horowitz, 1994). Auditions, contests, festivals, studio lessons, and private practice sessions illustrate the various situations in which reliable and valid assessment procedures are necessary for students to progress.

Although the present study is similar in many ways to the investigations conducted by Horowitz (1994), May (2003), and McPherson (1994), it is a departure from the facet-factorial approach to scale development. Instead, I employed a facet-rational strategy to develop the Wind Jazz Improvisation Evaluation Scale. The results of this study demonstrate that the facet-rational approach to rating scale construction can be used to develop a wind jazz improvisation measure that exhibits acceptable levels of both reliability and validity. Music educators that possess extensive instructional and performance experience, aided by a systematic method, should be able to develop effective performance measures. Jazz improvisation performance is in a constant state of transformation. Therefore, evaluation of such an evolving construction must be flexible and adaptive. The facet-rational approach to scale construction provides jazz educators with the means to introduce a degree of adaptability and flexibility that might be missing in a factor-analysis based approach to scale development.

### Implications

Arguably the most pertinent question that arises after the results of the present study have been documented, is "Why is any of this important?" What do the results mean for music educators, students, and researchers? The findings of this study have

broad implications for music educators, students, and researchers. In addition to providing a means of evaluating jazz improvisation, the results provide information that can be specifically applied to both jazz pedagogy and theory. These implications can be categorized into four distinct areas: (a) description of jazz improvisation, (b) elements of jazz improvisation and skill level, (c) evaluation of additional performance media, and (d) adjudicator training.

One of the primary outcomes of any scale development project is an eventual description of the construct. In this case, the 14-item WJIES along with previously constructed jazz improvisation scales (Horowitz, 1994; May, 2003; McPherson, 1995; Pfenninger, 1990) expand the collective understanding of the jazz improvisation process. By expanding what is understood about jazz improvisation, a deeper appreciation for the amount of skill required to successfully improvise is cultivated. This may eventually lead to further demystification.

It is hoped that the final outcome will be a total legitimization of jazz improvisation as an academic discipline. Although jazz instruction is presently enjoying renewed interest within both public schools and universities, it is still subject to the general status that music currently occupies within both entities. The obvious truth is that music may never be revered in the same manner as other academic subject areas. Therefore, research outcomes that add to the legitimization of any area of music education strengthen the argument for music education advocacy as a whole.

Further descriptions of jazz improvisation may also help music educators address pedagogical issues related to improvisation in general. Although improvisation is inherently linked to jazz, it is also associated with many different genres of musical

performance (Bitz, 1998; Tomassetti, 2003). Elementary music is one obvious example. Children are routinely taught to improvise melodies both vocally and instrumentally. Although the Wind Jazz Improvisation Evaluation Scale was developed with more mature performers in mind, many of the performance skills described by the scale can be applied to a variety of skill levels including elementary-aged students. Through transfer and modification, music educators teaching a variety of levels and genres may successfully utilize the WJIES for improvisation evaluation and the development of instructional strategies designed to teach improvisation.

A critical finding of this study was the emergence of two factors central to wind jazz improvisation, Performance Skills, and Creative Development, and the factors' relationship to skill level. A sequential format for teaching jazz improvisation instruction is supported by the close relation of the Performance Skills factor and novice or developing improvisation. This result implies a type of sequence, in which the process of skill acquisition from novice to expert is more clearly outlined. In order to progress from a novice improviser to a sophisticated or expert improviser, the elements that make up the Performance Skills factor must be mastered first. This outcome is consistent with the conclusions reached by Antonelli (1997), Bash (1983), Burnsed (1978), and Meadows (1991). The elements of the Performance Skills factor include jazz theory, melodic motifs and/or sequences, confidence, time feel, technique, intonation and solo development. Once a progressing improviser is relatively proficient at the skills related to this factor, those skills can be transcended and attention can be focused on the elements of Creative Development, which include fluidity, expression, imagination and/or creativity and so

forth. Works completed by Berliner (1994) and Corpolongo (1995a, 1995b, 1996a, 1996b, 1997) outline methodology for the development of Creative Development Skills.

Improvisation should not be deferred until sufficient performance skills are realized, however. Students of all ages should be encouraged to experiment with improvisation early in their development. These skills must be learned by actively engaging in the improvisation process. What the findings of this study do imply, however, is that the level of sophistication may be related to performance skill. As performance skill increases, the potential to create more creative improvised solos also increases. Therefore, any competent musician can learn to improvise. Improvisation is not a cryptic talent bequeathed only to a chosen few. Advanced improvisation skill can be learned if students are willing to develop the prerequisite skills.

Jazz educators might successfully foster advanced improvisation skill by developing curricula that focus on performance skills early in the instructional process. One of the first elements that must be cultivated in young students is confidence. Improvisation is essentially a leap of faith in which musicians rely solely on their referent knowledge and expression to create spontaneously. This requires sufficient confidence. If young students are unsuccessful at developing this confidence early, it becomes increasingly difficult to foster perhaps, especially relative to female instrumentalists (Wehr-Flowers, 2007).

Although the purpose present study was to develop a scale designed to measure wind jazz improvisation, the resulting items of the WJIES are not specific only to wind jazz improvisation performance. The scale should apply to a variety of performance media outside of instrumental wind performance. Instrumental wind jazz performance is

the most common medium for jazz improvisation, however, emerging artists such as Diana Krall, Regina Carter, and Stefon Harris are fueling the growing popularity of other media. Students whose chosen performance media include voice, strings, vibes, keyboard, or guitar may also benefit from the use of the WJIES as an assessment/instructional tool.

Lastly, the results related to judge reliability underscore several issues related to adjudicator training. The adjudicators in the present study were largely student performers with little or no experience evaluating jazz improvisation. The variability of the adjudication scores suggest that mere participation in jazz performance ensembles does not sufficiently prepare musicians to reliably adjudicate improvisation. Although anchor recordings were provided for each judge, the resulting scores varied. This outcome suggests a need for more extensive training for jazz improvisation adjudicators especially in the case of inexperienced judges. The findings of this study also indicate a need for training in the case of experienced jazz musicians. Given that an acceptable jazz improvisation can be manifested in a variety of forms, determining what constitutes a "good" performance may be problematic even for veteran judges (Pfenninger, 1990). Adjudicator training has become a staple of solo and ensemble competitions across the country. Some form of structured adjudicator training prior to jazz festivals, jazz tryouts, and so forth, seems reasonable.

#### Recommendations for Future Research

Future investigations should seek to extend the research of systematic approaches to scale construction and to examine the reliability of these scales in various evaluation domains.

As previously stated, adjudicator consistency was a concern in the present study. Based on the reliability outcomes of the WJIES, researchers should explore reliability among various panels of judges. How reliable is the WJIES when used by a larger panel of experienced adjudicators? Is reliability adversely affected when used by judges possessing extensive instrumental music education credentials but who lack specific jazz education experience? How does adjudicator training affect reliability?

Future investigations could also focus on what role the size of the adjudicator panel plays on the overall reliability of the WJIES. The present study examined the reliability of two different panel sizes. What is the "minimum" number of adjudicators that should use the WJIES? The present study corroborates earlier ones that found unreliability among single adjudicators

Although the WJIES was developed with a specific age group and ability level in mind, the WJIES might be effective in evaluating performances from a wider age range and variety of improvisation skill levels. By examining the reliability of the scale across varying ability levels, the efficacy of using the WJIES to evaluate developing improvisers may be confirmed or refuted.

