

## Orchestrating Creativity: An Instrumental Approach

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**ABSTRACT** While musicians are generally considered to be creative artists, they are not instinctively creative because they are musicians, but because the discipline and development of creativity parallels that of musical skills; therefore, the two go hand in hand. This article considers relevant research and literature, along with observations, interviews, and personal experience as it addresses this theory by analyzing music in relationship to the development of individual and collaborative creativity. Additionally, a study of musical instrument construction explores differences that impact function and interaction with other instruments (e.g., possibilities of dynamics, range/register, and timbre), relating the discoveries to individual and collaborative creativity. Finally, research is expanded to examine orchestras and other ensembles as compared to businesses. Evidence is presented establishing ways creative leadership cultivates an environment allowing for development of individual creativity or musicality that facilitates constructive collaborative creativity. Comparison of music and creativity underscores the value of each individual voice and how the distinct timbres can orchestrate a unique gestalt—whether in a musical ensemble or business boardroom.

*Keywords:* creativity, music, musical instruments, collaborative creativity, corporate creativity

### Introduction

Creativity is a buzzword in business, education, and most other fields. Various challenges surrounding creativity, from a basic question of defining the word “creativity” to understanding and cultivating it. My belief is that creativity is inherent in all human beings, and each individual needs an environment where their unique creative voice can be found, nurtured, and embraced. This can occur at home, work, school, or any other environment. Every experience contributes to a person’s being and the well from which they can draw. To understand the extent of influence requires a realization that creativity is not solely a solitary experience—each interaction affects creative potential.

Establishing conditions supportive of creative development from this perspective becomes the responsibility not only of the individual, but also the community, particularly those in leadership positions. Creativity takes practice and practice requires time, dedication, acceptance of failure as an impetus to try again, willingness to try things in different, diverse ways, mentorship to instruct and guide, and intent. In this way, the development of creativity is similar to that of music. The intent of this paper is to compare creativity and music as pertains to the development of the individ-

ual into a unique creative being, and the role in the workplace versus a musician learning a particular instrument and functioning in an ensemble.

### **Music and creativity in comparison**

Music is generally categorized as a fine art. Merriam-Webster defines *fine art* as “art (such as painting, sculpture, or music) concerned primarily with the creation of beautiful objects – usually used in plural” (2019). Thus, logically, musicians are generally considered to be creative artists. I would argue that musicians are not instinctively creative because they are musicians, but because the discipline and development of creativity parallels that of musical skills; therefore, the two go hand in hand.

**Inherent ability.** Creativity is often considered to be an ability only a few fortunate individuals possess. Tanner & Reisman argue that “In reality, creativity is a skill. It’s a skill that can be learned and applied like any other skill” (2014, p.45). Similarly, the myth that only some people are bestowed with the gift of music is advanced by comments such as “I’m tone-deaf” or “**I can’t** carry a tune in a bucket.” In a behest to music educators, Markku Kaikkonen declares that “music is a central aspect of humanity and it is the responsibility of educators to honor and support each learner’s potential... [by] providing inclusive environments that allow for the learning, experiencing, creating, and sharing of music for all” (2016).

**Potential.** If all humans are born creative and musical, the discussion turns to developing those skills and potential. “Everyone has the potential to be creative, but not everyone fulfills that potential” (Runco, 2014, p.39). The question then becomes how to cultivate that potential. “Creativity researcher E. P. Torrance concluded that your creativity involves three elements: your inherent abilities, the extent to which you develop your creative skills, and your motivation to continue to improve them” (Neilson, 2011, p. 43). One major influence on if and how potential is nurtured is environment. There is extensive research on what kinds of environments are optimum versus those that squelch creativity. For the purposes of this paper, I will look at characteristics of environments that not only facilitate discovering and developing creativity, but how they may be viewed under the umbrella of musical development.

**Practice.** Many of the ways in which music and creativity are learned, shared, and key to development have common denominators across the globe—through observation and imitation, exploration, communication, and play. But what is needed to become or be considered creative? One answer is consistent for creativity, music, or any skill—practice. “Creativity takes practice. Your creativity is there within you, but you must make a habit of using your imagination” (Tanner & Reisman, 2014, p. 28). Developing a habit or intentionally doing something is important even within practicing. Intentional practice is necessary not only in terms of scheduling time devoted to working on something, but also with how to proceed once in the practice room. Playing something repeatedly does not guarantee improvement. If you play the wrong notes fifty times, you will merely become an expert at playing those same wrong notes. The key is to approach the musical passage in a variety of ways—slow it down, use alternate rhythmic patterns, find a better fingering; there are many options. In other words, analyze the issue, pinpoint the problem, break down the mechanics, and find a solution. This is a prime example of how developing creativity skills can masquerade as developing musical skills. When applying intentional practicing to learning music, you are simultaneously using (and practicing) creativity. This connection is explained in an article about artistic scientists and scientific artists by Robert and Michelle Root-

Bernstein who stated, “Learning how to manipulate the creative process in one discipline appears to train the mind to understand the creative process in any discipline” (2004, p.129).

