Models and Patterns in Jazz Improvisation:

A Research Paper by Curtis Winters

Jazz improvisation requires a complex set of skills in which "sophisticated perceptual, intellectual and motor skills are required for success" (Pressing, 1987, p. 353). Any novice who has tried improvising over rapid chord changes has likely experienced frustrating episodes of miserable failure that Sudnow (1981) compares to Charlie Chaplin working on an assembly line in *Modern Times*. In this film sequence, Chaplin wields not one, but two wrenches, as he is frantically tightening double rows of bolts along an accelerating conveyor belt, falling behind, then rushing ahead, and ultimately getting twisted up in the machinery. Improvising successfully over chord changes is a very difficult task, and requires a combination of specific knowledge and developed skill. In this paper I will explore two interrelated concepts that are key to developing jazz improvisation skills: modeling and patterns.

Models in Jazz Improvisation

Learning to improvise is like learning a language. One of the recurring themes in jazz improvisation literature is the comparison of acquiring improvisation skills to how children acquire their native language. Of course, this comparison is not unique to jazz improvisation, as Suzuki (1969) was developing his *mother tongue* approach to teaching music well before jazz education publications began appearing in the 1950's (Witmer & Robbins, 1988). However, instructional books on jazz improvisation often remind the reader that children learn to speak their native language by "constantly listening to the sounds of the words…and…imitating what they have heard" (Bergonzi, 2003, p. 8), and advise young jazz musicians to "learn to speak jazz by imitating seasoned improvisers" (Berliner, 1993, p. 95). The value of learning through

imitation ought to provoke a re-examination of the balance between utilizing aural models and relying on music notation in teaching improvisation.

Sound before sight. Since children learn to speak long before they learn to read or write, it may follow that a sound-to-symbol (Jordan-DeCarbo, 1986) or sound-before-sight approach to teaching jazz improvisation is more effective than approaches which cause unnecessary "struggling with staff notation" (Hicks, 1980, p. 54). Skeptical of the intrinsic pedagogical value of standard notation, Dobbins (1980) states, "Imagine the absurdity of attempting to learn the style of Louis Armstrong from a printed page" (p. 41). Although the written score represents "but a skeleton" of the expressive nuances present in a live or recorded jazz performance (Laughlin, 2001, p. 2), an important question is whether learned dependence on notation is detrimental to learning to improvise.

On the one hand, Davison's study (2010) comparing aural-only to aural-and-notated instructional treatments in an experimental design found no significant difference in improvisation achievement between the two groups studied. However, Watson (2008) compared the effectiveness of aural instruction to notation alone, and found that "subjects who were exposed to aurally delivered instruction made significantly greater [improvisation] achievement gains than subjects who were exposed to instruction through the use of notated materials" (p. 145). In a similar study, Haston (2010) found that an aural/modeling group of beginning instrumentalists achieved higher performance scores, although not significantly, than a visual/notation group. Of greater interest, perhaps, was a surprising disparity Haston uncovered between students within the aural group. Among those who received aural/modeling methods of instruction, those with prior musical training actually scored *lower* than those *without* prior training, with mean scores of 25 and 29.7 respectively. Haston speculates that "participants with

prior training may have been hampered by their prior dependence on their eyes" (p. 22). Both Watson's and Haston's studies do suggest that a reliance on notation may negatively impact a student's developing improvisation ability. At the same time, they demonstrate that aural methods of instruction are reliably effective in helping students develop improvisation skills.

Aural models. Indeed, musical skill was passed from generation to generation through aural methods well before notational systems were invented (Sang, 1987). Even though music notation had been standardized and present for centuries by the time the 'jazz age' was ushered in, "many historically significant [jazz] performers claim to have learned predominantly by ear", and early jazz band leaders often hired "session" players who could read notation along-side "advanced soloists who sometimes could not" (Laughlin, p. 61). While current jazz musicians tend to be extremely competent readers of music notation, the reliance on aural transmission of musical information has played an indispensible role in the continuing evolution of the jazz language (Dobbins, 1980). For example, among a sample of 58 jazz trombonists, participants identified listening to jazz recordings and playing along with them as the most important means of learning to improvise (Gendrich, 2003). Fraser (1983) reports that seeking to "reproduce or approximate the sounds of a model improviser" was the norm in the early 20th century, and chronicles several significant jazz musicians who began their musical journey idolizing an older player (p. 141). Jazz trumpeter Dizzy Gillespie generalized this phenomenon in declaring that every jazz player starts out "trying to play exactly like somebody else" (p. 141). Dobbins concurs with this view, stating that "jazz musicians have always learned…through meticulous imitation of established masters" (p. 41).

