

**THE ESTIMATION OF MUSIC DURATION  
BY DIFFERENT LISTENERS' GROUPS**

The category of *time* is one of the most important issues in the science of music, owing to the fact that music is usually considered one of the “temporal” arts, i.e. arts with an essentially temporal component. This issue has several dimensions, thus several approaches, such as the aesthetic-musicological (the organization and course of time in music) and the psychological (time in the process of the listener’s music perception). In music the category of time exists as time in its normal course (real time), but also as “inner time”, in the inner, often ambiguous relationship of “past”, “present” and “future” (Lissa: 49-67). Music categories closely related to time are tempo, metro rhythm and form, that is, the process side of form – structuring the levels of music syntax and music composition constantly filled with moments of preparation, expectance, return, etc. Time in music perception existing in the form of a listener’s estimation of the music duration, according to researchers consists of at least two categories:

- “projected time” – estimation of the music duration during the process of listening, more exactly – the time the listener spent during the process of listening
- “observation time” – estimation of the duration of the individual experience of music during the process of listening

The two categories reflect the subjective process of music perception from a temporal aspect, deeply individual for each listener. They are interconnected and are in inverse ratio: the deeper or the “longer” the experience of music, the shorter the time that seems to have passed during the process of listening (Orlov). Therefore it becomes clear that music time, and especially the time of music perception, is completely subjective, ambiguous and incomparable to the real, physical time measured with a clock, even though they are related. Nevertheless, this real time cannot be avoided either in the estimation of the duration of works by the composers and performers, or in the process of perception by the listeners. Real time (in the form of a “biological clock”) determined the tempo of the compositions of the old masters; this time is the base of the metronome. It is connected to the duration of the music, syntactic and compositional units, such as themes-periods with an average duration of 10-12 seconds (Orlov). The 20<sup>th</sup> century counts at least three instances which reflect the growing role of real time in music thought and perception:

- the obvious “chronometring” of music duration in the contemporary sound carriers, consciously or unconsciously becoming a large part of listening and perceiving recorded music
- aleatoric compositions or fragments in which the physical duration of the aleatoric blocks is presented in “realistic” seconds become part of the structure of the entire composition
- music for films whose duration is related to the duration of the visual order of events. The composer is compelled to regard the real minutes and seconds (“... I write music using exact notes in seconds” (Prokofiev:251)), like the composer of classic ballet who had to think in meter and numbers of bars.

Thus, the function of real time in the general temporal process of music and its perception grows, making this process more complex.

The psychological aspect of music time, i.e. the perception of all its dimensions by the listeners, triggers different experiments, in which the aim is to interpret and study the results from the examined subjects, who on the other hand are to estimate the duration of specific compositions. One known and usually quoted experiment is that of the Russian music psychologist Belyaeva-Ekxemlyarskaya. The results are included in the special section (Belyaeva-Ekxemlyarskaya).

We performed a similar experiment with three groups different in ages and level of music experience: the students of the fourth, final year at FMU - Skopje (Faculty of Music), the 5<sup>th</sup> grade students from the primary school "Vojdan Chernodrinski" in Skopje, as well as professional musicians (professors at FMU and the music teacher in the above-mentioned primary school).

The idea for this experiment arose during the music education methodology classes with the 4<sup>th</sup> year students from the Department of Music Theory and Pedagogy during the assigned educational topic "Music Listening". The discussions included the duration of compositions as one of the criteria for the selection of works to be listened to in class (the realistic duration should be appropriate to the students' age which determines their ability to concentrate and follow without interruption, i.e. behave "well"). The students decided to check how they would estimate the works according to their own experience, and see what they would offer to their own students. We then decided to carry out a similar experiment with the younger students.

*Aims of the experiment:*

- to establish to what extent the exactness of numbers (minutes and seconds) will appear in the answers;
- to see whether the answers will correspond to the real duration;
- to see which tendency dominates the group's answers (a decline or an increase from the real duration, or coming closer to it);
- to see if there is a possibility to interpret the markers in the categories of the real, the perceptive and the "observation time".