Another important element of practice is failing, but using the failure to learn. The phrase “fail forward” describes the mindset needed—persistence and puzzling it out. There is often a mixture of extrinsic and intrinsic motivation applied. A child may take lessons because their parent made them or because their friends are playing in band or orchestra. Hopefully, engaging in the process of making music will be fulfilling, and through that experience, the motivation will shift from trying to please others (though that is a bonus) to having the process and product please the individual, thus developing intrinsic motivation and instilling a love of music. Sitting alone in a practice room takes self-discipline and motivation, wherever its source, to keep trying and stay focused on the goal. Dancer and choreographer Twyla Tharp refers to this type of failure as private failure:

The best failures are the private ones you commit in the confines of your room, alone, with no strangers watching. Private failures are great. I encourage you to fail as much as you want in private. It will cost you a little in terms of efficiency—the more you fail, the longer it takes to finish—but no one has to see this. Private failures are the first drafts that get tossed in the wastebasket, the sketches crumpled up on the floor, the manuscripts that stay in the drawer. They are the not-so-good ideas you reject en route to finding the one that clicks. (Tharp, 2003, p. 213)

**Interpretation.** Anyone can practice, learn the mechanics, and play the notes. Similarly, anyone can read the spreadsheet, follow the instructions, and plug themselves into a situation where they are a cog in the wheel. Much greater possibility exists. Each individual has a unique voice, musical or otherwise, and it needs to be explored, expanded, and expressed. Beyond the notes and the statistics, interpretation can take an idea or expression to the next level.

**Elaboration.** Elaboration refers to filling in the details and further developing ideas. When you elaborate, there is more depth and it expands both possibility and relevance. In music, this can include dynamics, articulation, and phrasing. A composer or arranger often indicates their preference, for example the dynamic marking *mp*. This symbol represents the Italian “mezzo piano” which dictionary.com defines as “somewhat louder than piano but softer than forte; moderately soft” (2019). The performer(s) must interpret what that means in context and be a kind of co-creator. How loud is loud? How soft is soft? The result is a combination of the individual’s experiences, the context in which the note(s) is played, acoustics, and relationships with other musicians and the audience. The same can be said for articulation. How short is staccato? How smooth legato? What is the trajectory of a ritardando (slowing down)? The list is endless and applies to every aspect of playing music; progressing from beginner to professional merely adds layers. Through this process, symbols on a page become a living, breathing expression of a collaborative creative work conceived by the composer and performed by the musician.

**Fluency and flexibility.** Sometimes interpretation goes beyond the musicality of how a piece is approached and extends to manipulations of the source material. This can be in the form of arranging or through improvisation. In order to do either of these things, there needs to be idea generation. “Fluency—generates many ideas” and “Flexibility—generates many categories of ideas” (Tanner & Reisman, 2014, p. 25).

Applying both of these characteristics of creativity through divergent thinking provides the musician a plethora of ideas from which to choose.

**Arranging.** Arrangements of a piece can include changing the key or instrument on which it is played; using an alternative group of or number of instruments; adding ornamentation or a countermelody; changing the accompaniment being played underneath the solo line; or combining pieces in either a medley/suite or overlapping two entirely different pieces—often done currently with popular music in the form of “mash-ups.” An example of the scope of arrangement possibilities is with the song, “Over the Rainbow” from *The Wizard of Oz*. It is impossible to know how many versions have been created of this song. There are arrangements for nearly every instrument and ensemble; it is performed by amateurs and professionals alike, has been combined with other songs, and sung in almost any setting imaginable, but just when you might roll your eyes and think, “not again,” someone comes up with a totally unique and interesting version.

**Improvisation.** Improvisation is defined as “the art or act of improvising, or of composing, uttering, executing, or arranging anything without previous preparation” (dictionary.com). This skill can come in handy throughout life. For example, if friends spontaneously show up around dinnertime or you get snowed in and have to raid the cupboards to throw something together for a meal—that is certainly a practical application of improvisation. In business, a project “may begin with a certain idea or direction, but obstacles such as limited resources, unforeseen market conditions, or even conflicts with team members can prevent them from executing their initial plans. This means [an individual will] need to find a way to quickly adapt to their circumstances, think on their feet, and create new plans to realize their vision” (Neck et al., 2018, p.78).

When someone thinks about improvisation in relation to music, thoughts often go directly to jazz, the genre most known for utilizing the skill. However, improv can be found in many other styles from Baroque to pop. (Bach was the ultimate improviser!) Scatting and vocal improvisation can allow the performer to add a unique touch, as does “riffing,” a different skill often heard in pop music. A key aspect of musical improvisation is an established structure—a basic melody and/or chord structure; a framework within which you can create. As with all kinds of improvisation, an assessment is needed of what is known and established, an understanding of possibilities for change, adjustment, and the degree of manipulation acceptable, active listening and interaction, and the impetus to act.

**Tolerance of Ambiguity.** The unknown factor relates to tolerance of ambiguity, another important characteristic for creativity. Being comfortable with the unknown and risk-taking are part of the improvisation equation, but they do not have to be intimidating. Improvisation skills can be developed as individuals expand their toolbox of ideas and experiences while remaining open to possibilities—get out of comfort zones, engage curiosity, observe, read, see movies, play or watch sports, play board games, interact with people and diverse situations to broaden perspectives. For musicians, this specifically entails listening to music and attending performances of a variety of genres and styles. The result is increased potential to make connections and expand the palette of creative colors with which to express unique individuality and voice.

Beyond the uncertainty of outcome, there is trepidation related to improvisation; people fear not only failing, as mentioned previously, but also being judged. A non-judgmental environment is key for any kind of creative development.