The WJIES was developed to evaluate trumpet, trombone, and saxophone improvisation performance. Research should be conducted that tests the viability of the WJIES for other media. Correspondingly, the WJIES should be used to evaluate live as well as recorded solos in order to determine whether visual components have a significant effect on evaluation scores.

Finally, future research should examine findings in relation to previously conducted research in order to advance understanding of the jazz improvisation construct.



Do the WJIES items support or contradict theoretical explanations for the improvisation process? By doing so, a more productive approach to jazz instruction, especially as it relates to jazz improvisation, might be developed.

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## APPENDIX A

### EMAIL SOLICITATION

Hello jazzers,

I'm almost at the point where I can start my dissertation project and basically, what I'm trying to do is create my own rating scale for wind jazz improvisation. In order to do that I must first define the construct. This is where I need your help. I'm writing everyone I know who plays and loves jazz to help me define improvisation. Think about the best (or worst, it doesn't matter) solo (trumpet, saxophone, or trombone) you've ever heard and describe that solo with descriptors. These will become "items."

Example:

- Plays with good tone
- Follows the changes
- Good swing feel etc.

These aren't necessarily the best items but you get the point. Send me as many as you can think of. I will eventually remove the redundant items and if I've received good ones to start with, the result should be a comprehensive description of the core elements of improvisation. I sincerely appreciate everyone's help. Don't worry about coming up with a large number, a few descriptors from everyone will be more than enough. Thank you all.

Derek T. Smith  
Graduate Student  
UMC

## APPENDIX B

### STATEMENTS DESCRIPTIVE OF WIND JAZZ IMPROVISATION

#### RESULTING FROM THE EMAIL SOLICITATION

1. Solo builds to climax
2. Solo contains logical phrases
3. Plays with imagination
4. Wrong notes are not effectively resolved
5. Solo doesn't end well
6. Uses melodic motifs or sequences
7. Plays with fire
8. Plays without confidence
9. Solo makes musical sense
10. Melodic lines are not logical
11. Plays with feeling
12. Soloist tries to express something
13. Plays with good style
14. Communicates with the audience
15. Ideas are fluently expressed
16. Use of voice leading
17. Soloists plays with good technique
18. Plays with a great sound
19. Plays soulful
20. Soloist has good rhythmic feel

21. Creating melodic lines
22. Hitting key arrival points
23. Rhythmic creativity and use of space
24. Facility on instrument
25. Full sound
26. Voice leaning/ tension and release
27. Repetition/sequencing
28. Energetic and emotional playing
29. Soloist tries to create something new and different
30. Plays with good harmonic concept

## APPENDIX C

### STATEMENTS DESCRIPTIVE OF WIND JAZZ IMPROVISATION FOUND IN INTERVIEWS, BOOKS AND RESEARCH PUBLICATIONS

<u>Statement</u>	<u>Source</u>
1. Keeps flavor of tonality	(Horowitz, 1994)
2. Solo communicated	(Hores, 1977)
3. Plays in a convincing manner consistent with the style	(Horowitz, 1994)
4. Expresses own feelings	(Jo Jones; in Shapiro & Hentoff, 1955)
5. Builds to make a statement	(Horowitz, 1994)
6. Plays with personality	(Horowitz, 1994)
7. Plays with awareness of what other musicians are playing	(Horowitz, 1994)
8. Connects with the band	(Dave Brubeck; in Shapiro & Hentoff, 1955)
9. Plays off the melody well	(Meehan, 2004)
10. Creates a unique mood	(Horowitz, 1994)
11. Exhibits musical attitude	(Horowitz, 1994)
12. Attempts to speak to the audience musically	(Pat Metheny; in Panken, 2000)
13. Conversational; sounds like he is playing just for you	(Horowitz, 1994)
14. You got to swing	(Jo Jones; in Shapiro & Hentoff, 1955)
15. Solo makes no sense	(Maria McPartland; in Bourne, 2001)
16. Sounds like licks over chords	(Horowitz, 1994)
17. Playing sounds unique	(Hores, 1977)
18. Plays in style	(May, 2003)
19. Vibrato sounds natural	(Horowitz, 1994)

20. Sounds effortlessly (Horowitz, 1994)
21. Play don't think (Eric Reed; in Panken, 2002)
22. Plays with one dynamic level (Horowitz, 1994)
23. References the "jazz language" without sounding stale (Stamm, 2001)
24. Makes wrong notes sound right (Berliner, 1994)
25. Sound has no core (Coleman Hawkins; in Hentoff, 2005)
26. Tones speak clearly (Bergee, 1987)
27. More breath support (Martin & Waters, 2002)
28. Too much vibrato (Horowitz, 1994)
29. Ends of phrases are logical (Horowitz, 1994)
30. Plays in the pocket (Clarke, 2002)
31. Phrases don't flow (Horowitz, 1994)
32. Steady rhythmic concept (Hores, 1977)
33. Jazz articulation is clean (Coker, Casale, Campbell, & Greene, 1970)
34. Plays with a deep understanding of the song (Hynes, 2000)
35. Performed with ease (Anderson, 1995)
36. Plays with no spirit (Horowitz, 1994)
37. Plays with excitement and joy (Murph, 2005)
38. Solo has a dramatic quality (Horowitz, 1994)
39. Plays wrong notes for certain harmonies (Coker, Casale, Campbell, & Greene, 1970)
40. Solo is emotionally moving (May, 2003)
41. Solo is intuitive (Mandel, 2001)

42. Sounds unsure (Horowitz, 1994)
43. Plays outside of the key too often (Artie Shaw; in Silsbee, 2001)
44. Use of sequencing ties in enharmonic tones (Coker, Casale, Campbell, & Greene, 1970)
45. Plays with a fresh approach (Horowitz, 1994)
46. Captures the essential tone of the song (Miles Davis; in Sidran, 1995)
47. Sings through the horn (Freddy Cole; in Barkan, 2000)
48. Not enough support behind the sound (Panken, 2001)
49. Technique but no soul (Horowitz, 1994)
50. Intonation is bad in the upper register (Bergee, 1987)
51. Tone is sweet (Horowitz, 1994)
52. Vibrato is lush (Panken, 2001)
53. Plays with a certain thoughtfulness (Horowitz, 1994)
54. Solo has something that grabs you (Horowitz, 1994)
55. Plays “on top” of the time (Friberg & Battel, 2002)

## APPENDIX D

### Directions For Evaluators

1. Before evaluating the recorded performances please read the “anchor” rationale and listen to the provided “anchor” recordings so that a frame of reference can be obtained pertaining to the range of skill of the improvisers.

#### *Anchor Recording Rationale*

The anchor recording is provided so that each evaluator will have a reference point in order to judge each solo within the ability range of the samples. In the same way that you would not judge beginners with the same criteria as professionals, concentrate on judging each solo within the range of skill illustrated by the two anchor recordings. Anchor recording number one is an example of a relatively strong solo based on the items found in both evaluation scales. If I were to evaluate this performance each item would receive a 5 or higher. Anchor recording number two exemplifies a relatively weak performance. The majority of the scores for this performance would fall toward the lower end of the scale. Please take into consideration these examples and score your evaluations accordingly.

2. Next, listen to each improvised solo and rate each recording using both the Wind Jazz Improvisation Evaluation Scale (WJIES) and the Instrumental Jazz Improvisation Evaluation Measure (IJIEM). Don't worry about totaling the scores. Be consistent and make sure your scores mean something. For example, if you believe that the first soloist's time was twice as good as the second soloist's, and if you give solo number two a 3 for time, then solo one should receive a 6.
3. Please read the items on the WJIES very carefully. The items are worded both positively and negatively.
4. Please do not share you evaluations with other evaluators until all measures have been collected.
5. If there are any problems with the recording, or any other issues, please email me or call ([dts7td@missouri.edu](mailto:dts7td@missouri.edu) or 601-451-9035).
6. Lastly, I would like to take this opportunity to thank each of you for your participation in this study. I sincerely appreciate your help.

