

Cognitive feedback and metaphors in emotional communication instruction of musical performance

Nuno Arrais and Helena Rodrigues

Centre for the Study of Sociology and Musical Aesthetics,
New University of Lisbon, Portugal

The use of metaphorical language is a common strategy in music teaching. Nevertheless, there is a lack of scientific knowledge about this subject. Inspired by earlier studies on cognitive feedback, emotion, and performance, an experiment was designed in order to test the metaphorical impact in the improvement of musical emotional communication. Two kinds of language were set: (1) technical, used in cognitive feedback studies, and (2) metaphorical. These were separately applied to two groups of violin students through a cognitive feedback process in order to make them communicate a specific emotion. Their performances were recorded and submitted to acoustical analysis as well as being evaluated by a set of judges. Results indicated that after only one session both languages improved students' performance and their emotional communication skills. Demonstrating that metaphors are efficient tools to learn musical expressivity, this study contributes to the research of metaphorical language use in a musical context and also to the knowledge about traditional teaching processes to enhance emotional communication.

Keywords: performance; metaphors; emotion; cognitive feedback; musical pedagogy

The use of metaphors for music-teaching purposes is well known by music educators, who have employed them for many years. As we may see in Barten (1992, 1998) and Woody (2002), music teachers apply them to evoke images and feelings that promote technical and expressive enhancement.

Barten (1998) says that this enigmatic way of communicating musical concepts seems to have a main role in supporting motor-affective aspects,

actions, and tendencies, and gives the impression of being especially prepared to communicate aesthetic experiences. The problem with this kind of language is that ambiguity and complexity appears to hinder the comprehensiveness and the study of the phenomenon.

On the other hand, Kövecses (2002) defends that, in a cognitive linguistics point of view, metaphors are able to fulfill with significance something that is uncertain or difficult to understand.

Casey (1991) asserts that there are several expressions that instrumental teachers' use that are metaphorical expressions. The multidimensional potential of this sort of language is obvious, since educators apply it in different contexts.

According to Juslin and Laukka (2000), Juslin (2001), and Juslin *et al.* (2004), metaphors usually are closely connected to the enhancement of emotional communication. According to these researchers, teachers use them as expressive cues to improve students' communication of emotions. Juslin and Laukka (2000) argue that cognitive feedback that uses technical expressions is a much more effective way to increase emotion communication.

However, it is our belief that metaphorical language can be used in an objective way and can be as efficient as technical terminology in the communication of emotions. The aim of this study is to find out if metaphors can improve emotional communication when used through cognitive feedback. The objective is to provide experimental evidence that cognitive feedback based on metaphors can impact students' performances in a very precise way, making them communicate a specific emotion.

METHOD

Participants

For this study, 16 violin students (eight female and eight male, aged 15 to 18 years old) who had been studying for at least five years in a specialized music school in the north of Portugal played the role of performers. The role of judges was played by 126 students (86 female and 40 male, aged 12 to 35 years old) who had been studying in specialized and regular schools.

Materials

Figure 1 presents the melody used in the musical instruction session. Recordings of the students' performances were made using Sound Forge 5.0 software with a high quality Sony-ECM-MS907 microphone, placed 1.5 m

RESULTS

Acoustic analysis evaluated mean tempo, mean sound level, frequency spectrum, mean articulation, articulation variability, and timing deviations. According to earlier studies on performance emotional communication (see Juslin 1997, Juslin and Laukka 2000), these are relevant indicators to understand the musical code in usage. *T*-tests were performed to find differences in the acoustical parameters between pre- and post-test within each group. As shown in Table 1, there is an increase of mean tempo, frequency spectrum, mean sound level, and a decrease of articulation variability, mean articulation, and timing deviations. With the exception of articulation variability, they confirmed the direction of expected indicators. Differences between the two groups were determined using *t*-tests. There were no significant differences with the exception of mean sound level post-test ($p=0.02$).

Judges' evaluations were submitted to Pareto's analyses. Table 2 reports the proportion of emotions that were detected by judges on pre- and post-test recordings. Differences between both groups were statistically significant, except for the case of sadness post-test. Results showed that happiness was better detected. According to these data, technical language was more efficient for the detection of this emotion. Nevertheless, this difference was already present on pre-test recordings. McNemar tests were carried out in order to verify if there were differences between pre- and post-test on happiness. Significant differences were found for the group that was submitted to technical language, $X^2(1)=152.98$, $p<0.05$, and for the group that was submitted to metaphorical language, $X^2(1)=222.88$, $p<0.05$.

