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Innføring i Musikkpråkets  
Opprinnelse og Struktur  
(1952)**

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# Musical structure: A translation of István Ipolyi: *Innføring i Musikkens Oprinnelse og Struktur* (1952)

Kjetil Falkenberg Hansen

## Abstract

*This article is an abbreviated and commented translation of István Ipolyi's monogram on the origins and structure of the language of music. Theories of structure in music, based on musical analysis, support assumptions that the origins of music lie in our early and primitive forms of expression, as observed in both infants and animals. Several models of musical structure are presented, which can improve our understanding of expression in music. The monogram was written in Norwegian in 1952 and published by J. W. Eides Forlag in Bergen, Norway. The translator is a native Norwegian speaker.*

## Preface

István Ipolyi's work gives a detailed description of musical structure, especially on the lower note level. Its claim is that all music can be comprehended and explained as contrasting tension and release on several different layers or aspects of musical performance and composition. Practical examples, both constructed and excerpts from the musical literature are provided, and further discussions on common musical styles and conventions supports the hypothesis. The book is structured into two main parts, "The origins of music" and "The language of music", where the first part looks at the development of music and musical expression from language and movement, while the second part offers a more in-depth analysis of musical structure as well as reading exercises for studying the presented theories.

Ipolyi was one of the sources of inspiration for the Swedish professor and violinist Lars Frydén to further explore how the musical analysis approach could be used to understand musical performance (Wallner, 1993). In turn, this opened up to a research field where the KTH rule system for musical performance has been developed (see e.g. Sundberg et al., 1991; Friberg, 1991; Sundberg, 1993; Friberg et al., 2006).

In the first part, Ipolyi takes a broad scientific approach. He connects ideas from biology, philosophy, music history, *musica practica* (Chanan, 1994), acoustics and communication. The second part is more focussed on musical analysis with some background in acoustics and perception. Several models of musical structure are presented, which together can explain the overall structure of music and even musical expression. These models are called "the language of music" and are divided into rhythmical, harmonic, motional and melodic structures.

Two omnipresent questions in the text are where "intellectual" or composed music has its origins, and whether we can understand musical structure both intellectually and physically.

István Ipolyi (1886-1955) worked as a professional violinist and participated on several recently released records with The Budapest String Quartet (Ipolyi, 1996, 2006a,b), where he played the viola from 1917 to 1935. Later, he moved to Bergen, Norway, where he wrote this book, and also a method for violin with both exercises and a theoretical part (Ipolyi, 1955). These are his only published scientific contributions.

## This translation

Ipolyi provides an interesting viewpoint on understanding musical structure that both has similarities to and distinguishes itself from contemporary publications, e.g. by Heinlein (1928), Hevner (1936), Seashore (1938), Truslit (1938)<sup>1</sup>, Schoen (1940), Pratt (1950), Capurso et al. (1952), Meyer (1956), and Zimny and Weidenfeller (1963). Also, for that time modern music analysis methods such as Schenkerian analysis, implication-realization analysis and motivic analysis (see e.g. Cook, 1987) must have been well known to him. In the book however, Ipolyi makes no references to similar work or methods, so how other ideas directly influenced his work remains an open question. Because it is written in Norwegian, few researchers have been able to become acquainted with his theories. I hope this translation does justice to the original, and that his well formulated ideas can inspire researchers even today.

Many later researchers have presented ideas that can be found here, either supportive or in opposition, and probably most were unaware of Ipolyi. For instance, many parallels can be seen between his view on musical structure and modern ones such as those of Lerdahl and Jackendoff (1983), yet there are fundamental and interesting differences. This synopsis will mostly present Ipolyi's text as it is, but also with a few references to his contemporaries and some recent researchers.

<sup>1</sup>In fact, this article is in turn evidently influenced and inspired by Bruno H. Repp's synopsis (1993) of Truslit's 1938 book, both structurally and content-wise.

Some parts are omitted to allow more thorough treatment of passages of higher importance. The text is biased toward the use of acoustical properties such as pitch, amplitude, duration and tempo to communicate emotions. This translation summarizes the around 70 pages of the original. Especially, parts discussing the 'biological' link between music/sound and the human life cycle and health conditions are shortened or left out. Some of the thoughts on these matters seem outdated or even presumptuous today, and many assertions are left unproven by the author. Also, the longer discussions on polyphonic, composed Western classical music are shortened radically.

In the second chapter, many of the numerous music examples are left out, as well as several pages of 'reading exercises' taken from the classical music lit-

erature. Figures are sometimes altered or simplified to compensate for information left out by removing surrounding figures or text. Parts of this chapter bear more resemblance to a traditional text book for music theory study with small assignments.

Most parts that are left out from the translation are commented in the footnotes. Furthermore, short supplementary explanations are given in footnotes where information is either presumed by the author or where the original text is abridged. The body of the text is thus only the translation, while all comments are collected in the footnotes. They are mainly ideas and thoughts expressed by the translator and not Ipolyi. As much as possible, the writing style and typographic style of the original is maintained.

