

## NATURE AND THE SPECIFIC FEATURES OF THE DEVELOPMENT OF POLYPHONIC HEARING

**Galina Zavadska**

Daugavpils University, Latvia

**Ilona Bagele**

Daugavpils University, Latvia

***Abstract.** Polyphonic hearing is a component of musical hearing. Polyphonic hearing implies the ability to perceive a simultaneous motion of two or more separate voices within the general sound fabric of a musical piece. Polyphonic hearing can be developed like all other sides of musical hearing. The development of polyphonic hearing can be enhanced by different work forms at the lessons in sol-fa: intoning, analysis by ear, many-voiced music dictation. The development of different sides of musical hearing during the process of work on solfeggio is really essential for a future musician-professional. Research aim: to determine the specific features of polyphonic hearing and characterize its developmental stages.*

*On the basis of long pedagogical experience, this paper reveals the specificity of polyphonic hearing, identifies and characterizes its developmental stages in the process of work on sol-fa.*

***Keywords:** polyphonic hearing, canon, polyphony.*

### Introduction

The presence and development of musical hearing is part and parcel of any musician-professional. Teachers-musicians are constantly seeking for new forms and methods for its development. Pure and rhythmic intoning by notes, a correct perception and reproduction of a music text belong to a musician's professional skills.

The contemporary research devotes much attention to the theoretical substantiation of the perception of pitch (Hallam, Cross, & Thaut, 2009; Карасева, 2009; Cook & Fujisawa, 2006; Swanwick, 2002; Петрушин, 1997; Essens, 1994; Gillespie, 1995; Narmour, 1990; Назийкинский, 1972), as well as analyzes the features of musical hearing and offers recommendations for its development (Урванцева, 2014; Hiner, 2011; Масленкова, 2003; Erickson, 1975; Desportes, 1970). In many of these works the term pitch describes a psychoacoustic sensation of the auditory system (Loeffler, 2006). However, the problems of theoretical substantiation are still insufficiently studied and research on the development polyphonic hearing is not extensive either. This situation

hinders making more essential corrections in the system of training professional musicians.

Music science does not provide a uniform classification of musical hearing. B. Teplov classifies musical hearing into two classes: melodic (the skill of recognizing a melody and intoning it precisely) and harmonic (perception of sounds, ability to perceive many sounds simultaneously as a single sound); also absolute and relative (Теплов, 1947). J. McDermott & A. Oxegem (Mcdermott & Oxegem, 2008), D. Kirnarska (Кирнарская, 2004), M. Starceusa (Старчеус, 2003), F. Lerdhal (Lerdhal, 2001), V. Petrusins (Петрушин, 1997) distinguish such forms (or sub-forms) of musical hearing as: that of the pitch (absolute and relative), mode, tonal, melodic, harmonic, intoning, rhythmic, architectonic, timbral, dynamic, textural, polyphonic etc.

On analyzing the typology of musical hearing offered by different authors, we can state that the development of timbral, dynamic, polyphonic, textural, analytical and other types of musical hearing can be put into practice as a special task only if the foundations of pitch hearing, e. g. melodic and harmonic types of hearing, have been developed.

In this paper, the object of our attention is the so called polyphonic hearing and its development in the context of ensemble music-making at sol-fa classes.

The problem of the development of polyphonic hearing, which has always been topical, is especially acute in the contemporary reality, since the contemporary music is polyphonic by its very nature. Studies of polyphonic music are a vital and necessary condition for a harmonic development of a musician of any speciality. The development of this type of hearing relates to the skill of being able to simultaneously hear in the sound fabric the movement of two or more voices. A developed polyphonic hearing helps an orchestral musician to hear what the other instruments play when he performs his own part, and a pianist or a chorister – to hear besides the basic melody all other textural elements of the bass movement, supporting voice, but in a polyphonic work – not only the upper, but also all other voices as well. Especially important here is the skill of hearing the originality and individuality of every single voice in a polyphonic piece when a multi-voiced work is performed.

