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# Audiation and Mental Imagery: *Implications for Artistic Performance*

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**E**dwin Gordon coined the term "audiation" to describe the ability to recall or create a mental image of the sound in the mind's ear in response to remembered musical patterns and, later, in response to printed notation. Gordon (1977, 1989) chooses not to use the term "image" because, for him, it connotes a visual representation. The product of audiation, however, is clearly a mental imagery experience in the form of an auditory or aural image.

This article explores audiation from a mental imagery perspective and illustrates ways in which audiation, as well as mental imagery experiences in other sense modalities, is used in the performance process by leading orchestral brass players. These illustrations are drawn from an ethnographic study (Trusheim, 1987) that used informants to explore mental imagery experiences which contribute to superior musical performance.

## **Mental Imagery: Historical Background**

Some background in the field of mental imagery will provide a framework for an understanding of audiation as an imagery process and its potential role in musical performance. This section will briefly outline a variety of imagery characteristics, experiences, and abilities, and will provide some basic information about mental imagery and its relationship to music.

Interest in the phenomenon of mental imagery dates back to the earliest psychological investigations of Galton (1880), who compared the nature of imagery experiences and abilities in scientists, normal adult males, and schoolboys. Research in mental imagery

flourished until the rise of behaviorism in psychology caused a waning of interest in inner mental processes which could only be studied subjectively by "self-report" measures.

With the current interest in cognitive psychology, imagery is again in the vanguard of psychological research. Richardson offers

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the classical definition of imagery in his seminal work on the subject. He defines mental imagery as:

- (1) all those quasi-sensory or quasi-perceptual experiences of which
- (2) we are self-consciously aware and which
- (3) exist for us in the absence of the stimulus conditions that are known to produce the genuine sensory or perceptual counterparts, and
- (4) may be expected to have different consequences from the sensory or perceptual counterparts (1969, pp. 2-3).

Mental images can be experienced in any of six sensory modalities — visual (sight), auditory (sound), kinesthetic (movement),

tactile (touch), olfactory (smell), and gustatory (taste). Practically speaking, an example of a gustatory image would be mentally experiencing the taste of biting into a lemon. The measure of the strength of this image would be the production of saliva in response to the image rather than the actual sensory event (see Richardson, 1983).

Gordon associates the term "image" with visual perception only, warns against the use of the term "aural imagery," and states "to use the term 'aural imagery' is to suggest a process that deals with notation, a process that involves seeing and not necessarily hearing" (1989, pp. 8-9). Audiation as a process is analogous to visualization. The product of visualization is a visual image, and the product of audiation is an aural image (see Walters, 1989, for a more complete discussion of this analogy). Gordon's concern is that the visual connotation of the word "image" would cause a misunderstanding about the product of audiation.

### **Research in Mental Imagery**

Gordon's assumption, however, is not consistent with the research in the field of mental imagery. The mental imagery literature does not place a visual boundary on the term "image." Based on Richardson's definition, images can arise from any sensory or perceptual experience. It is logical to assume that the mind encodes these experiences in the sense modality of the original stimulus. The recall of that experience is also likely to occur as a mental representation (image) in the same sense as the original. Hearing with the mind's ear is just as likely as seeing with the mind's eye. As one might expect, musicians often experience images in the auditory domain; but visual, kinesthetic, and even tactile images can contribute in special ways to performance.

As with any human ability, imagery skills vary greatly according to individual difference, and this variation occurs in terms of vividness (the clarity or strength of the image), controllability (an individual's ability to control or manipulate the images), and fluency (the ability to recall or create a large number of images). Individuals may also be prone to experience images more strongly

and frequently in one or another of the six senses. Multi-sensory images are also commonly experienced. Imagery is an ability that can be developed through use, and the conscious application of one's imagery ability can result in increases in all of the above-mentioned variables.

