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I wake to sleep and take my waking slow. I learn by going where I have to go.

Theodore Roethke, poet

We must simply act, fully knowing our ignorance of possible consequences.

Kenneth Arrow, economist

I think the fear of failure is why I try things ... if I see that there's some value in something and I'm not sure whether I deserve to attempt it, I want to find out.

Keith Jarrett, jazz pianist

At the dawn of the twenty-first century, we are in the midst of a revolution that has been called variously the post-industrial society (Bell 1973), the third wave (Toffler 1980), the information revolution (Naisbitt 1983), and the post-capitalist society (Drucker 1993). We do not yet perceive the entire scope of the transformation occurring, but we know that it is global, that it is based on unprecedented access to information, and that since more people have access to information than ever before, that it is potentially a democratic revolution. Perhaps the management of knowledge development and knowledge creation is becoming the most important responsibility for managers as we enter the twenty-first century. Indeed, ideas generated by various streams and movements, including socio-technical design, total quality management, re-engineering, remind us that the fundamental shift we are experiencing involves empowering people at all levels to initiate innovative solutions in an effort to improve processes.

Given the unprecedented scope of changes that organizations face and the need for members at all levels to be able to think, plan, innovate, and process information, new models and metaphors are needed for organizing. Drucker has suggested that the twenty-first century leader will be like an orchestra conductor. However, an orchestral metaphor—connoting pre-scripted musical scores, single conductor as leader—is limited, given the ambiguity and high turbulence that many managers experience. Weick (1992) has suggested the jazz band as a prototype organization. This paper follows Weick's suggestion and explores the jazz band and jazz improvising as an example of an organization designed for maximizing learning and innovation. To help us understand the relationship between action and learning, we need a model of a group of diverse specialists living in a chaotic, turbulent environment; making fast, irreversible decisions; highly interdependent on one another to interpret equivocal information; dedicated to innovation and the creation of novelty. Jazz players do what managers find themselves doing: fabricating and inventing novel responses without a prescribed plan and without certainty of outcomes; discovering the future that their action creates as it unfolds.

After discussing the nature of improvisation and the unique challenges and dangers implicit in the learning task that jazz improvisers create for themselves, I will broadly outline seven characteristics that allow jazz bands to improvise coherently and maximize social innovation in a coordinated fashion. I also draw on my own experience as a jazz pianist. I have played with and lead combinations of duos, trios, and quartets in addition to touring in 1980 as pianist with the Tommy Dorsey Band under the direction of trombonist Buddy Morrow. I will explore the following features of jazz improvisation.

1. Provocative competence: Deliberate efforts to interrupt habit patterns;

2. Embracing errors as a source of learning;

3. Shared orientation toward minimal structures that allow maximum flexibility;

4. Distributed task: continual negotiation and dialogue toward dynamic synchronization;

5. Reliance on retrospective sense-making;

6. "Hanging out": Membership in a community of practice;

7. Taking turns soloing and supporting.

Finally, I will suggest implications for organizational design and managing for learning.

The Nature of Improvisation

There is a popular misconception that jazz players are inarticulate, untutored geniuses, that they have no idea what they are playing as if picking notes out of thin air. As biographies of jazz players and studies of jazz have shown, the art of jazz playing is very complex and the result of a relentless pursuit of learning and disciplined imagination. Since (until recently) there have been no conservatories or formal schools of jazz instruction, veteran jazz players are highly committed to self-renewal, having had to create their own learning opportunities.

Jazz improvisers are interested in creating new musical material, surprising themselves and others with spontaneous, unrehearsed ideas. Jazz differs from classical music in that there is no clear prescription of what is to be played. From the Latin "improvisus," meaning "not seen ahead of time," improvisation is "playing extemporaneously ... composing on the spur of the moment" (Schuller 1989, p. 378). Given the highly exploratory and tentative nature of improvisation, the potential for failure and incoherency always lurks just around the corner. Saxophonist Paul Desmond said that the improviser must "crawl out on a limb, set one line against another and try to match them, bring them closer together" (Gioia 1988, p. 92). Jazz saxophonist Steve Lacy discusses the excitement and danger inherent in improvisation and likens it to existing on the edge of the unknown.

> I'm attracted to improvisation because of something I value. There is a freshness, a certain quality, which can only be obtained by improvisation, something you cannot possibly get from writing. It is something to do with the "edge." Always being on the brink of the unknown and being prepared for the leap. And when you go out there you have all your years of preparation and all your sensibilities and your prepared means but it is a leap into the unknown. (Bailey 1992, p. 57)

The metaphors of leaping into the unknown, hanging out on a limb, suggest the exhilarating and perilous nature of engaging in an activity in which the future is largely unknown, yet one in which one is expected to create something novel and coherent, often in the presence of an audience.

Gioia captures a sense of the challenge and difficulty inherent in jazz by considering what practitioners of other art forms would subject themselves to if they relied on improvisation as design.

> If improvisation is the essential element in jazz, it may also be the most problematic. Perhaps the only way of appreciating its peculiarity is by imagining what twentieth-century art would be like if other art forms placed an equal emphasis on improvisation. Imagine T. S. Eliot giving nightly poetry readings at which, rather than reciting set pieces, he was expected to create impromptu poems—different ones each night, sometimes recited at a fast clip; imagine giving Hitchcock or Fellini a handheld motion picture camera and asking them to film something, anything—at that very moment, without the benefits of script, crew, editing, or scoring; imagine Matisse or Dali giving nightly exhibitions of their skills—exhibitions at which paying audiences would watch them fill up canvas after canvas with paint, often with only two or three minutes devoted to each "masterpiece." (Gioia 1988, p. 52)

Improvisation involves exploring, continual experimenting, tinkering with possibilities without knowing where one's queries will lead or how action will unfold.

Learning to Improvise: Preparing To Be Spontaneous

It is worth exploring for a moment the way that jazz musicians learn to improvise in order to gain a deeper understanding of how they think while they are playing. Learning to play jazz is a matter of learning the theory and rules that govern musical progressions. Once integrated these rules become tacit and amenable to complex variation and transformation, much like learning the rules of grammar and syntax as one learns to speak. 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." According to trumpeter Tommy Turrentine,

> The old guys used to call those things crips. That's from crippled. . . In other words, when you're playing a solo and your mind is crippled and you can't think of anything different to play, you go back into one of your old bags and play one of your crips. You better have something to play when you can't think of nothing new or you'll feel funny laying out there all the time (quoted in Berliner, 1994, p. 102).

After years of practicing and absorbing these patterns, they train their ears to recognize what phrases fit within

different forms, the various options available within the constraints of various chords and songs. They study other players' strategic thought process that guided their solo construction, why they chose certain notes and how their motifs fit the contour of the overall phrasing.

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. Combining elements from different musical models, mixing different harmonies and grace notes, extending intervals, and altering chord tones is a metaphorical transfer of sorts (Barrett and Cooperrider 1990), transferring from one context into another to produce something new. By combining, extending, and varying, they breathe life into these forms. The variation could involve something as simple as taking automatic phrases and extending them into new and unfamiliar contexts, such as trying out a phrase over a different chord. Pianist John Hicks recalls experiencing a breakthrough when he combined previously unrelated chords. Saxaphonist Lee Konitz attempts to create new substitutions as he plays to enrich the basic harmonic structure of standard songs (Berliner 1994, p. 161).

The aim is to integrate ideas, freeing attention so that players can think strategically about their choice of notes and the overall direction of their solos. Hargreaves et al. (1991, p. 53) hypothesize that when improvisers employ automatic thinking[1] to execute patterns, they are free to plan the overall strategy of the piece; they are "aware of playing detailed figures or 'subroutines' at a relatively peripheral or unconscious level, with central conscious control reserved for overall strategic or artistic planning." Saxaphonist James Moody practices "trying to play something that you like and being able to put it anywhere you want in a tune" (Berliner 1994, p. 174). Jazz critic Mark Gridley claims that Bill Evans was a master strategist.

