

## Categories Inspired by Linguistics and Cognitive Psychology as Useful Tools in Music Analysis, Based on the Example of *In Croce* (1979) by Sofia Gubaidulina

**Abstract.** Since her emigration, in 1992, when her music entered the repertoire of the major European festivals, the quantity of musicological and popularising publications about the Russian composer Sofia Gubaidulina has been quite impressive. She became the main theme of various synthesising discussions, historical works, theme-based studies of her output as well as popularising texts. All of them have focussed on the key issues signalled in the composer's published utterances. Additionally, they have also concerned Gubaidulina's fascination with the relations between numbers ordered in specific sequences (e.g. Fibonacci, Lucas) and the metaphoric interpretation of the tone qualities of instruments and specific combinations of sounds. Yet it has not been highlighted how Gubaidulina realises the principle of contrast – so crucial in her compositional poetics – in the shaping of the distinctive narrative and design of her works and how she links that principle with her preferred numbers determining the proportion between the duration of successive (or selected) formal entities.

It would seem that categories inspired by linguistics and cognitive psychology, such as auditory scene, mental representation, sound form and cognitive prototype, might be useful tools for describing the properties of Gubaidulina's composition technique. It could be done in respect of the shaping of musical time and the specific qualities of the analysed sonority from the point of view of the effect of similarity and contrast, the impression of caesura and climax and their location within a particular work.

The present text represents an attempt to use cognitive tools to show regularities in the technique used in Gubaidulina's composition *In Croce* and to define their significance for the aesthetics and style of her works written during the seventies.

**Keywords:** Gubaidulina, sound form, interval prototype, auditory scene, *In Croce*.

### Basic terminology

The term 'auditory scene', referring to the mechanisms of our memory and attention, and understood as a mental representation (Sloboda 1986) of a given musical work, was introduced during the 1990s by Albert S. Bregman (Bregman 1990). The basic structural unit of the auditory scene is the 'sound form', which may be repeated, and its identity is determined by an analogical prototype (or invariant). Thus various 'sound forms' succeed one another on that auditory scene. In addition, contrasting sound forms can be set together and create the impression of simultaneous strands of musical action.

Thus the distinction of the basic units of construction is linked to *Gestalt* psychology. The duration of the larger, hierarchically differentiated formal units (sections, movements) is dependent on the effect of caesura. The term *Gestalt* was introduced into psychology by Max Wertheimer (Wertheimer 1924: 301–389), and it is interpreted here both as an entity forming a basic structural unit with a definite duration and also as a specific timbre dependent on performance means, the register and motion of pitches and also horizontal and vertical interval structures. Perceptually experienced *Gestalten* allow us to compare auditive perceptions with the notation of the score, partly with the aim of distinguishing the dominant interval structure.

So the description of Gubaidulina's works will draw on a few main features. First of them will be the notion of the sound form, the prototype (root) of which may be, for instance, a long note (chord) or repetitions of the same note (chord), a pitch motion figure with a stable interval structure or a similar contour to the changes of direction (up and down the pitch scale). In the second step the analysis will focus on sets of notes with a stable morphology or a similar dynamic to the changes in the interval structure. And finally, it will describe a specific tone colouring connected with the rapid, almost non-selective motion of notes within a particular segment of the chromatic (or diatonic) scale and conditioned by the register of pitches and by the timbre and articulation of instruments.

Also the metaphor of the figure and the ground is useful for describing the construction of Gubaidulina's music – terms introduced into *Gestalt* psychology in the early twentieth century (Stockwell 2002: 17–22). In many instrumental compositions, the sound material splits into a distinctive, dynamic sound figure and a stable, often non-selective, acoustic 'ground', realised in contrasting registers and with different articulation. The notional schemes or images of this work enable us not just to define the structural features of Gubaidulina's music, but also to capture its stylistic regularities. Adapting terms from other scientific disciplines can be useful for analysing both Gubaidulina's scores and works by other composers.