Richardson (1983) identifies four major types of images—the after-image, eidetic image, memory image, and imagination image. The memory image and imagination image are probably the most frequently experienced by musicians, and, interestingly, Gordon's seven types of audiation (1989) fall into these two categories. The memory image is "the common and relatively familiar image of everyday life. It may accompany the recall of events from the past, the ongoing thought processes of the present, or the anticipatory actions and events of the future" (Richardson, 1969, p. 43).

Gordon's Type 4 and Type 5 audiation involve the recall of memory images from past experiences with the musical material. Imagination imagery can be differentiated from memory imagery by the qualities of novelty, substantiality, and color. Imagination images can arise from novel recombinations of memory images and can differ in detail and vividness from the simple recall of a past sensate experience. Composers and performers engage in imagination imagery as they create music in their minds through composition, improvisation, and interpretation. Gordon would classify these imagination imagery experiences as Type 6 and Type 7 audiation.

Documentation of imagery experiences by composers has been gathered from many sources (see Agnew, 1922; Cowell, 1926; Sessions, 1970; and Khatena, 1984). Schumann, Mozart, Berlioz, Tchaikovsky, Wagner, and Brahms all wrote about their imagery experiences and compositional strategies. Mozart states that his compositions were already finished in his mind and that "it rarely differs on paper from what it was in my imagination" (quoted in Agnew, 1922, pp. 283-284). Memory and imagination images are often part of the normal compositional process used by many composers (see Bennett, 1976, and Nass, 1984). Composers

often work out compositional problems in their minds through the recall of memory images and the creation of imagination images, creating their work in the mind's ear prior to committing it to paper. A characteristic comment is offered by Sessions:

The aural imagination is simply the working of the composer's ear, fully reliable and sure of its direction as it must be, in the service of a completely envisaged conception. The conception, developed in consequence of musical ideas with which the composer started out, is the premise of everything that happens in the work which he is composing (1970, p. 110).

The imagery experiences of these composers fall into two categories. The first of these deals entirely in sound, involving the audiation of note and rhythm patterns, instrumental textures, and other nuances of the work being composed. The second category would be consistent with Gordon's "notational audiation" (1989) and would involve hearing the piece in connection with or in response to written musical notation. For many composers, imagery experiences in both categories would be synthesized into a process of working out compositional problems in the mind's ear, consistent with types 6 and 7 from Gordon's typology.

Imagery is also experienced and used by performers in a variety of practice, rehearsal, and performance situations. Like composers, performers recall or create aural images and use them in specific ways to enhance different aspects of their performance. While the audiation of note and rhythm patterns would certainly be used to build consistency, note accuracy, and musical understanding; performers also use audiation in the development of tone or timbre as well as for musical expression and interpretation. In addition, players use imagery strategies in a variety of sensory domains in order to make practice serve as a surrogate for actual performance through their development and use of mental rehearsal techniques.

Since Gordon's work is primarily devoted to musical learning by students at early stages of their musical development, his focus is on the use of audiation in the acquisition of syntactical understanding of musical material. While it is clear that

performers at an advanced stage of musical sophistication have already acquired this syntactical understanding, research indicates that such performers continue to find imagery useful in the refinement of their concept of timbre, musical expression and interpretation, and mental rehearsal.

### **Imagery Use by Elite Brass Players**

This discussion is based on a research project (Trusheim, 1987) which studied the use of imagery by eminent orchestral brass players in five major American symphony orchestras — the Baltimore Symphony, the Boston Symphony, the Chicago Symphony, the New York Philharmonic, and the Philadelphia Orchestra. Twenty-six musicians from the brass sections of these orchestras were interviewed face-to-face to explore the potential importance of mental images and imagery strategies in brass performance. This group of musicians represent the elite of the brass playing community. Several of these players are generally considered to be the best in the world, and all could be considered "world-class" performers. The responses of these brass artists and the subsequent results of analysis are illustrative of the significance of audiation and other imagery experiences in performance.