Research aim: to determine the specific features of polyphonic hearing and characterize its developmental stages.

Research method: the analysis of pedagogical experience, the comparison of contemporary methodologies worked out for developing polyphonic hearing.

### **Polyphonic Hearing as One of Musical Hearing Types**

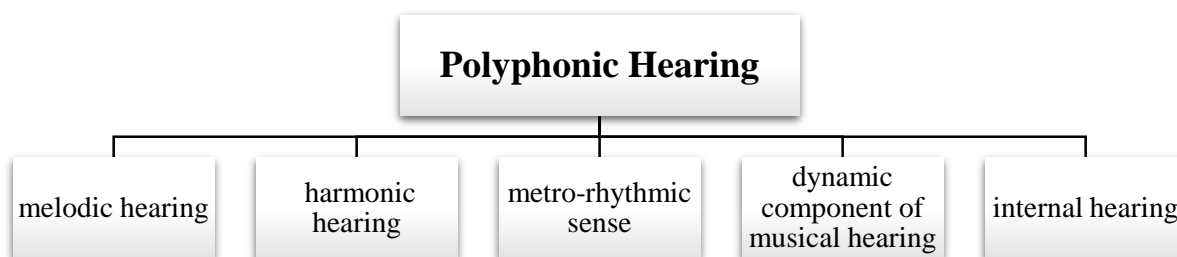
According to J. McDermott & A. Oxegem, polyphonic hearing is *Examples of music in which multiple sequences of tones are heard as separate “streams”*

*are commonplace* (McDermott & Oxege, 2006). G.M. Cipin, in his turn, defines polyphonic hearing as “musical hearing in its manifestations in relation to texture formed by at least of two voices ...” (Цыпин, 1984). A.G. Kauzova considers polyphonic hearing “as an especially complicated but the single ability oriented towards an integral perception of specific features of polyphonic music and polyphony as a common and essential feature of music of many voices” (Каузова, 2001). On the whole, the concept of polyphonic hearing involves the ability of hearing, following up and correlating the movement of several simultaneously developing melodies, melodic lines and textural layers.

This type of musical hearing, being a special ability, is seldom discussed in psychological-pedagogical studies on problems of musical development. In theoretical literature, this term is used to denote one of the components of harmonic hearing (Теплов, 1947; London, 2004; Кирнарская, 2004; McDermott & Oxege, 2008). At the same time, this concept as an independent concept is widespread among teachers- practitioners, who deal with auditory perception and interpretation of polyphonic pieces in performing practice. Polyphonic hearing is a complex of a number of different musical abilities. It involves melodic hearing (polyphony consists of melodies), as well as harmonic hearing (melodies form up in harmony), timbral-dynamic hearing (each voice is characterized by its own timbre and dynamics different from others), sense of rhythm (in the combining lines of voice which are rhythmically different), sense of musical logic, ability of “grasping a form” and internal perception of these intricate complexes. We have to note that all these components of musical hearing are in an active internal interaction and manifest themselves as one whole.

### **Components of Polyphonic Hearing**

In the process of the development of polyphonic hearing several vital components of musical abilities can be singled out (see Fig. 1):



*Figure 1 Components of polyphonic hearing*

At teaching melodic hearing, attention is first of all focused on the ability to hear a melody as an integrated whole, the basis for the formation here being the revealing of melody's principal features – melodiousness, dynamic development; in addition, the skill of comprising a long melody is being developed as well.

In polyphonic music, a special difficulty at perceiving a melody is created by the necessity to hear and reveal its individual uniqueness within the context of the whole. This is enhanced by the specific features of harmonic hearing as one of the principal hearing in the development of polyphonic hearing. In polyphony, a chord is the result of the movement of voices and this requires a clear perception and hearing of the harmonic side of the components of melody's polyphonic vertical line.

Polyphonic hearing, based on melodic, provides for hearing the horizontal multi-component musical texture, while harmonic hearing ensures hearing chords, their correlations and the whole vertical organization of texture.