## Part I

# Introduction to the origins and structure of the language of music

## 1. The origins of music

Until now there have been several attempts at explaining the origins of music, but without convincing results, so it is still an unresolved mystery.<sup>2</sup> Previous theories unite in the belief that music is a product of the human intellect. It seems unlikely, though, that music which affects all people in a similar way despite cultural, social and other differences can be an *invention* of man. It must be innate knowledge, with roots in the human being itself. The theory postulated here not only seems to prove this, but also provides us with a key to understanding music.

It is a well-known fact that newborns, humans or animals, cannot survive without the support of parents. For that reason, the first form of communication is to use the *acoustical organs to convey emotions*. All creatures start their life with a sound expressing suffering.<sup>3</sup> Immediately after birth an individual evolution of a sound language starts. With animals this leads no further than to expressing primal emotions as pain, hunger and anger. Birds, on the other hand, are closer to humans in their expressiveness, with poetic and musical elements<sup>4</sup> and with individuals becoming

superior to the rest of the flock in performance skills.

The human child soon has to follow the rules by which the mother interprets sounds and their emotional content. By instinct the child learns how to take advantage of the physical parameters of sounds to express its feelings, namely pitch, loudness, duration and tempo.

*Pitch* signifies the strength of the emotion in general, or the overall sensitivity:<sup>5</sup> more sensitivity — high pitch, less sensitivity — low pitch. *Sound level* characterizes the intensity of the emotion, disregarding sensitivity. The same tone will be performed louder to communicate greater emotional intensity.

The individual tones' *duration and tempo* signifies the vitality of the emotion. Long tones with pauses are interpreted as passive, negative emotions, while short tones in a fast tempo express active, positive emotions.<sup>6</sup>

*This is the hypothesis of primeval music:<sup>7</sup> Man's innate ability to express emotions with sound follows*

<sup>2</sup>Ipolyi gives no references to such studies (the original work has no references at all), but claims there are several. He divides them into two groups; studies based on basic rhythmical sensations (walking, heart-beats) and pre-language vocal origins of music.

<sup>3</sup>A study by Scherer et al. (2001) shows that the emotions *anger, fear* and *sadness* are recognized from vocal stimuli cross-culturally. Also in studies of musical development in children, e.g. Dowling (1999), this match is found. In 2-dimensional emotional spaces *suffering, distress* and *frustration* lie within the triangle drawn between anger, fear and sadness (see Scherer, 2000; Russell, 1980). Ipolyi's early assumption that even sound produced by non-experienced individuals can communicate emotions seems to have been proven by modern research in this field.

<sup>4</sup>*Art music* is specifically mentioned, most likely referring to Western classical music.

<sup>5</sup>It is not obvious how *strength of emotion* and *sensitivity* are to be distinguished in the original text. Sensitivity can be said to be the certain valence of an emotion (positive or negative), but it is a simplification. Also the *strength*, the *intensity* and the *vitality* of an emotion are used as three different descriptors. It can be argued that Ipolyi even classifies some emotions as stronger than others, though he is not explicitly saying so (closest is the claim that suffering is the first emotion).

<sup>6</sup>This perspective is in line with a current trend at that time of acknowledging that emotions are not *contained* in music, but expressed with aesthetic deviations from the regular in performance (Pratt, 1950; Seashore, 1938).

<sup>7</sup>The term *primeval music* will be used throughout the text, though other translations of the Norwegian *urmusikk* could be imagined, such as *pre-music*, *initial music* or *native music*. It is especially important to consider that primeval music here provides common descriptors of both music and communication. Primeval music is not so much the sounding result of a conscious action as an underlying set of rules by which music are interpreted.

*definite rules, based on pitch, loudness and tempo, and this ability promotes continuation of the species.*<sup>8</sup>

As the child grows and learns to communicate with language, the primeval music expression is replaced to some degree. But primeval music never loses its significance. Language evolves individually, but not independently, from primeval music. Primeval music gives the language “tone” and illustrates the emotional background for the words. It is impossible to express every emotion and feeling with words alone, because the person we are describing it for must have experienced the same emotion in order to understand it. But if we hear happy laughter, a mother praying by a child’s sickbed or the sick moaning child, we understand what the words joy, sorrow and pain mean, even if the words are spoken in a foreign language.

*Laughter*, for instance, is a phenomenon that emphasizes the richness of the emotional palette of primeval music. We may laugh from joy, fortune, love, pride, mockery, contempt or spite. Laughter and other extreme forms of emotional expression are cross-cultural behaviors we cannot easily suppress. Primeval music is thus our primal mother tongue, which we use from birth to death, whether we want to or not.

In the art of speech the conscious or subconscious use of primeval music plays a crucial role. Politicians, actors, priests and similar professionals need to know how to follow the rules of communicating emotions with simple acoustical tools, similar to those of art music, such as pitch, intervals, sound dynamics, duration and tempo. The music—language—expressiveness analogy goes even further:

#### Pitch<sup>9</sup>

Both instrumentation of music and casting of opera characters follow rules dependent on primeval music rules, where happiness and playfulness are personified by violins or sopranos, youth by sopranos and tenors, wisdom and calmness by basses.