The actual interview process focused on eight broad areas of imagery used by brass players. These areas, or topics, were identified through a study of recent methodological literature in brass performance (see Weast, 1979; Johnson, 1981; Severson & McDunn, 1984; Ristad, 1982; Dale, 1965; and Bush, 1962) and included Background and Training, the Mentor-Student Relationship, the Warm-Up Process, Development of Tone Production (or "Concept" of Tone), Musical Expression and Interpretation, Conductor's Imagery, Mental Rehearsal, and the Reduction of Performance Anxiety. Each interview was tape-recorded and later transcribed for detailed analysis. The responses of each brass artist were coded for imagery-related statements, and the responses of the entire sample were analyzed to identify common trends as well as unique or novel imagery experiences or strategies within each topic.

Because of limitations in the scope of this discussion, the focus will be narrowed to

imagery issues which most depend upon a player's ability to evoke a vivid aural image of the sound to be produced—Tone Production, Musical Expression and Interpretation, and Mental Rehearsal. Significant imagery experiences in sensory domains other than the auditory will also be included as appropriate to the discussion. The findings of this study support the notion that aural imagery (the product of audiation), as well as imagery in sense modalities other than the auditory, is central to artistic musical performance.

### **Tone Production or "Concept" of Sound**

"Concept" is used by brass players to denote some kind of mental representation of the sound character or timbre of their instrumental performance. This "concept" appears to consist of an aural image of the sound (although for some players, the mental representation is multi-sensory), verbal descriptions that refer to certain sound qualities, musical knowledge, and a storehouse of prior listening and performing experiences.

The earliest stage in this process is the cultivation of the ability to audiate an idealized sound or timbre. This idealization occurs through the accumulation of a wide variety of listening and performance experiences and is an ongoing process. One source of this image might be the influence of a mentor or master teacher as reported by one of the trombonists in the study:

I can hear his sound and I can hear his voice. . . . I can hear it vividly. . . . I consider aspects of his sound and playing to be sort of the Holy Grail that you're trying to reach for. (DY)

The majority of players build this aural image from a wide variety of sources which are primarily listening experiences. These experiences come from a storehouse of memory images which starts to accumulate from a player's earliest musical experiences. Players then pick and choose those experiences that seem appropriate and desirable and construct an aggregate of how they want to sound. Two characteristic responses illustrate this idea:

I think as the years have progressed, I'm developing more my own aural concept at this time which is a combination of everything I've heard. (PS)

I think that each of us has to develop an individualized and very specific image of how we want to sound. . . . I think that each person needs to take a little from here, a little from there, and wrap things up into an individualized package that says "this is the way I would like to hear my horn playing." (RG)

For the majority of players the aural image approaches their own ideal sound in vividness, clarity. Players audiate their ideal timbre in complete detail, capturing all the nuances of instrumental timbre:

It's not simply just the color or the beauty, it's the clarity of attack, the evenness of slurs, and the ability to change registers and dynamics. (VC)

Not just the pitch of the note, but the dynamic, the intensity, the length—all the things that are involved. (CS)

The process is dynamic and ever-changing, subject to each and every musical experience the player has. When a listening or performing experience is particularly meaningful, the player's concept may undergo renovation to include some new aspect of performance. The following comment illustrates this point:

As soon as you get to the point where you can produce your ideal, you'll go to a concert and you'll hear somebody do something—a little aspect of something, and you'll go back [to the practice room] and you can't do it. The ideal just went up! (WD)

This attitude was echoed by many of the players, indicating that the development of an ideal is surely a process which is "always open for renovation." (RG)

The next stage occurs as the stored image of instrumental timbre is audiated and used as a guide in actual playing. Audiation serves as a guide not only in producing the correct passage in terms of note and rhythm accuracy, but also in producing specific tone qualities or effects. One of the tuba players in the study asserts that the mental image or

“concept” is a replete version of the musical product that is used as the driving force behind actual performance. This player considers the aural image to be the stimulus for the production of the musical product:

We have to be very musical in the head. The ability you call imagery is the ability to conceive sound that has to come out in terms of—instead of vocal chord activity in the larynx, we do it by vocal chord activity in the trumpet. (AJ)

Another player makes a similar assertion about the importance of the use of audiation as a guide to playing:

I like to use the slogan, “The music plays me.” The music that I have inside my head is what plays the horn and that’s what guides the product that comes out. (RG)

The following comment describes a strategy which this player uses to accomplish this goal:

I would find a room in the music building. . . I would turn the lights off and I would just play single notes, going for the sound I had in my head. . . . I would listen for the characteristics that I considered ideal, and gradually, without trying to force it to happen, got closer and closer to that. (RG)

Time spent audiating the “ideal” sound seems to directly influence the production of the sound as one plays the instrument. One player suggests that “if you want to play the note louder, then hear it louder and then the mental side will tell the physical side what to do” (AJ). The responses of these brass artists suggest that the audiation process that they use goes far beyond tonal and rhythm patterns. As they audiate, they hear a complete rendition of the passage in terms of tone color, volume, and nuance. This process utilizes Gordon’s Type 4 audiation involving the recall of both memory and imagination images.

Some players find that the mental representation of their ideal sound has a visual, kinesthetic, or spatial aspect for them. Several players think of their timbre in terms of a triangle, or pyramid. The following comment explains this thinking:

I think of sound as being sort of triangular or pyramid-shaped, and the broadest part of that pyramid or triangle is the resonating point of the instrument. For me, the concept of that triangle or pyramid—depending on whether you’re looking at it two-dimensionally or three-dimensionally—establishes getting the sound to be broad and focused on as much fundamental or overtones in the sound. (CS)

Another player recalls an experience he had as a young musician when he practiced in an open field, projecting his sound across a large open space. Besides helping him build specific characteristics in his sound, he can vividly recall those youthful experiences to this day, imagining qualities of space and shape in his timbre. Yet another player visualizes his sound projecting the shape of his trumpet bell to fill the entire concert hall:

I try to spread the sound out following the contour of the bell so the sound is as broad as the concert hall. (CS)

Two players in the study report experiencing sound in terms of specific colors. This concept is congruent with “chromesthesia” or “colored hearing” in response to a musical passage:

I love the idea, the thought of color. There’s the shadings of color from vivid to pastel to opaque. And then different colors seem to have different kinds of reactions. . . . There are all kinds of things going on mentally while I’m playing. It’s not uncommon that I would think of colors and actually see them [while playing]. (WK)

This player experiences color and associates color with the musical content of a passage. This is a secondary association which may deepen the musical experience. He encourages his horn students to use this approach as a tool in their playing. One of the trombone players in the study actually visualizes his ideal sound in terms of color perception:

Sounds do have actual colors. . . . the ideal trombone sound—you know, that nice shiny bronze or shiny gold—not too gold—not a dull gold—has to have that shiny edge which will be the projection that I have. (NB)

Several horn players in this study speak of the visual and kinesthetic image of actually "throwing" their sound into the audience to conquer the inherent projection problems of the horn. Another horn player in the study uses a tactile image of "stickiness" to promote legato playing on the horn. The image used is one of notes sticking together to promote continuity in the phrase. He further enhances this image by imagining that his fingers are sticking to the valves of the horn. The variety and scope of the images used by these brass artists is remarkable, indicating that they are willing to use any musical or real-life experience that seems relevant to their performance.

It is obvious that these players have developed a very strong aural concept which is important in guiding their tone production in practice, rehearsal, and performance. Their imagery may be auditory in nature, or it may be associated with sensations or perceptions in other modalities. They hear instrumental timbre in their mind's ear and use it regularly as part of their performance process.