> Evans crafted his improvisations with exacting deliberation. Often he would take a phrase, or just a kernel of its character, then develop and extend its rhythms, its melodic ideas, and accompanying harmonies. Within the same solo he would often return to it, transforming it each time. And while all this was happening, he would be considering ways of resolving the tension that was building. He would be considering rhythmic ways, melodic ways, and harmonies, all at the same time, long before the moment that he decided was best for resolving the idea. . . . During Bill Evans's improvisations, an unheard, continuous self-editing was going on. He spared the listener his false starts and discarded ideas. . . . Evans never improvised solos that merely strung together ideas at the same rate they popped into his head.

> The results of these deliberations could be a swinging and exhilarating experience for the listener, but they reflected less a carefree abandon, than the well-honed craftsmanship of a very serious performer working in the manner of a classical composer. The adjective most frequently applied to his music is "introspective" (Gridley 1991, pp. 302, 303).

It is uncertain to what degree improvisers go through an "unheard, continuous self-editing," an anticipatory, virtual trial and error as they consider different directions and interpretations of the material. Within a split second, musicians must project images and goals gleaned from some musical model or one they have just heard. Although Gridley theorizes that Bill Evans is thinking fairly far ahead and choosing phrases long before he played it, some musicians seem to be deciding within shorter time spans which notes to play. One player describes the subtle interplay between prehearing, responding, and following an idea, who sees the direction of the phrase that is just ahead of him and likens it to "chasing a piece of paper that's being blown into the wind" (Berliner 1994, p. 190). Others speak of going on automatic pilot while they think of something, repeating a phrase in order to buy time while their imagination wakes up. This no doubt, is one characteristic that distinguishes great soloists: how far ahead they are thinking and strategizing about possible phrases, how to shape the contour of their ideas, how and when to resolve harmonic and rhythmic tension. This points toward a delicate paradox musicians face, a point I will explore below: too much reliance on learned patterns (habitual or automatic thinking) tends to limit the risk-taking necessary for creative improvisation; on the other hand too much regulation and control restrict the interplay of musical ideas. In order for musicians to "strike a groove," they must suspend some degree of control and surrender to the flow of the music.

The previous section addressed the nature of improvisation, the challenging task of playing unrehearsed ideas, the process of developing improvisatory skills and the process of learning the jazz idiom. In the following section, I will outline seven characteristics of jazz improvisation and explore how these features apply in non-jazz contexts.

Seven Characteristics of Jazz Improvisation

1. Provocative Competence: Interrupting Habit Patterns

Perhaps because of the treachery involved in improvising and the risk of playing something that is incoherent, there is often a temptation to do what is feasible, to play notes

that are within one's comfortable range. This is why, as many jazz critics attest, there is a temptation on the part of jazz improvisers to rely on "certain stock phrases which have proven themselves effective in past performance (rather than) push themselves to create fresh improvisations" (Gioia 1988, p. 53). Yet, the art of jazz improvisation demands that the musician create something different. Musicians and critics agree that "musicians who 'cheat' by playing the same or similar solos over and over again are looked down upon by colleagues and fans" (Gioia 1988, p. 52). Saxophonist Ronnie Scott contrasts Oscar Peterson's flawless pre-rehearsed solos with the risk taking of Sonny Rollins, who attempts to transform the harmonic and melodic materials that the tune presents.

> Oscar Peterson is a very polished, technically immaculate, performer, who—I hope he wouldn't mind me saying so—trots out these fantastic things that he has perfected and it really is a remarkable performance. Whereas Sonny Rollins, he could go on one night and maybe it's disappointing, and another night he'll just take your breath away by his kind of imagination and so forth. And it would be different every night with Rollins. (Quoted in Bailey 1988, p. 51)

Because of the temptation to repeat what they do well rather than risk failure, veteran jazz musicians make deliberate attempts to guard against the reliance on pre-arranged music, memorized solos, or habits and patterns that have worked for them in the past. Keith Jarrett decries those who play overlearned clichés and become imitations of themselves: "The music is struggle. You have to want to struggle. And what most leaders are the victim of is the freedom not to struggle. And then that's the end of it. Forget it!" (Carr 1991, p. 53). Jazz musicians often approach their work with a self-reflexiveness, guarding against the temptation to rely on ingrained habits, so that they don't repeat stock phrases and comfortable solos that contradict the goal of improvisation. Tony Oaxley recalls moments of self critique following performances: "The search was always for something that sounded right to replace the things that sounded predictable and (therefore) wrong (Bailey 1992, p. 89). Jarrett put it succinctly: "I think you have to be completely merciless with yourself" (Bailey 1992, p. 122).

Organization learning theorists have noticed that organizations also are tempted to rely on past successes and repeat stock phrases. Behavior in organizations is based on routines—rules, recipes, practices, conventions, beliefs—in short the response system that encodes activity learned from the past. Ordinary learning in organizations tends to lead to stable routines (March 1991) that perpetuate and become fixed even if they are no longer appropriate or detrimental (Levitt and March 1988), as if they

are playing themselves automatically. Even when stimuli change, organizations tend to generate the same responses (Weick 1991). Many routines are automatic and not even accessible to ordinary recollection and analysis, so that individuals and organizations continue them long after actors have ceased to be able to provide an account of their purposes (Cohen 1991). Levitt and March (1988) refer to this as the competency trap: the tendency for an organization to become competent and specialized in a routine that was successful, thereby squelching experimentation (March 1991).

Especially under stressful conditions, such as environmental turbulence, there is a tendency to fall back on habitual responses. In this sense, managers often face the same dilemma that jazz players face: their actions are quite public and therefore stressful; they too are tempted to repeat what they do well rather than risk failure if they should depart from what has been proven to work. As Argyris (1990) has pointed out, the pressure to look competent leads people to defend their actions and reasoning. This regression becomes an obstacle to the questioning of assumptions and considering situations from a fresh perspective that could lead to novel initiatives.

Hedberg writes that organizations and managers can voluntarily switch from routines to a deliberate search for alternative possibilities but this is rare: "learning is typically triggered by problems" (Hedberg 1981, p. 16). Of course, even deliberate search for alternatives might not be sufficient for creation of novelty.

This creates a challenge for jazz players: their purpose, by definition, is to avoid that which is automatic and safe and formulas that simply repeat past success. Some jazz musicians avoid "competency traps" and keep fresh alternatives open by deliberately exploring the limits of their knowledge and comfort level. Herbie Hancock recalls an early moment when he discovered the limits of his knowledge. He remembers being inspired when he heard someone playing a passage that he (Hancock) could not play. For some this might be discouraging. But for Hancock, and most successful jazz musicians, this is the beginning rather than the end of the story.

> I had been a musician all my life, had all this training, played with all these great players, but I knew I could never have created that. And if I can't do it, something is missing—I have to find out how to do it! I've always been like that when I've heard something I liked but I couldn't do. That's how I got into jazz. I heard this guy playing (jazz piano) at a variety show in high school, and I knew that he knew what was doing, and he was doing it on my instrument—but I had no idea of what was going on. So I wanted to learn how to do it. That's what got me started. In order to do that, you have to know what you don't know. (Novello 1990, p. 445)

What has not been explored much by learning theorists is managers' consciously "switching cognitive gears" from habitual to active thinking (Louis and Sutton 1991). Hedberg et al. (1976) encourage organizations to nurture small disruptions and incremental re-orientations to keep learning processes vital and handicap inferior routines. Incremental experiments sharpen perception and activate thought processes.

Many veteran jazz musicians practice provocative competence; they make deliberate efforts to create disruptions and incremental re-orientations. This commitment often leads players to attempt to outwit their learned habits by putting themselves in unfamiliar musical situations that demand novel responses. Saxophonist John Coltrane is well known for deliberately playing songs in difficult and unfamiliar keys because "it made (him) think" while he was playing and he could not rely on his fingers to play the notes automatically. Herbie Hancock recalls that Miles Davis was very suspicious of musicians in his quartet playing repetitive patterns so he forbade them to practice. In an effort to spur the band to approach familiar tunes from a novel perspective, Davis would sometimes call tunes in different keys, or call tunes that the band had not rehearsed. This would be done in concert, before a live audience. "I pay you to do your practicing on the band stand," Hancock recalls Davis telling them. Keith Jarrett recalls Davis' commitment to "keeping the music fresh and moving" by avoiding comfortable routines. "Do you know why I don't play ballads any more?" Jarrett recalled Davis telling him. "Because I like to play ballads so much" (Carr 1992, p. 53).