#### Loudness

The analogy between art music and primeval music is so apparent that it is necessary only to mention some common knowledge: in a musical piece we can always detect climax and anticlimax as loud and soft. Crescendo leads upward<sup>10</sup> and decrescendo downwards. Passion is expressed with rich and large sounds — sickness and death with subdued music.

#### Tempo

Use of tempo in art music demonstrates its origins in primeval music. Tempo naming conventions like *adagio*, *largo*, *grave*, *allegretto* etc. emphasize even the

<sup>8</sup>Later studies mainly support this theory of an evolutionary explanation of music, but there are also critical studies. For a comprehensive review, see Huron (2001).

<sup>9</sup>Ipolyi starts by mentioning the similarity between periods in human life (birth—childhood—youth—adulthood—old age—death) and an overall pitch division in four groups of instrumentation and voices in music (soprano, alto, tenor and bass for choir; violin, viola, cello and double bass for strings etc.). This, he writes, *has a strong organical/biological relationship to the primeval music’s four-part structure*, but it is not explicated what this four-part structure actually is.

<sup>10</sup>to a local emotional peak

emotional character. Slow pieces have long tones and slow movements. The emotional character is serious. Short, ‘pointy’ tones chase each other in a fast tempo in the happy, merry and bold pieces.

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*The previous paragraphs emphasise clearly the accordance between primeval music and art music in tones’ meaning and capability of expression.* If the contents in art music can be said to be emotional in the same way as in primeval music, we have solved the problem of the origins of music.

Authentic information on the contents of music is restricted to what the composer can actually tell us. *Aesthetical* value of a composition is of no concern in this context, as only *what* the composer wants to express, not *how*, is interesting. In the following, the composer’s intentions will be examined.

## 2. Vocal Music

Of all music, vocal music has the most immediate effect, as its instrument is the human voice, which nature has created to express emotions. In this part of music literature, the lyrics are the content.<sup>11</sup>

## 3. Instrumental Music<sup>12</sup>

The first prerequisite for understanding every kind of music is to know its architectonic foundation. This foundation is the theme, the core of the piece. A theme is a consecutive chain of tones where composers express the basic ideas and contents in a condensed form, and there we find the key to understanding a composition. But how can we “understand” a theme? It would be impossible without having the primeval music there as an unflinching guide.

Because of all conscious and subconscious training of the musical rules for expressing emotions, it is likely that we are unable to listen to musical tones or sounds after a while without immediately decoding them based on our primeval music comprehension. That is also how we (subconsciously) interpret the melodic intervals, durations,<sup>13</sup> loudness and tempo of a theme.

We use the same principles for understanding a painting, or any visual image, as music: we look for the motif or theme, or try to build such constructions from fragments of patterns or sounds. When we listen

<sup>11</sup>Ipolyi assumes that a composer builds the music around the lyrics, regardless of musical style (he mentions religious works, opera, romances, folk songs, ‘popular’ uncomplicated music). All lyrics are considered to be emotionally expressive and meaningful. Non-verbal vocal music or vocal music with other kinds of lyrics (e.g. with nonsensical or unintelligible text) are not discussed.

<sup>12</sup>This chapter is divided into Programmatic Music and Absolute Music, but programmatic music is omitted in the translation as it is not widely discussed. One observation is that the listeners’ knowledge of a program/context may amplify the emotional effect of otherwise neutral musical elements.

<sup>13</sup>The translation reads “relationships in duration”. The widely used term inter-onset interval, or IOI, was already known (Woodrow, 1951), but is not mentioned here. However it is clear that it is valid to relate discussions of ‘relationships in durations’, ‘articulation’ and ‘tempo’, to IOI.

to a chain of tones, we ask first of all: What do the tones express?

When we see a broken pattern, cracks in a wall or unstructured line drawings, we unconsciously try to construct an image from what we see. Likewise, we always hear some meaning, feeling or mood expressed in every set of sounds reaching our ears.<sup>14</sup>

Turning back to the theme, we see that because of our intuitive knowledge of primeval music, we instantaneously and fully understand all music that only consist of melodic themes.<sup>15</sup> Included in this music are most vocal music (hymns, psalms, motets, chorals), dances, folk songs and romances. It makes no difference to our understanding whether it is sung in its original form or played instrumentally. We do not need text to comprehend music comprised of only melodies. This is the reason why the great production of easy music<sup>16</sup> is so popular, and thus undemanding, whether it is vocal or instrumental.<sup>17</sup>

From the seventeenth century instrumental music started to evolve in a different direction to vocal music. Melodically and rhythmically characteristic fragments and alterations of themes are used to make links and bridges between the real themes or parts of larger compositions. These small fragments are called motifs<sup>18</sup> and are used to maintain both the emotional and formal/structural contents of the composition. The advancement of instrumental music is established on the interaction between the intense emotions of themes and the formal (intellectual) framework. In polyphonic music, the intellectual formality becomes more important than the emotional aspects, and this tendency continues in the further evolution of art music towards the strict polyphonic compositions.<sup>19</sup>

In reality there are no composed music pieces without a mixture of both emotional and intellectual, formal elements. This interrelationship calls for a certain approach from the listeners. Just as we cannot understand emotional elements in music only with our intellect, we cannot understand the polyphonic music formal structure instinctively, only conditioned on our innate knowing of primeval music. Listeners expecting to get emotional impressions from listening to polyphonic music will be equally disappointed as the

<sup>14</sup>This need not be musical sounds, but also everyday sounds and alarms. Further studies by e.g. Gaver (1993) and Avanzini et al. (2004) explore the similarities between musical and everyday sounds.

