A New Modular Approach to the Composition of Film Music

Thesis and accompanying folio of creative works
in two volumes.

VOLUME I

submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

by

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Abstract

This thesis documents the investigation and development of a new method of composing film music with a flexible structure, which more easily facilitates the mapping and redrafting of music during the film editing process. Frequent editing changes to visual materials are an unavoidable part of filmmaking. Consequently, among the many demands that a film composer faces, the issue of synchronising music to film is frequently a vital one. Since there is no simple correspondence between the temporal structure of music and film, adjustments of music can be difficult. Thus far, a comprehensive method of addressing this problem has not been developed or documented. This project is the first study that specifically addresses the problem of synchronising music with a visual component during film post-production. The approach to this thesis is both practical and empirical. Therefore, the compositions, audio and video files included are an integral part of the investigation, and not merely supporting materials. The method described in this project was created by combining three approaches: a) developing and applying a modular structure for the music; b) using non-linear properties of music; c) applying digital technology where individual modules can be layered, mixed and modified to accommodate changes in duration and structure. The fourth element is a new three-step approach to the composition of music that follows in a general sense the process of film making. Despite the omnipresence of computer technology in film scoring, the compositional approach to film music in many cases is still rooted in functional harmony. As a consequence, traditionally structured linear music does not always allow for non-linear editing, leaving film composers disadvantaged in the use of digital technology in comparison to filmmakers. The proposed new approach to composition of film / media music attempts to provide composers (but also music editors) with means to work with music in a similar fashion to the one applied by filmmakers to film material.

Keywords

Composition; film music; mapping; media music; modular approach; module; synchronisation

Declaration

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List of musical examples

All score examples in the text are in C.

List of audio examples

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Glossary of terms

Arpeggiator – A musical device that automatically performs a sequence of notes based on input notes or chords.

Assembly – The first version of the film with scenes organised into sequences in the script order.

BPM – (beats per minutes) – A unit used to measure tempo of the music.

Click track – An audible metronome signal used during a recording session for synchronising music with film.

Cross-cutting – an editing technique that juxtaposes shots from one or more sequences, actions or stories to suggest a parallel action.

Cue – An individual piece of music but also an event within the scene.

DAW – (digital audio workstation) – A system designed for recording, editing and playing back of audio material.

Dissolve – A technique which allows for a gradual transition from one shot to another through superimposition of a fade-out over a fade-in.

DoA – Director of audiography.

DoP – Director of photography.

Dubbing – Recording of all sound elements into one composite version.

Fine cut – The final version of the film.

First cut/Rough cut – An early edited continuous version of the film.

Flexi tool – Logic Pro editing tool that allows for quick manipulations of tempo and timing (i.e. compression/expansion) of editing material without the need for cutting.

Foley effects – Film sound effects produced by performers in studio.

Frame – A smallest compositional unit (i.e. single image) of the film.

Hit – A specific event within the scene that must be highlighted by a composer.

Linear editing – An editing method (tape to tape) that was available before introduction of non-linear editing systems in the 1990s.

Locked picture – A stage of film production where all changes have been done and approved.

Logic Pro – is a digital audio workstation (DAW) and a MIDI sequencer software application for Mac OSX platform.

MIDI – (musical instrument digital interface) - A protocol that allows electronic musical instruments to communicate and synchronise.

Mock-up – A demo of the score prepared using electronic (samples) and/or acoustic instruments.

Non-linear editing – A digital editing method that enables access to any section of the edited material (i.e. audio and video).

Plug-in – A software component which supplements larger software applications.

Post-production – All the manipulations done after the filming and/or recording of the music.

Post-synchronisation – recording of dialogue, sound effects and music in synchronisation with film after it has been shot.

Sampler – An electronic instrument that plays back recorded material with the use of the keyboard or other triggering device (e.g. a sequencer).

Samples – Digitally recorded sounds.

Sequencer – An electronic device, hardware or a computer-based program which can record and play back musical material in form of digital audio or MIDI data.

SMPTE Time Code – The Society of Motion Picture and Television industry standard synchronisation signal.

Spotting session – A meeting during which the director and composer decide where in film the music will be used.