### **Musical Expression and Interpretation**

This study dealt with musicians who are interpretive performance artists participating in an ensemble. The issue of musical expression and interpretation for them reaches clearly into the "aesthetic" of musical performance. Interpretation of the orchestral literature is personalized and individual for each player. Many of these players utilize audiation and visualization to build this personalized interpretation from a wide variety of sources.

These findings illustrate ways in which audiation can be used to refine expression and nuance. Because of the advanced musical abilities of the players who participated in this study, it must be assumed that they possess the ability to audiate the tonal and rhythmic patterns of the passages that they perform. The comments relevant to musical expression and interpretation indicate that they also audiate and visualize other characteristics of these passages in order to add understanding, depth, and

meaning to their performance. This represents ground which is not covered by Gordon in the practical application of audiation in his music learning theory.

Many players use a generalized imagery as they practice or rehearse expressive issues. These players form images from a variety of sources, manipulate them in their minds through imaging strategies, and externalize the resulting image in some way in their playing. This approach is congruent with the "iii Framework," a model developed by Rosenberg (1987) to describe the role of imagery in the artistic process. Players identify the primary sources of these images to be the actual musical content of a piece, prior personal experiences deemed to be relevant to the piece, and extra-musical associations based on the programmatic content of a work as supplied by the composer or from the player's own imagination. Once the image is recalled from memory, players review a passage in their minds:

... to clarify a phrase. I'll go over it and I'll think about it many times and then. ... I'll try to realize [on the instrument] what I've arrived at in my mind. (PK)

Imaging strategies allow players to try out different interpretive ideas prior to actually playing the passage. One of the horn players comments on the approach that he uses as he practices. He uses a combination of actual and imaginary playing to arrive at a personalized interpretation of the work he is practicing:

That's essentially what I'm doing between playings too. With the horn in my lap, I'm hearing the phrase and thinking about doing it in a different fashion. (RG)

Through the imaging process, manipulation of various aspects and nuances of tempo, phrasing, dynamics, articulation, intensity, and tone color build what amounts to an imagination image which serves as a temporary "ideal" interpretation for that passage. Most players audiate as they do this, dealing directly in the sound of the passage. According to Gordon's typology, these players would engage in both Type 2

and Type 4 audiation—responding to musical notation and also recalling retained images from memory. Some players report having an inventory of sounds which can be recalled as the playing situation demands:

It's hard now to think about my sound, *per se*. I think about the sound that I want for a particular kind of effect. I always have a mental image of what I want to sound like—many different sounds . . . but I don't think of the same things, or the same sounds, or the quality of color, or whatever, when I play Mahler as I do when I play Haydn. (DC)

The importance of this approach is that by audiating the appropriate sound or style, a player can facilitate the changing of timbre and interpretation in actual performance. Gordon would consider this to be high-level audiation in that the player would be audiating a given passage in relation to other pieces or styles which have been previously retained. Gordon identifies this as Stage 5 audiation (see Gordon, 1988, pp. 14-17 for a complete discussion of these stages).

Images that players deem to be important in issues of interpretation are not always aural. Some players also cultivate kinesthetic images or movements as related to the music that they are to perform:

A lot of times, I'll think movement too—I mean, how would my body move to this, you know. If I were going to dance to this, how would my body move? And therefore, I can see the movement before I play this thing. (WD)

Visual images can also help players in building an outline of a passage or an entire piece. One of the players visualizes a piece in terms of a road map and uses this to help him externalize his interpretation:

The notes on the page are like a road map and you just give an aural representation of that—how the map looks. You have lines in different colors, and it shows the roads and where they curve. (CS)

This player sees musical form and phrase structures as the route that a composition takes. He realizes that in performing the piece, nuances of expression are likely to be different, just as the scenery might change

along the route:

. . . and every day, you make the same trip, though it may take longer sometimes, or it may take less time. The scenery is going to be different depending on what time of year it is. Sometimes, the cows are out in the field, and sometimes they're next to the fence. So you have to report, you know, as you're driving. (CS)

This comment recognizes that, for the interpretive musician, the essence of expression is the addition of a personalized viewpoint to the written part and that this personal expression may be different each time the piece is played. This visualization of the structure of the piece is important for this player in his musical expression.