<sup>15</sup>Here it is assumed that such music is undemanding, simple and straightforward.

<sup>16</sup>Salon and jazz music is explicitly mentioned repeatedly in the text, but there are reasons to include all kinds of melody-based popular music into this, as this position reflects the current trend of separating art music from popular music, made explicit later by e.g. Adorno (1958).

<sup>17</sup>These statements are not entirely coherent with the earlier notion on lyrics being the most/only important aspect of vocal music. Lyrics are to be considered by themselves, not as part of the music. Therefore a piece will have larger impact when the words are sung than when it is played instrumentally, even if we can still fully understand the melody without lyrics.

<sup>18</sup>For the remainder of the text, there will be no significant distinction made between melody, theme and motif; even *episodes* and other terms are introduced. Consistently rather short series of tones are analyzed rhythmically and tonally, regardless of the term used, so this adaptation will do the same, always choosing the closest translation.

<sup>19</sup>I.e. 12-tone and atonal music.

listeners expecting intellectual impressions from the homophonic music.<sup>20</sup>

We can see this contradiction even in the music structure, since homophonic music is horizontally aligned (or understood), and polyphonic music is constructed and has its effect on the vertical axis.<sup>21</sup>

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Mans' talent in communicating emotions using sound supports and serves the survival instinct, or why else should we have such developed acoustical instruments as the voice? *Suffering is the first emotion that is expressed.* All other emotions are developed from this as they are experienced.<sup>22</sup>

The means to communicate emotions are: pitch, loudness, short and long tones and tempo. This is the primeval music.<sup>23</sup>

Moreover we found that art music uses the exact same expressive tools as primeval music, and that its content also expresses emotions, but in a different form. Art music is constrained expressively in the formal structure, where more elaborate structures limit the emotional contents.

As we cannot abstain from the influence of primeval music, there will always be traces of emotion in even the most complicated tonal constructions. In that way, art music is always communication of emotions in an aesthetic way.

*Art music is nothing but primeval music in poetic mold, while primeval music is the prosaic framework of art music and must be considered to be its origins.*

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<sup>20</sup>By homophonic is meant melody-based. So it seems that understanding music and getting impressions from it (or being affected by it) should be closely related. Understanding is the result of the innate knowledge of musical processes, but it remains unclear in the context if the capability can be trained and expanded, and if people have different predisposition for understanding. Also, more recent research is much less categorical in dividing music into emotional and intellectual elements (e.g. Juslin and Sloboda, 2001).

<sup>21</sup>All polyphonic music regarded here is available for studying in its symbolic form, written down with common music notation. Of course both polyphonic and homophonic music are listened to in the time domain, what is here called the "horizontal direction". It is only the compositional (and analytical) process that takes place in the vertical axis. Later studies point at different aspects on perception of polyphonic music, e.g. Gregory (1990) presumes that polyphonic music is perceived as two or more separated simultaneous auditory streams.

<sup>22</sup>Ipolyi stresses that this is why music communicating sadness, sorrow, concern and suffering has the deepest impact on listeners, and that such music will put us in direct affinity with the musical source, as it was born within us. No proofs or supporting experiments of what music affects us the most are presented, though. While this claim is not the major issue for this reading of the text, it is a pivotal point in this Chapter. Contrasting his theory, Bingham had previously found in an extensive experiment with 20,000 subjects rating emotional content in 290 recordings that negative emotions (e.g. fear, jealousy, envy) were conspicuously absent (from Schoen, 1940; in Capurso et al., 1952). More recent research justifies the claim that negative emotions are experienced in music at an early age (Kastner and Crowder, 1990; Giomo, 1993; Gerardi and Gerken, 1995). Boone and Cunningham showed that children can, from the age of 4, identify sadness in performances (1998) and produce movements identified as sad performances (2001). Identification and production of fear, happiness and anger appear about one year later.

<sup>23</sup>or rather: ...the origins of music.

## Part II

# The language of music

In art music the use of pitch, duration, tempo and loudness is strongly limited by style regulations.<sup>24</sup> While primeval music streams without organization and form, music as we know it today consists of individual tones connected by certain principals and rules to create a unity. The language of music is aimed at explaining how tones are tied together and how the musical phonemes, words and sentences are constructed.<sup>25</sup>

### 1. Rhythmic structure

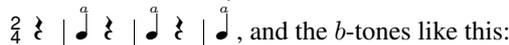
Printed notes give a false image of music. On paper, music is represented by notes in two dimensions, but in reality music exists only in the time domain. The tones seen in a bar are not several tones, but different phases of one single tone's motion in a given space of time.<sup>26,27</sup> This way of considering a sequence of tones as the movement of one tone will be consistent throughout.