**Avoidance of premature closure.** Keep an open mind. Without openness to different ideas and diverse perspectives, you may never reach an “aha” moment. This applies to individual as well as groups situations. If a group is brainstorming or generating ideas, the easiest way to squelch creativity is to allow judgment to enter the equation. Rather, if any and all ideas are encouraged, connections can be made. A suggestion may spark a totally different, and previously unrealized idea. Avoid limiting the options.

A non-judgmental environment is particularly important as people share their art. To perform, a musician must allow vulnerability as they express their feelings and inner self. Expression and openness to one’s own emotions are vital in music and creativity, as “The involvement of emotions broadens the process of associations and improves creativity on a variety of creativity measures” (Russ & Fiorelli, 2010, p.237). Receiving judgment and non-constructive criticism can undermine confidence and discourage someone from expressing themselves in the future. For musical or creativity skills to develop, there needs to be an awareness of personal potential and how to foster its growth. This can come from both extrinsic and intrinsic sources and differs for each individual. These skills require specific cultivation and a fertile environment, whether at home, school, work, or other arenas. “Creativity tends to flourish when there are opportunities for exploration and independent work, and when originality is supported and valued” (Kozbelt, Beghetto, & Runco, 2010, p.25). Every person, every situation, is different. There are no one-size-fits-all solutions. Each individual has their own voice.

### **Instrument Families**

In life, there are obviously numerous, diverse versions of the composition of a family, and being related does not necessarily mean family members look, think, feel, or act alike. The same is true of instrumental families; they share certain characteristics and live with certain realities in common. “They are often made of the same types of materials, usually look similar to one another, and produce sound in comparable ways” (“Instruments of the Orchestra”, 2019). Yet, even as they are similar, each different instrument and each person playing the instrument is unique.

An overview of research regarding home environments includes studying genetics and heredity, birth order, and sibling constellation. Musical application of these ideas can relate to instrument development (e.g., a hunting horn versus a French horn) or looking at contemporary capabilities. As within any family, there is a hierarchy; musically this extends from the order listed in a score, to seating arrangements, and even who plays which notes. Certain instruments are built with materials that make them inherently different regarding dynamics, range/register, and timbre; this effects how they are able to function and interact with other instruments. Considering the characteristics of the different instrument families can provide insight in how they relate to creativity. These are generalities and the reader should keep in mind that each voice (musical or creative) is unique, as is the expression from that individual (being or instrument).

There are four main groups: the string family—violin, viola, violoncello, and bass; the brass family—trumpet, French horn, trombone, and tuba; the woodwind family—flute, clarinet, oboe, English horn, and bassoon; and the percussion family—various instruments, ranging from drums and timpani to marimbas and piano. These four family groups are the most common way to categorize instruments. However, a variety of different sizes and versions of instruments exist within many of the instru-

ment families. There are also other questions of categorizing with guitar and electronic instruments; that is beyond the scope of this paper, so I will limit the discussion to these main four groups.

### The String Family

Instruments considered to belong to the string family include violin, viola, cello, and bass—sometimes guitar and harp, but they usually are placed with the percussion family. Within the string family, the most obvious visible difference is size. The violin is the smallest with the viola next largest, both held under the player's chin. Next in size is the cello which is large enough that it is usually played sitting down, and finally the bass that is so large it must be played standing or sitting on a tall stool. The different sizes directly affect the notes that the instruments play. The larger the instrument, the longer the strings, the lower the pitch. This establishes a logical sequence of musical arrangement and composition—the violins and violas on top with cellos and basses on bottom. In an orchestra or string quartet the sound is usually filled out by having two violin parts (first and second violin). While it may seem as if the first violin is the most important as the concertmaster/mistress walks on stage to applause and indicates when the musicians should tune, in fact, each instrument and part offers something special and creates an almost unlimited palette to create art in the form of sound. Likewise, each creative personality, each idea, each different perspective has something to offer. The vaster the experiences to draw upon, the more options in the creative palette. Sometimes certain voices or ideas might not fit a particular situation, necessitating being *tacet* (silent) in the culminating product/composition. At other times, after resting, they may fit a different part of the process/piece. Some moments call for an inner voice to be more or less prominent or the bass/foundation to be stronger. These are all options as the various instruments interact and collaborate.

Stringed instruments, though made of wood, are so called due to vibrating strings producing the sound. Strings are made of steel, nylon, or gut. Each type produces a different timbre, or sound quality. The sound is primarily made in three ways: by drawing a bow across the string (*arco*), plucking the string (*pizzicato*), or striking the string with the wood of the bow (*col legno*). Drawing the bow across the string is the most common way to play a stringed instrument. When playing *arco*, the horse hair on the bow (thinly coated with a wood sap called *rosin*) causes friction and initiates vibration of the string. Friction is often the catalyst for creativity as well. When a problem arises, we engage creative problem solving. Sometimes the music calls for swift bow strokes back and forth; sometimes long, full bows are drawn with smooth changes that cannot even be heard. Likewise, if there is a frustrating problem or issue, it might call for an abrupt change, a gradual adjustment, or back-and-forth. Drawing the sound from the instrument or culling ideas for a creative solution can strike just the right chord.

However, merely bowing across a string does not guarantee a sound, and certainly not a beautiful one. There are many details of craftsmanship, foundational necessities, that are vital in determining an instrument's possibilities. In fact, the construction of a stringed instrument can provide an interesting analogy of what needs to be in place to help foster creativity.