### The prototype and its application

The notion of the prototype is linked to the new cognitive theory of categorisation proposed by the American scholar Eleanor Rosch (Rosch 1978). That theory arose out of wide-ranging empirical studies in psychology. As we know, psychology distinguishes syncretic and sequential observation. In a syncretic way, we register simultaneously all those elements of the observed reality, which attract our attention and take the form of figures with some shape, colour, dimensions, position, etc. In the theory of music of this type, auditory experimentation is associated with the notion of polyphony. Sequential observation, meanwhile, is a process in which particular aspects of the 'auditory scene', its 'sounding figure', are observed in a specific order, imposed by temporal parameters. Such a sequence of distinguished 'figures' or units of musical construction, has underpinned the construction of various formal models of the musical work. So the prototype is a cognitive structure that can be referred to some 'sound form' (a segment of an auditory scene) and a cognitive 'reference point' enabling us to capture similarities between sound forms.

Analysis of Gubaidulina's compositions written after 1979 enables us to distinguish two types of sound form: 1) euphonic horizontal-vertical sets of notes, constructing a basic unit, that is, sound forms dominated by diatonic pitch motion figures and consonant combinations of notes, and 2) non-euphonic horizontal-vertical sets of notes containing chromatic sequences of notes, non-selective glissandos or note clusters.

|  | Euphonic sound form  | Non-euphonic sound form  |
|--|--|--|
| TONE QUALITY   | <ul style="list-style-type: none"> <li>- constant sound prototype with a definite and repeatable interval structure</li> <li>- note permutations derived from musical tradition (retrograde, inversion, etc.)</li> <li>- simple melodic writing, based on segments of modal or major-minor scales</li> <li>- lack of sophisticated effects of sonority and articulation</li> </ul> | <ul style="list-style-type: none"> <li>- lack of constant interval prototype</li> <li>- no such permutations</li> <li>- notes of indefinite pitch; chromatic scale with indefinite or changing centre</li> <li>- additional effects: clusters, noise, differentiated articulation</li> </ul> |
| DURATION AND ORGANISATION OF SEGMENTS OF A COMPOSITION | <ul style="list-style-type: none"> <li>- notation in a definite metre, strictly defined note values</li> </ul>   | <ul style="list-style-type: none"> <li>- indefinite metre, 'approximate' rhythmic values, duration defined in seconds or <i>ad libitum</i> sections</li> </ul>   |
| METRE-RHYTHM   | <ul style="list-style-type: none"> <li>- simple values: crotchets, quavers, minims, dotted crotchets</li> </ul>  | <ul style="list-style-type: none"> <li>- differentiated values, bringing disorder to rhythm; polyrhythm</li> <li>- non-mensural metre</li> </ul>   |

The highlighted contrast between sound forms refers to such categories as temporal relations, metro-rhythmic phenomena, note pitches, dynamics and articulation.

#### *In Croce* (1979) for cello and organ (accordion)

*In Croce* (1979) was commissioned by the outstanding cellist Vladimir Toncha, a good friend of the composer, and is dedicated to him. In the concert repertoire, this work exists in two versions, differing with regard to forces: the original version scored for cello and organ and a later transcription (1991) for bayan and cello made by the bayanist Elsbeth Moser; it is considerably more popular and more often performed. The present analysis will refer to the original version of this work.

In formal terms, *In Croce* refers to a traditional ABA<sup>1</sup> reprise form. Section A comprises three distinct segments. The first segment begins with a euphonic sound form presented by the organ, shaped on the basis of two prototypes contrasting with one another in terms of intervals: a seconds-based prototype, of the character of a drone ostinato, and a variable chordal prototype. Perceiving this segment as a closed entity gives a beginning and an end on the note *e*.

The effect of development is obtained through rhythmic permutations based on a fixed pattern and modifications of the pitch material. In order to compare two structures binary opposition becomes a crucial point: the dissonant character of the former and the consonant character of the latter. Placing them both in an atypical high register gives an interesting result: the effect of a 'bell' sound.



Example 1. Sofia Gubaidulina, *In Croce*, No. 1, euphonic organ prototype

t. 1-6  
t. 9-13  
t. 16-20  
t. 24-27

Example 2. Sofia Gubaidulina, *In Croce*, euphonic prototype and his development



Example 3. Sofia Gubaidulina, *In Croce*, No. 1, organ euphonic prototype

t. 7-8  
t. 14-15  
t. 21-25  
t. 29-30  
t. 38-41  
t. 47  
t. 81

Example 4. Sofia Gubaidulina, *In Croce*, organ prototype and his development

The compass of the discussed sound form covers an octave, and it employs a spread A major triad. Successive repetitions are not identical: minor alterations are introduced, such as rhythmic subdivision and the use of irregular groupings. These modifications do not determine the change of the sound form, since its distinctive construction, its retention of the prototypes standing as the principle of the alternating repetition, and its departure from and return to the note *e* – all these aspects serve as factors that determine the similarity between successive modifications.