### Informed Consent

I agree to participate in a study being conducted by Derek T. Smith of the Department of Curriculum and Instruction, University of Missouri-Columbia. I have made this decision based on the information I have read and have had the opportunity to receive any additional details I wanted about the study. I understand that I may withdraw this consent at any time without penalty.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



## APPENDIX E

### Informed Consent Letter

Title of Project: Development and Validation of a Rating Scale for Wind Jazz  
Improvisation Performance

Student Investigator: Derek T. Smith

You are invited to participate in a study focused on the development of a rating scale for wind jazz improvisation. As a participant in this study, you will be asked to perform two improvised solos that will be digitally recorded. The recording session will take place in Loeb hall room 121. The first task will involve the improvisation of two choruses of a Bb Blues (quarter note = 197 bpm) performed with a Jamey Aebersold (1981) play-along recording. Written chord changes will be provided. The second improvisation task will consist of each player performing one chorus of Benny Golson's *Killer Joe* (quarter note = 115 bpm), also accompanied by a Jamey Aebersold (1979) play-along recording. One chorus of the "Bb Blues" accompaniment will be played for each performer prior to the improvisation attempt. The A section of the *Killer Joe* song form will also be played for each instrumentalist prior to the second improvisational task. A lead sheet with chord changes for *Killer Joe* will also be provided. At the conclusion of each recording session you will also be asked to complete the Subject Experience Survey (SES). This survey is designed to collect background information including school classification, major instrument, piano experience, jazz listening per week, improvisation class experience, and self-described level of improvisation skill. This information will be used as a descriptor for the improvisation performers.

Participation in this study is voluntary, and will take approximately fifteen minutes of your time. Once all the improvised solos are recorded the samples will be burned to a compact disc and given to judges to be rated. You may decide to withdraw from this study at any time and may do so without penalty. Participation will in no way affect your grade or standing at UMC. The information you provide is considered confidential; indeed, your name will not be included or in any other way associated, with the data collected in the study. All data collected will be stored for 3 years from completion of the project. The risks associated with participation in this study are no greater than those associated with the performance of wind instrumental jazz.

Thank you for your assistance in this project. The supervising professor for this project is Dr. Martin Bergee. He can be contacted at 573-882-0939 or [bergeem@missouri](mailto:bergeem@missouri). My email address is [dts7td@missouri.edu](mailto:dts7td@missouri.edu) or I can be reached at 573-874-3864. The Campus IRB contact information is provided below if you have any additional questions or concerns.

Campus Institutional Review Board

Phone: (573) 882-9585

FAX: (573) 884-0663: 483 McReynolds Columbia, MO 65211

[umcresearchcirb@missouri.edu](mailto:umcresearchcirb@missouri.edu)

CONSENT FORM

I agree to participate in a study being conducted by Derek T. Smith of the Department of Curriculum and Instruction, University of Missouri-Columbia. I have made this decision based on the information I have read in the Information-Consent Letter and have had the opportunity to receive any additional details I wanted about the study. I understand that I may withdraw this consent at any time by telling the researcher without penalty.

Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX F

### Subject Experience Survey

*Please complete this short survey. Circle the appropriate response.*

1.) Year in school:

- Freshman
- Sophomore
- Junior
- Senior
- Graduate

2.) Major Instrument:

- Saxophone
- Trombone
- Trumpet
- Other

3.) Piano Experience:

- 0 yrs.
- 1-5 yrs.
- 6-10 yrs.
- Over 10 yrs.

4.) Jazz Listening (per week):

- Less than 1 hr.
- 1-3 hrs.
- 4 or more hrs.

5.) Improvisation Class Experience:

- Yes
- No

6.) Improvisation Level:

- (1) beginner
- (2) moderate ability
- (3) advanced

APPENDIX G

EVALUATION SCALES IJIEM & WJIES

Instrumental Jazz Improvisation Evaluation Measure

*Circle the score for each category. 1= low, 7 =high. Enter the score in the box on the right of each category.*

1.) Technical facility: (student's ability to manipulate the instrument)

1      2      3      4      5      6      7

2.) Rhythm/Time feel: (flow and overall rhythmic continuity)

1      2      3      4      5      6      7

3.) Melodic and rhythmic development: (sequences, melody reference, etc)

1      2      3      4      5      6      7

4.) Style: (stylistic presentation i.e. swing feel)

1      2      3      4      5      6      7

5.) Harmonic material: (outlining chords, triads, arpeggios, etc.)

1      2      3      4      5      6      7

6.) Expressiveness: (musical communication, emotion)

1      2      3      4      5      6      7

7.) Creativity:

1      2      3      4      5      6      7

## Wind Jazz Improvisation Evaluation Scale

*For each item, circle the number that best describes your level of agreement with each statement.*

**1. Soloist demonstrates a knowledge of theory. (scales, chords, etc.)**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**2. Soloist plays with uncharacteristic tone quality.**

<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**3. Soloist uses melodic motifs and/or sequences.**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**4. Soloist plays with a lack of confidence.**

<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**5. Soloist plays with appropriate time feel and/or rhythm.**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**6. Soloist plays with good technical facility.**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**7. Soloist expresses ideas with a lack of certainty.**

<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**8. Soloist plays with poor intonation.**

<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**9. Development of solo is logical.**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**10. Soloist performs with emotional expression.**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**11. Soloist plays with appropriate style.**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**12. Soloist's performance lacks imagination and/or creativity.**

<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**13. Solo lacks interaction and fails to dialog with accompaniment.**

<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

**14. Soloist effectively uses chromatic approach tones.**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Disagree Strongly	Disagree Moderately	Disagree Slightly	Neither Agree Nor Disagree	Agree Slightly	Agree Moderately	Agree Strongly

APPENDIX H

Item-Total Statistics for the WJIES

**Item-Total Statistics for Improvisation 1**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	62.02	98.951	.404	.561	.870
Tone	62.46	90.672	.544	.670	.863
motifseq	62.29	92.401	.554	.550	.863
Confidence	62.16	91.361	.511	.464	.865
Feel	61.97	94.741	.517	.584	.865
Technique	62.48	90.802	.703	.707	.856
Fluidity	63.27	86.813	.742	.693	.852
Intonation	62.40	92.727	.475	.650	.867
Development	62.44	92.057	.647	.624	.859
Expression	62.71	92.401	.521	.621	.865
Style	61.98	93.209	.705	.666	.858
Creativity	63.22	89.337	.608	.618	.860
Interaction	62.97	94.644	.379	.433	.873
Chromaticism	63.79	100.489	.246	.427	.876



**Item-Total Statistics for Improvisation 2**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	50.67	143.452	.560	.595	.896
Tone	50.27	151.620	.287	.549	.905
motifseq	51.13	138.177	.574	.550	.896
Confidence	51.16	136.620	.684	.733	.891
Feel	50.79	127.037	.802	.717	.885
Technique	50.97	137.838	.698	.620	.891
Fluidity	51.83	135.308	.684	.709	.891
Intonation	50.63	151.107	.261	.487	.906
Development	51.59	136.182	.684	.659	.891
Expression	51.27	138.684	.647	.541	.892
Style	50.59	137.311	.680	.707	.891
Creativity	51.30	145.569	.413	.412	.902
Interaction	51.75	134.418	.681	.724	.891
Chromaticism	51.48	138.641	.615	.535	.894