**The bridge.** The bridge holds the strings up so that they are not laying on the instrument and instead can vibrate freely. The tension of the strings without a bridge would cause them to lie directly on the fingerboard and muffle any sound, creating a buzzing noise and leaving the instrument unable to play music. In the same way, sup-

port with creativity can be uplifting and allow the free flow of ideas. Conversely, pressure and a lack of freedom can squelch creativity.

With the bridge in place, the free flow of vibration allows the sound to be drawn out of the instrument and is reminiscent of the idea of *Flow* conceived by Csikszentmihalyi. As stated in Kaufman's *Creativity 101*, "Flow represents the sensations and feelings that come when someone is actively engaged in an intense, favorite pursuit. You must feel like your abilities are a match for the potential challenges of the situation to enter the Flow state—someone who never played the piano would not enter Flow when trying to master Rachmaninov, and a concert pianist would not enter Flow trying to play 'Mary Had a Little Lamb'" (2016, p. 121). It is an optimal state of consciousness where all aspects of performance are heightened, including creative performance. Flow can also be used when describing various other elements of creativity; the free flow of ideas in a brainstorming session, or in conjunction with fluency or improvisation. The feeling of freedom is key— freedom to explore, freedom to fail, freedom to create.



Figure 1. Cello strings, bridge, and fine tuners

**The bass bar.** Another vital part of each stringed instrument is the bass bar. According to *Strings* magazine "Nothing exemplifies that leap from craft to art more than the bass bar, because it goes to the very heart of the sound of your instrument. It takes the highest level of skill and training to fit it properly, but when it comes to shaping it, there are no numbers or templates to go by; it's all in the fingertips" (McKean, 2016). When the instrument is assembled, the bass bar is barely visible. Yet, without the bass bar the top would collapse. A violin top is less than three millimeters thick—a cello top, not much more. "And when the strings are brought up to their full pitch, the bridge exerts more than 35 pounds of pressure straight down on the center of the top (and more than twice that for a cello)" (McKean, 2016).

Even the construction of an instrument is not merely assembling the parts or following the instructions. There is a delicate balance with each component vitally important. Each instrument and individual is unique, and their output is shaped by interactions—both big and small. Sometimes what might seem thin or weak can be the strength that holds the whole idea together. Support is also critical. Exploring and developing creativity can be scary, trying new things with unknown outcomes. Tolerance of ambiguity is much easier when there is a supportive environment. Tension and pressure can sneak into a creative situation, which can be dissipated (at least in part) by strong and well-designed support. Even unseen support or seemingly unimportant experience or ideas can be at the heart of the sound or of the creative expression.

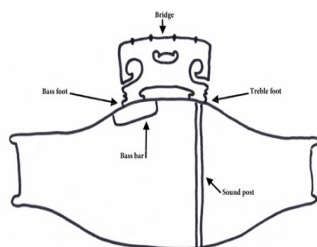


Figure 2. Diagram of a stringed instrument: bridge, bass bar, and sound post

**The sound post.** Under the bridge on the opposite side of the bass bar is the sound post that transfers vibrations from the front to the back piece. This small wooden dowel is an additional form of structural support on the treble side of the instrument. The sound post influences the quality of the tone of each individual instrument through its construction—thickness, type of wood, grain orientation, and placement. The sound post is wedged in place, rather than permanently affixed. Due to vibrations as the instrument is played, it gradually moves, slightly changing the sound quality or timbre of the instrument. String players regularly have the sound post adjusted and tapped back into place. With creativity, different types of support are needed; connections must be made. Each person has different strengths, experiences, and perspectives that influence the tone of their creative voice and output. Creativity is stimulated by connections and a free flow of ideas that resonate in a particular situation. And periodically, everyone needs a tune up, to make a few adjustments.

**Tuning.** Before a stringed instrument is played (or any instrument), it must be tuned. There are two ways to do this with strings. First, pegs are inserted into the scroll and the strings are attached. The pegs can be turned to make strings tighter or looser until the desired pitch is achieved. Many stringed instruments also have fine tuners. These are small screws located where the other ends of the strings are connected on the tailpiece, just below where they lie across the bridge. Fine tuners enable the musician to change the pitch in extremely small increments. Often when a string player tunes their instrument, the pitch will go back-and-forth, higher-and-lower, until it is correct. With creativity, similar experimenting is needed—a little of this or a little of that, sometimes big changes or a total new direction, sometimes just tweaking because it is almost there; the idea is adjusted in search of a satisfactory outcome.

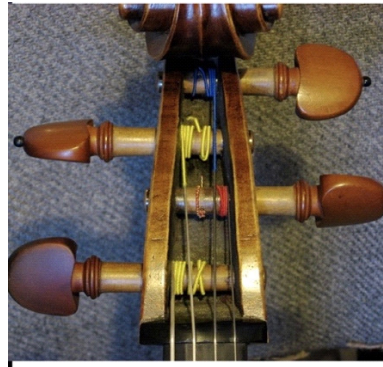


Figure 3. Cello peg box

## The Brass Family

Another family of instruments that can generally be recognized by their similar appearance, this family gets its name from the material from which they are made—brass. Brass instruments include trumpet, French horn, trombone, euphonium, and tuba, as well as variations such as the flugelhorn, cornet, and bass trombone. The instruments are made from various lengths of brass pipes that are twisted into different configurations. The smaller end of the tubing fits a mouthpiece; while the other end is shaped into a bell. To produce a sound, the player places their buzzing lips onto the mouthpiece, and as the vibrations travel through the instrument, the sound is amplified. Unlike stringed instruments where the player presses down on the string to essentially make the string shorter (thus a higher pitch), brass instruments have valves that open and close the pipes, diverting the vibrations, lengthening and shortening the tubes to change pitch. The same principal is clearly demonstrated with the slide found on a trombone, and also (though rarely) on a slide trumpet, changing the pitch by altering the length of the tubing. Buzzing initiates vibration which flows through the instrument and produces sound waves. With creativity, there needs to be movement or activity to make connections and generate ideas. Visualizing the air movement, flowing and



winding its way through the tubing, changing direction (and pitch) according to choices made by the musician, again relates directly to the process of creativity—some of this, some of that, change direction, just be persistent and keep going.