A teacher who wishes to provide models for his students can choose from at least two good options: "recorded examples" and "live performances of the desired musical behaviors"

(Davison, 2006, p. 45). Sang (1987) refers to these two types as *vicarious modeling* and *direct interaction modeling*. Both are valuable sources of musical information, but direct interaction modeling appears to be the more powerful of the two.

Value of live interactive models. One reason direct interaction with a live model is more educationally powerful is the presence of mirror neurons in the brain, which allow an observer to experience similar brain activity to the model—as if the observer were performing the action herself. Hodges and Sebald (2011) write, "We learn through imitation and through social reinforcement. Mirror neurons in Johnny's brain fire when he observes his father [play guitar] and they continue to fire when Johnny attempts to mimic his father's action" (p. 279). The authors reason that while the hypothetical Johnny could learn to play from a method book, "interactions with his father make learning more effective" (p. 279).

Other reasons for the instructional power of direct interaction modeling rely more on psychology than physiology. Kratus points out that "just as verbalizing with others is important for babbling babies who are learning to speak…improvising with other students and with a teacher" is important for young musicians (1996, p. 33). According to Watson (2008), "social cognitive theory proposes that one of the most important ways people learn is through observing and modeling the behaviors of others" (p. 149). And, recognizing that most early jazz players learned to improvise through imitating models and participating in spontaneous jam sessions, Maceli (2009) challenges educators to rethink the status quo and "find a way to create a [similar] authentic jazz experience" in the classroom (p. 342).

Quantitative research of modeling. Studies of teacher modeling in the classroom have confirmed it to be an essential strategy in effective music education. Sang (1985) found that, out of three skill categories, a teacher's modeling ability was the strongest contributor to variance in

instructional effectiveness when compared to other teachers. In a separate study he reports "Teachers who have stronger modeling skills and apply those skills in teaching are more likely to produce students who perform better than teachers who do not" and suggests modeling is a more efficient use of class time than verbalizing by nearly a 3 to 1 margin (Sang, 1987, p. 158). A study by Dickey (1991) involving a 45-day treatment period that compared a nonverbal modeling group to control groups showed that modeling produced higher student achievement in both rhythm achievement and ear-to-hand coordination, both of which are critical skills for jazz improvisers. Laughlin (2001) also found evidence of greater jazz improvisation achievement through using aural models in the curriculum.

Having made a case for the value of student imitation of models, I will now explore a second key concept in developing jazz improvisation skills: the practice and memorization of melodic patterns.

Patterns in Jazz Improvisation

Unlike modeling, which has broad pedagogical value in music education, the concept of using patterns as the basic building blocks of jazz improvisation has more limited pedagogical application, although it is not exclusive or unprecedented. I have settled on the word 'pattern' to describe the basic melodic unit of a jazz solo, although many different words, such as *scale fragment*, *motif*, *sequence*, and *lick* continue to be used to describe essentially the same thing (Witmer & Robbins, 1988). Barrett's (1998) concise overview of the initial process of learning to improvise is that, "Jazz players learn to build a vocabulary of phrases and patterns by imitating, repeating, and memorizing the solos and phrases of the masters until they become part of their repertoire of *licks* and *crips*" (p. 102). In the words of trumpeter Tommy Turrentine, "When you're playing a solo and your mind is crippled and you can't think of anything different to play,

you…play one of your crips. You better have something to play when you can't think of nothing new" (Berliner, 1994, p. 102). Although Turrentine's remark implies that patterns serve primarily as a memorized back-up plans for frazzled improvisers, other jazz players and pedagogues recognize that patterns serve many other valuable functions.

