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## LISTENING TO MUSIC WITH PARTICIPATION: EFFECTS ON MUSICAL MEMORY AND UNDERSTANDING

### **Abstract**

This paper approaches some pedagogical strategies to guide children on listening to music, namely (a) the activities of playing rhythms and (b) the activities of miming stories along with recorded music, which might function as possible ways of preparing children's minds to attend musical concerts. It has been argued that the acts of listening, performing and composing can nourish each other when working in articulation. The present paper combines the notions of articulation and simultaneity, by arguing that listening to music can be enhanced by simultaneous performance. It discusses some theories that describe musical thinking and understanding as complex operations dealing with different types of information, perceived through different modes (aural, visual, kinaesthetic, etc.). Listening to music with simultaneous multimodal activities gives origin to mental activations whose complexity can have benefits on mental processing. Some empirical studies show that children exposed to the multimodal experiences of miming stories and playing rhythms while listening to music demonstrate stronger musical memory and higher levels of understanding of the musical pieces than they would do if they would listen in more passive ways. In terms of memory, children tend to preserve stronger and more detailed mental images that allow them to be more successful in future identification of fragments from the musical pieces. Children also categorise different sections of the music, refer to their expected or surprising sequential interaction and show awareness of the whole musical form by comparing sections and identifying recurrence, transformation and contrast. There is also some evidence that children tend to judge more positively the musical pieces they listen to, when they mime or play along. The results might inspire teachers and musical performers in adopting preparatory listening schemes to be developed with children before attending musical concerts.

*Keywords:* listening with participation; listening and multimodality; musical memory; musical understanding; music education.

## 1. Introduction

The title of the present paper – Listening to music with participation: Effects on musical memory and understanding – refers to the acts of (1) listening and playing percussion instruments and of (2) listening and miming stories, as well as to (3) the mental imagery that is activated during those listening activities. What is suggested is that the physical activity of playing rhythms and of doing gestures, associated with the multi-modal information given by the stories and the musical instruments themselves, installs complex patterns of activity in the brain that tend to be preserved and reactivated in future, supporting mental processing in positive ways.

Some studies conducted by the present author have shown that children who play rhythms on small percussion instruments along with recorded music tend to recognize and to identify musical fragments in future with more success than children who listen in more passive and quiet ways (Godinho, 2000, 2003). These results not only give evidence about the potential of congruent multimodal material in mental processing, but also illustrate some theories of embodied knowledge, which refer to “knowledge in the hands, which is forthcoming only when bodily effort is made, and cannot be formulated in detachment from that effort” (Merleau-Ponty, 1962, p. 144). The results also echo Hallam’s discussion on musical memory by professional musicians (Hallam, 1997). According to their statements, much of their musical memory is “in the arms and hands”; music flows when playing the instruments, whereas it might be difficult to remember it in other contexts. In similar ways, children seem to remember and to identify musical fragments with the help of mental traces of physical movement.

It is like a pattern really. I do not know how they (the fingers) do it . . . they just sort of know where to go. If I think really hard about where they are meant to go they cannot do it. If I just let them go, they tend to work better as well. (Hallam, 1997, p. 94)

Because the physical movement of playing percussion instruments affected positively the detailed musical memory, both in terms of its conservation power (children recognized the musical piece in future) and of mental organization (children identified and allocated isolated fragments in the musical whole), other studies were conducted with a positive expectation that the movement of miming stories along with recorded music would have similar effects in children’s mind. The results also suggest that the

complex context of miming a story, which includes the sound, the space and the equipment, the individual actions, the social interactions, and so forth, has positive effects on the strength and detail of children's mental representation of music and memory (Godinho, 2015 and 2016).

The following sections will describe with more detail some strategies of playing rhythms and miming stories along with recorded music, as well as some of the effects that they tend to have on children's mental processing and "mental representation", taken "either as a synonym of mental image or as a synonym of neural pattern" (Damásio, 1999, p. 320).