An interesting way to consider the brass family is through its history. For instance, the trumpet, or a similar instrument such as the bugle, has been used throughout history to get attention. This could come in the form of an alarm or call to arms; or it could be a fanfare to announce an important person or event such as “Taps” at dusk or a funeral. The French horn heralds from France, its ancestor the hunting horn was also used for communication and the sound produced could signal excitement when the prey was spotted, disappointment if it was lost, or it could convey to both hunters and hounds when it was time to go home. The hunting horn is a simple, circular instrument and as with the bugle, there are no valves. Modern instruments not only have valves to help change the pitch, but also more tubing that increases range—unwound, a trumpet’s tubing is approximately four feet, while the French horn is closer to twelve feet. Along with these additions come more possibilities. Both the trumpet and the French horn are used in a multitude of ways far beyond that originally intended or even understood as possible.

Trombones originated as a larger sized trumpet to provide a lower register of notes, and the tuba came about much more recently as orchestras grew and expectations and demands increased from composers and audiences alike for more sound—range, dynamic, and timbre. As with their stringed comrades, each instrument offers different possibilities and has a different role; each can be a thread in the tapestry of a musical creation as imagined by a composer and/or performer.

Creative possibilities have comparably expanded. There are more resources and materials available. Especially with the advancement of technology, the possibilities seem almost endless. Ideas can be truncated or augmented, abridged or extended. However, bigger does not always mean better, and just as important as utilizing varying dynamics and shading, creative impulses can be developed in small or large ways, solving small or large problems, and benefitting small or large numbers of people.

### The Woodwind Family

Contrary to the string and brass families, woodwinds may not be as obvious to spot since contemporary versions of the instruments are not all made from wood. This group of instruments not only looks vastly different, but they are played using extremely different techniques. Rather than having the “wood” part of their name in common, instead they all produce sound using “wind” and the name is often abbreviated to “wind family.” This can be distinguished from the brass family that also uses air to generate sound; woodwind instruments’ sound is not produced by the players buzzing their lips on a mouthpiece. Different pitches are produced by holes in the instruments being opened (lengthened) and closed (shortened) by fingers and keys.

The highest pitched instruments in this family are the flute and its smaller version the piccolo, which though they can take many forms, are primary seen as tubular silver instruments. Sound is produced by blowing across an opening in the tube, making the air inside vibrate. Wood does come into play with the woodwind instruments that use a reed. Clarinets and saxophones use a single, thin wooden



Figure 4. Clarinet mouthpiece

reed placed on a mouthpiece. As a player blows into the mouthpiece, the vibrating reed sends air vibrating through the instrument. This is why the saxophone belongs to the woodwind family, even though it may appear like it should be in the brass family.



Figure 5. Oboe double reed

Similar in appearance to the clarinet, the oboe differs in that it uses a double reed. A vastly different timbre or sound quality is created as the oboist blows into two pieces of reed that are tied together. This same double reed is used by bassoons and English horns (which unlike the French horn does not resemble its name, being neither English nor a horn). Many of the woodwind instruments come in various shapes and sizes: E-flat clarinet, bass clarinet, contrabassoon, and soprano, alto, tenor, and baritone saxophone. The diversity in size, shape, color, timbre, range, and use is immense. It is a clear example of how a single idea such

as blowing into an instrument and vibrating the air inside can develop into vastly different products and uses.

### The Percussion Family

This is the most diverse family yet. What designates an instrument as a percussion instrument is that sound is generated by being struck. This can apply to something as simple as a child's toy or as complex as symphonic instruments such as timpani or marimbas. Sometimes people dismiss percussion, thinking it is easy because of its accessibility. Anyone can clap or keep a beat on a drum or egg shaker, right? That is the beauty of it. Yes, anyone can create music (and create in general) and it does not have to be sophisticated or technically challenging. It can be an individual expression at whatever level and in whatever way the individual is inspired to express themselves.

That being said, percussionists are some of the most versatile musicians. They play multiple instruments and coordinate a crazy choreography to cover each part in an orchestra or band. Additionally, many of the instruments have totally different techniques, unlike switching from the alto to the tenor saxophone which is similar in both sound production and fingering. *On the Edge of Chaos: Where Creativity Flourishes* presents the idea of how "In any system, there are forces pushing toward organization and others introducing unpredictability. A truly creative idea straddles both of those states" (Schwartz, 2014). Dr. Robert Bilder is quoted in the article stating, "The truly creative changes and the big shifts occur right at the edge of chaos" (Schwartz, 2014). Both of these statements seem to demonstrate a correlation between the multi-tasking and multifaceted skills of a percussionist and the collision of experiences, perspectives, and ideas that can lead to creative production. This may seem paradoxical in that percussionists are also often relied on to provide the steady foundation in many situations. This provides an example of why people should not be put in a box, but are fully capable of and should be encouraged to pursue a variety of interests and skills, even if those pursued seem at odds or unrelated.