Pros and cons of patterns. The basic need for some patterns in learning to improvise is acknowledged nearly universally by jazz educators. Coker, Casale, Campbell, and Greene (1970) write, "We seldom hear an improviser's solo that does not contain melodic fragments or patterns" (p. ii), and Bergonzi (2003) matter-of-factly states, "Of course, learning sound bites for all of the varieties of chords is an important objective" (p. 79). The importance of utilizing scales, licks, and patterns also emerged in Gendrich's study (2003), and Norgaard's research led him to conclude that improvisers need "a stored repertoire of ideas" (2008, p. 193).

Even while acknowledging the need for patterns in an improviser's development, some criticize the over-reliance on them. Witmer & Robbins (1988) warn that certain pedagogues' emphasis on patterns imply that "jazz is essentially a centonate music: a patchwork of preexisting elements" (p. 16) that involves "no true 'improvisation', in the sense of doing something unforeseen" (p. 12). Bergonzi (2003) agrees this is a risk when patterns are emphasized, but ultimately defers to the "tremendous upside" of practicing patterns (p. 79). I propose there are multiple advantages to practicing patterns, and the next section is devoted to exploring them in detail.

Benefits of Learning Patterns

Patterns provide a starting point. One of the benefits derived from learning patterns is elucidated in David Sudnow's insightful first-person narrative *Ways of the Hand* (1981). Having developed some basic piano skills in his college years (not including music-reading,

incidentally), Sudnow determined in his late 30's to learn to improvise on the piano. His new

jazz piano teacher spent the first several months helping him interpret and play chord changes.

At this point he recollects,

> "When my teacher said, 'now that you know how to play chords well, why don't you try
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> to improvise melodies with the right hand,' and when I went home and listened to my
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> jazz records, I found that in attempting to make up melodies like that, it was as if the
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> instruction 'go home and start speaking French' had been given" (p. 14).

At a future lesson Sudnow told his teacher, "I don't know where to go, how to start this making

up of melodies as you go along; tell me where to go" (p. 17). The teacher reluctantly obliged by

providing melodic patterns drawn from his own improvisations, helping to satisfy Sudnow's

need for 'places to go' and 'pathways' to get there (p. xi). The patterns Sudnow scribbled down,

using his own makeshift notational system, provided a supply of comfortable paths he could take

in the process of beginning to create an improvised solo. (p. 25-26).

Patterns connect melodic structures to harmonic structures. A second way in which

patterns are valuable is they help musicians connect melodic lines to the harmonic structure of

chord progressions. Baker (1980) writes, "Traditionally…improvisation has been based on chord

sequences, which means that a thorough knowledge of chord to scale relationships, harmonic

formulas, and jazz patterns is absolutely mandatory" (p. 47). Norgaard (2008) reports that

capable improvisers must choose notes based on both harmonic and melodic priorities, stating,

"One component of improvising with harmonic priority is the identification of chord tones" (p.

192). Further, he encourages students to "practice connecting the chord tones with conjunct or

arpeggiated motion, making certain that chord tones fall on the strong beats" (p. 193). I believe

that the best jazz patterns are those that fit Norgaard's criteria of emphasizing chord tones,

helping students to both understand and hear the harmonic structures present in jazz music.

Azzara (1999) agrees that learning tonal patterns, which outline the function of the harmony, helps students develop aural skills and a sense of harmonic progression. He assures the beginning improviser, "As a result of learning patterns, tunes, and bass lines, you will develop an understanding of how melodies combine to make harmony and how tones function within the harmony" (p. 23).

Patterns develop muscle memory. Patterns are also useful because of the way repeated practice develops muscle memory. According to Wilson (1986) the speed of note production that improvisation demands is too great for the motor cortex (a conscious, analyzing, and decision making part of the brain) to handle alone, and requires the cooperation of the cerebellum (an unconscious, automatic part of the brain). Hodges and Sebald (2011) explain that the cerebellum is trained through repeating a particular sequence of muscle movements. After a sufficient amount of repetition, the cerebellum stores the "habituated motor patterns" (p. 172) as a unit or program. "Once a program is learned, the cerebellum allows for speed of movement because it has figured out all the required movements in advance" (p. 235). Pressing (1984) writes about muscle memory in terms of "long-term 'object memory' in conceptual, muscular and musical coding" (p. 355). Suzuki (1969) reduces the technical verbage of these neurological experts to the following statement: "We do the thing over and over again until it feels natural, simple, and easy". (p. 51) And once Sudnow had practiced scales and patterns for roughly six months he acquired a sizeable "stockpile of places to go" stored in the form of muscle memory. (p. 28)