## 2. Playing rhythms along with recorded music

Any strategy dealing with activities being performed simultaneously with recorded music needs careful conception and design, in order to reinforce the expressive and structural features of the musical pieces. The rhythmic accompaniment created for the 3<sup>rd</sup> movement (*Gavotta*) from Prokofiev's *Symphony 1 in D major (op. 25)* might illustrate this concern, in terms of the chosen rhythms, instrumental timbre and pitch, dynamics and instrument distribution.

The symphony was written for a classical orchestra with strings, 2 flutes, 2 oboes, 2 clarinets, 2 bassoons, 2 French horns, 2 trumpets and timpani. The third movement – *Gavotta* – presents two contrasting melodies, structured in ABA form. In the first A, the strings have the main role, and the second and third melodic fragments are repeated. In the first half of part B, the woodwinds become more relevant, giving space to the strings in the second half. The woodwinds do the second presentation of part A, but they do it in a very softer way, in contrast with the strength of the first A. By the end of the piece, the strings play again the melodic line, but they maintain the soft character and they do a *decrescendo* until the final *pianissimo*. A schematic score of *Gavotta* is presented in Figure 1.



Figure 1. Schematic score of Prokofiev's *Gavotta*

The rhythmic score created to accompany the music used only two rhythmic motifs (Figure 2): the first motif is repeated throughout the whole music, except for the end of parts A, where the second motif is played.



Figure 2. Rhythmic motifs for Prokofiev's *Gavotta*

The simplicity of the rhythm to be performed by children allows it to be learned without any written support. For analytical reasons, though, the whole rhythmic score is presented in Figure 3. The instrumental symbols are placed above the rhythmic line, according to their sequence in the performance. The cheerfulness of part A is enhanced by the timbres of the drums and tambourines; the short and precise sound of the claves was chosen to support the conclusive rhythmic motif at the end of parts A. The low pitch of the timpani helps to cool down the character of the first half of part B, whereas the brilliancy of the triangle enhances the higher pitched second half. The *trillos* in part B are graciously supported by a small bell that shakes in a playful manner.

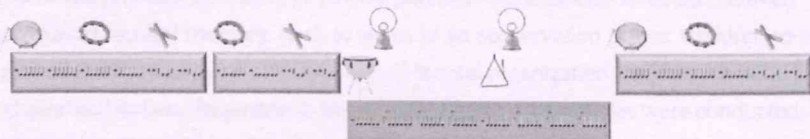


Figure 3. Rhythmic score to accompany Prokofiev's *Gavotta*

The strategy of playing rhythms along with recorded music is aimed to underline the expressive character, the musical phrases, their repetition and contrast and the overall structure. Being a support to listening, and in spite of the dynamics variations that might be suggested, the instruments should play softly, in order to ensure good listening of the recording. For the same reason but also for expressive reasons, the number of instruments playing simultaneously should be adjusted to the dynamics of the musical piece. In Prokofiev's *Gavotta*, fewer instruments may play the last part A, due to its soft character.

Although this is a strategy on listening to music, it becomes also a performing act. In this sense, children should be invited to play correctly but also expressively with suggestive arm gestures and postural attitude. The mental representation from the music being listened to is multimodal and articulates different kinds of information, among which kinetic information plays a decisive role. The next strategy explores more deeply the importance of movement in listening to music.

### 3. Miming stories along with recorded music

Prokofiev's *Gavotta* has also been used in listening activities with young children with the application of a different strategy, which consists on reciting and miming a story. The present author created the story and the gestures, after an attentive, empathic and analytical listening of the musical piece. The overall form (ABA) and the expressive character of each part, as described above, were determinant in imagining a story also with three scenes (Figure 4).