Miles Davis not only practiced this provocative competence in live concerts, he also extended this to the recording studio. This is illustrated in a famous 1959 session. When the musicians arrived in the recording studio, they were presented with sketches of songs that were written in unconventional modal forms using scales that were very foreign to western jazz musicians at that time. One song, contained 10 bars instead of the more familiar 8 or 12 bar forms that characterize most standards. Never having seen this music before and largely unfamiliar with the forms, there was no rehearsal. The very first time they performed this music, the tape recorder was running. The result was the album *Kind of Blue*, widely regarded as a landmark jazz recording. When we listen to this album, we are witnessing the musicians approaching these pieces for the first time, themselves discovering new music at the same time that they were inventing it.

What makes a disruption provocative rather than noxious can be gleaned from Miles Davis' example. First, his interruption was affirmative (Barrett 1995): he held an image of members as competent performers able to meet

the demands of a challenging task. He believed in their overall potential and capacity to perform successfully even if they felt uncomfortable (and possibly irritated). In fact, his band members were often able to perform at a higher level. Second, he did more than just disrupt habit patterns: he created alternative pathways for action. He imported new material that opened possibilities and suggested alternative routes for his players. Once the song begins, passivity is not an option: the activity is impersonally structured so that musicians are required to play something, to take some kind of action. Third, the interruption was incremental. These foreign contexts were scaled to be challenging, but not overly disruptive. This suggests the role of leadership in cultivating generative metaphors and seeding suggestive narratives (Barrett and Cooperrider 1990).

Hedberg et al. (1976) contend that system designers have weak direct influence on participants' behavior. They suggest that designers reconceive their roles as catalysts for a system's self-design by focusing on third order strategies for carrying out second order learning. Miles Davis had a talent for creating incremental obstacles and nurturing small disruptions that provoked his musicians to experiment with new actions that yielded new levels of creativity. This suggests that managers, like Miles Davis, develop a provocative competence that inspires alternative possibilities, an ability to create anomalies and unconventional obstacles that make it impossible for members to rely on habitual responses and rote thinking.

It would be useful to consider the organizational equivalent of requiring members to abandon overreliance on automatic processing and practicing familiar routines. Clearly this would have implications for dislodging conventional assumptions regarding such conventional practices as job descriptions, performance evaluations, and recruitment. Perhaps this is what W. L. Gore and Associates, the makers of Gore-tex, have in mind by abandoning formal job descriptions or conventional chain of command reporting structures. Reportedly, when a newly hired MBA reported for work one day, Bill Gore, the President and founder advised him to "look around and find something you'd like to do." Such a loosely structured environment makes it more difficult to rely on accepted routines and forces new hires to improvise new actions. Or consider the example of the R & D executive at Sony who, wanting to create a mini compact disc player, was faced with engineers who were convinced the CD technology could not be compacted further. Based on familiar routines, and perhaps enamored of the technology they themselves developed, they could not imagine

a smaller alternative. The executive walked into the meeting with a 5-inch block of carved wood and told them that the new CD player needed to be no bigger. The engineers now had novel constraints to work through, a challenging puzzle not unlike the modal sketches that Miles Davis' band found when they walked into the *Kind of Blue* recording session.

This suggests that we expand our definition of leadership to include creating conditions that encourage members to bring a mindfulness to their task that allows them to imagine alternative possibilities heretofore unthinkable. Consider the example of British Airlines which held an off-site workshop for its executives to consider ways to improve customer service for the business class. However, instead of sleeping in regular hotel rooms, one executive had the beds removed and replaced them with airline seats. This no doubt disturbed the taken-for-granted routines, not to mention sleep patterns. Faced with the puzzle of these unexpected constraints, they came up with a number of innovations to improve comfort, including the design of a more comfortable seat that included a footrest. Provocative competence involves creating irregular arrangements that disturb "stock phrases" and comfortable playing, encouraging members to improvise new solutions.

2. Embracing Errors As Source of Learning

If past successes create routines that drive out experimentation in organizations, there is a tendency to construe errors as unacceptable. However, errors are a very important source of learning. Abdel-Hamid and Madnick (1990) discuss the need to learn from failures in the development of new software. The Seifert and Hutchins (1992) study of decision making on a Navy ship demonstrated the learning potential of error-making, how errors serve as an opportunity for receiving feedback and becoming familiar with the wider task environment. As individuals learned through error correction procedures, they came closer to the eventual goal of error-free performance. Jazz bands also embrace errors as source of learning, but for quite different reasons. These studies suggest the value of learning from errors as a way to eliminate them under the assumption that in actual performance, errors are ultimately intolerable. Jazz bands, on the other hand, see errors as inevitable and something to be assimilated and incorporated into the performance.

Since jazz improvisation is a highly expressive art form that leads players to go out "on the edge of the unknown", it is impossible to predict where the music is going to lead. Risky, explorative attempts are likely to produce errors. In fact, jazz improvisers regularly make mistakes, often without the audience's awareness. Often, there are discrepancies between intention and action: sometimes the hands fail to play what the inner ear imagines. Sometimes musicians misinterpret others' cues or simply play the wrong notes.

> Somebody who decides to play jazz for a living knows he will struggle for the rest of his life, unless he opts for predictable and smoothing compromise. Honest jazz involves public exploration. It takes guts to make mistakes in public, and mistakes are inherent. If there are no mistakes it's a mistake. In Keith Jarrett's solo improvisations you can hear him hesitate, turn in circles for a while, struggle to find the next idea. Bird used to start a phrase two or three times before figuring out how to continue it. On the spot. Now. No second draft. It can take a toll night after night in front of an audience that just might be considering you shallow. (Zwerin 1983, p. 33)

Jazz players are often able to turn these unexpected problems into musical opportunities. Errors become accommodated as part of the musical landscape, seeds for activating and arousing the imagination. Drummer Max Roach sees the value in errors, "if two players make a mistake and end up in the wrong place at the wrong time, they may be able to break out of it and get into something else they might not have discovered otherwise." (Berliner 1994, p. 383). Herbie Hancock recalls playing an obviously wrong chord during a concert performance. Hearing the unexpected combination of notes, Miles Davis used them as a prompt, and rather than ignore the mistakes, played with the notes, embellishing them, using them as a creative departure for a different melody. Any event or sound, including an error, becomes a possible springboard to prime the musical imagination, an opportunity to re-define the context so that what might have appeared an error becomes integrated into a new pattern of activity. Looking backward, the "wrong" notes appear intentional.

Rather than treat an enactment as a mistake to be avoided, often what jazz musicians do is to repeat it, amplify it, develop it further until it becomes a new pattern. Pianist Don Friedman recalls listening to a recording with himself on piano and Booker Little on trumpet. When listening to the recording 20 years later, Friedman discovered that he played a major third in the chord instead of a minor third and Little brilliantly accommodated it, allowing the "wrong note" to shape his solo.

> Little apparently realized the discrepancy during his solo's initial chorus, when he arrived at this segment and selected the minor third of the chord for one of the opening pitches of a phrase. Hearing it clash with the pianist's part, Little improvised a rapid save by leaping to another pitch and resting, stopping the progress of his performance. To disguise the error further, he repeated the entire phrase fragment as if he had initially intended it as a motive, before extending it into a graceful, ascending melodic arch. From that point on, Little guided his solo

according to a revised map of the ballad. "Even when Brooker played the melody at the end of the take," observed Friedman with admiration, he varied it in ways "that fit the chord I was playing." (Berliner 1994, p. 383)

Repeating the phrase with the clashing note, Little made it sound intentional. When errors do happen, rather than search for causes and identify responsibility, musicians treat them impersonally: they make adjustments and continue. In this vein, Weick (1990) cites critic Ted Gioia who calls for a different standard for evaluating performance, an "aesthetic of imperfection". Rather than evaluate the success or failure of individual creations based on some external standard of perfection (such as one might find in the evaluation of a classical musical performance), Gioia calls for the need to evaluate courageous efforts. Such an aesthetic would involve evaluating the entire repertoire of actions that the musician attempted, the beautiful phrases combined with the clunkers that were the result of risky efforts, the same expansive efforts that no doubt produce beautiful passages.