Stem/split mixes – Premixed stereo audio files including all instruments (or sounds) of a certain type.

Temporary track (or temp track) – A piece of music used temporarily in film's soundtrack as a blueprint for the original commissioned score.

Tempo map – A series of tempo changes programmed into a sequencer or other synchronisation device.

Time stretching – A procedure that changes the duration without changing the pitch of the audio signal.

Preface

Musical composition is a problem solving activity (Watson, 2011, 21). Film music which is directly dependent on film requirements and structure (Lexmann, 2006, 14) generates perhaps the most diverse range of problems which composers have to face. One of the most common is the problem of synchronisation between a musical score and a picture (Prendergast, 1992, 151). Frequent editing changes to visual materials, which are an unavoidable part of a filmmaking routine, directly influence mapping and adjustments of music. As there is no simple correspondence between the temporal structure of music and film, and due to the non-linearity of the film medium in conjunction with nonlinear digital editing practices, adjustments of the music can be difficult and time consuming. To address this important practical problem, the present thesis documents the investigation and development of a new method of composing film music with a flexible structure which more easily facilitates the mapping and redrafting of music during the film post-production process. The present work focuses mainly on film, but many of the problems and practices described are also relevant to other media, such as television (TV) or radio, or to other situations where the synchronisation of music with images or other aural elements is vital.

The idea for this research originated from many years of the author's personal experiences dealing with synchronisation issues while composing music for television and radio purposes. Since many of these commissions were done from a distance (i.e. different cities and countries), the synchronisation of music with the production and the flexibility of the arrangement (i.e. pieces were to be adjusted by the consumer) were particularly important characteristics of the prepared music. These features were necessary because the author often dealt with only a brief description of what was needed musically; the visuals or recordings

(radio) were not always available at the time the music was commissioned. It is a standard practice for television and radio producers to ask a composer to prepare short fragments of music (e.g. 15, 30 seconds, or 1 minute in duration) and in many instances this approach provides an adequate support for the story. There are situations, however, when longer fragments of music can provide more suitable dramatic support. With this in mind, during work on several productions the author experimented with short segments of different arrangements that, if desired, could be developed into more complex sequences. These initial experiments demonstrated that, despite requests for standard (library music) durations, during the post-production process those short fragments were frequently combined together (as intended by the author) to provide a more continuous and responsive dramatic support.

Although some solutions on how to integrate music with the production structure using modular components already exist (as discussed in more detail in Chapter 1, section 1.3.5), a research-based systematic method of addressing this issue has hitherto not been developed. Hence the author decided to attempt the development of a method in the computer domain that would address issues related to music composition for film, television and radio. These issues include: simplification of mapping the music to the project structure; and the temporal and structural flexibility of the music. The structural flexibility is here intended not only to help a composer to respond quickly to requested changes, but also to allow for additional editing of the score (i.e. done by a music or film editor, a director or a producer) which does not compromise its musicality and facilitates integration of the music with other soundtrack components (i.e. dialogue and sound effects).

The theoretical background for this thesis is mainly concerned with "mainstream" Hollywood cinema, with a particular focus on the action/adventure genre. There are several reasons behind the decision to explore this particular practice in more detail. Firstly, Hollywood films are made according to well established and commercially influenced procedures (Wierzbicki, 2009, 217; Przylipiak and Szylak, 1999, 52; King, 2002, 2) which despite their evolution over the decades (e.g. a break-up of the studio system and the introduction of the digital technology) remain generally stable with respect to the solutions towards filmmaking and music (Donnelly, 1998, 143; Kalinak, 1992, 189). Further, as indicated by Rick Altman, genres of Hollywood films often share certain essential properties, for example, similar conflicts are resolved in a similar fashion (1999, 24).[1] When it comes to European cinema, however, with its diversity of languages, approaches, ideological influences, practices and financial restraints, it is impossible to distinguish one predominant style or method of filmmaking.