At teaching polyphony, a metro-rhythmic sense also has its own specific feature. First of all, a clearly pronounced metric pulsation and harmonies are absent in polyphonic perception, they are replaced by the rhythm of breathing. The structure of a polyphonic line is free of the accent symmetry, its characteristic feature is the method of accents which is not based on measure relations, but rather on the melodic plastics itself. Besides, the culminant points here require the strongest dynamic emphasis, thus evoking the sense of the increase of energy in the linear movement. In polyphony, the diversity of the rhythmic pattern of voices corresponds to the variety of metric patterns, and this requires even a higher developmental level of the sense of rhythm and appears possible only due to an intensive development of memory and the ability "to hear before" the succeeding movement of a music material.

Dynamics of polyphonic pieces creates a feeling of tension, motion, impression of approaching and moving away, as well as a feeling of space throughout the whole musical piece.

On the one hand, polyphonic practice requires a high level of internal hearing, on the other hand, it creates an opportunity for its development. In other words, it transforms this hearing from a passive form into an active form. Highly developed forms of internal hearing create the base for the sense of musical form. Here not only the correlation between the horizontal – vertical line is implied, but also the awareness about a form as a construction, and the comparison of components and planes are meant. And this enables comprehending the structure of a musical piece in its integrated whole.

The process of comprehending polyphonic music involves not only the creation of specific images in our consciousness, but also generalization of the perceptions about complexes, about polyphony as a specific kind of music.

Performance of many-voiced polyphonic music, be it an instrumental or vocal piece, requires a special developmental level of coordination, memory, perception and other abilities.

### **Specific Features of the Development of Polyphonic Hearing**

The development of polyphonic hearing, or the ability to perceive (hear) in a differentiated way and reproduce in a musical-performing activity (playing an instrument, conducting some musical collective, many-voiced singing etc.) sound lines somewhat matching each other in a simultaneous development is one of the most essential and complicated parts of musical development.

Developed polyphonic hearing is vital for choral singing. As a kind of collective music making, choral singing is an integral part of Latvian culture, an inestimable and irreplaceable, during centuries approved factor of the spiritual and creative growth of Latvian nation (Zavadska, 2015). The above mentioned traditions of Latvian musical culture are closely related to the development of musical hearing, especially of harmonic hearing (as well as polyphonic hearing), since the choral repertoires (arrangements of folk songs and original compositions by Latvian authors) include compositions with polyphonic elements.

Musical classes on sol-fa offer unique opportunities for developing polyphonic hearing, since singers (solo singing is implied), wind instrument players are always restricted by the frames of musical monophony. String – bow instrument players are in principle able to play elements of polyphony, however their abilities are more modest than those of pianists or choral singers, which actually leaves an imprint on their repertoire. Within the context of this paper we will consider the development of polyphonic hearing in the process of a collective music making (ensemble or a choir) and writing a dictation.

