Music and Expression

musicking in the instrumental lesson

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By expression we are referring not only to the actual sound of speech and music but also to facial expression and bodily gesture. Expression enhances comprehension, but may also serve as a more economic vehicle of communication. In addition, expression may make it possible to say the otherwise incommunicable, not only in speech but also in music.

Although expression in speech as well as in music can frequently be characterized as 'emotional', that does not necessarily imply that the purpose of that communication is to 'convey emotion'. Present findings strongly suggest that musical expression makes large use of the same emotion-specific patterns of acoustic cues as vocal expression. In both cases, there is a similar redundancy of cue which largely reflects the sound production mechanisms of the voice and musical instruments.

Research has tended to confirm the view that there is a connection between music structure and expression. Systematic patterns of expression result from transformations of the performer's internal representation of musical structure.

MUSIC AND EXPRESSION

In the psychology literature, the terms 'interpretation' and 'expression' are frequently defined as 'deviations from the score' (Gabrielsson 1987). Musicians would never state it that way. Simply because they don't have the feeling they're 'deviating' from anything. Research on music reading has demonstrated that good readers even play the notes correctly when they're printed wrong. There are mistakes in printed music by frequently played classical composers that have existed for a hundred years without being corrected, simply because musicians haven't noticed them (Sloboda 1976). Pianists' errors during sight-reading of pieces in which deliberate pitch alterations had been placed indicate tacit knowledge of likely melodic and harmonic relationships. Ask a musician to play completely without 'expression' and he will even be unable to do so. Attempts to play without expression significantly dampen patterns of timing and dynamics but do not remove them altogether (Bengtsson and Gabrielsson 1983; Palmer 1989; Seashore 1938).

The reason is, of course, because reading notation, not only in language but also in music, is a symbolic system representing an auditory phenomenon and not the other way around. The notes are not the music. In German, the music score is rightly called 'die Noten'. In English we mistakenly think we have put the 'music' on the stand. When we read music we no more deviate from the score than we deviate from a poem while declaiming it.

There are, of course, different ways of playing the notes, just as there are different ways of declaiming a poem or interpreting a role in a play. This was particularly well recognized in the eighteenth century when composers wrote *only* the notes and expected performers to supply not only the articulation and dynamics but even the ornamentation and, in the case of figured bass, the chords, and, where appropriate, improvised 'eingangen' and cadenzas.

So how do we know how to play the music? Or how do we know how to read a poem, for that matter? There being so many different ways to pronounce the language, and so many different ways of declaiming a poem, is there actually anything definite we can say about the way it should be done, the way the words should be read?

It is obvious that there is. Dictionaries tell us which syllable should be stressed. Phonetic symbols inform us as to the 'correct' pronunciation. We know how the 'king's English' is spoken and what a southern drawl sounds like. When Rene

Zellweger took the role of Bridget Jones, she learned to pronounce English with a diametrically opposed accent to the one she had learned in her native Texas. It was impossible to distinguish her accent from the British actors playing aside her. The same is true in music. Musicians learn to stress metric accents, phrase correctly, resolve accented passing tones, and play swing rhythms.

But, of course, there is more to it than that. An actor does not just pronounce the language correctly or speak fluently. He plays a role. And the language is just as much a part of that role as the facial expression and the gestures he employs. So there is freedom of expression in language as well as in music. Within bounds. The actor generally remains true to the written text. And, unless justified by his interpretation of the role, speaks the language as it should be spoken (Germans in World War II Hollywood movies are the noted exception, but that is a justifiable departure from the norm).

There seems to be a good deal more freedom of interpretation in theatre than in music. Composers in the nineteenth century began to employ tempo markings, articulation, and dynamic symbols extensively in an effort to specify the desired interpretation although publishers in the same era practically rewrote music history by revising articulation and dynamics in the works of their predecessors. These revisions have been corrected in the present day Urtext editions.

Nevertheless, modern-day recordings of classical music are illustrative of the relative freedom artists take although it has been considerably reduced since Ravel chastised Cortot with the famous remark, 'You should play the music as written.' In our time, Jazz composers have reverted to the eighteenth century practice of leaving it mostly to the performer.

So there is a fundamental distinction between the ability to speak a given language on the one hand, and the 'interpretation' of a given role in the theatre on the other. A 'native speaker' possesses the basis prerequisite to becoming an actor (Arnold Schwartzenegger can be seen as an exception to the rule), but must still learn to interpret a role. Likewise, the ability to read and play music accurately is a skill that an individual could acquire without actually learning how to 'interpret' a classical work of art. Unfortunately, in the world of music, this fine distinction is hardly ever made.