Secondly, even though European and other cinemas (e.g. Asian) developed their own methods and aesthetic solutions, Hollywood output dominates and influences most local film markets (Everett, 2005, 16; Elsaesser, 2007, 38; Higson, 1989, 42). Thus, commercial film and television productions worldwide are increasingly influenced by Hollywood and particularly by action cinema; although it is worth acknowledging that, despite Hollywood cinema being a part of the European cultural repertoire (Morley and Robins, 1995, 57), European cinema and filmmakers have also had a significant influence on the American film industry in terms of

[1] There is, however, a tendency in new Hollywood films for blurring attributes of different genres together in order to target the production to different audiences (King, 2002, 136).

style, technique and aesthetics (Mera and Burnand, 2006, 4).[2] Due to globalisation, growing costs of feature film productions and a desire to share costs and risks, Hollywood increasingly cooperates with international collaborators, among which Europe is the primary partner (Purse, 2011, 171).

Thirdly, in spite of these interrelations, there are differences when it comes to the dramaturgical function and aesthetic approach to the music, mostly in so called art European cinema (e.g. films by Jean-Luc Godard, Federico Fellini, Andrei Tarkovsky). Such films tend to feature less music than American productions and tend to highlight a certain mood (e.g. music that is often asynchronous to the on-screen action). They may also reflect ambiguity in the narrative which is often non-linear (e.g. where characters express disorientation and roam without a specific purpose) (Hayward, 2000, 10). In mainstream Hollywood action cinema (in the majority of cases, movement orientated), on the other hand, the narrative usually has a precise temporal dimension (i.e. a particular task has to be completed by a specific date) (Belton, 1994, 25), time is predominantly linear and music is usually synchronised closely with the action. According to George Antheil: "Hollywoodian [sic] music is action-crazy" (1938, 251) and this observation remains valid more than seven decades later. Consequently, it is the Hollywood action/adventure genre (and thus films and TV productions in various countries that are influenced by it) which presents composers with the greatest challenges with respect to synchronisation during post-production.

[2] Patrick J. Gorman stresses, however, that Hong Kong films among other international cinemas had the greatest influence on Hollywood (Gorman, 2003).

The sound component of film production is a complex construct that combines together the dialogue, music and sound effects. For some practitioners and scholars, film soundtrack is an indivisible composite entity. Of all components of the film soundtrack, however, it is the music which may most often collide with the non-linearity of the film edit. Thus, as much as the author recognises the importance of the interrelations between soundtrack components in the process of supporting the narrative, this research project has focused on composition of the musical component only. Sound design for film, being a sound-based phenomenon, usually does not impose difficulties in terms of synchronisation with the images and adjustments resulting from editing.[3] While focusing on practical aspects of scoring, with regard to non-linear digital editing practices, this thesis *does not* seek to provide: an overview of World cinema, with its diverse approaches and practices; in-depth analysis of sound in film; or a comprehensive theory of film. Since film editing is frequently the reason for changes in music - and dealing with these changes is the main focus of the present work - the thesis discusses consequences of film editing, and touches on problems of sound and sound design for film.

As an empirical work which tests a method through musical examples, the thesis is particularly addressed to practising film and media composers, music editors and researchers interested in practical aspects of composing for film and other media. The work is not targeted towards film theorists or musicologists interested in the theory and aesthetics of music. Due to its scope it is not directly addressed to filmmakers, but its theoretical component may be of some interest to this group of professionals.

[3] According to Landy: "the term *sound-based music* typically designates the art form in which the sound, that is, not the musical note, is its basic unit" (Landy, 2007, 17).

Structure of the thesis

Volume I of the thesis contains: the theoretical background for the research project and methodology; five compositional case studies (including music for a short film); analysis of interviews between the present author and three directors; and a final chapter which summarises the outcomes of the research project.

Chapter 1 starts with the discussion of major aspects of film editing and its role in film narrative. This is followed by: a general overview of sound in film; its components; the role of the soundtrack in film; its construction and editing practice; and a brief discussion of sound design for film, with emphasis on the technology involved. The chapter explains the role of the musical score in supporting the narrative, looking at structural and psychological means. It then reviews compositional scoring practice including the role of the music editor. It also introduces the problem of changes in the musical score resulting from film editing, discusses solutions developed to date to address this problem, and concludes with the rationale for the new compositional method.

Chapter 2 starts by listing research questions (the main one and subsidiary ones) and the hypothesis and continues by discussing relevant definitions. It then presents the significance of the present research and its contribution to the discipline. Finally, the chapter describes the methodology for the present project.