Some percussion instruments are rhythmic only, some have pitch notated. Timpani are an example of tuned percussion instruments. The pitch is changed by stretching or loosening the drumheads via a foot pedal. Often timpanists must change the pitch during a piece in a way that the sound is not heard from the audience—and there is not a chance to check it with a tuner or compare the pitch with a tuning note,

they have to know exactly how far they need to change the pitch. They have to think and act independently, another characteristic of creativity.

The piano is also part of the percussion family. There is sometimes confusion about why this is the case, since a piano makes sound via vibrating strings. However, much as brass instruments are not categorized as “wind” instruments even though vibrating air produces the sound, pianos are not categorized by strings that vibrate and produce sound. Instead, buzzing that generates vibration is considered for brass instruments and similarly a hammer striking the string to begin the vibrations categorize the piano as a percussion instrument. This alternate way of looking at the instrument provides a different perspective. Previously unseen commonalities, connections, or approaches can be found when open to alternate interpretations—even with those that seem to make sense and be obvious.

Each of these instruments and instrumental families have far more to offer this investigation and the personalities and characteristics of each could be a paper of its own. However, rather than focus more on a particular individual aspect, I want to conclude by considering the bigger picture in terms of collaborative or corporate creativity and music making—once again referring back to the title “Orchestrating Creativity.”

### **Orchestrating Creativity**

Orchestras and other ensembles are directly comparable to businesses in that they require an environment which allows for success. There are many moving parts and individuals bringing unique skills, characteristics, perspectives, motivations, preferences, and experiences, who collectively comprise a single organization.

**Environment.** Environment is key to supporting, enabling, and nurturing creativity or musicality, producing a productive, successful atmosphere in which to work and contributing to a thriving organization. Characteristics of this type of environment include a positive atmosphere. Both individual development and collaboration are encouraged, as is clear communication. Goals are stated, and resources (including rehearsal time) are used wisely. Within the environment, appropriate and interesting challenges are provided, as well as a judgement-free zone where individuals feel respected and appreciated.

**Alignment.** In their book on *Corporate Creativity*, Robinson and Stern state six essential elements: alignment, self-initiated activity, unofficial activity, serendipity, diverse stimuli, within-company communication. Alignment is described as “ensuring that the interests and actions of all employees are directed toward” and support a company’s key goals (1998, p. 13). In an orchestra, each performer should strive to be the best possible ensemble player. Yes, there are solos for individual instruments or sometimes entire sections of instruments, but a balance is still necessary. If everyone wanted only their part to be heard, there would be a cacophony of sound with no cohesion. Successfully performing with any kind of ensemble depends on the performers having a unified vision and goal, bringing all the parts together and blending musical ideas.

**Self-initiated activity.** Self-initiated activity refers to a project embarked upon by an employee due to personal interest—a problem for which they have enthusiasm and feel capable of mastering. This relates to intrinsic motivation. In an orchestra, what is presented to each individual musician might be better defined as a puzzle rather than a problem, however it comes in the form of an individual part which needs to fit into the picture. There are many layers to how the ensemble member figures out their solution, but the fact is that passion to play their chosen instrument and create a

musical experience ignites the intrinsic motivation to figure out how to perform that specific music to the best of their ability.

**Unofficial activity.** In the absence of direct or official support, employees should engage in unofficial activity. Exploration away from the eyes of others offers a safe haven where there is the chance to develop an idea or skill until the employees feel secure enough to overcome any resistance to their creative output. This is truly a space to experiment and fail without judgment—the “private failure” concept as previously attributed to Twyla Tharp. Robinson & Stern state: “There are limits to what a company can ask of its employees, but far fewer limits to what people will ask of themselves. Creativity, especially the unplanned kind, often requires extraordinary dedication and effort” (1997, p. 168). Musicians are often perfectionists and notoriously hard on themselves. This absence of direct, official support most likely happens in the practice room. What is done in the practice room is cumulative. Even when not preparing for a specific performance or to play a certain piece, musicians practice scales and etudes to develop and hone a vast number of specific techniques. This practice discipline spans their entire career—it never ends. These are the fundamentals; musicians must keep in shape, sight-read as many different pieces and kinds of music as they can get their hands on, and as previously mentioned, listen to and experience as much music as possible.

Sometimes orchestral members will be given their music ahead of time to practice individually or rehearse as a group, and sometimes not. It is not uncommon for a professional musician to sight-read a concert; for many, that type of challenge is the most stimulating. However, those on-the-spot performances are possible only because of the various etudes and scales played and skills developed outside of that particular music, but then connected and utilized in a specific way not yet experienced by the musician. This process combines the previously-mentioned essential elements of self-initiated activity and intrinsic motivation with un-directed and un-supervised activity in the practice room—as the aforementioned “safe haven” where development happens until the musician is a strong enough player to contribute with their creative output.

**Serendipity.** Serendipity is explained as a combination of a fortunate accident with keen insight. An example is given, stating, “Creativity often involves recombining or making connections between things that may seem unconnected” (Robinson & Stern, 1997, p. 14). Further, it is suggested that “An organization should encourage its employees to take classes that are not directly related to their work, to go to conferences where they are not making a presentation, take study leaves or sabbaticals with the purpose of learning something different. One can never know when new knowledge will become useful” (Robinson & Stern, 1997, p. 191).

