

Distorted Pieces of Something: A Compositional Approach to Luminance as a Timbral Dimension

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Introduction

Generally, there is a need to describe timbre in relation to physical features of the possible sound source or the type of experience involved in its perception. Wallmark has provided a typology of timbre descriptors in seven basic categories: affect, matter, cross-modal correspondence, mimesis, action, acoustics, and onomatopoeia (2019). Zacharakis, Pasiadis & Reiss have studied English and Greek words that describe timbre as well as the correlations between them and the acoustic conditions that determine timbral perceptual qualities to propose three semantic dimensions: luminance, mass, and texture (2014). Here, I approach *luminance* as the semantic dimension that accounts for the amount and intensity of light perceived in timbre, through the compositional process of the piece *Distorted Pieces of Something. Study on Light (when it rains)* (2019), for soprano saxophone and viola.

Luminance is the dimension that describes timbre in terms of how *brilliant* it is, as a metaphor associated with visual perception: major inharmonicity and a stronger spectral centroid fluctuation seem to reduce the brilliance perceived in timbre, while the presence of a fundamental frequency tends to make timbre brilliant (Zacharakis, Pasiadis & Reiss, 2014). Lochhead develops the concept of ‘radiance’ as a formal property that emerges from the interaction of three types of musical phenomena: moments of sonic *luminance*, moments of ‘*flickering*’, and moments of *intensity*, so the ‘events’ of luminance include sounds with prominent upper partials, higher pitch, and a louder dynamic (2016). Liza Lim approaches the concept of ‘shimmer’ in her compositions inspired by a sacred painting technique called *bir’ yun*, developed by the ancestral culture Yolngu in Australia, in which fine cross-hatching drawn in high-contrast colours over the surface projects a shimmering brightness that is read as a representation of ancestral power as well as felt as a direct manifestation of it (Rutherford-Johnson, 2011). These ideas of ‘flickering’ and ‘shimmer’ stress the importance of movement and contrast to understand that the perception of light in timbre is neither a steady nor fixed experience.

The musical analysis of new music repertoire has enabled me to recognise how musical descriptors for luminance seem to rely on metaphors or poetical expressions that evidence a desire to distinguish the identity of timbre clearly, a kind of effort to discover its purity or describe the obstacles to bringing it about. In the piece *eyam I (it takes an ocean not to)*, Ann Cleare uses several expressions to accompany specific instrumental techniques. For instance, for the dyad multiphonics (alternating with aeolian tones or just air) she writes: ‘gently and fluently: like a whispering voice in the fog’, or ‘New element III: tiny piercing lights’ (2009-14). Such evocative experiences could be central to explorations of nuances in the perception of light in timbre. Indeed, Amato writes: “in illuminating the desirable, lighting exposes the undesirable” (2001). The experience of light could transgress the idealisation of timbre; the presence of light could make evident conditions that were covered by other factors, but an excess of light could exaggerate or distort some characteristics. On the other hand, the absence of sound has been usually associated with the experience of darkness. The perception of different levels of darkness in timbre can be approached from the impossibility of listening as a consequence of very soft dynamics, but also as an intentional covering effect when a timbral quality is behind a kind of screen that hides it. Rebecca Saunders explores the phenomenon of silence in her work *vermilion* (2003) inquiring about its inner qualities and function (Saunders & musikFabrik, 2008). She uses the following fragment from Samuel Beckett’s *Company* as an epigraph for the score: “By the voice a faint light is shed. / Dark lightens while it sounds. / Deepens when it ebbs. / Is whole again when it ceases.” (1980).

These references exemplify the strong influence of the visual experience of light in the perception of luminance in timbre. Consequently, this research seeks the development of compositional strategies that allow to approach this timbral dimension from a creative and technical perspective.

Method

I propose a scale of two phases that measures the *amount* of light going from dark to clear, as well as in terms of the *intensity* of light for qualities from clear to distorted. The terms used to mark each level reunite the most common descriptors for the perception of luminance in timbre that have been recognised through the literature review and analysis of instrumental repertoire for this research, as well as my own experience and compositional criteria.

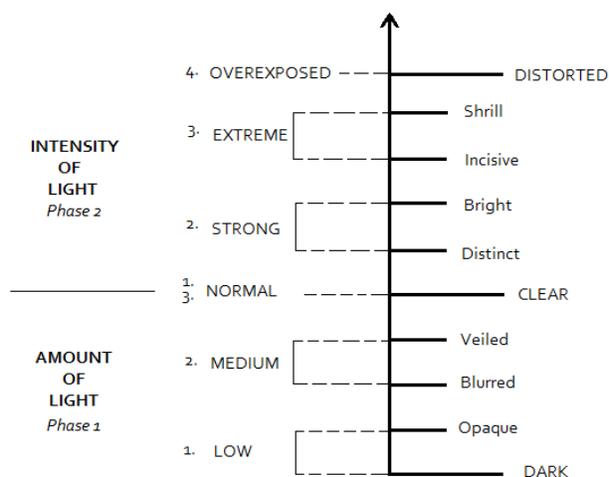


Figure 1: Luminance Scale for the measurement of intensity and amount of light perceived in timbre.

The levels of the scale function as structural points for five uninterrupted micro-sections: *a* (bright-incisive), *b* (shrill), *c* (distorted), *d* (normal-distinct), *e* (blurred-veiled). Saxophone and viola techniques are developed and categorised according to the specific timbral experience pursued in each section. The composition is approached as a process of interconnections of temporal luminance experiences in which the instrumental techniques are continuously altered through changes in the execution that directly affect the levels of luminance perceived in the timbral experience. This piece was workshopped with Wojciech Psiuk (saxophone) and Aleksandra Demowska-Madejska (viola) during the SYNTHETIS International Summer Course for Composers (July 15-27, 2019). Recordings of these sessions have been spectrally analysed to recognise the acoustic characteristics and the conditions of the interaction between the parameters of sound that determine the timbral behaviour and lead the resulting timbre to be measured according to the luminance scale.

