

Polyphonic Structures:
Modular models and modular forms
(a creative investigation of mobile musical architectures)

Portfolio of compositions and commentary
Thesis submitted for the degree of Doctor of Philosophy

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I hereby declare that the present work and the works in the accompanying portfolio are my own except as otherwise specified.

ABSTRACT

*Polyphonic Structures: Modular models and modular forms*¹ is a creative research project that exploits the relations between independent pieces, structures and sonic events as self-contained moments. The dissertation describes a number of general and particular compositional strategies, techniques and constructivist explorations which are intimately related to the compositions included in the portfolio as a single body of work. The doctoral research includes a portfolio of the following compositions; *Apposition (figures of disorder)*, *Archipiélago*, *24-Modular Cells*, *Free Module Study n°1*, *Systematic Double Bind* and *Within Modular Objects*.

Combining different pieces as polyphonic structures, in part or in total, to create new works, and the development of novel compositional strategies through interrelated pieces, have been explored by many composers. The most influential of these is Karlheinz Stockhausen. His ideas to interconnect pieces within a distinctive variety of compositional procedures have been the prime musical concepts from which the research dissertation and original works germinated. However the exploration of the ideas develop by Iannis Xenakis in theory of grains of sounds and Curtis Roads in *Microsound* has been crucial to define the modularity. Ultimately, the conception of Brian Ferneyhough's figure and gesture has been essential to incorporate micro-modules as self-contained singularities.

Moreover, the research is an attempt to establish methodological linkages between self-contained and self-sufficient units. In this manner, the study of Bertrand Russell's logical atomism help me to define the smaller unit in a musical context. Accordingly, modularity has been used as a key element to define the structural and analytical method throughout the dissertation. Furthermore, Gilles Deleuze and Pierre-Félix Guattari's rhizome theory turned out to provide a valuable framework to establish a conceptual link generator.

Thus, the commentary summarises a personal approach to some of the principal issues related to contextual discontinuity and multi-layer structuralism. However, no matter how vital rhizome theory has been, the use of dichotomies and the linear process has not been completely avoided. The inquiry into new forms of interaction has led the research to map possible strategies to break the traditional binary thinking and linear unidirectional processes.

The documentation of the compositional techniques, concepts and structures presented in the following dissertation has the sole intention of defining a particular and personal methodological framework.

¹ **Modular forms** – are functions with an enormous amount of symmetry which play a central role in number theory connecting it with analysis and geometry. They have played a prominent role in mathematics since the 19th century and their study continues to flourish today. They occur in string theory and played a decisive role in the proof of Fermat's Last Theorem. Modular forms formed the inspiration to Langlands' conjectures and are expected to play an important role in the description of the cohomology of varieties defined over number fields. There are five fundamental operations in mathematics: addition, subtraction, multiplication, division and modular forms. (Apocryphal statement ascribed to Martin Eichler; 1912) – (Bas Edixhoven, Gerard van der Greer, Ben Moonen, *Modular Forms on Schiermonnikoog*, 2008 – Cambridge University Press)

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1. Introduction

Polyphonic Structures: Modular models and modular forms is a creative PhD research that investigates the possible interactions between independent pieces that can be combined in larger works. It includes a portfolio of the following compositions: *Archipiélago*, *Apposition (figures of disorder)*, *24-Modular Cells*, *Free Module Study n°1*, *Systematic Double Bind* and *Within Modular Objects*.

Any doctoral investigation has as its basis the research of novel ideas or distinctive perspectives on existing ideas. In that sense, my experimentation has developed a relation between *momentform*² and modularity – *modular structures* and *modular forms* – in supra, macro and meso-structures. The starting point has been the development of a systemic unity of diverse categories with a distinctive use of different compositional techniques within the framework of a unifying model. In the following chapters, this dissertation attempts to relate philosophical, conceptual, analytical and musical parameters with working procedures developed by thinkers and composers that have been and are relevant to me.