How we perceive a sequence of tones rhythmically depends on the bar framework it is put into.<sup>28</sup> The primary goals are to understand what barlines denote and something about the relationships between tones in a bar.

As a starting point we choose this form:<sup>29</sup>



If we look at only the *a*-tones like this:



and the *b*-tones like this:



<sup>24</sup>Considering only Western classical music, this study is limited to the chromatic scale and standard note length representations of written scores. Even tempo and loudness are bounded to the stylistic ideals of this type of music. More recent research (Friberg et al., 1991) indicates that the rules derived from studies based on this restricted music can be applied to music that falls outside this scope (and, indeed, non-musical forms of communication such as facial and gestural expressions).

<sup>25</sup>When the music is said to communicate emotions in this context, it is meant not in the performance, but within the construction or score. In general, all the tools and models accessible to the composer that will be discussed can be emphasized and taken advantage of in the interpretation by a performer (cf. Sundberg et al., 1989).

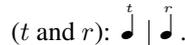
<sup>26</sup>This is an interesting, but rather simplified understanding of the pitch/time dimensions in music.

<sup>27</sup>The translation follows closely the original text in using *tones* and *notes* exclusively. Tones are often considered a sounding representation of a musical instance (e.g. one plucked string), while notes are abstract or graphical representations of the same. The term *note* is used very sparingly, indicating an intentional bias. Whether there actually is a semantical distinction between the two terms or not is left to the reader to decide.

<sup>28</sup>Some examples are given with various groupings of 6 tones in different time signatures. Grouping and rhythmical structuring is of course still a big research field in musical perception (e.g. Lerdahl and Jackendoff, 1983; Desain et al., 2000).

<sup>29</sup>Letters over notes, e.g. 'a' and 'b' are structure indicators.

several bars, or just stopped at any point, without disturbing the sense of *release*. With the *b*-tones we get an impression of breathlessness, distress and tension. Even this motion can be continued or stopped without altering the tension. This mean that we can see the above example as three figures of tension—release

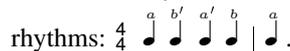


(*t* and *r*): A tone moving from one bar to the next goes through a *rhythmical process*. Close to the barline the tone is filled with tension. Crossing the barline, all tension is released and the tone is calm. Toward the next barline the tension builds up once again. Such units of tension—release tones will be called *rhythmical motifs*. A bar can therefore not be considered a rhythmical entity.<sup>30</sup>

The tension builds up steadily during the rhythmical entity, so even single tones will go from being calm to tension-filled. At the beginning of a bar, the tension-value is 0 units, while at the very end of the bar, the value is 3 units.<sup>31,32</sup> *These numbers must be understood as symbolic values only.*

#### 1.1. Rhythmic structure in 4-part rhythms

The same principle of tension and release as constituents of rhythmical entities also applies to 4-part



rhythms: It looks like the  $\frac{4}{4}$ -bar is just a double  $\frac{2}{4}$ -bar, but since composers denote them exclusively, there surely must be a difference?

The answer comes from the study of 2-part rhythms where the tension from *a*—*b* is steadily increasing from 0 to 3 units. Half-way into the progress lies *b'*—*a'* where the tension of *b'* will be half of *b*, and *a'* will be a release of the built up tension, but *a'*

<sup>30</sup>It should be emphasized that the bar is not considered differently than in common music theory, or unimportant, but here the rhythmical units of music consist of the building up of tension from calm to tense, with a sudden fall to calm again. This sawtooth-like movement will go across barlines, and the smallest unit is two tones on each side of a barline.

<sup>31</sup>The *tension-values* of 0-3 units will be used to illustrate the intensity of the tension, and are not measured values. Ipolyi uses the units somewhat confusingly, as is evident in the 3-part rhythm

later in the chapter which looks like this:  $\frac{3}{4}$  First tone has an initial value of 0, second tone an initial value of 1, while the tension-value 3 is located at the very end of the third tone. Therefore all tension units must be considered relative to the start (0 units) and end (3 units) of each bar. Tension-values follows a continuous scale with occasional decimal values.

<sup>32</sup>This definition of tension and release is seemingly the opposite of later theories by e.g. Lerdahl and Jackendoff (1983) where bars start with tension moving towards release.

is at the same time in the middle of the overall process and contains more tension than  $a$  (0 units).  $b-a$  and  $b'-a'$  is the primary respectively secondary rhythmical peak or peak motif.

A bar with several tones will thus have more motifs, and each of the motifs will have an intensity that correlates with its position in the bar. But regardless of how many motifs there are, the peak motif will always have the same intensity. On the barlines, this intensity is 3 units. With growing numbers of motifs per bar, and with higher tempo, it becomes harder to distinguish differences in intensity, and in the end we might only notice the most intensive nuances.