**Item-Total Statistics for Improvisation 3**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	61.68	146.672	.441	.541	.908
Tone	61.75	140.515	.509	.565	.907
motifseq	61.59	140.924	.689	.637	.901
Confidence	61.52	137.447	.706	.731	.899
Feel	61.21	144.392	.668	.721	.902
Technique	61.78	141.240	.665	.591	.901
Fluidity	62.16	134.845	.638	.574	.902
Intonation	61.52	137.157	.650	.745	.901
Development	62.13	135.597	.728	.683	.898
Expression	62.35	134.812	.660	.662	.901
Style	61.63	138.526	.736	.764	.899
Creativity	62.56	133.348	.644	.651	.902
Interaction	62.46	136.414	.667	.701	.900
Chromaticism	62.54	141.833	.389	.541	.914

**Item-Total Statistics for Improvisation 4**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	59.05	184.047	.596	.648	.923
Tone	58.74	182.981	.608	.757	.923
motifseq	59.00	184.393	.581	.624	.924
Confidence	59.23	178.145	.629	.686	.922
Feel	58.66	176.752	.745	.751	.919
Technique	59.00	176.754	.800	.812	.917
Fluidity	59.34	180.457	.593	.682	.923
Intonation	58.60	183.720	.595	.701	.923
Development	59.32	176.255	.683	.794	.920
Expression	59.40	170.245	.768	.832	.917
Style	58.71	176.767	.714	.696	.919
Creativity	59.77	176.669	.682	.726	.921
Interaction	59.29	175.816	.716	.645	.919
Chromaticism	59.48	180.549	.562	.679	.925

**Item-Total Statistics for Improvisation 5**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	72.48	115.479	.614	.553	.912
Tone	73.13	114.855	.387	.520	.922
motifseq	72.63	110.590	.759	.785	.907
Confidence	72.03	119.257	.568	.671	.915
Feel	72.22	113.789	.669	.705	.911
Technique	72.67	111.000	.692	.603	.909
Fluidity	72.60	113.953	.483	.513	.917
Intonation	72.90	107.668	.654	.735	.911
Development	72.67	113.484	.663	.684	.911
Expression	72.67	108.323	.698	.758	.909
Style	72.32	113.317	.831	.763	.908
Creativity	72.71	106.078	.780	.822	.906
Interaction	73.06	107.060	.723	.785	.908
Chromaticism	73.21	106.392	.650	.635	.912

**Item-Total Statistics for Improvisation 6**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	68.86	184.737	.573	.571	.949
Tone	68.98	173.403	.682	.690	.947
motifseq	69.10	176.152	.737	.841	.945
Confidence	68.68	174.769	.654	.743	.947
Feel	68.86	177.479	.752	.676	.945
Technique	69.22	170.918	.731	.703	.945
Fluidity	69.02	165.435	.789	.832	.944
Intonation	68.89	172.262	.779	.829	.944
Development	69.29	171.175	.835	.902	.943
Expression	69.05	171.046	.722	.721	.946
Style	68.87	170.145	.811	.838	.943
Creativity	69.27	165.232	.871	.898	.941
Interaction	69.67	174.452	.598	.633	.949
Chromaticism	69.21	170.489	.812	.780	.943

**Item-Total Statistics for Improvisation 7**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	72.67	118.000	.531	.684	.901
Tone	73.06	112.706	.552	.481	.899
motifseq	72.87	110.177	.779	.808	.892
Confidence	72.30	117.375	.420	.612	.904
Feel	73.32	109.123	.527	.658	.902
Technique	72.40	115.663	.573	.624	.899
Fluidity	72.71	106.627	.741	.699	.891
Intonation	72.78	118.434	.329	.571	.908
Development	73.37	106.461	.740	.755	.891
Expression	73.16	108.491	.752	.715	.892
Style	73.10	105.894	.777	.792	.890
Creativity	73.14	108.802	.645	.640	.896
Interaction	73.81	105.253	.664	.684	.895
Chromaticism	72.95	116.530	.467	.584	.902

**Item-Total Statistics for Improvisation 8**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	72.79	130.263	.743	.685	.949
Tone	72.84	130.329	.706	.626	.950
motifseq	72.68	129.898	.792	.778	.948
Confidence	72.43	129.507	.830	.815	.947
Feel	72.52	132.576	.826	.823	.948
Technique	72.59	132.569	.770	.709	.949
Fluidity	72.71	128.207	.768	.754	.948
Intonation	72.63	133.236	.648	.589	.951
Development	73.03	125.193	.662	.600	.953
Expression	72.78	127.885	.835	.755	.947
Style	72.68	130.736	.826	.820	.947
Creativity	72.90	126.184	.860	.830	.946
Interaction	72.89	129.391	.716	.653	.949
Chromaticism	72.84	127.103	.671	.612	.951

**Item-Total Statistics for Improvisation 9**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	72.58	110.051	.804	.834	.934
Tone	72.98	103.655	.720	.707	.936
motifseq	72.69	111.167	.560	.587	.940
Confidence	72.50	108.254	.789	.736	.934
Feel	72.90	107.269	.725	.740	.935
Technique	72.39	110.536	.753	.682	.935
Fluidity	72.77	106.538	.679	.581	.937
Intonation	72.73	102.956	.848	.766	.931
Development	72.94	108.389	.695	.699	.936
Expression	72.90	107.827	.764	.787	.934
Style	72.73	106.268	.716	.688	.935
Creativity	73.05	106.375	.741	.717	.935
Interaction	73.37	108.762	.609	.502	.939
Chromaticism	72.71	107.882	.591	.543	.940



### Item-Total Statistics for Improvisation 10

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	72.68	120.583	.667	.704	.930
Tone	73.15	123.011	.514	.736	.935
motifseq	73.02	121.688	.729	.779	.928
Confidence	72.58	120.543	.681	.728	.929
Feel	72.71	121.586	.789	.814	.927
Technique	72.71	118.964	.800	.813	.926
Fluidity	72.82	117.591	.723	.766	.928
Intonation	72.89	125.020	.467	.675	.936
Development	73.13	119.229	.596	.807	.933
Expression	72.84	116.990	.755	.822	.927
Style	72.95	119.916	.694	.782	.929
Creativity	72.79	119.447	.830	.867	.926
Interaction	73.37	118.631	.644	.774	.931
Chromaticism	72.87	117.786	.827	.775	.925

### Item-Total Statistics for Improvisation 11

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	84.94	39.286	.722	.700	.928
Tone	85.24	39.926	.506	.544	.933
motifseq	85.13	39.693	.610	.607	.930
Confidence	84.94	40.577	.602	.765	.931
Feel	85.10	38.636	.700	.719	.928
Technique	84.92	39.590	.638	.670	.930
Fluidity	85.06	38.318	.757	.821	.926
Intonation	85.16	38.071	.772	.781	.926
Dev	85.33	35.645	.852	.862	.922
Expression	85.30	37.182	.738	.657	.926
Style	85.06	37.996	.806	.769	.925
Creativity	85.25	37.838	.704	.749	.928
Interaction	85.40	36.211	.657	.699	.931
Chromaticism	85.25	35.547	.690	.755	.930