One implication for enhancing innovative action in organizations is to question the way we look at errors and breakdowns. How can people in organizations be expected to attempt something that may be outside of their reach if breakdowns are seen as unacceptable? This would suggest that innovation would be enhanced if organizations resisted the attempts to over-focus on the elimination of error or to see mistakes as character blemishes. Too often managers create monuments to organizational breakdowns through exhaustive search for causes and framing mistakes as unacceptable. This often has the unintended consequence of immobilizing people. Given the nature of knowledge work in the organizations of the future, this suggests that perhaps organizations need to adopt an "aesthetic of imperfection," an acknowledgement that learning is something that often happens by trial and error, by brave efforts to experiment outside of the margin. This would propose a different standard for organizational evaluation: evaluate performances not just on conventional standards of success, but on strength of effort; level of purposeful, committed engagement in an activity; perseverance after an error has been made; passionate attempt to expand the horizon of what had been considered possible. At the very least, it suggests distinguishing between errors that are the result of carelessness and those that are the result of caring deeply about a project.

Similarly, once errors are made, how do managers turn these unexpected events into learning opportunities, as imaginative triggers and prompts for new action? Consider an example from Nordstrom's department store where employees are encouraged to "respond to unreasonable customer requests." Stories circulate about an employee paying a customer's parking ticket when the store's gift wrapping took too long. Such capacity for accommodation and adjustment might be indispensable when attempts at innovation and customer satisfaction do not immediately meet expectation. Rather than simply rewarding managers for "fixing" problems, perhaps organizations should consider the way that managers persevere and make use of mistakes as points of creative departure. An aesthetic of imperfection implies that errors would be framed not so much as character blemishes, but as unavoidable mishaps to be creatively re-integrated as negotiation proceeds.

This also suggests that if organizations advocate ad hoc action and serendipitous learning, then there are times when members must be willing to release one another for consequences that they could not predict, for errors of trespassing and over-extension. Hannah Arendt (1958) noted that the one antidote to the predicament of unpredictability is forgiveness. Imagine executives developing an aesthetic of forgiveness, releasing those who make noble efforts, for consequences that could not be foreseen. Otherwise, tightly bound bureaucracies might be necessary to ward off trespassers.

3. Minimal Structures That Allow Maximum Flexibility

In an effort to guarantee consistency and efficiency, organizations often attempt to systematically avoid changes and ambiguity through creating standard operating procedures, clear and rationalized goals, and forms of centralized control. Hedberg et al. (1976) suggested that organizational processes would be improved if designers create minimal structures that allow diversity and minimize consensus. Similarly, Eisenberg (1990) analyzes jamming in jazz bands and contends that creativity is enhanced when emphasis is placed on coordinating action with minimal consensus, minimal disclosure, and minimal, simple structures. Modest structures value ambiguity of meaning over clarity, preserve indeterminancy and paradox over excessive disclosure. By "making do with minimal commonalities and elaborating simple structures in complex ways," (Eisenberg 1990) players balance autonomy and interdependence.

Jazz improvisation is a loosely structured activity in which action is coordinated around songs. Songs are made up of patterns of melodies and chord changes, marked by sections and phrases. Following Bastien and Hostager (1988) songs are "cognitively held rules for musical innovation" (p. 585). When musicians improvise, it is usually based on the repetition of the song structure.

These guiding structures are nonnegotiable, impersonal limitations: musicians do not have to stop to create agreements along the way. The selection of standard tunes and their chord changes embody minimal tacit rules that are rarely articulated. The musicians know the chord changes to "All of Me" or a 12 bar blues, so that often musicians who have never met are able to "jam" and coordinate action. These moderate constraints serve as benchmarks that occur regularly and predictably throughout the tune, signalling the shifting context to everyone. Everyone knows where everyone else is supposed to be, what chords and scales players are obliged to play. These minimal constraints allow them freedom to express considerable diversity. Players are free to transform materials, to intervene in the flow of musical events and alter direction. Once there is a mutual orientation around the basic root movement of the chord patterns, even the basic chords themselves can be altered, augmented or substituted.

Songs impose order and create a continuous sense of cohesion and coordination: all the players know where everyone is at any given moment. Individual players are able to innovate and elaborate on ideas with the assurance that they are oriented to a common place. How can organizations achieve fluid coordination without sacrificing creativity and individual contributions? What would be the equivalent in organizations, of structures that are minimal, non-negotiable, impersonal tacitly accepted rules that do not need to be constantly articulated. Weick (1990) suggests that one organizational equivalent of minimal structure might be credos, stories, myths, visions, slogans, mission statements, trademarks. Organizational slogans, such as Avis' "we try harder" are catchy phrases awaiting embellishment, encouraging individual members to elaborate on their version of the melodic path that fits within the tacit constraints. Organizational stories and myths, such as the Nordstrom's employee who paid a waiting customer's parking ticket, persist as markers to remind and seed other employees to embellish on the melody, initiating unusual actions to satisfy customers.

One counterpart to minimal models in organizations is the design prototype. The prototype is the design pattern upon which engineers model and create variations on basic structures. For example Crick and Watson, credited for discovering the structure of DNA, recall that when they were exploring the molecule, they frequently built and re-built prototypes and copper models even though they knew the models were not completely accurate. The DNA prototypes acted as a minimal structure that provided imaginative boundaries around which they could explore options, a shared orientation that invited them to elaborate upon their ongoing creation. Under traditional

norms of organizational design, prototypes are often the exclusive property of design engineers, kept separate from manufacturing, marketing, and other groups, not to mention the customer. As a result, many brilliant designs never get produced, or worse, different engineering groups work on their parts separately, only to discover in the final stages that their contributions, however brilliant and innovative, do not fit together. Often technical disciplines are segmented as knowledge specialists develop ideas at different rates, produce solutions that work well in lab settings, but are difficult to reproduce (Purser and Pasmore 1992).

As Weick (1990) pointed out, organizations pay disproportionate attention to beginnings and endings, but not much attention to ongoing temporal coordination. Many breakdowns in innovation occur because organizations are too segmented. Often members do not share a mutual orientation after a project is launched, so that when someone alters action or changes direction, no one is sure where others are located, and do not find out until it is too late. As a result they either feel too constrained to take creative action, or when they do, they discover too late that it causes problems for others.

But what would be the organizational equivalent of song, a structure in which options are minimally-limited, publicly shared, impersonal, simultaneous, and temporally punctuated? Perhaps one counterpart to a song would be rapid prototyping, regular updating and changing of design prototypes. Such a practice would allow cross-discipline communication so that people can create while knowing how and where their ideas fit into the whole evolving system. Consider an alternative that Kodak initiated when they were developing the Funsaver camera. Rather than working separately, the engineering, manufacturing and marketing departments created a shared work space and collaborated to develop a prototype for the camera. Designers made changes and creative contributions to their individual parts, but would update the schematic for the whole camera. Each morning these individual changes were made public and accessible so everyone saw the results of their joint efforts on an ongoing basis and each knew where everyone else was through each stage of the design. Using computer technology to make these contributions public on a regular basis allows everyone to attune themselves to possible direction, like changing the root movement of the chord. People add variants, like the drummer adding accents, that might inspire creative departures. Rapid prototypes function like the loose framework of the song: they leave a great deal of room to depart and deviate; and yet there is enough structure there to give players enough collective confidence to play together. The temporal updating

of the minimal structure notifies everyone where others are in their incremental innovations, like the chord changes of a song, and increases the likelihood that people can achieve a successful joint awareness throughout the life of the project.

4. Distributed Task: Continual Negotiation Toward Dynamic Synchronization

Although there are many players well known for their soloing, in the final analysis, jazz is an ongoing social accomplishment. What characterizes successful jazz improvisation, perhaps more than any factor mentioned thusfar, is the ongoing give and take between members. Players are in a continual dialogue and exchange with one another. Improvisers enter a flow of ongoing invention, a combination of accents, cymbal crashes, changing harmonic patterns, that inter-weave throughout the structure of the song. They are engaged with continual streams of activity: interpreting others' playing, anticipating based on harmonic patterns and rhythmic conventions, while simultaneously attempting to shape their own creations and relate them to what they have heard.