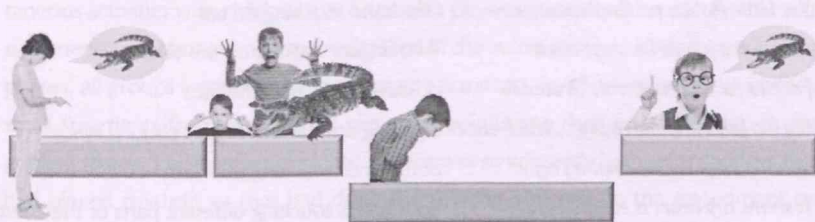


Figure 4. Graphical scheme of the mime for Prokofiev's *Gavotta*

In this sense, the lively first A refers to an old rabbit giving some scary advice to his grandson about a dangerous crocodile; the repetition of the second half, describes the disobedience of the young rabbit and his physical encounter with the crocodile. The low and mysterious part B refers to the scared and stressed young rabbit after meeting the crocodile. The soft and delicate reappearance of part A includes the same kind of advice as the first part, but given by the young rabbit to his friends. It works as the moral conclusion of the story, which is whispered, in order to match the final *decre-scendo* of the music.

The text of the story was written as spoken lyrics, which use the rhythm of the main melody. In this way, children are invited to learn these lyrics by heart and, then, to recite them with expressive physical gestures. Table 1 presents both the text of the story and the correspondent miming gestures.

Table 1. Story and mime for Prokofiev's *Gavotta*

| Story   | Mime   |
|---|--|
| <i>Albertino Rabbit tells his grandson</i>        | Pointing with one hand                           |
| <i>It is dangerous to walk alone</i>              | Pointing with the other hand                     |
| <i>'Cause in the jungle lives Crocodile</i>       | Shaking both hands near the face                 |
| <i>And little bunnies are flesh and bone</i>      | Hands like paws; hands like eating               |
| <i>Step by step the crocodile approaches</i>      | Hands stepping forward                           |
| <i>Big big jaws and suddenly... (click click)</i> | Opening arms and... fingers clicking twice       |
| <i>Yet Little Rabbit paid no attention</i>        | One hand touching on ear                         |
| <i>And to the jungle he went alone</i>            | Two fingers walking on the other arm             |
| <i>Face to face he was with Crocodile</i>         | Holding hands near the face                      |
| <i>Big big jaws and narrowly... (click click)</i> | Opening arms and... fingers clicking twice       |
| <i>What a fright! Oh, what a fright!</i>          | Both hands touching the heart                    |
| <i>It seems my heart is everywhere</i>            | Both hands touching different parts of the chest |
| <i>What a fright! Oh, what a fright!</i>          | Both hands touching the heart                    |
| <i>It seems my heart is everywhere</i>            | Both hands touching different parts of the chest |
| <i>My poor head is still on fire</i>              | Hands touching the forehead                      |
| <i>I'm so hot I cannot bare</i>                   | Hands shaking like fans in front of the face     |

|   |  |
|---|--|
| <i>My poor head is still on fire</i>              | Hands touching the forehead                  |
| <i>I'm so hot I cannot bare</i>                   | Hands shaking like fans in front of the face |
| <i>Now the little rabbit tells his buddies</i>    | Pointing with one hand                       |
| <i>It is dangerous to walk alone</i>              | Pointing with the other hand                 |
| <i>'Cause in the jungle lives Crocodilo</i>       | Shaking both hands near the face             |
| <i>And little bunnies are flesh and bone</i>      | Hands like paws; hands like eating           |
| <i>Step by step the crocodile approaches</i>      | Hands stepping forward                       |
| <i>Big big jaws and suddenly... (click click)</i> | Opening arms and... fingers clicking twice   |

After the learning phase of reciting the story with physical gestures, children are invited to repeat the gestures, but in silence, i.e. reciting the story inside their minds. This works as the last preparation before the listening phase. When the music is finally listened to, it is accompanied by the miming gestures, in silence.