Working with mobile structures that are considered self-contained musical moments which are recombined to create new polyphonic structures, has been explored by many composers. The most influential of those is Stockhausen due to his ideas to interconnect pieces within a distinctive variety of compositional strategies.

As starting point, to develop a systemic line of action, the research focused on the *momentform* theory and its possible subsequent application. The main characteristic of this subject-matter is the importance it attaches to individual segments. Therefore, the construction of larger structures gravitates around these individual structural segments. These segments are considered self-contained and self-sufficient units. Ultimately, (Whittall 2008) it is an attempt to substitute the goal-directed development by a non-cumulative structure which avoids the cause/effect action. Stockhausen (1963) describes the concept as “a non-linear development where the musical events do not take a fixed course between a determined beginning and an inevitable ending. The moments are self-sufficient structures and not merely a precedent or a consequence of any other musical idea.”³.

Later, Stockhausen introduced the idea of Inserts – *Einschübe*⁴. These are short excerpts inserted between moments. Consequently, the musical context into which the inserts are interspersed strongly modified their perceivable characteristics. Therefore, the focus was driven by two central ideas; how Stockhausen approached each piece with new strategies and how he constructed modular elements or formulas, referential for the development of independent but interrelated pieces. Consequently, one of the main issues has been how to implement a personal reinterpretation of Stockhausen's conception of *momentform* as the domination of the vertical over the horizontal

² *Momentform* – a concept of Stockhausen's which sought to focus maximum weight on the individual structural segments that make up larger wholes. By regarding each segment as self-contained and self-sufficient, Stockhausen was attempting to provide a definitive substitute for the cumulative, goal-directed formal design of classical and romantic tradition. (Whittall – Cambridge Introduction to Music: Serialism-Cambridge: Cambridge University Press, 2008)

³ *Stockhausen* – 1963, p.250, translated in Wörner 1973, p.46-47

⁴ *Einschübe* – Momente CD booklet 1975, Deutsche Grammophon 2709055

dimension without rejecting the horizontal development of musical parameters. Therefore, momentform, more precisely the “*Einschübe*”, has been the axis used to relate modularity with discontinuity. The concept has been expanded by the application of diverse compositional strategies and the consideration of the modular agents as an autonomous body. A key point has been the perception of micro units as self-contained moments with distinctive characteristics. It has been crucial to understand the micro units as independent elements not dependant of the relational material in the sequential macro-form. Likewise, this ideological subject-matter has been explored to develop a systemic interaction/combination/recombination, in a parametrically defined framework, of different pieces, sections of pieces, segments or fractions.

Hence, the hypothesis of a self-contained and self-sufficient moment is reinforce when applied to elements developed in longer timescale – meso-timescale – as well as to elements developed in very short timescales – sound object timescale. As a consequence, this relationship has underpinned the personal interpretation of the timescale as the primary delimiting element of the moment. Consequently, the moment is defined by the perceptual characteristics of each segment in the timescale. Likewise, the conceptual combination of momentform and modularity allows the development of a simple idea that can be used in very different formal and sound environments: that is, to develop a systematic plan that can define the structural organisation as well as embrace a common principle to be applied to all strata of the compositional process.

Thus, it has been crucial to my research to understand the moment as a module of a variable timescale. Such an understanding will help establish a versatile strategy to define the procedures through which distinctive independent mobile structures interrelate.

Systematic Double Bind
work in progress

mateu malandra flaquer

Section C:

The score is a complex musical score for a chamber ensemble. It features six staves: Mezzo-Soprano, Flute, Violoncello, Mezzo, Flute, and Violoncello. The Mezzo-Soprano and Mezzo parts include lyrics in Spanish. The score is annotated with various musical notations, including dynamics (e.g., *mf*, *f*, *pp*), articulation (e.g., accents, slurs), and performance instructions (e.g., "try to emphasize different overtones", "flexible order"). The tempo is marked as $\text{♩} = 60$. The score is titled "Systematic Double Bind" and is a work in progress by Mateu Malandra Flaquer.

Fig. 1.1: Score example: Systematic Double Bind. For detailed explanation, see chapter 7