On the other hand, 'expressivity' is a characteristic not only of the performing actor, but also of the native speaker. And in music, 'expressivity' is a characteristic not only of concert performance, but also of the mother's lullaby

and the lover's serenade. So what is the function of 'expression' in language and music?

Language is a form of communication. As such, its goal is comprehension. Fluency in a language is characterized by coherent grammar, adequate vocabulary, and correct pronunciation and articulation as well the use of appropriate stress, synchronization of breathing with phrase endings, etc. As such, fluency lies at the basis of comprehension. Notwithstanding, verbal and facial expression and body gesture are able to increase comprehension considerably, not only by adding to the effect of structural elements of the language, but also by substituting as a more economic vehicle of communication.

A parent supplying adequate vocal, facial and bodily gesture to the following verbal communication:

'Clean your room up immediately.'

will undoubtedly achieve a result that can hardly be rivaled by a paragraph of prose defining the obvious advantages of complying with the request and the unquestionable disadvantages of noncompliance.

As extensive as the vocabulary of a language may be, and as complex its syntax and idiom, the existence of poetry points to the fact that the content of human expression is frequently inadequately communicable by those means. In his essay on medieval law, Barfield (1966) points to the use of metaphors in judicial language, enabling legislators to establish fine distinctions that 'normal' language would be unable to make. He contends that the use of metaphor in poetry is based on this necessity. It is arguable that the use of vocal and facial expression and body gesture in declamation and drama do the same.

Written prose and written literature in general, compared to oral tradition an historically rather recent phenomenon, demand from the imagination of the reader the ability to supply content the author is unable to communicate by means of vocal and facial expression and body gesture. The popularity of films based on books illustrates that fact. Although film, by necessity, is forced to leave out large quantities of factual information necessary to comprehension, the content supplied by vocal and facial expression and body gesture is perceived by the viewer as a more than adequate compensation.

We may therefore contend that, although vocal and facial expression and body gesture are able to enhance comprehension in language and make more economical communication possible, they may also possesses the capacity of communicating otherwise incommunicable content to the listener.

In music, as well as in language, comprehension can be enhanced by 'expression'. Nevertheless, expression may also substitute as a more economic vehicle of communication or as a vehicle for the expression of content music structure may even be unable to communicate. What that content may be has always been a subject of debate in music. Let us at least point to a fine distinction. Many authors have contended that music conveys emotions (Seashore 1938). In the previous paragraphs we have contended that expressivity is able to communicate content music structure does not or cannot communicate. We have not stated that that content *was* by definition a given emotion.

In our example of the use of verbal and facial expressivity and body gesture in speech, the parent communicated the fact that there might be possible sanctions related to the omission or postponement of the desired behavior. While exaggerated (emotional) expressivity was the vehicle for this communication, the content of the communication can be described as propositional. Although the parent was emotional and expressive, he or she was not simply 'conveying an emotion'.

That does not imply that the content of communication *cannot* be a particular emotion. And in music it can, of course, be the purpose of a performer to convey a given emotion (Juslin 2000). In the eighteenth century music was seen as a vehicle for the communication of emotions (Mattheson 1739; C.Ph.E Bach 1753) In the baroque, harpsichordists were want to face the audience for the very purpose of allowing their facial expression to assist the communication of the emotions they were attempting to convey. The view that music conveys emotions is still prevalent among performers and music students in our time (Lindström et al 2003). Seashore (1938) noted that 'deviation from the exact…. is the medium for the creation of the beautiful – *for the conveying of emotion*'. In fact, it can be the purpose of the composer himself to convey that emotion.

It is also quite possible that music structure itself might be unable to plumb the depths of emotion the composer wants to communicate and that vocal expressivity, or even bodily gesture, might be necessary to do so, or at least more economical. Opera is a case in point. The fact that modern composers may not wish to convey emotions in their music however, does not necessarily mean

that other composers in history did not wish to do so or even that music is unable to convey emotional content. However, the mere fact that 'expressivity' is employed by performers does not point to an exclusively emotional content.

Nevertheless, individuals seem to react to performances as if they were expressions of emotions (Witvliet and Vrana 1996). And it has been demonstrated that professional performers are able to communicate basic emotions to listeners with an accuracy approximately as high as in facial and vocal expression of emotions (Juslin & Laukka. 2003).

MACHINE ART

With the advent of Artificial Intelligence, the possibility of talking computers emerged. Computers could be programmed not only to pronounce a given language correctly, but also to master the grammar and learn to make statements, understand native speakers, and formulate answers to questions. And farther afield, the distant possibility of computers which (who) could create literature and write poetry. A number of these goals has already been realized.

In this same virtual world, the computer could not only be programmed to perform music from the scores of the great composers, but also to improvise or even compose. These developments would of course depend on the necessity of developing 'rules' of performance and composition which the computer could follow as Artificial Intelligence is not yet advanced enough to allow the computer to develop these rules itself.