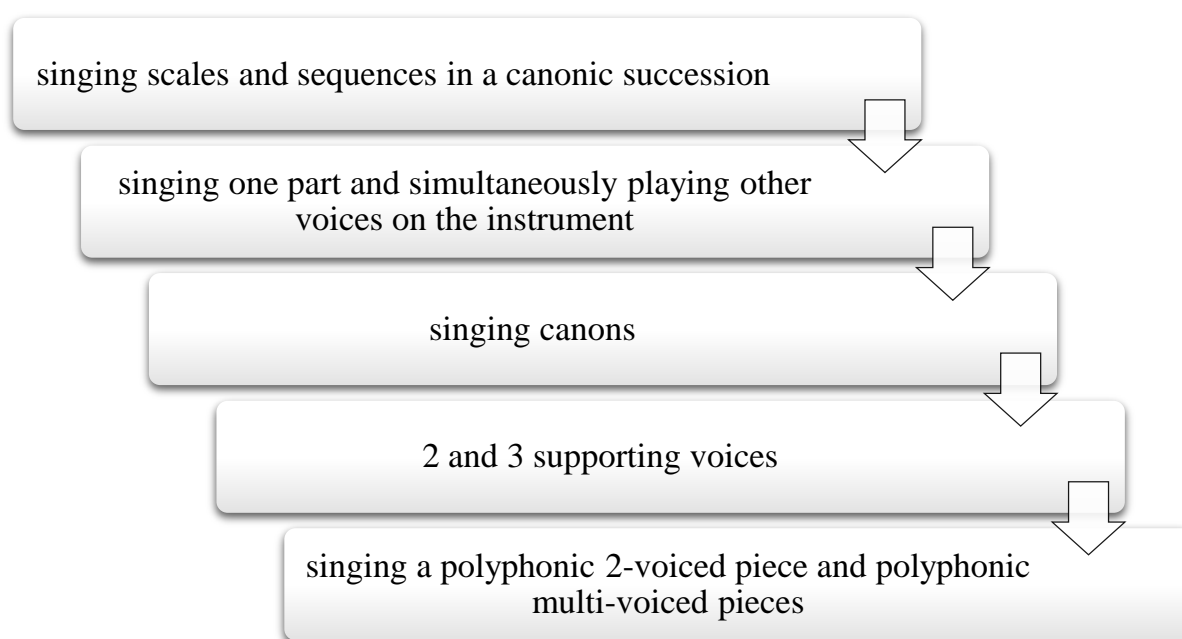
At all stages of teaching sol-fa, an effective means of the formation and development of intoning skills is singing in an ensemble, since the harmonic coordination in polyphony, and the auditory orientation towards the structure which is developing vertically enhance a correct reproduction of melodic tones constituting the polyphonic fabric. In polyphony, musical pattern is represented as an integral system, in the result of which a 2, 3, and 4-voiced singing actively promotes the development of melodic and harmonic hearing, as well as the sense of harmony and rhythm. Writing a many-voiced musical dictation that includes the elements of polyphony (supporting voice, imitating elements) also enhances the development of polyphonic hearing.

## Stages of the Development of Polyphonic Hearing in the Process of Ensemble Music-Making

The development of polyphonic hearing is one of the most essential and complicated parts of the development of musical hearing. It involves the formation of skills of a multi-plane perception, differentiated-integrated hearing and comprehending of polyphonic many-voiced texture.

We have to note that polyphonic hearing is a higher level of the development of musical hearing. Work on its development begins when melodic and harmonic hearing, musical memory, differentiated perception of voices (layers) and other musical abilities are already relatively developed. Therefore, it is not possible to specify the age of the group with which you can begin to work on the development of polyphonic hearing.

On the basis of our long pedagogical experience gained during our work in secondary and higher music education institutions we offer the following sequence of work on the development of polyphonic hearing in the process of ensemble music-making (see Fig. 2):



*Figure 2 Sequence of work on the development of polyphonic hearing*

Work on the development of polyphonic hearing, perceiving and understanding the polyphonic elements of musical language can be started from singing scales in a canon. Besides enabling to understand a canon, this exercise will contribute to the purity of intoning major and minor, and will be a useful practice in singing parallel thirds with a transposition of voices in addition. Performing in ensemble trains learners' hearing to get accustomed to the situation

where a live vocal intonation sounds, and also develops the skill of adjusting themselves to one another in the situation of a various timbral combination of voices.

The next stage of the development of polyphonic hearing is singing one part and simultaneously playing other voices on the instrument. In this way, sounding of one voice is adjusted to the sounding of other parts, awareness about a harmonic vertical line. At first, this work involves 2, but later 3 and 4 voices. This type of work cannot replace singing in ensemble. Performing in ensemble trains singer's musical hearing to get accustomed to the situation where a live vocal intonation sounds and develops the skill of adjusting to each other in the situation of a various timbral combination of voices.