For many players, the issue of interpretation goes beyond the simple matching of a sound that is audiated in the mind's ear. These players make a wide variety of multi-sensory associations based on their perception of the content of a piece of music. This content may be programmatic in nature, or it may be an imaginal association which the player has made in response to the musical content of the piece. Sometimes, by recalling a memory or imagination image of one of these associations, players can evoke a mood or atmosphere which becomes part of the substance of musical expression for them, giving them an added level of inspiration in their playing. One player comments that:

Every piece we play has some [connection] like that. And if you haven't had something definite in your background for it, you have to substitute something from your imagination. I don't think any of us would be playing in a group like this if we didn't have that kind of resource. (AH)

He goes on to give a specific example of this phenomenon from his own personal experience which he considers a vital resource in his playing:

So when I play, for instance, in the slow movement of the Mahler—[he sings]—all I'm thinking of is that marvelous feeling the very first time I played that with Bruno Walter up there. I can see that man up there and I can

get back that feeling. . . . You've got to have something there to feed into you to tell a story. (AH)

## Mental Rehearsal

A great majority of players regard mental rehearsal as a useful tool in practice and performance situations. Perhaps the most significant point here is the way that musicians use their imagination to make practice a surrogate for performance. One of the most convincing statements on this issue was made by a horn player who said "I never practice, I only perform" (DC). What he means by this is that he plays his best when under the stress of actual performance, so he views practice as an extension of the performing atmosphere.

The use of mental rehearsal falls into two categories—spontaneous and controlled. Spontaneous mental rehearsal occurs when the image of a piece to be played enters the conscious thought of the player without an attempt on the player's part to evoke the image. This can occur at any time depending on the player. The following comment is illustrative of this phenomenon:

At times, I've awakened in the morning thinking of some passage—the first thing I thought of was playing the passage and how to do it—the fingerings—and that stays with you during the day. . . . Sometimes you get wrapped up in it, but it does happen, and it does help. (DM)

Once the image of a piece rises to consciousness, the player can decide to either dismiss it, or to use it as an opportunity for mental rehearsal. When players decide to apply mental rehearsal techniques to this imagery occurrence, they find it has potential value in their playing:

It is valuable to imagine through a thing—sometimes sort of half practicing—by doing the articulation with the instrument or maybe doing some other movement—maybe moving the body like dance. . . something to help loosen things up and make it a little different in some way. (DF)

In controlled mental rehearsal, players consciously audiate a passage to be performed in order to try out some interpretive idea or work on technical problems involved

with the passage. The majority of the players that were interviewed utilized some conscious form of mental rehearsal as part of their practice regimen. For some, mental rehearsal simply means evoking a vivid image of the music end product:

My mental rehearsal is primarily the musical message. I always conceive a certain sound. . . what comes out of the bell should be a mirror image of your concept. (AJ)

Other players use mental rehearsal techniques to conquer specific playing problems. Some find mental rehearsal to be particularly helpful in learning a new piece of music, or something that is "modern," or something that has a high degree of intricacy with complex rhythms or fingering patterns:

I usually do it mentally—I read through it, I don't play it on the trumpet. . . . I study through it a lot of times and just imagine the fingerings. . . . I work on it that way in advance of actually playing it. That makes a big difference on that kind of music especially. (DT)

This comment is congruent with Gordon's notational audiation—looking at the printed music and audiating the proper end result. Another common technique which involves the audiation is the development of the ability to hear mentally the piece as a whole during practice:

I can't play a symphonic passage anymore without hearing the orchestra. The sound of what is going on in the rest of the orchestra is always in my imagination. (VC)

If I played the opening to "Pictures" I would hear the opening couple of bars by myself, but then I would hear the whole brass section in the third and fourth bars. So I never played alone. (VP)