Chris Bilton, using art as a metaphor for creativity in business states, “Artistic innovation follows its own internally generated rules and is the result of a deliberate, self-conscious, process which encompasses different thinking styles, different points of contact with others, different aspects of the self. Above all the creative process is complex, multidimensional and this process is ‘managed’ by the artist (occasionally with some outside help)” (Bilton, 2007, p.135).

This relates to everything else that has been stated regarding musicians and ensembles. All those skills and techniques that have been honed are engaged. As different connections are realized and different counter melodies or harmonies heard, an incredible depth is brought to the music. Every performance is different because, even if the musicians, location, and all the elements seem identical, the players bring added experiences to the moment. The beauty of live music is that no two performances are

ever the same. The appeal of this experience is evident in the current trend of live performances accompanying movies—orchestras are playing to sold-out audiences who come to watch movies they have seen multiple times.

The other charge made by Robinson and Stern, to encourage taking classes and having experiences other than only work or specifically project-directed, is one that musicians need to take to heart. Some musicians become so focused on their craft, they neglect to do other things. The phrase “All work and no play” applies to them just as much as anyone—even if playing music is something they love and it seems as if it should be the source of joy. There needs to be more: more diverse experiences, more stimulating interactions, more to life.

**Diverse stimuli.** Diverse stimuli help provide fresh insight. Even though stimuli might arise in connection with daily life or a particular project, diverse interactions can inform new perspectives. A variety of experiences enhances music just as it does creativity. This is a concern when kids are started on an instrument at a very early age and driven to become a virtuoso—they should also have the opportunity to play sports, board games, or participate in scouts, and interact with others. The concern extends beyond music with standardized testing and AP classes that focus a student so specifically on a singular goal that other life gets surpassed. Those “other” experiences are educational and develop the whole person in ways leading to a fulfilled life; that type of individual is desirable for working in your business or playing in your orchestra.

**Within-company communication.** The final essential element is within-company communication. The need for clear communication seems obvious, but is often overlooked. Misunderstandings and missteps can happen when assumptions are made or unclear cues given. Communication is key in a variety of ways. First of all, logistically. Everyone needs to be on the same page. This means having the music, knowing what is being played, details such as schedule, dress code, etcetera. People should be set up for success. They must understand expectations to avoid beginning at a disadvantage. This comes full circle, because being aligned and having the same goals necessitates those goals being made clear.

Then comes my favorite part of communication—the music making. This can be done as one instrument picks up the melody line from another or when players breathe and move together to create a perfectly timed entrance. In a smaller ensemble, this type of communication can come through watching, nodding, and listening.

### **Creative leadership**

In a larger group, there is often a conductor. That raises the question of leadership. A good conductor is a good leader. They strive to facilitate getting the best out of each individual musician, resulting in the best possible ensemble performance. The conductor does not play an instrument, rather the orchestra is their instrument, and conductors are vulnerable to what the musicians produce. They are represented by the aggregate of the individual musicians’ contribution or production in a very exposed way. If someone misses an entrance, the conductor, as well as others around them, helps to get the lost musician back on track.

There is a very obvious connection between the individual and the whole—every voice is vital to the success of the performance. Puccio, Mance, and Murdock are among many people who have researched and written about creative leadership and what is necessary to be a successful leader. In their book *Creative leadership: Skills that drive change* they pose a similar theory to my initial statement regarding

parallel development of musicality and creativity. They state: “When we teach and train them in creativity theories, models, and strategies, we find that, in very clear and profound ways, we are also developing their leadership skills” (Puccio et al., 2011, p.xvii) and “Effective leaders embody the spirit of creativity. As a result, they use flexible and adaptive thinking to proactively introduce change and to productively respond to external sources of change. Creative thinking is the fuel that makes leadership work” (p. xiv).

**Conductors.** Conductors must use flexible and adaptive thinking regularly. Think about the aforementioned instance when someone misses an entrance. The conductor has to “right the ship” and communicate in front of a live audience. Or how about conducting in an opera or theatre pit? Anything can happen onstage—lines or verses skipped, entrances missed, set changes taking forever—some of these issues can be anticipated as possible problems, but many occur unexpectedly. The conductor has to make split decisions and communicate them instantly to keep things running smoothly.

This is one of the core competences of creativity mentioned by Puccio, Mance, & Murdock: “Diagnose complex situations and design process plans that effectively respond to those various scenarios” (p. xix). Another of the competences applies even more in a situation where the conductor is also the musical director—“Create a compelling vision focused on attaining a productive opportunity and possess the foresight to identify the most significant challenges that must be addressed to achieve the vision” (p. xix). Challenges that impact the musicians and the product that they are capable of producing can occur in a variety of areas. One example results from production demands. What a director wants is not always possible, and the music director/conductor needs to walk the fine line of middle management, finding a creative way to not only communicate the difficulties, but help to find a solution, while protecting the interests of the players working under their baton and the integrity of the music.

Challenges can also be found in that key word to which I keep returning: *environment*. What about physical environments? Musicians rarely play in only one location. Different venues can offer challenges regarding space, acoustics, and a variety of issues. Referring again to pits, there is usually a lack of room in a pit. Arranging space to fit in a way that it is physically possible to play your instrument, see the conductor, and hear is a challenge, but obviously vitally important. The conductor can help facilitate positioning in a way that reduces friction among players wrangling for space.

Even with an orchestra or band not in a pit, unreasonable demands can be made—outdoor concerts where the sun, heat, or cold can actually harm your instrument, or demands to play louder when it is not physically possible for your instrument. If these types of situations are allowed, the musicians will resist, frustration will set in, and there is a good chance that musicality and creativity will be stifled.