Patterns allow 'automatic' performance. The ability to recall patterns encoded in muscle memory leads to another benefit of pattern learning: the improviser can play with a measure of automaticity. As Kratus (1995) puts it, a soloist who has acquired a basic vocabulary

of patterns possesses "the skill to manipulate an instrument…in a way that seems to be automatic" (p. 29) "The student at this level does not have to give conscious thought to the specific movements necessary to transform the emerging improvisational ideas into sound" (p. 34). Norgaard's (2008) phenomenological study of the improvisational thinking of seven improvisers concludes that while jazz artists may devise an initial plan for their solo, as the solo unfolds "the final choices are made by an implicit, automatic process and executed by the motor system" (p. 188). In fact, a recent fMRI study of jazz improvisers suggests that deliberate decision making is actually *less* engaged during jazz improvisation than during many other musical activities (Limb & Braun, 2008). This finding seems counterintuitive, since a loose definition of improvisation might be 'making it up as you go along'. However, it makes complete sense within the perspective of pattern automaticity. The tendency to gravitate towards sequences of notes that feel "comfortable to the fingers and hands" (Coker, 1970, p. ii) is so strong that Pressing (1984) asserts, "no improviser (even in 'free' improvisation) can avoid the use of previously learned material" (p. 346). And Sudnow is grateful for the automaticity that pattern learning provides, because "when you make music…you can't stop for long and think through a next place to go. You have to keep on playing" (p. xii).

Patterns develop ear-to-hand skill. Yet another benefit from learning patterns is improved ear-to-hand coordination skills. Sudnow recognized this need as he began striving to move beyond 'pathway playing', in which he only produced melodies that his hands had learned through muscle memory. He recalls, "It was not until the start of my third year of play that I found myself 'going for the sounds'" (p. 37). He further points out, "I knew what the paths sounded like…they had become quite familiar to me. But it is one thing to recognize familiar sounds you are making and another to be able to aim for particular sounds to happen" (p. 37-38).

Aebersold (1992), one of the most prolific publishers of jazz improvisation materials, identifies this need for ear-to-hand coordination in stating, "[An] improviser's ultimate goal is to be able to reproduce instantly on their instrument the sounds they heard mini-seconds ago in their mind" (p. 7). Coker concurs that an improviser must be able to rapidly correlate pre-heard ideas into correct fingerings on her instrument, and suggests, "practicing patterns is one way to make such correlations" (p. iii). It is important to note that ear-to-hand coordination refers to being able to play both things that are heard aurally, and things that are heard, or imagined, in the mind—the phenomenon Gordon (2007) has labeled 'audiation'. Even though a capable improviser listens to and responds to the real-time music accompanying his solo, his primary objective is to play the melodic ideas that arise out of his own imagination. This makes the audiated version of ear-to-hand coordination the most critical to develop. And, aside from listening to jazz music, it would seem that the most potent way to build a storehouse of melodic ideas *in the mind* would be to practice and memorize melodic patterns. This is exactly what Coker infers in stating, "An unusual scale, for example, may be too new to *be heard*, but practicing patterns which use that scale *unlocks the door to hearing it*" (p. iii, italics added). Thus one way pattern learning improves ear-to-hand coordination is that the memorized patterns contribute to the idea bank from which audiated melodic lines are drawn.

General ear-to-hand ability can also be improved through call-and-response pattern exercises. While a study by Delzell, Rohwer, and Ballard (1999) concluded that 3 additional years of performing on an instrument through reading band literature did not automatically yield any improvement in the ability to play by ear, Dickey's study revealed "the use of teacher demonstration-student imitation cycles to teach melodic patterns contributed significantly to the development of instrumental ear-to-hand coordination skills" (1991, p. 140). Musco (2009)

similarly found that "significant improvement in playing melodies by ear" could be achieved through instruction and practice (p. 90). Since the ability to play by ear is one of the best predictors of improvisation achievement (May, 2003), the ability to produce newly 'heard' melodic lines on an instrument via ear-to-hand coordination is highly desirable, and therefore call-and-response exercises with melodic patterns should be considered an essential part of jazz improvisation instruction.