Jazz improvisation is an emergent, elusive, vital process. At any moment a player can take the music in a new direction, defy expectations, trigger others to re-interpret what they have just heard. Trumpeter Wynton Marsalis, in terms reminiscent of John Dewey's dictum that genuine learning is by nature a participative, democratic experience, compares improvisation to working out ideas in democratic groups.

> Groups of people can get together and the process of their negotiation can have an integrity, and the fact that they can get together and have a dialogue and work—it's like what the UN does. They sit down, and they try to work things out. It's like any governing body. It's like a wagon train, you know. (Marsalis and Stewart 1995)

Pianist Tommy Flanagan discusses his duo albums with Hank Jones and Kenny Barron.

> You don't know what the other player is going to play, but on listening to the playback, you hear that you related your part very quickly to what the other player played just before you. It's like a message that you relay back and forth. . . . You want to achieve that kind of communication when you play. When you do, your playing seems to be making sense. It's like a conversation. (Tommy Flanagan quoted in Berliner 1994, p. 369)

In order for jazz to work, players must develop a remarkable degree of empathic competence, a mutual orientation to one another's unfolding. They continually take one another's musical ideas into context as constraints and facilitations in guiding their musical choices. Saxophonist Lee Konitz discusses the interactive interplay.

> I want to relate to the bass player and the piano player and the drummer, so that I know at any given moment what they are all doing. The goal is always to relate as fully as possible to every sound that everyone is making. . . . but whew! It's very difficult for me to achieve. At different points, I will listen to any particular member of the group and relate to them as directly as possible in my solo. (Lee Konitz quoted in Berliner 1994, p. 362)

Players are continuously shaping their statements in anticipation of others' expectations, approximating and predicting what others might say based on what has already happened.

Traditional models of organization and group design feature static principles in which fluctuations and change are seen as disruptions to be controlled and avoided. Jazz bands are flexible, self-designed systems that seek a state of dynamic synchronization, a balance between order and disorder (Purser and Pasmore 1992), a "built in instability" (Takeuchi and Nonaka 1986). In jazz, ongoing negotiation becomes very important when something interrupts interactive coherence. Given the possibility of disorientation and miscalculations, they must be able to rely on one another to adjust, to amend direction. Drummer Max Roach recalls a performance of "Night in Tunisia" when the players lost the sense of a common beat.

> When the beat got turned around (in Night in Tunisia), it went for about 8 bars. In such a case, someone has to lay out. You can't fight it. Dizzy stopped first because he heard what was happening quicker than the rest of us, and he didn't know where "one" was. Then it was up to Ray Brown and Bishop and myself. One of us had to stop, so Bishop waved off. Then it was up to Ray Brown and myself to clear it up. Almost immediately, we found the common "one" and the others came back in without the public realizing what had happened. (Berliner 1994, p. 382)

The example above illustrates the dynamic, flexible potential when a group successfully creates a distributed task. Seifert and Hutchins (1992) refer to the features that make up a distributed task: shared task knowledge, horizon of observation, multiple perspectives. Jazz members are able to negotiate, recover, proceed, adjust to one another because there is shared task knowledge (members monitor progress on ongoing basis), have adequate horizon of observation (they are witnesses to one another's performance); and they bring multiple perspectives to bear (each musical utterance can be interpreted from different points of view).

When the players successfully achieve a mutual orientation to the beat, they develop what they call a "pocket," or some refer to as "achieving a groove." Establishing a groove is the goal of every jazz performance.

Groove refers to the dynamic interplay within an established beat. It occurs when the rhythm section "locks in" together, when members have a common sense of the beat and meter. Establishing a groove, however, is more than simply playing the correct notes. It involves a shared "feel," for the rhythmic thrust. Once a group shares this common rhythm, it begins to assume a momentum, as if having a life of its own separate from the individual members. There is a sense that the groove acts as what Winnicot called a "holding environment," a reliable nesting that provides a sense of ontological security, a sense of trust that allows people to take risks and initiate actions.

> When you get into that groove, you ride right on down that groove with no strain and no pain—you can't lay back or go forward. That's why they call it a groove. It's where the beat is, and we're always trying to find that. (Drummer Charlie Persip in Berliner 1994, p. 349)

> Every musician wants to be locked in that groove where you can't escape the tempo. You're locked in so comfortably that there's no way you can break outside of it, and everyone's locked in there together. It doesn't happen to groups every single night, even though they may be swinging on every single tune. But at some point when the band is playing and everyone gets locked in together, its' special for the musicians and for the aware, conscientious listener. There are the magical moments, the best moments in jazz. (Franklin Gordon in Berliner 1994, p. 388)

> I don't care what kind of style a group plays as long as they settle into a groove where the rhythm keeps building instead of changing around. It's like the way an African hits a drum. He hits it a certain way, and after a period of time, you feel it more than you did where he first started. He's playing the same thing, but the quality is different—it's settled into a groove. It's like seating tobacco in a pipe. You put some heat on it and make it expand. After a while, it's there. It's tight. (Saxophonist Lou Donaldson in Berliner 1994, p. 349)

What happens when musicians strike a groove adds a paradoxical dimension to our earlier discussion of attention and cognitive processing. Good improvisers, we said, employ a combination of automatic and controlled cognition. However, this experience of groove that improvisers hope for seems to involve a surrender of familiar controlled processing modes; they speak of being so completely absorbed in playing that they are *not* consciously thinking, reflecting, or deciding on what notes to play, as if they are able to simultaneously be inside and outside of their bodies and minds. Controlled thinking is depicted sometimes as an obstacle, something to develop only to escape.

Herrigel suggests a similar paradox in the practice of archery. Like jazz, the art of archery involves deliberate preparation and active conscious attention (controlled cognition) in disciplined practice; but when the moment comes when one wants the perfect shot, the archer must surrender and let go of conscious striving. At that moment:

> nothing definite is thought, planned, striven for, desired or expected, which aims in no particular direction ... which is at bottom purposeless and egoless ... is therefore ... called "right presence of mind." This means that the mind ... is nowhere attached to any particular place. (Herrigel 1989, p. 41)

This sense of aimless aiming, a surrender in which "nothing is left of you but a purposeless tension" (Herrigel 1989, p. 35) is similar to the way clarinetist Ken Peplowski describes such peak musical moments.

> When we play at our best, I find many times that I'm not actually thinking about anything and you can actually have a strange experience of going outside of yourself and observing yourself while you're performing. It's very strange. And you can actually listen as you're playing and listen to the rest of the group and you can be completely objective and relaxed. And come to think of it, completely subjective also, because you are reacting to everything else around you. (Peplowski 1995)

This points to a core paradox at the heart of jazz improvisation: if musicians strive too much to attain this state, they obstruct it. Regulation and control can restrict the interplay of musical ideas. Peplowski goes on to say that what makes this possible are prior intensive practice, learning to master tools skills; but at the moment of leaping into playing, "you're forgetting about all these tools you've learned."

Musicians often speak of such moments in sacred metaphors. They speak of the beauty, the ecstasy, the divine, the transcendent joy, the spiritual dimension associated with being carried by a force larger than themselves. They talk about these moments in language strikingly close to what has been described as an autotelic experience, or flow (Csikszentmihalyi 1990). This research suggests that people are able to attain a state of transcendence when they are absorbed in pursuit of desired activity, they feel like they are being carried away by a current, like being in a flow.

When musicians are able to successfully connect with one another at this level and establish a groove, they sometimes experience an ability to perform beyond their capacity. This dimension is perhaps the most elusive, if vital characteristic of jazz improvisation. Pianist Fred Hersch recalls that playing with bassist Buster Williams inspired him to play differently.

> Buster made me play complex chords like Herbie Hancock sometimes plays—that I couldn't even sit down and figure out now. It's the effect of the moment and the effect of playing with

Buster and really hearing everything, hearing all those figures. (Pianist Fred Hersch in Berliner 1994, p. 390)

And Buster Williams recalls that when playing with Miles Davis, the music took on a life of its own.