The part of the cello, like the organ part, is based on two contrasting sound prototypes (see examples 5a and 5b).

Modifications introduced in the interval prototype refer to typical polyphonic modifications: inversion, retrograde. In the cello part, the constant element is not the rhythmic scheme but an interval structure that is developed through polyphonic modifications. The prototypes are either consecutive or interlocking (the last note of one structure is the first note of the next). In the graphic representation, the different interval prototypes are marked in different rims.



Examples 5a, 5b. Sofia Gubaidulina, *In Croce*, No. 5–6, interval prototype of cello's: 2> – 6 and 2> – 2>

Example 6. Sofia Gubaidulina, *In Croce*, modification of interval prototype 2> – 6 and 2> – 2> in cello's part; O – Original, R – Retrograde, I – Inversion, IR – Retrograde Inversion

The contrast between the instrumental parts is highlighted on the level of oppositions in the melody, rhythm and articulation. The organ employs almost exclusively a high register and *legato* articulation; the development of the sound form over long segments without any distinct caesura gives the impression of duration and continuity. The cello's phrases use a low register and are characterised by an irregular form and fragmentary profile.

Quarter-tone intervals are introduced into the cello part. Intervals are differentiated into  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  of a note, marked in notation as follows: .

The effect of contrast is enhanced by the rhythmic structure of the prototypes of both instrumental parts. On one hand, we have 'regularity', small and strictly defined values realised in the organ part; on the other, we have long values and a lack of repeated rhythmic patterns in the cello part. The element that highlights the contrast between the two parts is articulation: its homogeneous character in the organ part (constantly *legato*) and its varying character in the cello part, including *arco*, *glissando*, *sul tasto* and *sul ponticello*.

An analogous principle behind the structure and development of the work is present in the cello solo cadenza. The interval prototypes affect both the horizontal and the vertical structures (see Ex. 7).

Example 7. Sofia Gubaidulina, *In Croce*, cello's cadenza, No. 32–33;  
horizontal and the vertical structures of the cello part

### Non-euphonic sound forms

The climactic phases of *In croce* employ non-euphonic sound forms, based on a cluster. The first section of a climax is characterised by non-selective rising or falling passages (cello part). The note pitch and duration are notated in an approximate way, and the narration is staked out by short 'breaths' notated between clusters. The effect of the climax of this segment is underscored by a dynamic oscillating around the levels *f*–*ff*–*fff*.

Its repetitive colouring is determined by a sound effect achieved by means of register and articulation. Concerning sound forms with non-selective interval structures, it is impossible to distinguish, in perception or in analysis, a distinct core structure. This is due either to the rapid succession of notes or to the complete lack of any such distinct structure.

Example 8. Sofia Gubaidulina, *In Croce*, No. 24, non-euphonic sound form of the cello part  
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The Section B clearly contrasts with the outer sections on the level of rhythm, articulation and the interval prototypes that are used. Although a second is also the dominant interval structure of the prototype, its use is different. The structure of the prototype falls into a sequence of quavers in downwards motion (or falling-rising), which represents a segment of the diatonic scale, and it gives the effect of a euphonic sound (see Ex. 9a). It is developed through the repetition of the prototype, based on a falling melodic and harmonic progression. The latter is based on a sequence of parallel chords (see Ex. 9b).



Example 9a. Sofia Gubaidulina, *In Croce*, No. 36, euphonic sound form



Example 9b. Sofia Gubaidulina, *In Croce*, No. 36, progressive euphonic sound form based on the diatonic scale

In Section A<sup>1</sup>, the original sound form returns, together with the structural prototypes. The principle of their alternation is retained, but one crucial change is introduced. The prototype based on a spread A major chord that was originally used is merely ‘indicated’ here: what is left are notes *e* as the notes of ‘departure’ and ‘arrival’, between which a glissando unfolds in a falling and rising motion (like the A major triad earlier; see Ex. 10). Despite this change, thanks to its bright, consonant sound, it is still identified with the prototype.