In 1983, Lerdahl & Jackendoff's 'Generative theory of Tonal Music' (1983) was the first major attempt to formulate such rules. Curiously their research was financed by a grant which had been meant to allow them time to compose music. The fact that they felt justified to apply the grant to this research may serve as a demonstration of the ultimate goal of this type of AI research, the 'production' (composition) of music by machines.

The immediate goal of their research was a 'formal description of the 'musical intuitions' of the listener who is experienced in a musical idiom.' Their theory is an application of linguistic (Chomsky-ian) theory to music. They do not contend that music is a 'language' as has been done in the past. They employ linguistic theory simply as an heuristic method. They make therefore no attempt to define

'words' or 'meanings' in music or find other dubious parallels between both disciplines.

Since the Generative Theory was published, other researchers have emulated their approach, for example Clynes (1987) and Sundberg et al. (1991). Mazzola and Beran (1998) attempted to define the transformation of a score to music in effective mathematical terms. Friberg et al (2000) went even farther and developed a program (Director Musices) that actually produced a performance of a score, based on the rules they had formulated.

Logically, the majority of research was oriented towards analysis of actual music performance in an effort to establish the exact relationship between music structure and expression in performance (Gabrielsson 2003). Many findings have established a causal relationship between musical structure and patterns of performance expression (Clarke 1988; Palmer 1989; Sloboda 1983).

Nevertheless, research indicates that performance cannot be solely explained by analysis of music structure. Evidence that performers can imitate expressive timing patterns that have an arbitrary relationship to the musical structure suggests that performance expression is not generated solely from structural relationships (Clarke 1993).

In his GERMS theory of music performance, Juslin has attempted to define other constraints on performance (Juslin 2003), arguing that no one factor is responsible but that various determinants contribute in varying ways. In his theory, the G-component stands for the generative, structurally determined facet of performance, the E-component for emotion, the R for random, the M for motion and the S for local deviations from performance convention. Juslin calls it S for stylistic unexpectedness. We might want to dub it the S for 'surprise', or more accurately the S for 'Spiel'.

Juslin motivates his theory by stating that the primary goal of a psychological approach to music performance should be to explain the nature of performance expression in order to provide a solid foundation for the teaching of expressive skills in music education (Juslin 2003). Juslin's goal seems to be at odds with the goal of Artificial Intelligence which would be to enable mankind to program machines to perform (expressively) or even to compose music. Nevertheless, it would seem that, although their goals are different, both approaches are running along similar paths.

Juslin's model may be a good step in the right direction when applied to the problem of programming computers to perform from written scores. However, the challenges of music pedagogy are slightly different from those of Artificial Intelligence. While it may be necessary, for example, for computer programmers to deal with the problem of randomicity as a determinant of expressivity, in human music performance it will appear automatically. We will therefore want to consider which determinants of music expressivity are relevant to music education and, in particular, which are most susceptible to the influence of teaching.

TEACHING EXPRESSIVE SKILLS: A MODEL

Vocal cues

The existence of acoustic similarities between vocal expression of emotions and musical expression could help explain why listeners perceive music as expressive of emotion (Kivy 1980). Vocal as well as facial expression is innate, as demonstrated by the fact that both remain more or less intact among children born deaf and blind (Eibl-Eibesfeldt 1973). Vocal expression is closely related to involuntary and emotion-specific physiological changes associated with emotions which produce its specific acoustic features (Johnstone and Scherer 2000). Smiling tends to raise formant frequencies, whereas frowning tends to lower them (Tartter & Braun 1994).

Present findings strongly suggest that musical expression makes large use of the same emotion-specific patterns of acoustic cues as vocal expression (Juslin and Laukka 2003; Tartter and Braun 1994). In both cases, there is a similar redundancy of cue which largely reflects the sound production mechanisms of the voice and musical instruments: for example, just as in speech, a harder string attack produces a tone that is both louder and sharper in timbre (Wolfe 2002).

Findings indicate that, in music as well as speech, rate (tempo), intensity (dynamics), quality (tone), and vocal formant (pitch) are among the most powerful cues in terms of their effect on listeners' ratings of emotional expression (Juslin and Madison 1999; Lieberman and Michaels 1962; Scherer and Oshinsky 1977). Pitch is for musicians, of course, not only an aspect of performance expression (intonation) but also of compositional structure. The strong

relationship between vocal and musical expression suggest that the development of music expressivity should be in part based on the innate ability of the individual to express him- or herself vocally.