### Item-Total Statistics for Improvisation 12

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Theory	83.51	48.544	.622	.726	.945
Tone	83.75	47.644	.720	.710	.942
motifseq	83.70	46.150	.839	.782	.939
Confidence	83.44	49.477	.663	.577	.944
Feel	83.60	46.082	.849	.807	.939
Technique	83.48	47.157	.809	.765	.940
Fluidity	83.49	46.770	.765	.731	.941
Intonation	83.54	48.188	.720	.701	.942
Development	83.60	48.953	.668	.698	.944
Expression	83.49	47.673	.748	.747	.942
Style	83.52	47.834	.797	.766	.941
Creativity	83.57	47.442	.722	.739	.942
Interaction	83.73	47.426	.591	.615	.947
Chromaticism	83.57	47.733	.690	.749	.943

APPENDIX I

Randomized Extractions of the Intraclass Correlation Coefficient

<u>Improv. 1</u>	<u>Improv. 2</u>	<u>Improv. 3</u>	<u>Improv. 4</u>	<u>Improv. 5</u>	<u>Improv. 6</u>
.83	.95	.91	.91	.88	.97
.88	.57	.95	.82	.90	.89
.96	.65	.83	.92	.94	.96
.83	.93	.94	.96	.97	.92
.87	.93	.85	.95	.93	.97
.72	.95	.97	.89	.77	.94
.93	.84	.91	.93	.94	.93
.97	.81	.97	.71	.95	.98
.34	.63	.78	.94	.86	.78
.85	.85	.93	.92	.86	.99

<u>Improv. 7</u>	<u>Improv. 8</u>	<u>Improv. 9</u>	<u>Improv. 10</u>	<u>Improv. 11</u>	<u>Improv. 12</u>
.91	.93	.92	.98	.78	.96
.75	.90	.97	.95	.88	.94
.92	.94	.95	.97	.87	.96
.96	.95	.78	.96	.98	.97
.86	.89	.91	.93	.92	.93
.90	.97	.90	.93	.92	.95
.64	.99	.97	.92	.98	.94
.97	.96	.95	.82	.94	.93
.85	.97	.91	.72	.89	.97
.95	.97	.97	.98	.81	.93

APPENDIX J

INITIAL FACTOR ANALYSIS ONE AND THREE-FACTOR SOLUTIONS

Rotated Component Matrix for Improvisation 1

	Component		
	1	2	3
Intonation	.861		
Tone	.756		
Technique	.667	.504	
Feel	.640		
Fluidity	.600	.430	
Style	.564	.498	
Theory	.469		
Dev		.779	
Expression		.735	
motifseq		.679	
Confidence	.417	.571	
Chromaticism			.859
Interaction			.694
Creativity		.561	.571

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 5 iterations.

### Rotated Component Matrix for Improvisation 2

	Component		
	1	2	3
Fluidity	.843		
Interaction	.774		
Dev	.720		
Confidence	.713		
Feel	.635	.564	
Style	.633	.476	
Technique	.624		.465
Theory		.813	
Chromaticism		.728	
motifseq		.719	
Expression	.416	.664	
Intonation			.833
Tone			.825
Creativity			.579

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 7 iterations.

### Rotated Component Matrix for Improvisation 3

	Component		
	1	2	3
Tone	.812		
Feel	.766		.483
Intonation	.747		
Confidence	.747		
Fluidity	.714		
Style	.711	.440	
Technique	.620		
Dev	.502	.498	
Interaction		.840	
Creativity		.800	
Expression		.757	
motifseq	.481	.492	
Theory			.846
Chromaticism			.817

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 5 iterations.

### Rotated Component Matrix for Improvisation 4

	Component		
	1	2	3
Dev	.826		
Expression	.814		
Creativity	.773		
Interaction	.742		
Chromaticism	.620		
Technique	.616	.612	
Theory	.542		
Tone		.879	
Intonation		.791	
Style	.572	.629	
Feel	.494	.626	
Fluidity			.868
Confidence		.460	.739
motifseq		.404	.557

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 8 iterations.

### Rotated Component Matrix for Improvisation 5

	Component		
	1	2	3
Interaction	.860		
Creativity	.820		
Expression	.802		
Dev	.697	.425	
Style	.619	.534	
Confidence		.829	
Feel		.735	
Theory		.707	
Fluidity		.677	
motifseq	.455	.582	
Tone			.856
Intonation			.823
Chromaticism	.550		.678
Technique	.422		.591

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 5 iterations.

### Rotated Component Matrix for Improvisation 7

	Component		
	1	2	3
Style	.865		
Feel	.818		
Interaction	.783		
Fluidity	.766		
Dev	.752		
Expression	.741		
Technique	.559		.465
Tone	.489		
Chromaticism		.796	
Theory		.786	
motifseq	.439	.732	
Creativity	.423	.711	
Confidence			.867
Intonation			.827

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 5 iterations.

### Component Matrix for Improvisation 8

	Component
	1
Creativity	.881
Confidence	.865
Feel	.865
Style	.864
Expression	.857
motifseq	.824
Technique	.818
Fluidity	.806
Theory	.786
Interaction	.754
Tone	.749
Chromaticism	.709
Dev	.703
Intonation	.699

Extraction Method: Principal Component Analysis. 1 component extracted.



### Rotated Component Matrix for Improvisation 10

	Component		
	1	2	3
Expression	.850		
Fluidity	.817		
Interaction	.797		
Creativity	.715	.415	
Chromaticism	.693		.415
Confidence		.805	
Technique	.457	.768	
Style		.743	
Feel	.460	.724	
Theory		.553	
Dev			.813
Intonation	.459		.773
motifseq		.411	.747
Tone		.562	.711

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 8 iterations.

## APPENDIX K

### FACTOR ANALYSIS TWO-FACTOR SOLUTIONS AND SCREE PLOTS

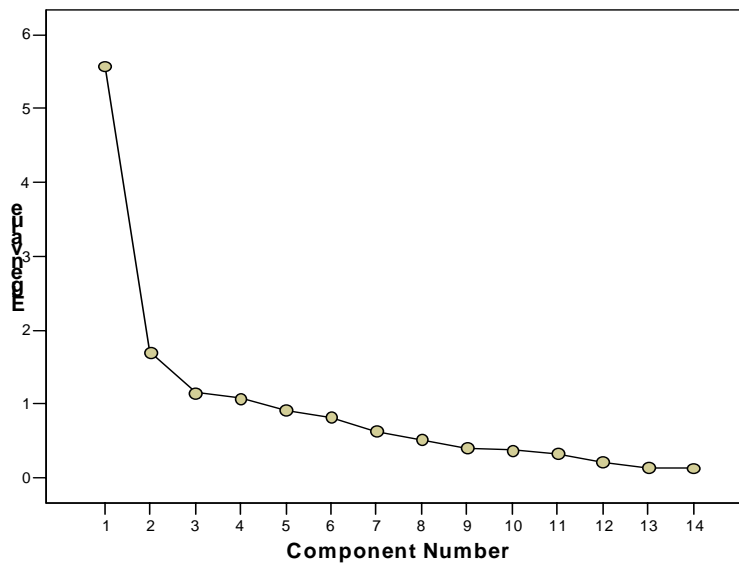
Rotated Component Matrix Improvisation 1

	Component	
	1	2
Technique	.806	
Intonation	.784	
Tone	.702	
Style	.680	
Fluidity	.661	.447
Feel	.660	
Confidence	.635	
Dev	.536	.508
motifseq	.492	.439
Theory	.480	
Creativity		.765
Interaction		.733
Expression		.658
Chromaticism		.612