Several players comment on audiating connecting passages and interludes as they practice. This helps them prepare for the next entrance as well as to promote continuity in the piece. One of these players states:

Hearing, while you're playing, all the other parts going on in your head so that you're not just listening to yourself, but you're training

yourself to think of what else is happening. You're hearing the whole picture . . . you've got to play the interlude too—sing it through in your mind. (PS)

Another important issue in mental rehearsal is the use of visualization or other multi-sensory images to recreate the performance environment in the practice studio. The players picture themselves in the concert hall, playing before an audience. One player comments about the importance that this could have for students, even more than for a more seasoned orchestral musician:

Some students have a tendency to get used to playing for the four walls of their practice studio and that's one of the hardest things for them to overcome—to suddenly realize that they're no longer playing for those four walls, they're playing for an audience. Your thinking process has to be practiced the same as your music has to be practiced. If you think you're playing in a practice room, you're going to sound like it. If you think you're playing for a performance, you will. (WS)

One of the players uses guided imagery to help him prepare for special performances such as auditions or recitals. He recreates the experience as meticulously as possible in his mind as he sits quietly in a chair. His imagery involves all the senses as he guides himself through the experience. He visualizes the performing environment, he sees himself in that environment, and audiates in complete detail. Incorporated in this guided imagery is "positive imagery," which some call "rehearsal for success" (Severson & McDunn, 1984). The following passage describes this player's experience with guided imagery:

I try to do it as realistically as is humanly possible. I try to feel everything that I would be feeling, but I do it in a very positive sense. I try to feel very at ease playing the instrument. I'll try to feel extremely comfortable going over the more difficult passages—having them float out exactly the way I want them to happen musically—hearing it—hearing the sound. (RG)

The use of mental rehearsal during performance can also be a significant factor in performance. While the ability to audiate note and rhythm patterns is an essential

prerequisite, these players audiate passages in complete detail moments before playing them in performance situations. One player speaks of "singing along" instants before actually playing:

I'm almost reproducing what I'm playing in my mind. It's like I'm singing along. If I don't hear it or conceptualize it in my brain, there's no way I'm going to get it. (PL)

Another player expands on this idea and also reports using a much more elaborated image in his mental rehearsal. This player also comments on using these techniques at various times relative to actual performance:

Before I play, I try to envision what I intend for it to sound like. . . I try to imagine sounding just a certain way and then try to play it that way. . . I'll do this before playing a concert or at intermission. If there's a particular passage—without playing it, I'll just sit down and try to envision it. This could be like minutes before, or seconds before—or in terms of intermission, an hour or so before. (DM)

The general feeling among the musicians in this sample was that mental rehearsal has tremendous potential for them, and they use it as part of their practice and performance regimen.

## Conclusion

The responses of these brass artists point to the importance of imagery experiences in their performance process as professional musicians. They have cultivated the ability to audiate an idealized sound with a high degree of vividness and detail. They use generalized imagery strategies as they practice and perform. They form or recall images from a storehouse of past experiences, manipulate these images through a variety of strategies, and create new imagination images which they externalize in their performance. They do not perform in isolation. They draw on a wide variety of experiences from everyday life as well as from their professional training and performing careers. They find relevance in all kinds of experiences and bring them into an approach which could be called holistic. They have built up an arsenal of mental tools which can be called upon as needed.

Gordon's assertion that the ability to audiate is a core ability that is necessary for musical understanding and learning is certainly supported by these findings. The ability to hear, in the mind's ear, melodic and rhythmic patterns prior to performance is essential for consistency and accuracy for both singers and instrumentalists. This basic imagery ability has the potential to play a much greater role in performance as the ability to audiate is refined in vividness, clarity, and detail and used as a part of the performance process. Players at the pinnacle of achievement seem to do this naturally. Some make a more conscious effort at developing and using their imagery experiences than others.