#### 4-part rhythms with different durations

It is easy to find the structure in a bar with mixed durations since we know the intensity value of each tone. Two neighboring tones of the same duration can originate from one longer tone divided in two, or from the

halves of two tones divided in two:  $\overset{a}{\downarrow} \overset{b}{\downarrow} = \overset{a}{\downarrow} \overset{b'}{\downarrow} \overset{a'}{\downarrow} \overset{b}{\downarrow}$ . Tones  $a$  and  $b'$  originate from the same tone, while  $b'$

and  $a'$  from two different. Tension in  $\overset{a}{\downarrow} \overset{b'}{\downarrow}$  is always rising, and tension in  $\overset{b'}{\downarrow} \overset{a'}{\downarrow}$  is always falling.

So we see that a group of two tones with increasing tension is part of different motifs, while a group of two tones with decreasing tension is part of the same motif.

In fast passages, though, difference in tension between two tones of the same origin can be too small to notice, so the neighboring tones have the same tension-value as the origin:<sup>33</sup>  $\overset{0}{\downarrow} \overset{2}{\downarrow} \overset{1}{\downarrow} \overset{3}{\downarrow} | \overset{0}{\downarrow}$ .

### 1.2. Rhythmic structure in 3-part rhythms

Following the reasoning above, 3-part rhythms will have these tension-values  $\frac{3}{4} \overset{a:0}{\downarrow} \overset{a':1}{\downarrow} \overset{b:3}{\downarrow} | \overset{a:0}{\downarrow}$  and can have two different motif-structures:  $a'-b-a$  or  $b-a-a'$  if the harmonic content is the same for  $a'$  and  $a$ .

If a bar consists only of eighths, the situation

changes:  $\overset{a}{\downarrow} \overset{a'}{\downarrow} \overset{b}{\downarrow} | \overset{a}{\downarrow}$ .<sup>34</sup> The tension-value, as always, correlates with the tone's position in the bar.

#### 3-part rhythms with different durations

Again, tempo determines the structure of bars with mixed durations. A slow tempo will reveal the tension nuances between neighboring tones, while a high tempo will make us group the eighths in pairs. A slow and fast passage is experienced differently:

*adagio*  $\frac{3}{4} \overset{a}{\downarrow} \overset{a'}{\downarrow} \overset{b}{\downarrow} | \overset{a}{\downarrow}$  and  
*presto*  $\frac{3}{4} \overset{a}{\downarrow} \overset{a'}{\downarrow} \overset{b}{\downarrow} | \overset{a}{\downarrow}$ .

<sup>33</sup>Numbers over notes are tension units or values.

<sup>34</sup>The curved brackets over the notes group them, but they are not tied notes.

Other rhythms and combinations follow the same rules. If  $\downarrow$  is exchanged with  $\downarrow \downarrow$  or some tones are replaced with rests, the rhythm often becomes more animated, as the differences in tension stand out as more isolated and clearer.

### 1.3. Irregular rhythms

Irregular rhythms, such as  $\frac{5}{4}$ ,  $\frac{7}{4}$  or  $\frac{11}{4}$  are all constructs of 2-, 3- or 4-part rhythms.<sup>35</sup>

### 1.4. The hidden tension and its meaning

The principle of tension—release as foundation for rhythmic structure also has another important implication: it provides the key to understand the nature of all rhythmic efficacy.

In the following example the whole note in the first bar is positioned close to both left and right barlines:

$\frac{4}{4} \overset{0}{\downarrow} | \overset{0}{\downarrow} \overset{2}{\downarrow} \overset{1}{\downarrow} \overset{3}{\downarrow} | \overset{0}{\downarrow} \overset{1.25}{\downarrow} \overset{0.75}{\downarrow} \overset{2}{\downarrow} \overset{1}{\downarrow} \overset{2.25}{\downarrow} \overset{1.75}{\downarrow} \overset{3}{\downarrow} | \overset{0}{\downarrow}$ . Therefore the long tone must start as calm and build up tension steadily for its whole duration. Every tone contains all nuances of tension, with tension-values corresponding to the position in the bar. If a long tone is interrupted somewhere in the bar, there will be higher tension on the left side of the discontinuity than on the right side. In other words, a motif is created. If we continue to break up the long tones to shorter ones, the rhythmical character becomes more pronounced with more motifs. However, when the tones are getting very short,<sup>36</sup> the rhythmical processes in the short motifs will have too little intensity to be clearly distinguished:

$\text{c} \overset{0}{\downarrow} \overset{1.25}{\downarrow} \overset{0.75}{\downarrow} \overset{2}{\downarrow} \overset{1}{\downarrow} \overset{2.25}{\downarrow} \overset{1.75}{\downarrow} \overset{3}{\downarrow} \text{c} \overset{0}{\downarrow} \overset{1.25}{\downarrow} \overset{0.75}{\downarrow} \overset{2}{\downarrow} \dots$

We have now seen two conditions that determine the effect of rhythmic structure: The intensity of the motifs and a tempo suitable to perceive them. A third condition is that the hidden tension<sup>37</sup> should have a release, preferably on the primary rhythmical peak. For instance,  $\overset{a}{\downarrow} \overset{a'}{\downarrow} | \overset{b}{\downarrow}$  is more remarkable than  $\overset{a}{\downarrow} \overset{a'}{\downarrow} \overset{b}{\downarrow}$  because the tension is released at the primary peak in the first figure.