*Music material*

The examinees were offered to hear seven compositions from a genre we shall here refer to as instrumental miniature and that are usually on the listening lists of the primary schools:

- P.I Tchaikovsky: "Seasons" – "November. Troyka";
- E. Grieg: "Peer Gynt" no.1 – "Morning"
- E. Grieg: Suite "Peer Gynt" no. 1 – "The Hall of the Mountain King"
- C. Saint-Saens: "Carnival of the Animals"- Introduction
- C. Saint-Saens: "Carnival of the Animals" – " Kangaroos"
- C. Saint-Saens: "Carnival of the Animals" – "Aquarium"
- C. Saint-Saens: "Carnival of the Animals" – "Fossils"

(With the university students we used this order of music, whereas the primary school students we changed the order of Grieg's compositions: we placed "The Hall of the Mountain King" before "Morning" in order to avoid playing two works with moderately-slow tempi and longest of all the other works)

We used the following recordings for all students:

1. P Tchaikovsky: Seasons. Siberian Violinists Ensemble (Artistic director Mikhail Parkhomovsky). SUCD 10 – 00201
2. E. Grieg. Peer Gynt Suites 1 & 2. Slovak Philharmonic Orchestra / Libor Pesek SYCD 6003
3. C. Saint-Saens. Carnival of the Animals. The London Symphony Orchestra conducted by Barry Wordsworth. 3242 CD.

The shortest example lasted 25 seconds (C. Saint-Saens: fragment from the Introduction), the longest – 3 minutes and 53 seconds (Grieg “Morning”)

Apart from the fact that these compositions already exist in the listening programs of primary schools, their choice was based on other factors:

- tempo: moderate, slow, fast, tempo gradations
- form: reprise (ternary and rondo), through-composed, variations, unfinished fragment;
- number of themes: one theme, multiple themes
- meter: binary time with a clear distinction between bars, triple time without a clear distinction between bars
- meter units: binary time, triple time, quadruple time.

Let us add that all compositions are instrumental (there is an absence of text as a parallel element of the parameters of the composition, including its artistic time).

**Table 1. Parameters of the compositions**

Title	Tempo	Form	Number of themes	Meter	Meter units
Tchaikovsky: “November”	Moderate	Complex ternary	2	Binary time	Gradation from binary time through trinary time to quadruple time
Grieg: “Morning”	Moderate-slow	Through-composed	1	Binary time	Trinary time
Grieg: “The Hall of the Mountain King”	Moderate with a gradation towards fast	Variations	1	Binary time	Binary time
Saint-Saens: Introduction	Fast	Unfinished fragment	1	Binary time	Quadruple time
Saint-Saens: “Kangaroos”	Undefined: ad libitum accel. and rit.	Through-composed	1	Triple time (indistinct)	Indistinct
Saint-Saens: “Aquarium”	Moderate	Through-composed	1	Binary time	Quadruple time
Saint-Saens: “Fossils”	Fast	Rondo	3	Binary time	Quadruple time

Therefore, the chosen works contain different features of the parameters which reflect their temporal dimension, which could cause these compositions to be perceived differently.

#### *Course of the experiment*

The same procedure was used in all groups: the examinees were told to listen to the music as if they were “at a concert” and to then mark its duration in minutes and seconds on their own sheets of paper (university students) and on the special leaflets in the form of an “accordion” (primary school students) so that the previous answers would be covered. It was emphasized that there aren’t any wrong answers – all that is noted down is correct because it denotes their individual feeling of duration.

#### **Results of the experiment**

The analysis and interpretation of the results was a complex task which actually produced more questions than answers. The results are heterogeneous, but nevertheless give grounds for drawing conclusions and making some generalizations.

The general (and expected) conclusion is – **the subjectivity of the individual estimation of the duration** of the compositions. This subjectivity is visible in several instances through which the secondary aims of the experiment were realized:

- *expressing duration in exact numbers of minutes and seconds*. We expected the units of seconds to be a problematic, but more exact marker (e.g. when estimating the composition “November” with its realistic duration 2’29”). When processing the results it became obvious that most of the examinees use a number divisible by 5, i.e. that ends with a 5 or a 0. The primary school students gave 121 such answers (out of a total of 182), and the university students 156 (out of 244). We assume that this reflects the general habit of operating with numbers such as “decade”, “century”, “millennium”, as well as with “half” numbers (“half a century”, “half a year” “noon” etc). The correspondence between the correct answers and the compositions with such numbers is not coincidental (Tables 2.1, 2.2). The question remains: which time interval can be neglected in order to consider the answers as closest to the correct ones (or close among each other) when estimating music duration, i.e. is there a “zone” in the perception of time (similarly to the “zone” in music intonation, tempo and rhythm). The answer to this question calls for additional research.

