

Metaphorical cognitive feedback: Rethinking musical emotion communication enhancement

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The present study aims to manage an alternative perspective on the importance of metaphorical thinking as a developing tool for musical purposes. As Barten (1998) and Woody (2002) have concluded, we also find a great lack of knowledge on this matter, and hopefully, our work will help to formulate a turning point on the undervalued way that this secular form of communication is usually treated.

We believe that an objective empirical approach is needed in order to understand cognitive and emotional backgrounds of metaphorical decoding. In the present work, an outlook of our exploratory study and preliminary observations will be given, leading to the Metaphorical Embodied Cognitive and Emotional Feedback debate as a scientific structured paradigm for formal and informal music learning.

Theoretical Background

Music and language are two dimensions of human behaviour built-up on perceptive, cognitive and emotional mechanisms. According to Falk (2000), in human brain anatomical and functional observations, made by means of Positron Emission Tomography (PET) and Functional Magnetic Resonance Imaging (fMRI), primary neuroanatomical substructures seem to be shared by musical and linguistic activities. Pointing to the prospect of having the same origins and evolutionary development, this idea is firmly reinforced when combined with recent studies results on animal protolinguistic behaviour (vd. Wallin, Merker & Brown, 2000).

Similarities on the genetic nature of those two activities can be seen in several perspectives of the learning process. Chomsky, in his theory of language, based on the assumption that people have an inborn universal grammar (vd. Costa & Santos, 2003; Pinker, 1994; Pinker, 2007) is quite analogous to Gordon's (2000) idea of Musical Aptitude, which proposes an inherent potential to learn music. For both authors we all have this innate predisposition to acquire competences.

As purposed by Lerdahl & Jakendoff (vd. Lerdahl & Jakendoff, 1983; Sloboda, 2005) the study of generative and combinatory processes of tonal music can be done by applying equivalent procedures to those used in grammatical analysis. In other words, besides difficulties in giving objective significance to music, it is possible to approach both music and language in an identical way and infer structural and hierarchical characteristics that make discourse coherence.

On the other hand, due to the holistic nature of metaphorical language, it appears to have some ambiguous parallels with music expression. Metaphors seem to appeal for our individual, idiosyncratic, imaginative sense, and music calls for personal appreciation of subjective emotional states. Nevertheless, as we will see further, not only music is capable of communicate specific emotions, but metaphors can have quite a precise cognitive imprinting as well.

Historical registers widely illustrate that a very common way of explaining one thing is in terms of another. For example, ancient classical texts report philosophical and highly structured thinking, making widespread use of metaphors as a linguistic tool to express ideas. Metaphorical thinking is a universal pathway to conceptualize our living environment and used in most situations to explain both simple and objective matters or complex and subjective issues, such as those we easily find in music.

Kövecses (2002) says that a conceptual metaphor takes place when concrete aspects from a *source* domain convey significance to a *target* domain. Taking as an example in the expression: "*River of sounds*", "*sounds*" would be the ambiguous *target domain*, taking advantage from physical (ex. velocity, kinetic power, density) and psychological (ex. the feeling of freshness of a river passing by) features of the "*River*" *source domain*. This way the intangible musical *corpus* will be fulfilled of meaning by a sensorial-cognitive triangulation, becoming more understandable.

Lakoff & Johnson (1980) have supported that metaphors remain in language as a reflex of human thinking and not only as mere verbal speech adornment. Structured thinking is based on interaction with the physical world, through activity and basic feelings. For these authors metaphors were essential for the evolutionary process allowing development from a physical state of awareness to a more abstract and conceptualized appraisal, in order to understand better our environment and plan strategies of action. In addition, Petrie & Oshlag (1993) assume that metaphorical language enables the passage from one conceptual structure to another in a more memorable way, representing a very critical, affective and solid teaching approach.

Various authors assert that music teachers make systematic use of metaphors with diverse objectives in mind: getting students' attention, find best ways to explain either simple objects or intangible concepts, underline a good relationship for better work, emphasize expressive contours of musical interpretation, etc. (vd. Casey, 1991; Barten, 1992; Barten, 1998; Woody, 2002; Laukka, 2004). Metaphorical language has the feature of calling for states of almost informal interaction, predisposing students to learn and teachers' ideas to be reinforced and understood.

According to Barten (1998), music teachers tend to use all means to engage students' attention and most of the time, when a teacher intends to develop expressive aspects of a student' performance, uses non-verbal, gesture and singing elements, complemented with peculiar metaphorical expressions. For Barten, music teachers find figurative language a very effective way to work due to its integrating qualities and references to motor-affective properties of music, making it easily understandable.

Opposing to this idea, Juslin & Persson (2002) alleged that metaphorical language relies too much on personal living experiences to be used for music emotional communication purposes, and therefore not usable in ideal controlled music class environment.