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

**Scree Plot Improvisation 1**



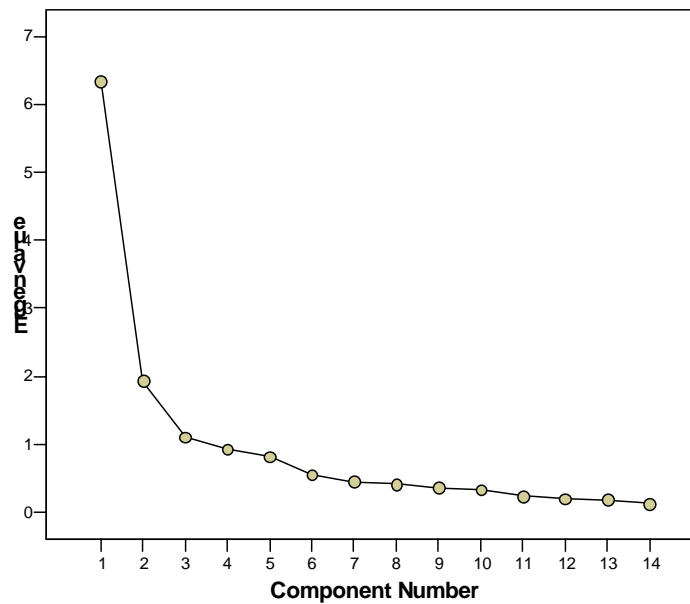
### Rotated Component Matrix Improvisation 2

	Component	
	1	2
Feel	.817	
Dev	.775	
Interaction	.775	
Style	.773	
Chromaticism	.769	
Expression	.761	
Theory	.688	
motifseq	.647	
Fluidity	.587	.506
Confidence	.573	.525
Tone		.860
Intonation		.785
Technique	.535	.605
Creativity		.527

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

### Scree Plot Improvisation 2



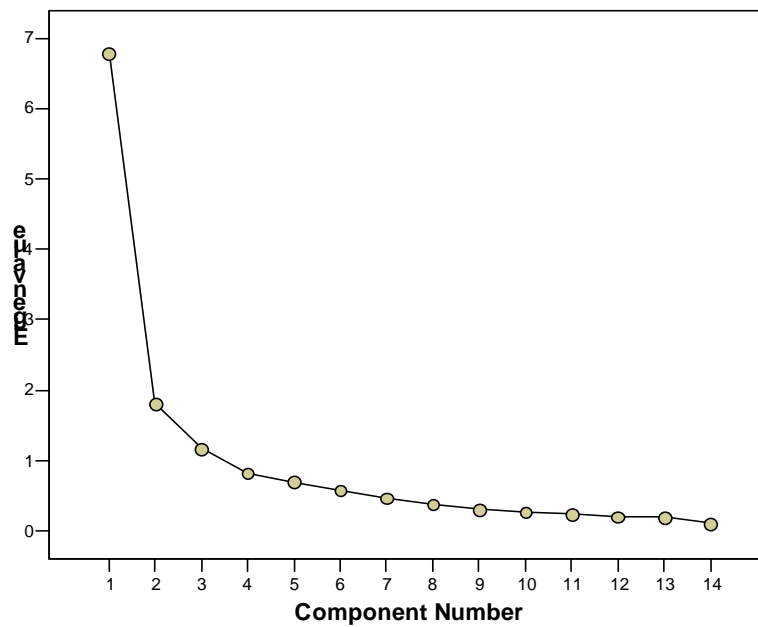
### Rotated Component Matrix Improvisation 3

	Component	
	1	2
Intonation	.841	
Tone	.800	
Style	.797	
Confidence	.773	
Fluidity	.734	
Feel	.664	
Technique	.607	.407
Expression	.604	
Dev	.582	.530
motifseq	.565	.498
Chromaticism		.834
Theory		.761
Interaction		.728
Creativity		.666

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

### Scree Plot Improvisation 3

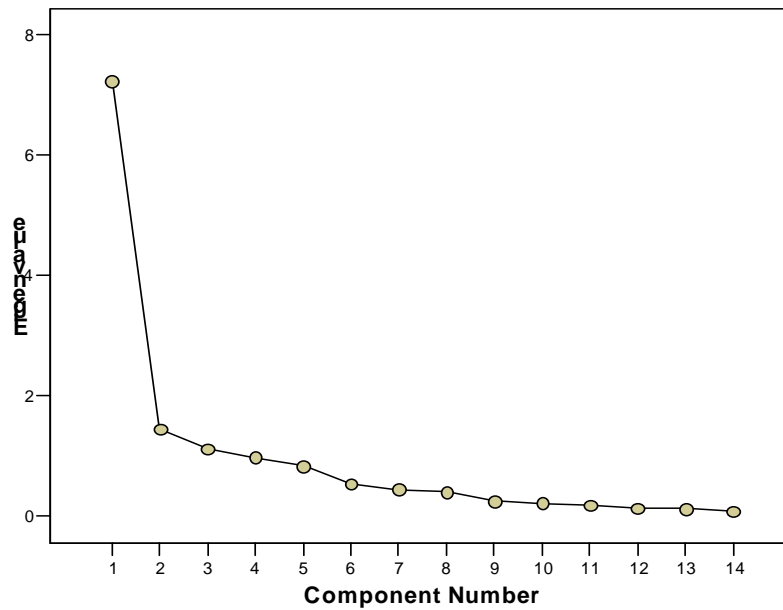


### Rotated Component Matrix Improvisation 4

	Component	
	1	2
Dev	.873	
Expression	.791	
Interaction	.775	
Creativity	.763	
Chromaticism	.668	
Technique	.605	.594
Theory	.582	
Fluidity	.504	
Tone		.882
Intonation		.839
Confidence		.709
Feel	.498	.638
motifseq		.582
Style	.534	.561

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.  
a Rotation converged in 3 iterations.

### Scree Plot Improvisation 4

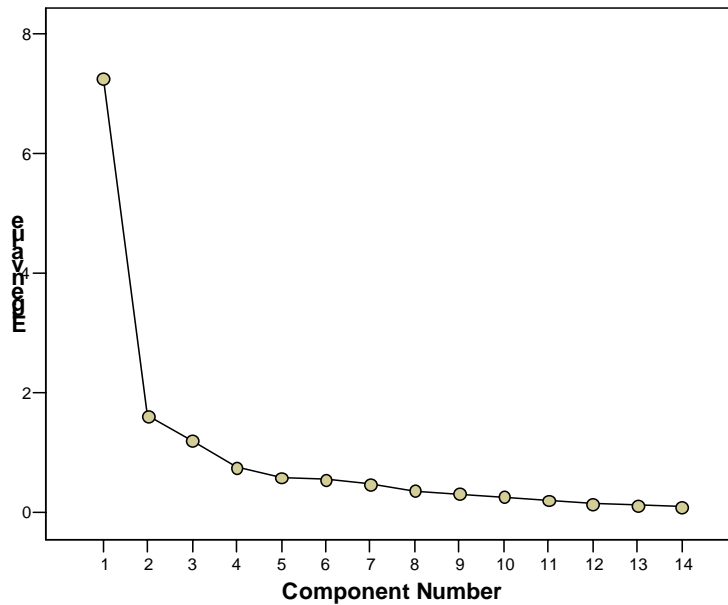


### Rotated Component Matrix Improvisation 5

	Component	
	1	2
Expression	.809	
Style	.778	.415
Dev	.776	
Confidence	.762	
Creativity	.753	
motifseq	.698	.429
Interaction	.682	
Fluidity	.667	
Feel	.659	
Theory	.613	
Intonation		.849
Tone		.820
Chromaticism		.763
Technique	.455	.643

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.  
 a Rotation converged in 3 iterations.