- *a significant difference between the minimal and maximal estimation* – with one exception, it is larger than the duration of the work itself:

**Table 2.1. Selected markers of the answers from primary school and FMU students**

	Tchaikovsky: “November” (2’59’’)		Grieg: “Morning” (3’53’’)		Grieg: “The Hall of the Mountain King” (2’15’’)		Saint-Saens: Introduction (0’25’’)		Saint-Saens: “Kangaroos” (0’55’’)		Saint-Saens: “Aquarium” (2’00’’)		Saint-Saens: “Fossils” (1’18’’)	
	P/S	FMU	P/S	FMU	P/S	FMU	P/S	FMU	P/S	FMU	P/S	FMU	P/S	FMU
Min.	0’28’’	1’50’’	1’23’’	2’00’’	0’30’’	1’00’’	0’05’’	0’10’’	0,10’’	0’15’’	1’00’’	0’50’’	0’50’’	0’40’’
Max.	4’09’’	5’50’’	5’00’’	7’00’’	3’30’’	5’00’’	0’35’’	1’56’’	2’00’’	2’15’’	3’20’’	4’30’’	3’00’’	3’20’’
diff. – real and min.	2’31’’	1’09’’	2’30’’	1’53’’	1’45’’	1’15’’	0’20’’	0’15’’	0’45’’	0’40’’	1’00’’	1’10’’	0’28’’	0’38’’
diff. – real and max.	1’10’’	2’51’’	1’07’’	3’07’’	1’15’’	2’45’’	0’10’’	1’31’’	1’05’’	1’20’’	1’20’’	2’30’’	1’42’’	2’02’’
diff. min-max.	3’41’’ (1:9)	4’00’’ (1:3)	3’37’’ (1:3,6)	5’00’’ (1:3,5)	3’00’’ (1:7)	4’00’’ (1:5)	0’30’’ (1:7)	1’46’’ (1:11,6)	1’50’’ (1:12)	2’00’’ (1:9)	2’20’’ (1:3,3)	3’40’’ (1:5,4)	2’10’’ (1:3,6)	2’40’’ (1:5)
Average value	2’15’’ (-44’’)	3’30’’ (+31’’) )	2’58’’ (-55’’) )	3’57’’ (+04’’) )	1’43’’ (-33’’) )	2’13’’ (-02’’) )	0’17’’ (-08’’) )	0’25’’	0,45’’ (-10’’) )	0’55’’	1’40’’ (-20’’) )	2’03’’ (+03’’) )	1’18’’	1’35’’ (+17’’) )
Underestimated	25 (96%)	13 (38%)	23 (88%)	15 (43%)	23 (88%)	20 (57%)	23 (88%)	25 (71%)	20 (76%)	19 (54%)	19 (73%)	17 (49%)	17 (65%)	16 (46%)
Overestimated	1 (4%)	21 (62%)	3 (12%)	20 (57%)	3 (12%)	13 (37%)	1 (4%)	10 (29%)	4 (16%)	15 (43%)	5 (19%)	12 (34%)	9 (35%)	19 (54%)
Correct	0	0	0	0	0	2 (6%)	2 (8%)	0	2 (8%)	2 (6%)	2 (8%)	6 (17%)	0	0
Total	26	34 <sup>1</sup>	26	35	26	35	26	35	26	35	26	35	26	35

<sup>1</sup> one FMU student joined the experiment from the second composition, changing the total number of students from 34 to 35.

Since the group of professional musicians only included four students, we fully present their answers:

**Table 2.2. Answers from the professional musicians**

	Tchaikovsky: “November” (2’59’’)	Grieg: “Morning ” (3’53’’)	Grieg: “The Hall of the Mountain King” (2’15’’)	Saint-Saens: Introduction (0’25’’)	Saint- Saens: “ Kangaroos” (0’55’’)	Saint-Saens: “Aquarium” (2’00’’)	Saint- Saens: “Fossils” (1’18’’)
Prof.mus.1	8’00’’	6’00’’	4’00’’	0’30’’	0’20’’	2’00’’	1’30’’
Prof.mus.2	7’00’’	5’00’’	4’00’’	0’30’’	1’00’’	1’40’’	1’20’’
Prof.mus.3	4’00’’	4’30’’	2’50’’	0’20’’	1’00’’	2’20’’	2’40’’
Prof.mus.4	5’30’’	4’25’’	6’20’’	0’35’’	2’00’’	4’30’’	5’00’’
Average value	6’37,5’’	4’58,75’’	4’17,5’’	0’28,75’’	1’05’’	2’37,5’’	2’37,5’’
Underestimated	0	0	0	1	1	1	0
Overestimated	4	4	4	3	3	2	4
Correct	0	0	0	0	0	1	0

The results presented above show that generally there is *proportionality* between the estimations and the real duration – as opposed to the cases described by Belyaeva-Ekzemplyarskaya, who noted a large difference between the two categories (Belyaeva-Ekzemplyarskaya: 312-14)

### Categories of the duration of music perception reflected through the estimation of the duration of the compositions

According to Orlov, the type of the temporal markers of duration could determine which category of psychological time this estimation refers to:

- “minimal” markers – a reflection of the projected time (the time the listener spent in listening to the composition);
- “average” markers – a rationalized estimation of real time
- “maximal” markers – a reflection of the “observation time”, experiencing the composition deeply (Orlov)

The condition for such a classification is a thorough, “expert” listening-perceiving of music. The question is posed immediately: can this be applied to all listeners or only to “experts”? The other question is: what will be the temporal unit for noting the borders between “minimal” – “average” and “average” – “maximum” markers and can such a unit be defined at all?