Benefits of Patterns During Improvisation

Once a musician has built an idea bank of patterns, the learned patterns positively influence the generation of melodic ideas in at least two ways. The first of these is that patterns can be creatively altered and combined to produce new melodies. The second is that learned patterns allow more cognitive resources to be allocated to conscious attention and decision-making while improvising.

Creative alteration and combination of patterns. The notion of making an artistic product through combining smaller, ordinary elements is not exclusive to improvisation, or music, or even art. In many human endeavors the unique and complex are created from the simple and commonplace, such as in carpentry, cooking, and (once again) verbal communication. Gjerdingen (2007) offers two interesting examples of this notion: (1) After thousands of hours practicing specific figures, like the double axel and sit spin, a figure skater weaves any number of these elements into a unique and individualized performance, and (2) musicians in 18th century Italy learned hundreds of stock musical phrases, called *zibaldone*, so they could later combine and recombine these melodic prototypes in a seemingly endless variety. Speaking to students of jazz improvisation, Aebersold (1992) advises, "Exercises are merely a means to an end. Practicing exercises, patterns, licks, scales, and chords should lead to a more

expressive creativity" (p. 3). Baker (1980) offers additional specifics, suggesting that a developing improviser should begin trying to play "things that are in his realm of experience but that he has not actually played before…drawing on his fund of knowledge, putting things together that were formally apart" (p. 60). According to Pressing (1987) the fundamental nature of improvisation is the "stringing together of a series of 'event clusters' during each of which a continuation is chosen…either the continuing of some existing stream of musical development…or the interruption of that stream by the choosing of a new set of array entries" (29). In a different article Pressing (1984) suggests a jazz player must link "novel combinations of action units in real-time and [change] chosen aspects of them" (p. 355). It is clear that the human mind is capable of creatively assembling and altering previously learned material, and this job is made easier for the jazz improviser if there is an abundance of learned jazz patterns.

  Patterns allow greater ability to think and choose. Doyon & Benali (2005) hypothesize that once motor skills become 'automatic' they require very little cognitive resources and are more resistant to interference from competing tasks. In Pressing's (1984) words, encoded patterns "tend to reduce central processing load, since many aural data are now partially 'pre-processed'" (p. 355). And according to Doidge (2007), a more efficient use of the motor system requires fewer neurons, and as the neural pathways get more efficient even fewer neurons are required to perform a given task. This is good news for the developing improviser, who constantly feels like she can't think fast enough to keep up. For just as in a conversation one chooses her next words while in the course of speaking, an improviser must plan the upcoming phrase while playing the current one (Norgaard). Learned patterns greatly assist the brain's ability to multi-task in this way during improvisation. Pressing explains that through the "automaticity of certain motor sequences…the results of one decision can be performed while a

new set of sensory data are being processed" (p. 354). Indeed, professional improvisers report that they are able to plan upcoming note choices while playing a previously selected phrase, often 'hearing' an upcoming phrase while playing the end of a preceding phrase (Norgaard, 2008). Berkowitz and Ansari's (2008) research involving fMRI scans of improvising piano players suggests the improvisation process requires a soloist to "generate possible sequences" before selecting among them and finally executing the chosen sequence, meaning at least three cognitive functions must be occurring simultaneously during improvisation (p. 535). Whatever number of functions may be involved in improvisation, if a jazz musician wishes to listen, analyze, creatively survey possible note sequences, and strategically choose his moment-by-moment melodic output, then committing more patterns to muscle memory frees up his cognitive processing load, allowing more resources to be dedicated to these functions.

The Transformation

Both jazz musicians and researchers describe a phenomenon that occurs at some point in an improviser's development—a point at which improvised musical lines begin to be fluidly imagined in the mind and performed on the instrument. The work of improvisation begins to feel effortless. Barrett (1998) writes,

> "After years of practicing and absorbing these patterns…a transformation occurs in the player's development when he or she begins to export materials from different contexts and vantage points, combining, extending and varying the material, adding and changing notes, varying accents, subtly shifting the contour of a memorized phrase" (p. 606-7).