With Miles, it would get to the point where we followed the music rather than the music following us. We just followed the music wherever it wanted to go. We would start with a tune, but the way we played it, the music just naturally evolved. (Buster Williams in Berliner 1994, p. 392)

Most of our studies of organizational behavior have a rational-cognitive orientation. Organizational learning theories in particular stress rational, adaptive modes of inquiry. Appreciating the interactive complexity involved in jazz improvisation suggests that we pay attention to intuitive and emotional connections between organizational members, the experience of passionate connection that inspire deeper levels of involvement and committed participation. Studies of jazz improvisation suggests that researchers revisit such familiar concepts as empowerment, motivation, and team building, concepts which have been studied almost exclusively from a cognitive and individualistic perspective. The experience of spiritual intimacy, synergy, surrender, transcendence, and flow warrant wider study. Would it not be useful to study the role of supportive relationships in drawing out one another's latent capacities, for example? At the very least, this would suggest a relational view of the learning process, in the spirit of Vygotsky's concept of the zone of proximal development. (Vygotsky 1987)

5. Reliance on Retrospective Sense Making as Form

Because jazz improvisation borders on the edge of chaos and incoherence, it begs the question of how order emerges. Unlike other art forms and other forms of organized activity that attempt to rely on a pre-developed plan, improvisation is widely open to transformation, redirection, and unprecedented turns. Since one cannot rely on blueprints and can never know for certain where the music is going, one can only make guesses and anticipate possible paths based on what has already happened, meanwhile continue playing under the assumption that whatever has happened must amount to something sensible. Gioia (1988) writes:

The improviser may be unable to look ahead at what he is going to play, but he can look behind at what he has just played; thus each new musical phrase can be shaped with relation to what has gone before. He creates his form *retrospectively*. (p. 61)

The improviser can begin by playing a virtual random series of notes, with little or no intention as how it will unfold. These notes become the materials to be shaped

and worked out, like pieces of a puzzle. The improviser begins to enter into a dialogue with her material: prior selections begin to fashion subsequent ones as themes are aligned and reframed in relation to prior patterns.

Weick (1993) likens the jazz improviser to Levi-Strauss' (1966) concept of *bricolage*, the art of making usage of whatever is at hand. The bricoleur, like the jazz musician, examines and queries the raw materials available and entices some order, creating unique combinations through the process of working through the resources he/she finds. Weick cites the example of a man in upper state New York who built a tractor from a myriad collection of unrelated junk and diverse parts he had accumulated in his front yard. The jazz musician, like the junk collector, looks over the material that is available at that moment, the various chord progressions, rhythmic patterns, phrases and motives, and simply leaps into the quagmire under the assumption that whatever he is about to play will fit in somewhere. Like the bricoleur who assumes that there must be a tractor somewhere in that pile of junk, the improviser assumes that there is a melody to be worked out from the morass of rhythms and chord changes. As new phrases or chord changes are introduced, the improviser makes connections between the old and new material. In the absence of a rational plan, retrospective sense-making makes spontaneous action appear purposeful, coherent, and inevitable.

Organizations tend to forget how much improvisation, bricolage, and retrospective sense making are required to complete daily tasks. In an effort to control outcomes and deskill tasks, they often attempt to break complex tasks down into formal descriptions of work procedures that can be followed automatically. Following Brown and Duguid (1991), managers wrongly assume that these simple steps reflect the way that work actually gets done. Given that many tasks in organizations are indeterminate and people come to them with limited foresight, members often need to apply resourcefulness, cleverness, pragmatism in addressing concerns. They often have to play with various possibilities, re-combining and re-organizing, to find solutions by relating the dilemma they face to the familiar context that preceded it. In spite of the wish for a rational plan of predictable action, they often must take a look around and act without a clear sense of how things will unfold.

Consider Orr's (1990) study of Xerox's training of service technicians representatives. The trainers, in an effort to downskill the task of machine repair, attempted to document every imaginable breakdown in copiers so that when technicians arrived to repair a machine, they simply looked it up in the manual and followed a pre-determined decision tree to perform a series of tests that dictate a

repair procedure. Their premise was that a diagnostic sequence can be devised to respond to the machine's predictable problems. However, the study revealed that no amount of documentation could include enough contextual information necessary to understand every problem. Orr (1990) relays a story of a technical rep confronting a machine with error codes and malfunctions that were not congruent with the diagnostic blueprint. This machine's malfunction did not fit the kind of errors that were documented nor had anything like this problem been covered in his training. Both he and the technical specialist he called in to help were baffled. To simply give up the repair effort and replace the machine would have been a solution, but would have meant loss of face with the customer—an unacceptable solution. After exhausting the approaches suggested by the diagnostic, they attempted to make sense of this anomaly by connecting it to previous experiences and stories they had heard from others' experience. After a five-hour trouble shooting session of trials and errors, they fell upon a solution. Many jobs in organizations require this kind of bricolage—fumbling around, experimenting, patching together an understanding of problems from bits and pieces of experience, improvising with the materials at hand. Few problems provide their own definitive solutions.

Jazz players, junkyard collectors and technical reps find themselves in the middle of messes, having to solve problems in situ, creating interpretations out of potentially incoherent materials, piecing together other musicians' playing, their own memories of musical patterns, interweaving general concepts with the particulars of the current situation, creating coherent, composite stories.

6. Hanging Out: Membership in Communities of Practice

An essential part of learning jazz is becoming a member of the jazz community, "hanging out," learning the code, behaving like one of the members. Learning is not simply a matter of transmitting de-contextualized information from one person to another. Local jazz communities of peers in large metropolitan areas such as Detroit, Chicago, and especially New York have serve as informal educational systems for disseminating knowledge. Musicians get together to listen to recordings of great soloists, memorize their solos, play tunes in different tempos and keys until they could find the right feel. They join other musicians, "hanging out" in coffee shops and bars after a performance and exchanging stories. Stanley Turrentine remembers he learned from others by "asking about things I didn't understand." Novices discover they need to learn certain "standard" tunes; they learn appropriate keys and tempos: the norms and conventions of the

trade. One young trumpeter even recalls learning how to dress from "hanging out" with Miles Davis (Berliner 1994). Central to learning jazz is the institution of the jam session, in which musicians get together to play extemporaneously. A special fraternity often develops among jazz musicians as they guide each other through various learning experiences, borrowing ideas from one another.

Brown and Drugid (1991), refer to organizations as communities of practices. To foster learning, they contend, organizations must see beyond conventional, canonical job descriptions and recognize the rich practices themselves. In the example of the technical rep above, their successful experience with the recalcitrant machine became part of the technicians' folklore, told and retold during coffee breaks. These stories form a community memory that others could draw upon when facing unfamiliar problems. Essential to organizational learning is access to legitimate peripheral participation (Lave and Wenger 1990), understanding how to function as an insider. This recognizes that learning is much more than receiving abstract, acontextual, disembodied knowledge. It is a matter of learning how to speak the language of the community of practitioners.

This has real consequences for organizations. Consider the case of how a technological change attempted at a manufacturing plant failed because management did not value the communal foundation of learning: useful local innovations were not disseminated, learning from mistakes was limited, and good routines that varied from the officially sanctioned ones were kept unofficial. Learners need access to experienced practitioners, through formal and informal meetings, conversations, stories, myths, rituals, etc.

7. Alternating Between Soloing and Supporting

One of the most widespread, yet overlooked, structures in jazz is the practice of taking turns. Jazz bands usually rotate the "leadership" of the band: that is, they take turns soloing and supporting other soloists by providing rhythmic and harmonic background. Such an egalitarian model assures that each player will get an opportunity to develop a musical idea while others create space for this development to occur. In order to guarantee these patterns of mutuality and symmetry, it is necessary that people take turns supporting one another. The role of accompaniment, or "comping" is a very active and influential one: it provides a framework which facilitates and constrains the soloist. In written arrangements, the scored passages often precede the soloist's improvisation and channel, sustain, and embellish it. In a sense the background accompaniment conditions the soloist, organizes the course of the solo through passing chords, leading tones and rhythmic accents.