#### 4. Some results

The mind that listens to recorded music with simultaneous activities of playing rhythms and miming stories processes music in multimodal mental patterns of activation, which include verbal, aural, visual, spatial and kinetic information. The expectation of the benefits that such activation would have in children's musical minds has been demonstrated in several studies that have uncovered some effects on memory, understanding and taste.

Experiments that compared children that listened to recorded music with simultaneous activities with children that listened in physical passivity have shown that musical memory is stronger and more detailed in the active groups. After the treatment phases, all groups were subject to a memory aural test, in which they had to identify small fragments from the musical pieces by pointing to their exact position in the guiding scores. The number of identifications was significantly higher for children that had played rhythms or that had done the miming gestures. In the experiment reported in Godinho 2003 and 2006, children that just listened and watched the teacher pointing to the rhythmic score identified a mean of 1.13 fragments out of six, whereas children with simultaneous performing actions identified a mean of 2.46 fragments out of six ( $t = 8.79, p < .01$ ). In a more recent experiment (Godinho, 2016), children

that just listened and watched the teacher telling a story and doing the mime, identified a mean of 2.22 fragments out of six, whereas children that did the miming gestures identified a mean of 3.08 fragments out of six ( $t = 2.82, p < 0.01$ ).

Another experiment that compared the conditions of playing rhythms or miming stories with the condition of listening in physical passivity (Godinho, 2015) asked children to write down some sentences that would describe the musical piece they had listened to. The analysis of these writings has also shown different levels of musical understanding between the groups. The assessment scale used in the analysis was Swanwick's model of musical understanding, which includes the layers of Materials, Expression, Form and Value (e.g. Swanwick, 1999). The writings of the more passive children tended to focus mainly in the sound materials used in the musical piece, such as the types of instruments and the dynamics levels. On the other hand, the more active children dedicated their writings to the description of the expressive character of the different parts of the music and to the ways they related to each other in sequential relationships. Figure 5 shows that 60% of the passive children were allocated to the first layer of Materials, against 21% of the percussion group and 5% of the miming group. In significantly different ways, only 14% of the passive children reached the third layer of Form, against 47% of the percussion group and 52% of the miming group.

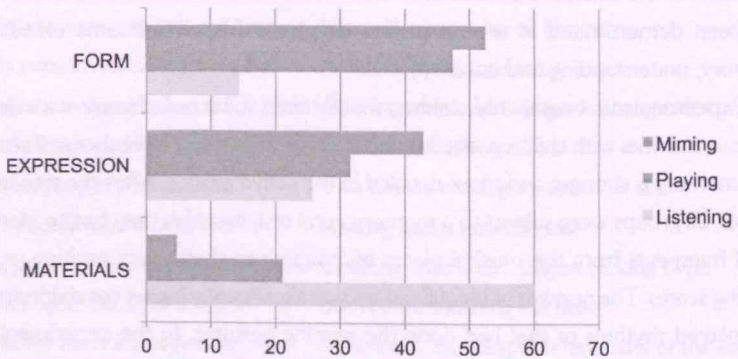


Figure 5. Graphical distribution of children's descriptions throughout the layers of musical understanding



In quite spontaneous ways, many children in all groups decided to include in their writings their own judgements about the musical piece. This happened, for example, in an experiment with Prokofiev's *Gavotta* (Godinho, 2015), and it was clear that children, who had participated with performing tasks, had a more positive attitude towards the musical piece. No children from the active groups had negative appreciations and 60% of the playing group and 66% of the miming group declared spontaneously that they liked the music. On the other hand, 70% of the more passive children decided to judge the music, but only 45% said that they liked the music, whereas 25% openly declared they did not like the music (Figure 6).