### Scree Plot Improvisation 5



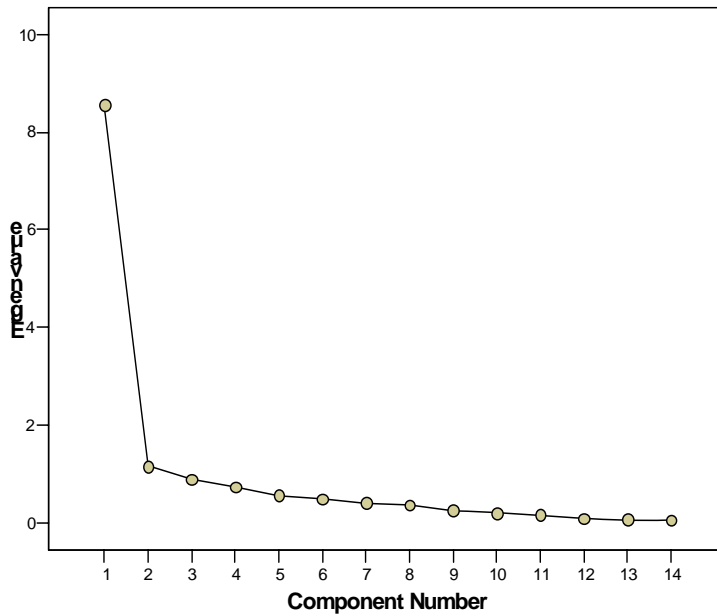
### Rotated Component Matrix Improvisation 6

	Component	
	1	2
Dev	.889	
Creativity	.814	.429
Interaction	.808	
Style	.767	.408
Intonation	.723	
motifseq	.682	.404
Chromaticism	.650	.541
Technique	.642	.437
Expression	.548	.541
Confidence		.871
Theory		.749
Tone		.723
Fluidity	.498	.684
Feel	.530	.598

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

**Scree Plot Improvisation 6**



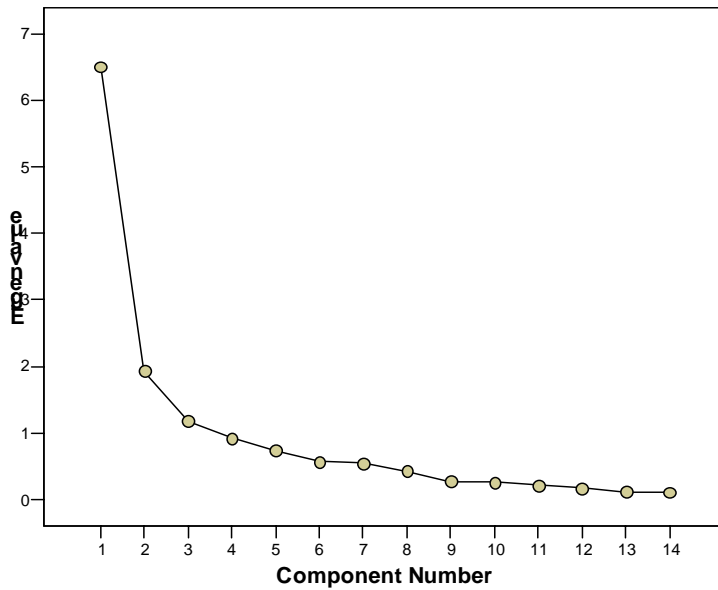
### Rotated Component Matrix Improvisation 7

	Component	
	1	2
Style	.866	
Interaction	.833	
Dev	.801	
Feel	.782	
Expression	.779	
Fluidity	.766	
Creativity	.554	.460
Tone	.545	
Technique	.525	
Confidence		.768
Theory		.726
Intonation		.711
Chromaticism		.702
motifseq	.547	.691

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

### Scree Plot Improvisation 7





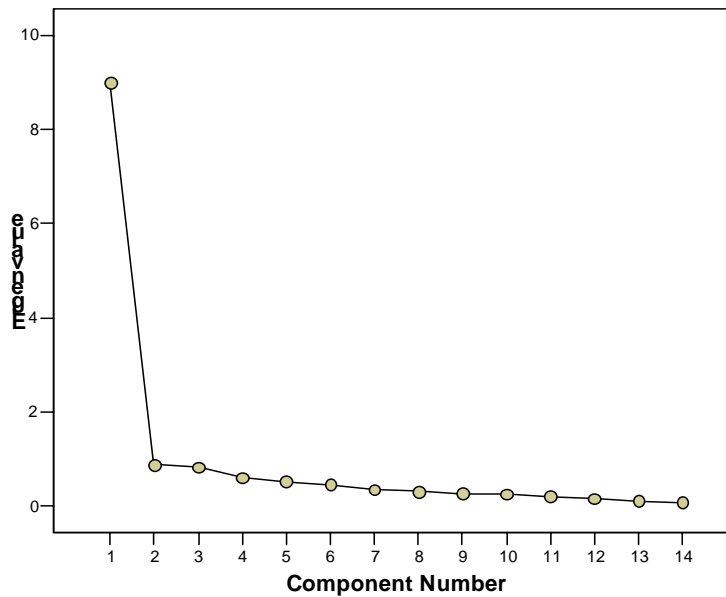
### Rotated Component Matrix Improvisation 8

	Component	
	1	2
Feel	.842	
Intonation	.797	
Style	.742	.467
Technique	.732	.410
Theory	.727	
Confidence	.652	.569
Tone	.644	.404
motifseq	.594	.571
Chromaticism		.897
Interaction		.728
Expression	.511	.712
Creativity	.565	.688
Fluidity	.487	.664
Dev	.477	.521

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

### Scree Plot Improvisation 8



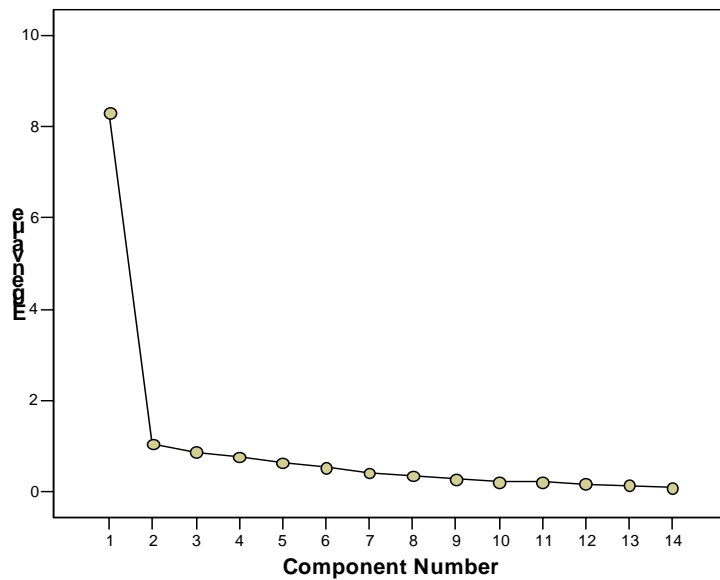
### Rotated Component Matrix Improvisation 9

	Component	
	1	2
Style	.835	
Feel	.817	
Technique	.807	
Theory	.742	.428
Intonation	.729	.496
Confidence	.704	.441
Fluidity	.670	
Tone	.579	.521
Interaction	.571	
Chromaticism	.555	
motifseq		.877
Expression	.412	.785
Creativity	.425	.738
Dev	.464	.630