Our results show that the answers generally show a tendency to *underestimation with primary school students* and *overestimation with university students* (tables 3.1, 3.2). The four *professional musicians* showed an even greater tendency to *overestimate*. (table 2.2). If we accept Orlov’s theory, we can interpret this result as a more obvious presence of the “observation time” in the numbers provided by the students and an almost exclusive presence in the numbers provided by the professional musicians. Let us recall that this estimation of duration notes the degree of “in depth” analysis of the music process, of following the music “events”, active listening “cooperation”, i.e. “expert” listening.

**Table 3.1. Tendency for underestimating or overestimating (primary school students)**

All -	6 -, 1 +	5 -, 2 correct	5-,1+,1 correct	4-, 3+	4-,1+,2 correct	4+, 3-
13	5	1	2	2	1	2
<i>Tendency for underestimating: 24</i>						<i>tendency for overestimating: 2</i>
<b>T o t a l 26</b>						

**Table 3.2. Tendency for underestimating or overestimating  
(FMU students)**

All -	6-, 1+	5-, 2+	5-, 1+, 1corr.	4-, 3+	3-, 2+, 2 corr.	4+, 3-	4+, 2-, 1corr.	4+, 1-, 2 corr.	5+, 2-	5+, 1-, 1corr.	6+, 1-	6+, 1corr.	All +
8	6	1	1	2	1	2	1	1	2	2	2	1	5
<b>Tendency for underestimating: 19</b>						<b>Tendency for overestimating: 16</b>							
<b>Total 35</b>													

It is interesting to note that with the primary school students this marker increased during the experiment, especially during the last three compositions. It reached its maximum with the composition “Fossils” – as we learnt, the students had heard it during the previous lessons, and most of them recognized it immediately.

**Table 4.1. Number of answers with an overestimation  
(primary school students)**

Tchaikovsky “November” (2’59’’)	Grieg: “Morning” (3’53’’)	Grieg: “The Hall of the Mountain King” (2’15’’)	Saint-Saens: Introduction (0’25’’)	Saint-Saens: “Kangaroos” (0’55’’)	Saint-Saens: “Aquarium” (2’00’’)	Saint-Saens: “Fossils” (1’18’’)
1 (out of 26)	3 (out of 26)	3 (out of 26)	3 (out of 26)	4 (out of 26)	5 (out of 26)	9 (out of 26)
VII	IV – VI			III	II	I

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**Table 4.2. Number of answers with an overestimation  
(FMU students)**

Tchaikovsky “November” (2’59’’)	Grieg: “Morning” (3’53’’)	Grieg: “The Hall of the Mountain King” (2’15’’)	Saint-Saens: Introduction (0’25’’)	Saint-Saens: “Kangaroos” (0’55’’)	Saint-Saens: “Aquarium” (2’00’’)	Saint-Saens: “Fossils” (1’18’’)
21 (out of 34)	20 (out of 35)	13 (out of 35)	10 (out of 35)	15 (out of 35)	12 (out of 35)	19 (out of 35)
I	II	V	VII	IV	VI	III

Does that mean, then, that the answers, according to the given numbers, include all three types of estimation? Or, the question of overestimation as a marker of “the observation time” loses its ambiguity? Certainly, over or underestimating may imply greater or lesser quality of music perception. Therefore, the underestimations of the primary school students could reflect (of course, approximately, metaphorically) a type of temporal interval during which they felt concentrated on the music. For example, in the duration estimation of “November”, some markers come close to the duration of the first part, some to the first part and the episode, etc.

On the other hand, the underestimations may designate the “trace” of various “points” of effect of the music process which left the greatest impression and “overshadowed” the impression of the entire composition in the minds of the listeners. Thus, each composition contains such “points” which affect the shorter or longer course of time. In such a way in the work “Fossils” the parameters of thematicism (several themes), tempo (change of tempo in the episodes) may contribute to the longer course of time effect, whereas the shortened refrain at the faster tempo at the end – for the shorter course of time. The work “Kangaroos” has the same quality: the continuous gradations of accelerando – ritardando and the significant role of the rest make the work “breathe” in a specific manner, they constantly “compress” and “stretch” time,

leaving space for its *ambivalent estimation* (see estimation of Prof. Musician 1 in table 2.2). In fact, it is precisely this *ambivalence* that becomes the prevailing quality of the perception of the temporal aspect of music conditioned by the general system of music means of expression, but also by the characteristics of perception and the estimation of this aspect by the listeners.

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