It is not enough to be an individual virtuoso, one must also be able to surrender one's virtuosity and enable others to excel. In order to "comp" or accompany soloists effectively, jazz musicians need to be very good listeners. They need to interpret others' playing, anticipate likely future directions, make instantaneous decisions in regard to harmonic and rhythmic progressions. But they also may see beyond the player's current vision, perhaps provoking the soloist in different direction, with accents and chord extensions. None of this responsiveness can happen unless players are receptive and taking in one anothers' gestures. If everyone tries to be a star and does not engage in supporting the evolution of the soloist's ideas, the result is bad jazz. When they listen well to others' soloing, they help the soloist reach new heights. Usually we think that great performances create attentive listeners. This notion suggests a reversal: attentive listening enables exceptional performance.

This has considerable implication for organizational learning. In spite of the increasing popularity of empowerment and employee involvement, organizations often have difficulty supporting participation (Pasmore and Fagans 1991). Organizations struggle with finding ways to include voices that traditionally have been silenced. The deceptively simple practice of taking turns creates a mutuality structure that guarantees participation, inclusion, shared ownership without insisting on consensus and its unintentional hegemonic consequences.

Beyond a model for sharing leadership through turn-taking, it also offers a model of followership. Given the complex and systemic nature of problems that cross conventional boundaries, managers, as knowledge specialists, cannot be solo operators: they need one another's expertise and support in order to arrive at novel solutions. The term "job rotation" takes on new meaning when we think about the shifting of leadership and support responsibilities that jazz bands enact. Perhaps organizational innovation would thrive if members were skilled at giving others' room to develop themes, to think out loud and discover as they invent. One suggestion would be to have organizational "jam" sessions in which members take turns thinking out loud while others listen. Recent interest in organizational dialogue (Senge 1990) resemble attempts to include disparate voices that might otherwise become overlooked.

Yet, organizations tend to reward individual performance and achievement rather than supportive behaviors. This emphasis often leads to excessive competition to achieve stardom, efforts to be in unilateral control, efforts to defend one's position against challenges, hesitancy to acknowledge the limits of one's knowledge: all obstacles to the learning process (Argyris 1993). Imagine if such practices were to become more widespread in organizations: employees, managers, and executives evaluated on their capacity to surrender self and ego in effort to support the development of another's idea. Perhaps if organizations would recognize and reward those who strive to nourish, strengthen, and enhance the expressive capacity of relationships, they would unleash their capacity to improvise and innovate.

Implications for Non-jazz Contexts

Managers often attempt to create the impression that improvisation does not happen in organizations, that tightly designed control systems minimize unnecessary idiosyncratic actions and deviations from formal plans. People in organizations are often jumping into action without clear plans, making up reasons as they proceed, discovering new routes once action is initiated, proposing multiple interpretations, navigating through discrepancies, combining disparate and incomplete materials and then discovering what their original purpose was. To pretend that improvisation is not happening in organizations is to not understand the nature of improvisation.

Many business organizations, under pressure to perform, create cultures that reinforce instrumental, pragmatic, rational, and deliberate action rather than a culture that is expressive, artistic, paradoxical, and spontaneous. In fact, there are locales and durations which seem to rely on routines and predictable outcomes, particularly in functions such as production and manufacturing. Organizations must face a tradeoff between servicing efficiency and stewarding attention as a scarce resource to be focused where needed. In this sense, improvisation is best conceived as an activity that occurs for stretches of human behavior.

Clearly there are certain industries and contexts that require an improvisatory mindset: high velocity, high technology firms; research and development activities; cultures of high urgency and excitement, such as the early days of the Apple Macintosh; interdisciplinary project teams formed to address a specific problem. Certainly popular management literature has created a language that resonates with the jazz idiom: suggesting that organizations need to learn to thrive on chaos; managers are encouraged to create a sense of urgency by "turning things upside down," doing away with job descriptions, and valuing failures as a sign that people are experimenting and learning (Peters 1987).

Are there ways to socialize a mindset that nurtures spontaneity, creativity, experimentation, and dynamic synchronization in organizations? What practices and structures can we implement that might emulate what

happens when jazz bands improvise? The jazz band as prototype offers a few suggestions.

1. Boost the processing of information during and after actions are implemented.

Jazz players act their way into the future, then justify their actions by placing their statements within a context of meaning (chord changes, rhythmic emphasis, etc.). Like jazz soloists who realize how notes, phrases, and chords relate as they look back on what they have created, it is during and after action that people in organizations become aware of the goals and values they implicitly hold and what constraints these values place upon their future actions (Weick 1995). Within the ongoing flow of everyday organizational activity, people retrospectively make sense or construct a story or justification for what they have already done (Staw 1980). These stories can become the seeds for greater discoveries and inventions. Therefore, one implication is to boost the processing of information and surface multiple interpretations of diverse participants within close proximity to action.

Organizations might consider a strategic orientation that links planning, action, implementation, and environmental scanning. Organizations could benefit from creating virtual strategic planning sessions in which members engage in trial and error thinking, just as jazz musicians do when they solo. Generating multiple, simultaneous alternatives minimizes escalation of commitment to a single option (Staw 1980, Eisenhardt 1989) and allows members to make adjustments and re-orientations as they receive disconfirming feedback regarding any single action scenario. This view would challenge the traditional notion of strategic planning as a form of rational control, or as an abstract exercise divorced from and prior to action. In this spirit, Senge (1990), advocates a view of planning as play or as a "practice field" in which managers practice thinking ahead, predicting, and guessing future moves within various constraints. In virtual planning scenarios managers could try out alternative maps and alter the core assumptions that have remained unquestioned (see Hampden-Turner 1990). This is apparently a practice familiar to managers at Shell Oil (DeGeus 1988) who were asked to respond to multiple (and sometimes contradictory) assumptions regarding their environmental constraints, including entertaining the notion that the price of oil might be slashed in half—something that seemed unthinkable at the time. This became in DeGeus' words, a "license to play." These incremental disruptions also created a larger repertoire of knowledge structures, higher variety of responses, when such an unprecedented event did occur.

2. Cultivate provocative competence: Create expansive promises and incremental disruptions as occasions for stretching out into unfamiliar territory.

Provocative competence is a leadership skill that involves challenging habits and conventional practices, challenging members to experiment in the margins and to stretch in new directions. Organizational learning theorists (Argyris 1990) write that one of the shortfalls of single loop learning is that managers choose to address only those problems that are familiar, those issues for which a solution is imaginable. Miles Davis surprised his band by disrupting their routines and stretching them beyond comfortable limits: calling unrehearsed songs and familiar songs in foreign keys. Of course there is a potential downside to disruptions. Research suggests that when people confront environmental jolts, they fall back on habitual modes of action (Walsh 1995). Also, there might be a tendency to escalate commitment to a wrong course in the context of a threatening interruption (Staw and Ross 1987).

One way leaders practice provocative competence is by evoking a set of higher values and ideals that inspire passionate engagement. A context in which goals that are beyond the capacity of single individuals to accomplish might enhance the need for improvisation, testing comfortable boundaries, cooperation, and negotiation. Barrett (1995) discusses visionary organizations that make expansive promises that defy "reasonable limits" and stretch members to re-define the boundaries of what they have experienced as constraining. Consider Canon's promise in the 1970s to produce a personal copier that would sell for $1,000 (Prahalad and Hamel 1989). Given the constraints that existed at the time, (the least expensive copier sold for several thousand dollars), such a proposal seemed preposterous. Surprised engineers engaged in different kind of conversations, searching for new approaches, experimenting with substituting a disposable cartridge for the very complex image-transfer mechanism that Xerox and other companies, including Canon, had employed in their copiers. Such tasks demand cooperation, exploration, and improvisation.

3. Ensure that everyone has a chance to solo from time to time.

When self-directed work teams are performing well, they are often characterized by distributed, multiple leadership in which people take turns leading various projects as their expertise is needed (Guzzo 1995). In jazz bands, everyone gets a turn to solo. Organizations might consider evolving norms that insist on including diverse voices, giving everyone a regular turn at bat and valuing those who make room for others to shine.