Example 10. Sofia Gubaidulina, *In Croce*, No. 48, organ part; segment A<sup>1</sup>, prototype based on a spread A major chord which a glissando unfolds in a falling and rising motion

### Concluding remarks

The principle behind the shaping of the musical narrative shown in the above analysis of the composition *In Croce* and the choice of auditably recognisable sound forms can successfully be applied to other works by Sofia Gubaidulina, including *Helles Und Dunkles* (1976) for solo organ, *Garten von Freuden Und Traurigkeiten* (1980) for flute, harp and viola (and recite *ad libitum*), *Sieben Worte* (1982) for cello, bayan and orchestra, and the sonata *Et exspecto* (1985) for solo bayan, to name just a few. The composer shapes the work's narrative on the basis of sound forms, at the heart of which lies an easily recognisable interval prototype. The recurrence of this principle underlying the composition technique in many of her works enables us to formulate some more general conclusions:

- 1) The creation of two contrasting sound forms is a constant means of shaping musical tension;
- 2) The phrases of a work are shaped through the development of a selected sound form;
- 3) The shaping of a climax is based on fixed compositional strategies;
- 4) The form of a work is based on traditional processes, but new tonal resources;
- 5) Repeated sound forms and fixed compositional strategies are used in various compositions from the mid seventies onwards.

These crucial features help to forge Sofia Gubaidulina's characteristic technique and style.

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### Lingvistikos ir kognityvinės psichologijos inspiruotos kategorijos kaip veiksmingas įrankis pasirinktų Sofijos Gubaidulinos kompozicijų analizei

#### Santrauka

Lingvistikos ir kognityvinės psichologijos inspiruotos kategorijos, tokios kaip garsinė aplinka (*auditory scene*), mentalinis atkūrimas (*mental representation*), garso forma (*sound form*) ir kognityvinis prototipas (*cognitive prototype*), gali būti paranki priemonė apibūrinant Gubaidulinos kompozicinės technikos ypatybes. Tam reikėtų atsižvelgti į muzikinio laiko ir analizuojamo sonoro specifinių kokybių formavimą, besiremiantį panašumo ir kontrasto efekto principu, cezūros ir kulminacijos kūrimu bei jų vaidmeniu konkrečiame kūrinyje.

Gubaidulinos kūrinių, parašytų nuo 1979 m., analizė leidžia išskirti dvi fundamentalias garso formas, paaiškinančias muzikinio naratyvo ir kulminacijos formavimą: 1) eufoninį horizontalų ir vertikalų garsų darinį, besiremiantį diatoninėmis judėjimo figūromis ir konsonansinėmis garsų kombinacijomis bei 2) neeufoninius horizontalius ir vertikalius garsų darinius, kuriuos sudaro chromatinės garsų sekos, neapibrėžti *glissando* ar garsų klasteriai.

Muzikinio naratyvo formavimo principas, pademonstruotas kompozicijos *In Croce* analizėje, ir klausia atpažįstamų garso formų pasirinkimas gali tikti ir kitiems Gubaidulinos kūriniams, pvz., *Helles Und Dunkles* (1976) vargonams solo, *Garten von Freuden Und Traurigkeiten* (1980) fleitai, arfai ir altui (ir rečitavimui *ad libitum*), *Sieben Worte* (1982) violončelei, bajaranui ir orkestrui bei sonatai *Et exspecto* (1985) bajaranui solo. Kompozitorė formuoja kūrinių naratyvą garso formomis, kurių šerdyje slypi lengvai atpažįstamas intervalo prototipas. Šio principo, pagrindžiančio kompozicinę techniką, identifikavimas daugelyje jos kūrinių leidžia suformuluoti keletą bendresnio pobūdžio išvadų:

- 1) dviejų kontrastuojančių garso formų naudojimas yra akivaizdi muzikinės įtampos kūrimo priemonė;
- 2) kūrinių frazės yra formuojamos plėtojant pasirinktas garso formas;
- 3) kulminacija pasiekama fiksuotomis kompozicinėmis strategijomis;
- 4) kūrinių forma yra paremta tradiciniais procesais, bet naujais toniniais šaltiniais;
- 5) besikartojančios garso formos ir fiksuotos kompozicinės strategijos yra naudojamos įvairiose kompozicijose nuo 8-ojo dešimtmečio vidurio.

Šie kurtiniai bruožai padeda charakterizuoti Sofijos Gubaidulinos techniką ir stilių.