The literature suggests that imagery is a skill that can be developed; by attending to such experiences that occur naturally, musicians could begin to discover an additional asset in the process of performance. The development of imagery abilities in all sense modalities should be considered along with the development of performance technique and musical learning as a vital part of musical training.

The experiences of these brass artists hold a number of implications for music education. Imagery strategies could certainly be beneficial at all levels of musical learning. If audiation is, as Gordon suggests, a core ability in music learning sequence, then all music students should work to develop their audiation skills. Music students should also be encouraged to expand their ability to audiate into the areas of tone production and interpretation. They should work on developing vividness and clarity in their imagery. They should utilize every opportunity to enlarge their personal storehouse of musical and listening experiences. These experiences are valuable resources which can be used in the refinement of their ability to audiate in complete detail. The development of imagery strategies is also important and should be incorporated in music instruction, where appropriate, by music educators and studio teachers. Students should be encouraged to use mental rehearsal techniques in practice and performance to enhance their playing and to help them prepare for difficult

passages. Like their counterparts in the major symphonies, music students should work to develop the mental side of musical performance. Musical artistry truly involves the use of imagination—through imagery—to guide the player in selecting the appropriate tool—either mental or physical—at the proper moment to give a convincing and artistic performance.

## References

- Agnew, M. (1922) The auditory imagery of great composers. *Psychological Monographs*, 31, 279-287.
- Bennett, S. (1976) The process of musical creation: Interviews with eight composers. *Journal of Research in Music Education*, 24(1), 3-13.
- Bush, I. R. (1962) *Artistic trumpet: Technique and study*. Hollywood, CA: Highland Music company.
- Cowell, H. (1926) The process of musical creation. *American Journal of Psychology*, 37, 233-236.
- Dale, D. A. (1965) *Trumpet technique*. London: Oxford University Press.
- Galton, F. (1880) Statistics of mental imagery. *Mind*, 19, 301-319.
- Gordon, E. E. (1977) *Learning sequence and patterns in music*. Revised edition. Chicago: GIA Publications.
- Gordon, E. E. (1989) *Learning sequences in music: Skill, content, and patterns*. Chicago: GIA Publications.
- Johnson, K. (1981) *The art of trumpet playing*. Ames, IA: Iowa State University Press.
- Khatena, J. (1984) *Imagery and creative imagination*. Buffalo, NY: Bearley Limited.
- Nass, M. L. (1984) The development of creative imagination in composers. *International Review of Psycho-Analysis*, 11, 481-491.
- Richardson, A. (1969) *Mental imagery*. New York: Springer Publishing Company.
- Richardson, A. (1983) "Imagery: Definitions and types." In A. A. Sheikh (ed.), *Imagery: Current theory, research, and application*. New York: John Wiley & Sons., Inc.
- Ristad, E. (1982) *A soprano on her head: Right-side-up reflections on life and other performances*. Moab, UT: Real People Press.
- Rosenberg, H. S. (1987) *Creative drama and imagination*. New York: Holt, Rinehart, and Winston.
- Sessions, R. (1970) *Questions about music*. Cambridge, MA: Harvard University Press.
- Severson, P. and M. McDunn. (1983) *Brass wind artistry*. Athens, OH: Accura Press.
- Sheikh, A. A. (Ed.) (1983) *Imagery: Current theory, research, and application*. New York: John Wiley, and Sons.
- Trusheim, W. H. (1987) Mental imagery and musical performance: An inquiry into imagery use by eminent orchestral brass players in the United States. (Doctoral dissertation, Rutgers, the State University of New Jersey). *Dissertation Abstracts International*. Pub. No. 88-08237.
- Walters, D. L. (1989) "Audiation: The term and the process." In Walters, D. L. and Taggart, C. C. (eds.) *Readings in music learning theory*. Chicago: GIA Publications.
- Weast, R. (1979) *Keys to natural performance in brass players*. New York: McGinniss & Marx Music Publishers.