Pressing (1984) describes this new sensation of free-flowing improvisation as, "an uncanny feeling of being a spectator to one's own actions" (p. 359). Bergonzi (2003) once again invokes the language correlation, explaining,

"When studying a language there comes a time when you begin to learn phrases and how to put the words into a context. The same is true when acquiring a jazz vocabulary…after learning a great variety of lines [patterns], one forgets the lines but can carry on a conversation with the same sounds or words" (79).

After much frustration trying to break free of 'pathway' playing (based strictly on combined patterns), and attempting to realize on the piano keyboard the 'singing' melodies that streamed through his imagination, Sudnow (1981) finally experienced a transformation. He describes it as "a new sort of hookup between the singing me and these hands…a new sort of synchrony and directionality of linkage between my head's aimings for sung sounds and my fingers' aiming for singable [muscle-memorized] sounds" (p. 95-96). Once reaching this point, a jazz musician is able to freely and easily express the melodic ideas that flow into the mind, and is only limited by his technical skills and by the keys and chord structures he has (or hasn't) studied.

Although there is always room to improve and develop as an improviser, reaching this point of transformation, even with only a few chords and scales, opens the door for the 'flow' experience, which is the state of mind described as the 'optimal human experience' (Csikszentmihalyi, 1990). Norgaard's research led him to believe "students *at all levels* can experience flow" while improvising (2008, p. 193, italics added). While I agree that students at all levels *can* experience flow while improvising, it has been my experience that most beginning jazz students do not. Instead, they focus on their lack of competence in fluidly creating coherent musical ideas, and often do not feel satisfaction through engaging in improvisation. However, the key concepts of models and patterns offer powerful ways to help students develop improvisation skills and ultimately make the transformation into a 'flow' improviser.

Conclusions and Personal Perspectives

In my personal pathway to developing improvisation skill I can attest that the act of improvising is deeply satisfying. Opportunities to improvise, both with and without an audience, are among the most enjoyable and enlivening experiences I have known. While even my first experiences improvising were enjoyable, I realized I needed to practice *a lot* in order to really improvise proficiently. However, like Sudnow I was immensely perplexed by the questions of *what* to practice and *how* to practice it.

Jazz improvisation literature identifies the need for learning patterns, but in many pedagogical books the only patterns that are provided are scales. Sadly, that is all I was expressly told by jazz educators: practice and memorize all 12 major, dorian, and mixolydian scales, and then use them to improvise. However, this helped only a little. In retrospect it seems fitting to compare scales to the letters of the alphabet and melodic patterns to actual words. Sudnow reinforced this notion by pointing out that repeated sequences of letters, such as "noinoinoinoinoi…" (p. 17) are meaningless and do not qualify as English words. He and I both wish we could go back and spend our time practicing patterns like "the book, the book, the book, book, book" (p. 36).

Jazz improvisation literature also identifies the need for models and imitation of models. With the exception of a few teachers who modeled for me at summer music camps, my only sources for models were recordings of jazz trombone players. While many would consider this a positive factor, I was often discouraged by my inability to imitate these models with my limited technical abilities on the trombone. Nevertheless, I absorbed the melodic ideas of the models, if not the muscle memory of them, allowing me to gain some proficiency in improvising like a jazz trombonist. Meanwhile I constantly felt like I was missing *something* that would allow me to

freely produce competent, flowing improvised solos. Developmentally appropriate models, and interaction with live models would have certainly provided some of the missing *things*, and sped along my development as an improviser.

There are many other elements that are essential to becoming a competent improviser, such as developing fluency with music theory, becoming familiar with historical jazz styles, exploring personal expression, practicing different ways of developing a solo, and learning to interact with a rhythm section. However, evidence drawn from both my personal experiences and the literature on jazz improvisation suggests that utilizing models and learning patterns are two of the most critical elements in developing improvisation skill. I expect that a greater emphasis on these two elements will empower students of all ages and backgrounds to more efficiently acquire the knowledge and skills needed to freely communicate in the jazz language.

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