At the initial stage of developing learners' skills of singing in a polyphonic ensemble, singing canons has an especial importance. A canon is a strict imitation where each voice, performing one and the same melody, joins in with some delay in regard to the previous one. Singing canons, on the one hand, seems an easy task, since it is enough for all to learn one melody and you can sing it in many voices. However, actually to perform a canon qualitatively appears to be no simple task. Singers' undeveloped hearing does not allow them to hear other parts and entwine their melody into the melody of other voices. Here, the auditory orientator is the imitated voice rather than harmonic intervals, though they too have an important role. At first, a task of imitating on an octave (in unison) is offered, then - on the fifth and only after that on different other intervals. Interesting and useful might be singing in canon well-known folk songs (see Fig. 1 – example of notes), since known folk melodies are intoned more precisely. Singing of canons gives the opportunity to better comprehend the nature of polyphonic fabric.

In the process of the development of polyphonic hearing, 2 and 3 supporting voice singing has an essential role. In such melodies, voices now move concurrently, now merge into unison, and now create independent lines. In samples of this kind, at the moment of their dividing into 2 and 3, voices melodically move as if independently, but are tightly tied together by harmonic consonantal intervals. The thirds and the sixths in a concurrent movement of voices, unisons, octaves at the point of their merging, as well as the fifths which often are the intonation support, serve as auditory coordinators for those singing in ensemble. Thus, singing of 2 – 3 supporting voices is as if a transition link towards singing polyphonic works.

## Bēdu manu, lielu bēdu

Kanons

Latviešu tautas dziesma



1 Bē - du ma - nu, lie - lu bē - du, es par bē - du ne - bē - dāj'.

5 2 Bē - du ma - nu, lie - lu bē - du, es par bē - du ne - bē - dāj'.

9 3 Ram - tai ram - tai ra - di - ri - di rī - di, ram - tai rī - di ral - la - lā,

13 4 Ram - tai ram - tai ra - di - ri - di rī - di, ram - tai rī - di ral - la - lā.

Figure 3 Latvian folk song “Bēdu manu, lielu bēdu”

Singing polyphonic 2-voiced and later multi-voiced music is a new stage in the development of polyphonic hearing. In polyphonic works, every voice develops relatively independently, but at the same time all voices in their combination create an integral musical form, the intoning of each voice separately is based on regularities of a melodic horizontal structure: on identifying in the process of intoning the structures of constructions, on hearing similar tones, creating inertia and overcoming it. A horizontal coordination of voices in polyphony occurs first of all at the supporting moments of form: on the strong metric parts, in cadenced parts of episode constructions, in episodes where the role of harmony is really obvious.

At singing in ensemble examples of polyphonic kind based on intonations of non-canonic type, the orientator for hearing is a thematic material. When working on polyphony, we have to bear in mind the fact that the functions of voices in such music are constantly changing: in every voice sometimes a theme is being developed, sometimes - a contra-formation, and each of them sometimes plays a leading role, but sometimes – the accompanying role.

At the classes on sol-fa, mostly vocal music is used for singing in ensemble, while in work on polyphonic multi-voiced music instrumental works are employed. Convenient for the use are some 2-voiced (*C dur, a moll, d moll, B dur*) and 3-voiced (*a moll, d moll*) interventions, J.S. Bach’s fugues from *Das Wohltemperierte Klavier*, fugues for the organ.



During the process of work on the development of polyphonic hearing, we gained general perceptions about complexes and about polyphony as a specific kind of music.

### Conclusions

- Polyphonic hearing is a kind of harmonic hearing and an ability to hear, follow and correlate the movement of several simultaneously developing melodies, melodic lines, and texture layers.
- The development of polyphonic hearing is related to the development of other individual's abilities: melodic, harmonic kinds of musical hearing, metro-rhythmic sense, the dynamic component of musical hearing and internal hearing.
- Work on the development of polyphonic hearing starts when melodic and harmonic hearing, musical memory and a differentiated perception of voices (layers) have already been relatively developed.
- The stages of the development of polyphonic hearing during the process of ensemble music making might be as follows: singing scales and sequences in a canonic succession, singing one part and simultaneously playing other voices on the instrument, singing canons, 2 and 3 supporting voice pieces, singing polyphonic 2-voiced and multi-voiced music.