The fourth condition for increased rhythmical stamina and power is the blending of different figures, so that the contrast between the different mechanisms mutually intensifies and makes the impression livelier than if using homogeneous rhythmical figures.

### 1.5. Syncopations

A syncopation is a tone that lies symmetrically or unsymmetrically on both sides of a rhythmical peak: here

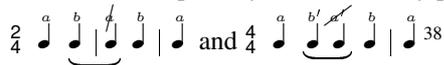
<sup>35</sup>It is not explicitly suggested anything on how to interpret irregular rhythms in this short chapter, but there seems to be no reason to treat them differently than regular rhythms, as long as they can be divided in their 2-, 3- and 4-part components (for instance, a  $\frac{7}{4}$  bar

is often written and played  $\frac{2+2+3}{4}$ :  $\frac{7}{4} \overset{a}{\downarrow} \overset{a'}{\downarrow} \overset{b}{\downarrow} \overset{c}{\downarrow}$ ).

<sup>36</sup>i.e. the tempo is high

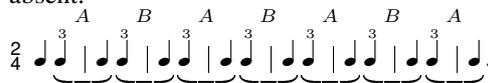
<sup>37</sup>The tension being built up in a long tone.

around first the primary then secondary peak:



Syncopations are fusions of two tones in tension—release pairs (in other words, a *b*—*a* motif). Because of the fusion, we cannot hear the release-tone, and this is why syncopations have such an impact on the listener. As the above example shows, a syncopation, already a tension-filled tone, must be followed by another tension tone. The tension in a syncopation is therefore of a higher degree than a normal tension tone, and makes the syncopation a rhythmical dissonance.<sup>39</sup>

Even structurally, syncopations behave differently. In a row of several syncopations, we do not find the usual motif structure, as the foundation for this — difference in tension between neighboring tones— is absent:



Syncopated motifs must occur in *B*—*A* pairs, since we know that the first syncopation is an ending tone.<sup>40</sup> Also, the differences between 2-part and 4-part rhythms becomes evident with syncopations: in 2-part rhythms there is only one kind of syncopations, the ones occurring across a barline. In 4-part rhythms the syncopation occurs both in the middle of the bar and across barlines. On barlines, the syncopation will have 3 tension units, while in the middle of a bar only 1 unit. The syncopated motif starts on the tone with 3 tension units and ends on 2 units:



Everything we have discovered in this section — the role of barlines, rhythmical relations of tones, rhythmic structure, the hidden tension, and finally, the very nature of rhythmic efficacy— is deduced from the principle of rhythmic tension and its release.

## 2. Harmonic structure

Harmony is no longer a strict rule system that composers must adhere to. All regulations on tonality and harmony have today only historical interest. Modern composers accustomed to atonality, poly-tonality and twelve tone music treat all chords equivalently. But if dissonance—consonance can be defined as identical to harmonic tension—harmonic release, it is clear that the structural principle of tension—release can also be applied to harmonic elements.<sup>41</sup>

<sup>38</sup>Syncopations are marked with curved ties under the notes.

<sup>39</sup>Even though syncopations are claimed to be of a higher degree (or literary ‘risen to a higher power’ as it is actually written), the values for tension are the same for syncopations as other tones.

<sup>40</sup>Meaning it should release the tension from previous tone.

<sup>41</sup>This chapter begins with an introduction to Western music harmony which is omitted here. In short, acoustical properties of sounds from traditional instruments defines our perception of consonance and dissonance. These physical laws of acoustics are preserved in the chromatic scale. Further, Ipolyi will use the term ‘tone’ about both homophonic tones and polyphonic chords in the Chapter on harmonic structure.

Unlike rhythmic structure, harmonic structure is not restricted to barlines or rhythmical peaks, and there is no implicit momentum that leads harmonic tension towards its release. A change from one chord to another will necessarily create a motif of harmonic tension—release, but it does not need to co-occur with rhythmic tension—release.

Any tone will be in one of four different states in the rhythmic-harmonic system.<sup>42</sup> When equal values of tension for rhythm and harmony are held in a tone, the effect of the tone increases. When the values are unequal,<sup>43</sup> the qualities oppose each other and reduce the effect and significance of the tone. If the harmonic and rhythmic peaks are not coinciding, the passage will be meaningless, not acceptable in stylistic terms, and will even leave a sense of discomfort in the listener.