Although recent studies by Juslin & Laukka (2000) e Juslin, Friberg, Schoonderwaldt, & Karlsson (2004) on the enhancement of musical emotional communication through cognitive feedback are based on the use of technical instructions, an inquiry made by Lindström, Juslin, Bresin & Williamon (2003) revealed that students prefer to work musical expression by means of metaphorical instructions,

with personal contact with teachers, instead of technical directives or software based feedback.

Method

Kendall & Carterette (1990) found that musicians and non-musicians are able to distinguish precise emotions from musical performances. According to Juslin & Laukka (2000) this happens because musicians and listeners share the same acoustical code, an individual sound identity with exclusive characteristics for each basic emotion. Musicians and listeners equally recognize this set of cues without needing for musical expertise or special awareness of acoustical properties to communicate or identify musical expressed feelings.

After several studies on emotion acoustical code discrimination, Juslin & Laukka (2000) have developed a cognitive feedback based system for musicians, combining acoustical analysis and listeners opinions, and according to authors, this may improve emotional communication in 50%, after only one session. Based on that, Juslin *et al* (2004) developed specific user-friendly software to convey this type of cognitive feedback in real time.

Inspired on these findings an exploratory experiment was designed in order to find objective use of metaphorical language to improve music emotional communication. Two groups of violin students (n=16; ages between 15 and 18) were in test; n=8 instructed by a set of metaphorical expressions and the other n=8 instructed with technical terminology. Each student attained for a single 30 minutes individual session where, for ecological reasons, class conditions were simulated. All students were instructed to play a given simple melody in order to communicate *Happiness* emotion. Cognitive feedback procedure was mediated by the researcher, giving instructions and helping students on the analytical listening of their own recordings, as well in the evaluation of graphical data from the editing software.

Then a set of 126 judges listened and evaluated pre-test and post-test recordings in order to assess detection of the intended emotion.

Analysis of acoustical parameters - Mean tempo, Frequency spectrum, Mean sound level, Mean articulation, Articulation variability and Timing deviations - showed that post-test performances of both groups were significantly better than the previous ones, given that students were able to change performance standards according to instructions. This indicates that not only metaphorical language is able to change general sound settings, but also seems that each metaphor can manage a single acoustic parameter in a certain way. In addition to this, judges' questionnaires revealed that, besides a better performance of technical instructed students, students working with metaphorical expressions made significant improvement on the communication of the intended emotion.

This pilot study showed that not only metaphors may induce the change of particular aspects of students' performance, but they can also improve the capability to communicate specific emotions. These promissory findings and the identification of some limitations of the study, lead us further to a complementary study that is now in course.

The earlier design is going to be replicated, making the necessary adaptations to include 3 groups in test: one working with technical instructions; the second working with metaphorical instructions; and a third one with no instruction, serving as a control group.

This time 24 choir singers' participants, with ages between 7 and 10, will be instructed to communicate another basic emotion: *Sadness*. As in previous study, pre

and post-test recordings will be made, and evaluated by a set of judges by means of an enquiry. Besides some recording technical improvements, data will be collected and analyzed in an identical way to the pilot study.

Furthermore, choir rehearsals observation and data collection of teachers' use of metaphors and children reactions are being done. This will be essential for the setup of metaphorical expressions to be used in the experiment, regarding natural aspects of class context.

Conclusions

Based on functional brain observations, Rachmandran & Hubbard (2001) found that Angular Gyrus has an important role in decoding metaphors, as well as it is responsible for synaesthetic behaviour. In other words, not only brain has specific components to deal with this linguist feature, it is close related to transmodal use of sensorial system.

In addition to what has been said, informal discussion with music teachers of all quadrants exposed an intrinsic enthusiasm about the use of metaphorical language in pedagogical context. Metaphors, some how, fulfil a public domain of dealing with music matters. The question is how we can know more about this multimodal-stimulating interface.

We believe that the embodied and almost intuitive use of metaphors by music teachers is not due to a lack of theoretical and technical knowledge. On the opposite, they have the empirical know-how that makes them sure it works in certain conditions.

Our former study brought new data on the use of metaphors in musical education. Besides a certain common feeling that metaphors are just a holistic attribute of language, is now open the possibility that it may serve objective and generative purposes in music. The main reason to reinforce our conclusions with new studies is that we are dealing with a very abstract object that needs to be approached with circumspect scientific diligence in order to obtain eligible results.

As we found that metaphors are valid to improve individual aspects of musical expression, it would be important to assess more quantitative and qualitative data in other fields of musical behaviour. That would lead the way to develop what we aim to call Metaphorical Embodied Cognitive and Emotional Feedback, a teaching tool based on objective knowing of metaphorical contours in musical context. This way, a consistent theoretical basis on the use of imagery and figurative stimulation could provide cognitive and emotional exploration, in order to make music learning as much exciting and effective as possible.

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