There are other ways that leaders can stifle creativity beyond what external situations dictate; a major problem is with micro-management. Micro-management causes all kinds of negativity. Instead, there needs to be a level of respect, trust, and autonomy. Kyle Hoyt, professional French horn player in New York City asserts:

Micro-managing conductors are the biggest stiflers out there and micro-managing principle players ... micro-managers that really make you feel like a cog in the wheel. It kinda sucks the soul out of what you got in this for... The best kind of conductors are the ones that see the forest rather than the trees. That’s all personality and style. It doesn’t necessarily have anything to do with compe-

tenacy. They can be perfectly competent, but if they're a micro-manager and I hate every second that I'm playing with them, then the product that they get is actually not going to be as good as somebody who gives me some rope and actually trusts me. (K. Hoyt, personal interview, May 26, 2018)

"Leaders cannot have all the answers... leaders must not only rely on their own creativity but must also be adept at facilitating the creative thinking of others, which implies that they possess the ego strength to admit that they do not have all the answers and the open-mindedness to entertain and support others' ideas" (Puccio, Mance, & Murdock, 2011, p.10).

Miriam Burns, conductor of the McLean Orchestra and former cover conductor of the New York Philharmonic, explains how she practices this type of creative leadership:

Sometimes conductors over-conduct and that can get tiring for the players. Players want to be unleashed to play and that's the best part of conducting—when you have, for example, a group of wind players... solo horn [or] whatever, where they're so creative, and they're playing, and you just want to sit back, when it's appropriate, and let them take the reins and I love that. And there's nothing more fulfilling." (M. Burns, personal interview, June 1, 2018)

Ego needs to get out of the way. It can be a major issue and its impact needs to be diminished. There must be a commitment to developing others to their fullest potential, enabling those who follow to go beyond self-interest and to achieve extraordinary accomplishments for a collaborative vision. This can be done through connections and communication. In a case study performed by Dr. Fredricka Reisman, she quotes a student who applies this concept to the workplace stating, "I believe that creativity in the workplace is kind of like a dance. There's a point where the creative individual will need to lead the dance and time when management needs to take the lead. However, both need to work together in a push and pull and back again relationship" (Reisman, 2017, p. 29).

Without this concept, a group will not function to its ultimate potential. It requires an understanding both by leaders and those being led, not only in music, but in any arena. In an orchestra, these connections and communications exist between the conductor and musicians, between the musicians themselves, and between the conductor and musicians, and the music.

**Connections.** To create successful connections, never be satisfied with merely playing the notes... listen. Energy and inspiration come from what is happening around you. If the status quo is accepted or just going through the motions with tunnel vision, it is unlikely to produce anything productive.

In each of these interactions—between conductor, musicians, and music, having the broadest possible understanding of each relationship is vitally important. Whether a musical organization or any kind of organization, it is necessary that those involved understand their role in a *functioning* organization to realize the fullest extent of its potential. Each individual has a different role, and it is important that every individual understand that they are contributing to a complete performance or development of a concept. Every individual needs to function within—or be able to contribute their approach to—both the process and product. "It's insufficient for an organization to have creative individuals. The environment must be structured for creative tension, positive turbulence around a vision, and the space and freedom for people to 'dance with their ideas' without fear of mistakes" (Tanner & Reisman, 2014, p.124). Orches-

trating creativity requires the same mind set. In his book *When: The Scientific Secrets of Perfect Timing*, Daniel Pink expresses summarily these concepts:

Human beings rarely go it alone. Much of what we do—at work, at school, and at home—we do in concert with other people. Our ability to survive, even to *live*, depends on our capacity to coordinate with others in and across time... individuals [need] to work in tempo, to synchronize their actions with others, to move to a common beat and toward a common goal... A lone voice can sing a song. But combine a few voices, sometimes lots of voices, and the result transcends the sum of the parts.” (Pink, 2018, pp.180-182)

### **Limitations**

There are many other parallels with creativity and music, from music composition to pedagogical practices, some of which have been touched upon and many more that have gone unmentioned. The scope of this paper cannot possibly incorporate all aspects of music, musical concepts, musical instruments, and ensembles from any one culture, let alone encompass a global perspective. However, the discoveries and analogies presented are universally applicable. And, beginning with the premise that both creativity and musicality are inherent human traits, while the nuances of an individual instrument or human has depths that cannot be plumbed in a single narrative, this investigation can offer insight into the value of developing both musical and creativity skills.

### **Conclusion**

Each instrument and individual offer different possibilities. While potential is inherent in every human, creativity and musicality can be cultivated or squelched. Developing these skills takes practice and a supportive, nurturing environment. Characteristics of creativity—elaboration, fluency, flexibility, improvisation, openness to experience, tolerance of ambiguity, avoidance of premature closure—parallel many of those vital in musical development. At times this can create a situation where one masquerades for the other. Development of individual creativity or musicality allows for constructive collaborative creativity as each individual voice contributes a unique timbre that, when incorporated, can orchestrate a *gestalt* worthy of their efforts.

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## Figures

*Figure 1.* Cello strings, bridge and fine tuners

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*Figure 2.* Diagram of a stringed instrument: bridge, bass bar, and sound post

*Figure 3.* Cello peg box

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*Figure 4.* Clarinet mouthpiece

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*Figure 5.* Double-reed mouthpiece

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