Table 1. *T* values (df=7) for differences between pre- and post-test in both groups.

	<i>Technical language group</i>		<i>Metaphorical language group</i>	
	<i>t</i> (7)	<i>p</i> value	<i>t</i> (7)	<i>p</i> value
Mean tempo	-8.03	0.000	-5.17	0.001
Frequency spectrum	-4.59	0.003	-3.03	0.019
Mean sound level	-4.70	0.002	-4.35	0.003
Mean articulation	3.72	0.007	5.77	0.001
Articulation variability	1.92	0.096	2.84	0.025
Timing deviations	1.46	0.189	6.00	0.001

Table 2. Proportion of detected emotions in pre- and post-test on both groups.

<i>Emotion</i>	<i>Technical language</i>	<i>Metaphorical language</i>
<i>Pre-test</i>		
Happiness	11.89%	6.44%
Tenderness	17.80%	22.31%
Sadness	15.78%	18.87%
Anger	4.10%	2.36%
<i>Post-test</i>		
Happiness	28.27%	24.73%
Tenderness	7.59%	5.80%
Sadness	3.02%	3.57%
Anger	11.55%	15.93%

DISCUSSION

Acoustical analysis and judges' evaluations demonstrated that the communication of happiness through musical performance may be improved in a single lesson. This improvement can be obtained through the use of either technical or metaphorical language in musical instruction based on ecological cognitive feedback.

As much as technical language, metaphorical language seems to have the capacity to make students aware of the acoustic code needed to modify their performances in a certain way. Since there were similar improvements in musical performance with both groups, we infer that metaphors provide analogous cognitive effects to technical language. Hence, improvement of emotional communication would be one of the roles of musical teaching.

A limitation of this study is the age of the performers, since metaphorical language may assume different impacts depending on the subjects' maturity. Future research must develop experiments that study the influence of metaphors on teaching according to a participants' age. Further studies should increase the number of instruction sessions and also consider other emotions and other musical instruments. Also, this study does not clarify what would happen if the students were asked to demonstrate happiness in their performance and then let them practice for 30 mins without instruction.

Certainly, brain monitoring could be a powerful tool in order to verify the cerebral network that is activated when a metaphorical instruction is given.

This study indicates that metaphorical language can be efficiently used when teaching communication of an emotion. We believe this is just a part of their potential. One possible reason why metaphors have been used in music

education for so long with success is because they relate to something that is much less clear than a specific emotion. The subjectivity of a metaphor can activate a palette of emotions, and that can be richer than the basic ones.

Acknowledgments

Thanks are due to Christopher M. Johnson from the University of Kansas (USA), Ana Braga and Lino Costa from the University of Minho (Portugal), and José Alexandre Reis from ARTAVE (Professional Artistic Music School of Ave Valley, Portugal).

Address for correspondence

Nuno Arrais, Faculty of Social Sciences and Humanities, Centre for the Study of Sociology and Musical Aesthetics, New University of Lisbon, Avenida de Berna 26 C, Lisboa 1069-061, Portugal; *Email*: narraais@gmail.com

References

- Barten S. S. (1992). The language of musical instruction. *Journal of Aesthetic Education*, 26, pp. 53-61.
- Barten S. S. (1998). Speaking of music: The use of motor-affective metaphors in music instruction. *Journal of Aesthetic Education*, 32, pp.69-97.
- Casey J. L. (1991). *Teaching Techniques and Insights for Instrumental Music Educators*. Chicago: GIA Publications.
- Juslin P. N. (1997). Perceived emotional expression in synthesized performance of a short melody: Capturing the listener's judgment policy. *Musicae Scientiae*, 1, pp. 225-256.
- Juslin P. N. (2001). Communicating emotion in music performance: A review and theoretical framework. In P. N. Juslin and J. A. Sloboda (eds.), *Music and Emotion: Theory and Research* (pp.310-337). Oxford: Oxford University Press.
- Juslin P. N., Friberg A., Schoonderwaldt E., and Karlsson J. (2004). Feedback learning of musical expressivity , In A. Williamon (ed.), *Musical Excellence* (pp. 247-270). Oxford: Oxford University Press.
- Juslin P. N. and Laukka P. (2000). Improving emotional communication in music performance through cognitive feedback. *Musicae Scientiae*, 4, pp. 151-183.
- Kövecses Z. (2002). *Metaphor: A Practical Introduction*. Oxford: Oxford University Press.
- Woody R. H. (2002). Emotion imagery and metaphor in the acquisition of musical performance skill. *Music Education Research*, 4, pp. 213-224.