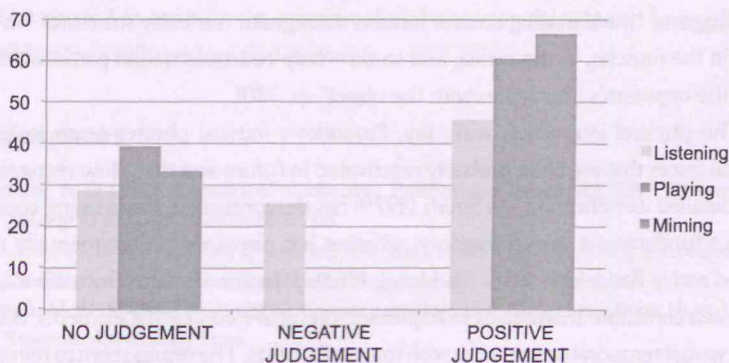


Figure 6. Graphic of the percentage distribution of children's descriptions throughout the layers of musical understanding

## 5. Final considerations

Various studies have uncovered the benefits of listening to recorded music with simultaneous activities of playing rhythms or miming stories. The results suggest that listening with active physical participation has positive effects on the ways children represent music in mind, allowing deeper understanding and stronger and more detailed memory from the musical pieces.

A major influence that the strategies seem to have on children's mental representation of music can be related to the creation in the classroom of more complex multimodal experiences. Adding physical actions to the experience allows the activa-

tion of more differentiated mental patterns, which include a greater variety of information received from different sensory modes being processed (and reactivated) in parallel, that is, simultaneously, and in meaningful connections. In fact, connectionism offers a definition of knowledge that goes beyond what we can verbally articulate, explain, or even be aware of (Eysenck & Keane, 1995; McClelland *et al*, 1986; Rogers & McClelland, 2014; Rumelhart *et al*, 1986). The connectionist interpretation of the mental processing implies that knowledge may include what is perceived, what the environment sends through our sensory channels, what we may feel, what we may imagine. Mental representation is seen as a connected complex of everything lived, remembered, and imagined, where reality coexists with “ourselves.” As Damásio (1999) also suggests, “the signalling devices located throughout our body structure – in the skin, in the muscles, in the retina, and so on – help construct neural patterns which map the organism’s interaction with the object” (p. 320).

The physical interaction with, say, Prokofiev’s musical phrases seem to leave mental traces that are most probably reactivated in future and that allow recognition and detailed identification. As Smith (1979) has demonstrated, the learning context plays a fundamental role in memory, whether it is physically or just mentally reinstalled and in Baddeley’s terms (Baddeley, 1982), different elements from the experience can constitute themselves as important interactive contextual elements, due to their spatial-temporal coexistence with (musical) objects. The results seem to reinforce the idea that musical memory and mental representation are based on a cerebral map strongly moulded by the representations of a body (cf. Damásio, 1999; Leman, 2007) that interacts with music in generalized and differentiated ways. The mime gestures and movements, in close relationship with the expressive character of the musical pieces and their sections, become fundamental elements of musical knowledge, which goes beyond what can be verbally articulated and which resembles the “knowledge in the hands,” or embodied knowledge, of Merleau-Ponty (1962).

By its own nature, the studied strategies might have an immediate applicability in listening to recorded music in the classroom but also in preparing children to attend musical concerts. Playing rhythms and miming stories along with recorded music in the classroom will most probably affect children’s mental representation in positive ways, during the activities and in future. During the concerts, children will be able to empathize with the musical pieces, by remembering and reactivating the mental patterns of what was experienced in the classroom.

The nature and quality of the playing or miming schemes need, however, to be monitored, as well as the extent to which they allow and enhance the relationship with the musical material. The results of most memory aural tests show that some of the phrases were better identified than others, with large differences of success, and this might suggest that the congruency of the rhythm-music or mime-music overlapping have different levels of efficacy throughout the musical pieces. Being a guided and modelled strategy to listen to music in classroom settings, this kind of activity requires that rhythmic scores, stories and mimes be carefully planned and designed, expressively and structurally suitable and faithful to the musical pieces. Further research will be needed to assist on the creation of listening material that can be used more confidently as valid pedagogical resources.

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