The process of forming and developing polyphonic hearing is effective and successful in case work on it is gradual and purposeful.

### References

- Cook, N.D., & Fujisawa, T.X. (2006). The psychophysics of harmony perception: Harmony is a three-tone phenomenon. *Empirical Musicology Review*, 1(2), 106–124.
- Desportes, Y. (1970). *Comment former l'oreille musicale*. Paris: Editions Max Eschig.
- Hallam, S., Gross, I., & Thaut, M. (2009). *The Oxford Handbook of Music Psychology*. Oxford, UK: Oxford University Press.
- Erickson, R. (1975). *Sound Structure in Music*. California: University of California Press.
- Essens, P. (1994). *Determination of temporal pattern perception*. Dorn.
- Gillespie, J. (1993). Difficulty factors in melodic perception. *Journal of music theory pedagogy*, 7, 41-52.
- Hiner, H. (2011). «Сольфеджио»? А что это такое? Retrieved from <http://rudocs.exdat.com/docs/index-51719.html>
- London, J. (2004). *Hearing in time: Psychological aspects of musical meter*. Oxford: Oxford University Press.
- Lerdahl, F. (2001). *Tonal pitch space*. New York: Oxford University Press
- Loeffler, B.D. (2006). *Instrument Timbres and Pitch Estimation in Polyphonic Music*. School of Electrical and Computer Engineering Georgia Institute of Technology. Retrieved from

- <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.90.1526&rep=rep1&type=pdf>
- McDermott, J., & Oxegem, A. (2008). *Music perception, pitch, and the auditory system*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2629434/>
- Narmour, E. (1990). *The analysis and cognition of basic melodic structures: The implication-realization model*. Chicago: University of Chicago Press.
- Swanwick, K. (2002). *Musical Knowledge: Intuition, analysis and music education*. London, New York: Routledge, Falmer.
- Zavadska, G. (2015). *The Development of Future Music Teachers' Harmonic Hearing in a Higher Education Establishment*. Retrieved from [https://du.lv/wp-content/uploads/2015/12/Zavadska\\_kopsavilkums.pdf](https://du.lv/wp-content/uploads/2015/12/Zavadska_kopsavilkums.pdf)
- Карасева, М. (2009). *Сольфеджио - психотехника развития музыкального слуха*. [Sol-fa – Psycho-Technique for Developing Musical Hearing]. Москва: Композитор.
- Каузова, А. (2001). *Музыкальный слух. Теория и методика обучения игре на фортепиано*. [Musical Hearing. Theory and Methodology of Piano Teaching] Москва: ВЛАДОС.
- Кирнарская, Д. (2004). *Музыкальные способности*. [Musical Abilities] Москва: Таланты XXI века.
- Масленкова, Л. (2003). *Интенсивный курс сольфеджио: Методическое пособие для педагогов* [Intensive Course in Sol-Fa: Methodological Aid for Teachers]. Санкт-Петербург: Союз художников.
- Назайкинский, Е. (1972). *О психологии музыкального восприятия* [On Psychology of Music Perception]. Москва: Музыка.
- Петрушин, В. (1997). *Музыкальная психология*. [MusicPsychology] Москва: Гуманитарный издательский центр ВЛАДОС.
- Старчеус, М. (2003). *Слух музыканта*. [Musician's Hearing]. Москва: Музыка.
- Теплов, Б. (1947). *Психология музыки и музыкальных способностей*. [Psychology of Music and Music Abilities]. Москва, Ленинград: Издательство педагогических наук.
- Урванцева, О. (2014). Освоение стилевых моделей в курсе сольфеджио. [Learning Style Models in the Sol-Fa Course]. *Музыкальное искусство и образование, 1*, 87-98.
- Цыпин, Г. (1984). *Обучение игре на фортепиано*. [Teaching Piano]. Москва: Просвещение.