Results

Results are not separable from the specific compositional experience of the piece *Distorted Pieces of Something. Study on Light (when it rains)*; therefore, it is recommended to listen to the work for a clearer understanding of this information. Thus, two parameters of sound are recognised as fundamental in the perception of luminance from a compositional perspective: dynamic envelope and spectral content.

Dynamic envelope: a soft attack can make timbres unclear or undefined mostly because parameters like pitch and harmonic content cannot be easily discriminated, which leads listeners to perceive qualities like those in the first phase of the scale while, with a medium attack these parameters become more precise, making timbres clearer or even distinct and bright. Very strong attacks can easily lead to the perception of

the inharmonicity of timbre making it complex or unstable and more likely to be in the third and fourth stages of the intensity phase of the scale. Moreover, the amount or intensity of light perceived through the development of a timbre can be affected by dynamics. The increase or reduction of loudness has a direct consequence for the spectral centroid: that is, constant medium dynamics can make timbres steady or stable during the course of their development and likely to be perceived as clear. Consequently, loud dynamics stimulate large variations and fluctuations in the spectral centroid, which results in timbres that are more likely to be in the top range of the intensity of light. Very low levels of loudness can make timbres unstable producing unclear fundamental pitches and increasing inharmonicity, which tends to be perceived in the first phase of the scale.

Spectral content: the presence of high partials and the distribution conditions that produce harmonic dissonance can lead to the perception of both extremes of the scale according to the level of loudness. Then, the perception of high intensity of light in timbre can be a consequence of high loudness while soft dynamics can lead to perceive low amount of light. In addition, timbres with a strongly present fundamental frequency and low perception of higher partials seem to be perceived as clear. Particularly, low pitch fundamentals are more likely to be perceived in the range of the first phase of the scale.

The following graphs allow the analysis of timbre from the relation between the instrumental techniques and the compositional approach.

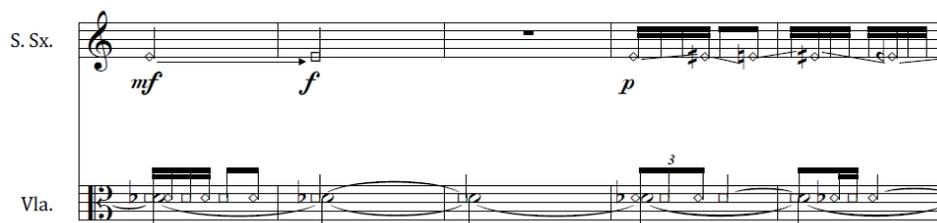


Figure 2: Score excerpt (mm. 118-122)

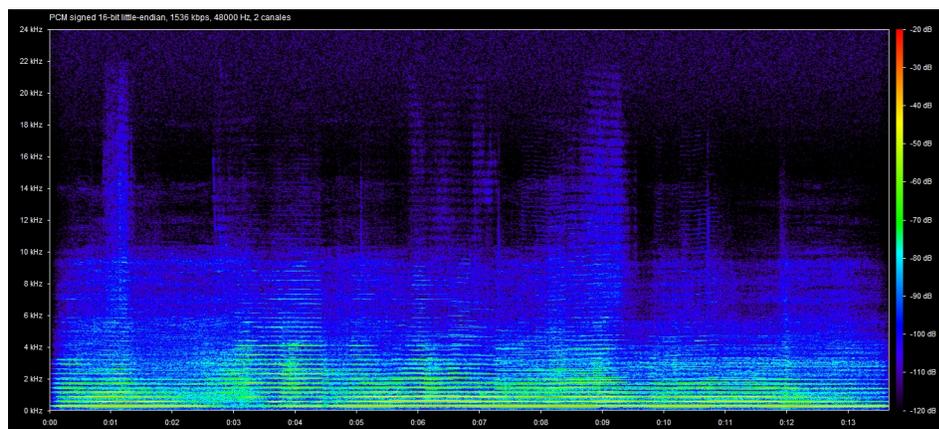


Figure 3: Spectrum corresponding to the excerpt showed in Fig. 2 (premiere recording).

This timbre, composed for *section e*, can be perceived as *veiled-blurred* because of the lack of higher partials. The fundamental frequency is weak due to the instrumental techniques approached: saxophone's aeolian sounds and viola's very low finger pressure. The inharmonicity produced by these techniques as well as the fluctuation generated by the proximity of frequencies played in both instruments at the same time, act as a filter for light that prevents the perception of a complete revealed timbre. This condition is reinforced by general low levels of loudness.

Discussion

This practice-led research allows the understanding of luminance in terms of the *amount* and *intensity* of ‘light’ perceived in timbre, from the correlations between specific timbral conditions and the words that describe them. In the compositional practice, it is possible to recognise that *dynamic envelope* and *spectral content* exert a strong influence in the perception of luminance. The attempt to measure light in a two-phase scale is a productive strategy for the study and organisation of instrumental resources, as well as for attributing specific qualities to the timbral experiences intended in each composition. Working directly with performers is fundamental for the development of specific instrumental techniques that respond to the different levels of luminance perception in the composition. Nonetheless, this research is still searching for new structural approaches that reflect more accurately the complexity of the dynamic and multidimensional condition of timbre.

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