It is well known that individual performances vary considerably. In addition, the same piece can be performed on different instruments, for example on a piano instead of on a harpsichord, or in an arrangement for symphony orchestra. One question that needs to be answered is how the communicative process can be successful if there are such large individual differences in cue utilization? Juslin (Juslin 2000; Juslin & Laukka 2000) suggests that the communicative process can be described in terms of a modified version of Brunsvik's 1956 lens model.

Listeners shift from one cue that is unavailable to another that is available (Juslin & Laukka 2003). Listeners therefore do not experience the inability of a harpsichordist to employ dynamic (volume) cues as unmusical while they might tend to demand dynamic variety from the pianist playing the same piece. Multiple cues that are partly redundant yield a robust communicative system that is forgiving of deviations from optimal code usage (Juslin 2000).

One potential application of the lens model in music education is to provide cognitive feedback. Results have shown that CFB yielded a 50% increase in communication accuracy after only a single feedback session (Juslin & Laukka 2000). A large number of studies have suggested that expressive aspects of music performance are neglected in music education (Persson et al. 1996; Tait 1992). Given that expressive musical performance is the long-term goal of all instrumental work, it seems surprising that the technical focus of standard practice behavior has not previously been questioned (Davidson et al. 2001).

Syntax

Research into music performance has tended to confirm the view that there is a connection between music structure and expression. There appear to be strong commonalities across performances that reflected cognitive functions of grouping, unit identification, thematic abstraction, elaboration, and hierarchical nesting (Palmer 1997). One function of interpretation seems to be to highlight particular structural content (Clarke 1987).). Tones that are temporally offset tend to be perceived as belonging to separate streams (Bregman & Pinker 1978). It has been found that pianists tend to offset melody tones in chords by as much as 50 ms (Palmer 1996a, 1996b). Voices can be distinguished by their intensity or

timing (Vernon 1936). Events at the most salient levels (tactus, phrase) are commonly emphasized in performance (Repp 1992b; Todd 1985).

Probably the most widespread structural characteristic of Western music is its hierarchical nature (Clarke 1998; Lerdahl & Jackendoff 1983; Schenker 1969). Performers' improvised continuations reflect influences of both the contents of the musical fragments and the abstract tonal and metrical hierarchies typical of Western music (Krumhansl& Kessler 1982; Lerdahl & Jackendoff 1983). According to Clarke, (1993, 1995) systematic patterns of expression result from transformations of the performer's internal representation of musical structure. Expression is concerned with the deliberate manipulation of timing, dynamics, and intonation for intentional effects that are usually related to the musical structure (Davidson, Howe, & Sloboda 1997 in North & Hargreaves). Expressive timing cannot possibly be understood as a learned pattern that is applied to a piece each time it is played, but must be generated from the performer's understanding of the musical structure (Clarke in Deutsch 1999). The implication of reproducibility and consistency in expressive performance (Clarke in Sloboda 1988; Todd 1985; Shaffer 1984) is that expression can be taught (Davidson et al. 2001). Nevertheless, mapping between particular musical structures and performance expression appears not to be consistent across contexts (Drake & Palmer 1993).

The relationship between 'interpretation' and perception has also been researched. It was demonstrated that interpretative aspects of performance influenced listeners' perception of the musical structure (Bengtsson and Gabrielsson 1983; Penel & Drake 1998; Palmer 1989; Sloboda 1983). Musical and linguistic sequences that were well-formed in their serial order were often not understandable unless additional constraints held on the relative timing of the individual sequence elements (Palmer 1997). Listeners, for example, most often choose the intended meter primarily on the basis of articulation cues (Sloboda 1985a). So it not surprising that 'interpretation' tends to strengthen phrase boundaries relative to other locations (Palmer 1992). Listeners also distinguish voices by their intensity or timing (Vernon 1936): tones that are temporally offset tend to be perceived as belonging to separate streams (Bregman and Pinker 1978).

In addition, perceptual sensitivity to temporal and intensity changes seems to be modulated by structural aspects of musical sequences; performance expression

may serve to compensate for those modulations (Kurakata et al. 1993). Performance expression can communicate particular interpretations and resolve structural ambiguities, but may also function to compensate for perceptual constraints of the auditory system. Musicians play some events louder or longer simply because they are heard as softer or shorter otherwise (Drake 1993). Findings suggest that the structure given in a music composition has inherent relational properties that constrain both perception and performance, rather than perception simply constraining performance or vice versa (Repp 1995a; see also Jones 1987).

The hierarchical nature of music is shared not only with language, but also with movement coordination itself. The ability to structure the complex sequences of movements necessary for the manipulation of tools is dependent on the ability to 'nest' subroutines within higher 'programs'. Indeed, it would seem that the evolution of both music and language must have built on already existing neural structures serving action coordination: aiming an arrow is apparently very similar to making a point. We may assume that the hierarchical organization of music performance is subserved by similar neural machinery.

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