Organizations might experiment with a structured process that provides participants with a chance to solo and

offsets those influential members who might control or dominate a group. A simple organizational development tool called the nominal group technique (Delbecq et al. 1975) is structured to do just this: every individual in turn "brainstorms" out loud while others listen to his or her ideas. No one is allowed to interrupt or re-direct; people are encouraged to build on others' ideas they have heard. A variation of the structure is that no one speaks twice until every other person in the group speaks at least once. This is an impersonal, nonnegotiable structure that monitors air time, cultivates group creativity and ensures that every individual has voice. This also approximates Habermas' notion of the "ideal speech situation" in which collective learning is enhanced because individuals are free to communicate openly, completely free from compulsion or distortions of power, and the force of the better argument may prevail (Habermas 1970).

4. Cultivate comping behaviors.

Organizations must go beyond merely inviting new voices, but must also create processes that suspend the tendency to criticize, judge, express disbelief that might kill a nascent idea. In order for soloists to have impact, there must be ongoing comping (accompaniment) from supporters. What would be the equivalent of comping in organizations? Perhaps this would suggest supportive behaviors such as mentoring, advocating, encouraging, listening. This means rewarding people who support others' to take center stage, including such skills as blending, helping people along the way as they transition and develop ideas at different rates. This might include expanding the stories we tell about creative achievements beyond those that highlight autonomous action, to include the roles of those who assisted, who gave others' room, who encouraged fledgling, nascent gestures with subtle nudges much like a jazz pianist comping.

Such deliberate efforts to make room for peers' contributions is close to what jazz musicians do when they comp—agree to suspend judgement, to trust that whatever the soloist is doing right now will lead to something, to blend in to the flow and direction of the idea, rather than to break off in an independent direction. Such democratic structures enhance the likelihood that people not only have the right to be heard, but also have opportunity to influence.

5. Create organizational designs that produce redundant information

From a rational design perspective, organizations should be designed to process information efficiently. However, to maximize flexibility and creativity, one could follow the lessons of jazz bands and create designs that produce a redundancy of information. Following Hutchins (1990) in Weick and Roberts (1993) systems

sustain flexible actions and mindful performance when jobs are designed to reproduce overlapping knowledge. Overlapping knowledge creates redundant sets of information that permits people to identify with and take responsibility for whole processes rather than parts of the process. Designing more interdependence into tasks increases members' responsive capacity.

6. Create organizational climates that value errors as a source for learning.

Good things can happen when people jump in and act even when all plans are not complete and elegant. Rather than over-rely on pre-planned strategies and canonical job descriptions, acknowledge members' capacity for bricologe and pragmatic reasoning, their ability to juxtapose, recombine, and reinterpret past materials to fashion novel responses. Organizational learning, then, must be seen as a risky venture, reaching into the unknown with no guarantee of where one's explorations will lead. Since errors are indispensable in the creative process, organizational leaders can create an aesthetic of imperfection and an aesthetic of forgiveness that construes errors as a source of learning that might open new lines of inquiry. Often, however, organizations view errors as a result of individual incompetence rather than systemically determined, leading people to suppress mistakes and deny responsibility (Argyris 1990). This suggests that leaders need to create contexts in which reporting and discussing errors is not risky behavior.

7. Cultivate serious play: too much control inhibits flow.

Jazz is an activity marked by paradox: musicians must balance structure and freedom, autonomy and interdependence, surrender and control. They grapple with the constrictions of previous patterns and structures: they strive to listen and respond to what is happening; at the same time they try to break out from these patterns to do something new with all the risks that both paths entail. If musicians strive too much to hit a groove, achieve flow (Csikszentmihalyi 1990), or jam (Eisenberg 1990), they obstruct it. Organization theorists have articulated a similar paradox: Quinn (1988) argues that having a conscious purpose with logical, internally consistent abstractions sometimes creates a unidimensional mindset that is blind to emerging cues: "When behaving with conscious purpose, people tend to act upon the environment, not with it" (p. 27). Quinn's discussion of masters of management sounds very much like what master improvisers do:

The people who come to be masters of management do not see their work environment only in structured, analytic ways. Instead, they also have the capacity to see it as a complex dynamic system that is constantly evolving. In order to interact effectively with it, they employ a variety of different perspectives

and frames ... [b]ecause of these shifts (in contradictory perspectives). (Quinn 1988, pp. 3-4)

Jazz musicians suggest that one way to manage this paradox is to adopt a disciplined concentration that one adopts when playing a game, the way rock climbers and chess players experience their task (Csikszentmihalyi 1990) or the way that Bill Russell talks about playing basketball (Eisenberg 1990). There is a sense of surrender in play, a willingness to suspend control and giving over of oneself to the flow of the ongoing game. (Perhaps this is what organizations like Southwest Air are hoping to encourage when they declare having fun in the workplace as a core value). This suggests that we re-visit the conventional separation between work and play: legitimate play as a fruitful, meaningful activity, one that enhances the sheer joy of relational activity.

Conclusion and Discussion

The mechanistic, bureaucratic model for organizing—in which people do routine, repetitive tasks, in which rules and procedures are devised to handle contingencies, and in which managers are responsible for planning, monitoring and creating command and control systems to guarantee compliance—is no longer adequate. Managers will face more rather than less interactive complexity and uncertainty. This suggests that jazz improvisation is a useful metaphor for understanding organizations interested in learning and innovation. To be innovative, managers—like jazz musicians—must interpret vague cues, face unstructured tasks, process incomplete knowledge, and yet they must take action anyway. Managers, like jazz players, need to engage in dialogue and negotiation, the creation of shared spaces for decision making based on expertise rather than hierarchical position.

Although rich in implications, there are limits to the applicability of the improvisation metaphor. The discussion of jazz bands has held up jazz as an "ideal type." Most of the points discussed so far assume a base level of competence. In reality, not all players are equally competent. This is where the metaphor begins to break down for managerial purposes. No amount of listening, support, or "comping" can enhance a performance if the performer is not up to the task. If an interaction with competent players can enhance individual performance, there might also be an opposite effect: performers of lesser competence can have a debilitating effect on the overall group performance. Also while tolerance of errors is essential to enhance experimentation, there are cases where errors are intolerable: in high reliability organizations, for example. But even beyond high reliability organizations, the

consequences of small actions can have large consequences when the structure is loosely coupled (Weick 1991). Consider the collapse of Barring Bros., one of the most prestigious financial institutions in the world, due to the erroneous actions of one man.

By looking at the practices and structures associated with jazz playing, it is possible to see that successful jazz performances are not haphazard or accidental. Musicians prepare themselves to be spontaneous. Jazz improvisation has implications that would suggest ways that managers and executives can prepare organizations to learn while in the process of acting.

Finally, jazz improvisation can be seen as a hopeful activity. It models individual actors as protean agents capable of transforming the direction and flow of events. In that sense, jazz holds an appreciative view (Cooperrider and Srivastva 1987, Barrett 1995) of human potential: it represents the belief in the human capacity to think freshly, to generate novel solutions, to create something new and interesting, reminding us of John Dewey's contention that we are all natural learners. To quote the saxophonist Ornette Colman, "Jazz is the only music in which the same note can be played night after night but different each time."

Endnote

[1]Cognitive psychologists distinguish between "automatic" and "controlled" information processing. Automatic modes of processing are effortless, familiar, habitual, outside of conscious awareness. "Controlled" modes of processing are deliberate, effortful, active, strategic, directed, and intentional (Schneider and Shiffrin 1977, Shiffrin and Schneider 1977). Jazz improvising seems to employ a combination of modes of processing. When learning new phrases, or attempting challenging musical ideas, players employ controlled processing. Trumpeter Benny Bailey said, "You just have to keep on doing it (practicing phrases) over and over again until it comes automatically." (Berliner 1994, p. 165). Once learned, these become second nature, or learned habits that one can rely upon. Pianist Bill Evans (1991) explains "You take problems one by one and stay with it ... until the process becomes secondary, or subconscious, then you take on the next problem until it becomes second nature, or subconscious." Pressing (1984, p. 139) describes the switch from controlled to automatic as one in which musicians "completely dispense with conscious monitoring of motor programmes, so that the hands appear to have a life of their own, driven by the musical constraints of the situation."

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