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

**Scree Plot Improvisation 9**



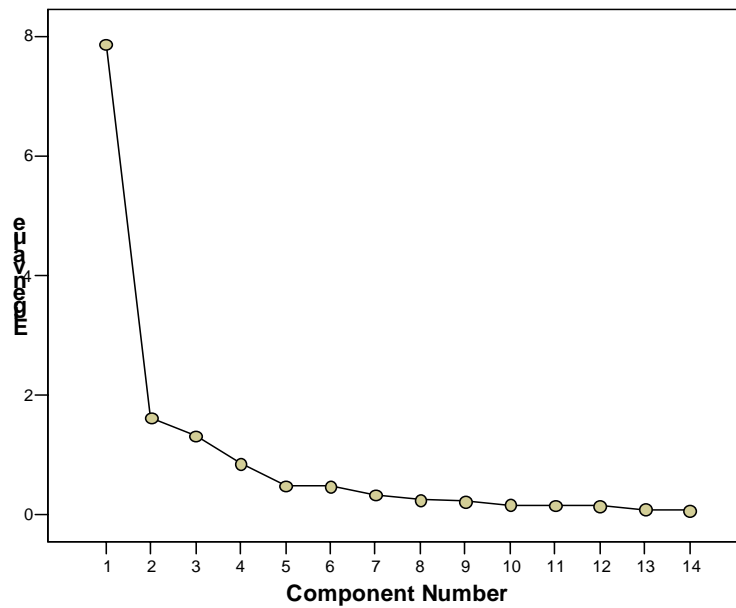
### Rotated Component Matrix Improvisation 10

	Component	
	1	2
Expression	.851	
Fluidity	.828	
Interaction	.825	
Creativity	.801	
Technique	.795	
Feel	.770	
Chromaticism	.745	.425
Style	.726	
Confidence	.664	
Theory	.575	.441
Tone		.847
Dev		.824
motifseq		.802
Intonation		.634

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

### Scree Plot Improvisation 10



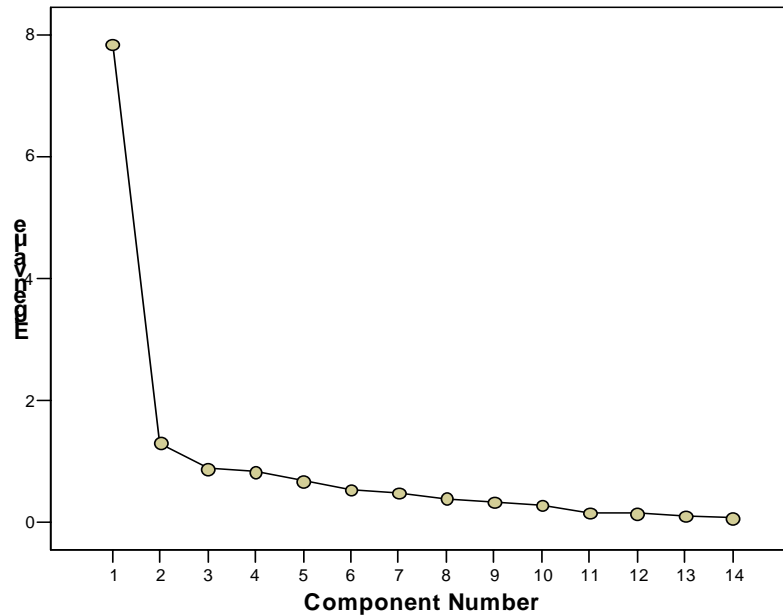
### Rotated Component Matrix Improvisation 11

	Component	
	1	2
Technique	.804	
Feel	.783	
Style	.774	
Expression	.755	
Dev	.753	.463
motifseq	.723	
Theory	.701	
Chromaticism	.605	.434
Creativity		.824
Confidence		.784
Interaction		.742
Tone		.659
Intonation	.503	.658
Fluidity	.549	.602

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

### Scree Plot Improvisation 11



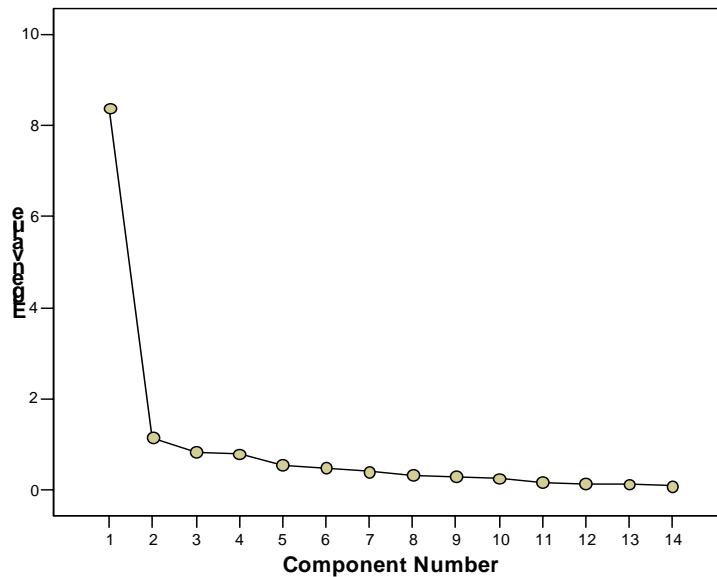
### Rotated Component Matrix Improvisation 12

	Component	
	1	2
Creativity	.880	
Chromaticism	.828	
Expression	.781	
Fluidity	.616	.512
Interaction	.610	
Tone	.590	.485
Theory		.911
Confidence		.768
Style	.463	.718
motifseq	.549	.682
Feel	.577	.671
Technique	.546	.650
Dev	.428	.588
Intonation	.514	.559

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 3 iterations.

### Scree Plot Improvisation 12



APPENDIX L

Pearson's Correlation (*r*) Matrix for the Instrumental Jazz Improvisation Measure, the Wind

Jazz Improvisation Evaluation Scale, and the Global Improvisation Rating

MTMM Correlations

	IJIEMPerfS	IJIEMCreatD	WJIESPefS	WJIESCreatD	GlobalPerfS	GlobalCreatD
IJIEMPerfS	1	.979(**)	.962(**)	.981(**)	.779(**)	.792(**)
		Pearson Correlation				
		Sig. (2-tailed)				
		N				
IJIEMCreatD	.979(**)	1	.977(**)	.988(**)	.806(**)	.836(**)
		Pearson Correlation				
		Sig. (2-tailed)				
		N				
WJIESPefS	.962(**)	.977(**)	1	.971(**)	.761(**)	.833(**)
		Pearson Correlation				
		Sig. (2-tailed)				
		N				
WJIESCreatD	.971(**)	.988(**)	.971(**)	1	.726(**)	.792(**)
		Pearson Correlation				
		Sig. (2-tailed)				
		N				
GlobalPerfS	.779(**)	.806(**)	.761(**)	.726(**)	1	.800(**)
		Pearson Correlation				
		Sig. (2-tailed)				
		N				
GlobalCreatD	.792(**)	.836(**)	.833(**)	.792(**)	.800(**)	1
		Pearson Correlation				
		Sig. (2-tailed)				
		N				

\*\* Correlation is significant at the 0.01 level (2-tailed).

## VITA

Derek T. Smith was born April 20, 1974 in Cheyenne Wyoming to Derek and Lorena Smith. His earned degrees include a Bachelor of Music Education with emphasis in jazz from Jackson State University, and a Master of Music with emphasis in education from the University of Mississippi. This dissertation has been completed in partial fulfillment of the degree of Doctor of Philosophy in Music Education at the University of Missouri-Columbia. He has successfully taught university courses in the areas of marching, concert, and jazz band, music education, theory, applied woodwinds, and jazz pedagogy. Dr. Smith currently holds the position of Assistant Professor of Music Education/Woodwinds at Lincoln University in Jefferson City Missouri and hopes to continue research in the area of jazz improvisation.