These considerations only apply to classical harmony. Entering atonality, we will soon be led astray as the overwhelming amount of dissonant chords cannot be classified *objectively*.<sup>44</sup>

## 3. Structure of motion

Motion motifs exist when a succession of tones with equal duration is terminated with either a longer tone

or a pause: . It is easy to appreciate the structure of the motion motifs. As long as the succession of tones of equal duration continues, the tension continues. Tension intensity depends on the tempo.

A motif can be only two tones or as long as a whole piece, the so-called “Moto Perpetuo”, where all the tones in the piece build tension toward the very last tone.

Motion motifs are independent of rhythmic and harmonic elements, but their combined quality in each tone will increase or decrease its impact on the listener, as was the case with harmonic motifs.

In a prolonged motif, shorter units or motifs can be defined based on for instance melodic structures. Often it is the case when a sequence opposes the defining rhythm:



Such structures, where for instance 3-tone sequences run across the clear 4-tone rhythm, can be classified as rhythm polyphony. Bach and his contemporaries used them to liven up long, monotone motifs. In modern compositions, especially in jazz music, rhythm polyphony has evolved into an art form.

<sup>42</sup>Rhythmic+Harmonic tension, R+H release, R tension and H release, R release and H tension.

<sup>43</sup>e.g. high harmonic tension and low rhythmical tension

<sup>44</sup>When this was written, music analysis of atonality and poly-tonality was still quite a novel research field without developed methods, which is why less tonality-orientated music is left out. This chapter is, in perspective, less detailed and practicable than the previous on rhythm.

## 4. Melodic structure

The amount of tension is the same for melody tones as for harmony tones. The tonic has no tension, the third and the fifth have only some tension, and then the rest of the scale tones follow with increasing tension.

Intervals have the same tension-values, qualitative and quantitative, regardless of the horizontal (melodic) or vertical (harmonic) alignment. Melodic structure, like previous structure principles, is independent. One single tone can for instance be melodically tension-filled, while tension-less in rhythm and motion.

Melody and in some cases the theme is hence the most important grammatical unit in music.

Melody has a special structural organization of architectonic significance that is only partly found in themes.

Despite the close relationship between melody and theme, these two differ in both character and construction.

Melodies, built up by groups of motifs, can be structured in “super-bars” called *periodic bars*. The smallest unit in periodic bars is one bar. Periodic bars follow the same logic as normal bars: immediately to the right of the barline is the tension-less bar in the period, while to the left of the periodic barline is the most tension-filled bar.

To understand the periodic structure of a melody, we must first find the right placement for the periodic barlines.



It seems natural to place the periodic barlines after bars four and eight, but the tension-less bar must be on the right side of the line. It must therefore be between bars seven and eight, and likewise the first periodic bar must be between bars three and four:



We see with some surprise that the melody does not start on the first but the second beat<sup>45</sup> in the periodic bar. This means that there exists an imaginary rest in the beginning of the melody:



If we compare the two-tone motifs encompassing each periodic barline<sup>46</sup> we see that with periodic barlines between G-F and C-(G), the motifs are meaningless and lack any rhythmical imprint. On the other

<sup>45</sup>Ipolyi calls each normal bar in a periodic bar a *beat*.

<sup>46</sup>Respectively, G-F and C-(G) in the first of the three previous examples and A-G and D-C in the last. The (G) is the following tone in the melody.

hand, with the imaginary empty bar, the motifs bring logic and coherence to the short piece, and even a peculiar attractiveness.

Thus, musical pieces can be structured in two layers: an inner construction and a coating. The inner construction is all of the structural elements<sup>47</sup> while the exterior is the bar motifs and the whole melody as a periodical motif.

Bar motifs behave similarly to smaller groups of tones with their tension relations of tension—release.<sup>48</sup>

It may seem a coincidence that the melody of the previous example starts with a non-existent silent bar, but it is the contrary. It is almost impossible to find a melody among the works by the great composers that start on the first bar of the period. On the other hand, many melodies start with a short or long “up-beat”. *This upbeat is always in the first bar of the period* and thereby fills the void before the melody really starts.

We have now seen the dominating role that the principle of tension—release plays in all the grammatical forms discussed. But not only that, this principle govern practically all musical types, including the most developed.<sup>49</sup>

Even in a larger perspective is it obvious that the principle of tension—release is universally applicable. Of the architectural forms<sup>50</sup> of A—B—A we can generally assume them to have a peace—tension—peace structure. More recent composers treat these forms more freely and develop individual varieties on classical models.

We have to consider the simple rhythmical principle:  as the all-embracing principle of everything relating to the language of music, from the smallest to the largest forms.

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<sup>47</sup>Rhythmical, harmonic, motion and melodic.

<sup>48</sup>This analogy is followed even further. Melodies can have different amount of bars in each period, and the periods can further be of higher or lower intensity, as previously demonstrated for primary and secondary peaks (Section 1.1). Periodical bars are typically divided into two or four parts, and only occasionally into three. Other variants can always be seen as combinations of these.

<sup>49</sup>By ‘most developed’ we may assume means 20<sup>th</sup> century compositions, or also the most developed music *within* a certain style, e.g. baroque style.

<sup>50</sup>The text discusses song, sonata and fuga to some extent.

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