Chapter 3 provides a literature review, which discusses source materials in the field of film music studies, and then indicates the ones particularly relevant to the topic of the thesis. It

reviews research on and approaches to synchronisation of music to picture, and discusses relevant literature on tonal and non-tonal music in film.

Chapters 4 to 8 focus on five compositional case studies (including music for a short film). Each case study is preceded by a rationale for a particular experiment and includes experimental re-cuts of compositions which were used to test the flexibility of the method. Case study No. 1 (Chapter 4), *Collection Basket*, is focused on the structure of melody and the possibilities for composing a musically coherent piece from previously composed modular components. Case study No. 2 (Chapter 5), *Skippy's Adventure*, explores the correlation of the horizontal (i.e. melodic) and vertical (i.e. harmonic) planes in a modular composition. Case study No. 3 (Chapter 6), *Oxygen*, presents the music composed for a short science-fiction film, directed by Dave Norris. The music for *Oxygen* applies the modular compositional method to a specific film project. Case study No. 4 (Chapter 7), *Ostinatello*, focuses on rhythm and explores possibilities for creating a work from various types of melodic and rhythmic ostinati (and their aggregations), as well as minimalist techniques such as extensive repetition, use of ostinato, static harmony. Case study No. 5 (Chapter 8), *Cut the Moon in Half*, is centred on the problems of orchestration and texture, in conjunction with a dramaturgical context. The composition refers to the achievements of selected twentieth century composers. Case studies are pragmatic in nature, documenting steps undertaken during each experiment and presenting the most significant observations.

Chapter 9 presents a discussion of the three interviews conducted with professionals involved in different fields of the media: film, commercials, and radio drama. In this chapter the outcomes of the case studies are supplemented by the three directors' perspectives.

Chapter 10 concludes the discussion by presenting the outcomes of the project and its contribution to knowledge and practice in the discipline, a personal perspective, limitations, and potential for future research.

Volume II comprises musical scores and two DVDs. This supporting folio of original creative works presents various aspects of the modular approach. It contains four compositions and music for short film *Oxygen* (DVD No.1). The overall duration of the composed music is approximately 80 minutes (including additional versions of the pieces). Each musical piece has been composed in a modular way with a focus on flexibility, and addresses a different problem relevant to film scoring (e.g. melody, tonality, rhythm, and orchestration).

Section 1, *Collection Basket*, consists of three scores:

Collection Basket for clarinet v (version) 1- main version

Collection Basket for viola v2 - transcribed version

Collection Basket for clarinet v3 - extended version

Section 2 *Skippy's Adventure*, consists of five scores:

Skippy's Adventure for orchestra – main version

Skippy's Adventure for orchestra – 15" cut version

Skippy's Adventure for orchestra – 20" cut version

Skippy's Adventure for orchestra – 25" cut version

Skippy's Adventure for orchestra – 30" cut version

Section 3, *Ostinatello* consists of one score:

Ostinatello for two pianos, drum kit and percussion ensemble (Movements I-V) – score

Section 4, *Cut the Moon in Half* consists of two scores:

Cut the Moon in Half for orchestra and sampler v2

Cut the Moon in Half for orchestra and sampler v3

DVD 1 contains *Oxygen*, a 24-minute film directed in 2008 by Dave Norris and produced by Deborah Kol (both from the Victorian College of the Arts). The soundtrack for *Oxygen* exemplifies the application of the modular compositional method to film. **DVD 2** contains the audio and video clips for the case studies 1-5 as well as selected Logic Pro files for case studies which were prepared to illustrate how the modular structure was used in conjunction with the video material.

Please note: Apple QuickTime player software is necessary to watch DVD 1 and DVD 2. Streaming directly from DVDs may result in some interruptions during playback. In this case for PC users, please employ alternative versions of the clips (*Oxygen* individual cues) or copy video clips to a computer hard drive. The application for both Mac and PC computers can be found in DVD2, Folder 06, in folder Additional files, and subfolder QuickTime. The application can also be downloaded directly from the Apple website: http://www.apple.com/quicktime/download/

Chapter 1: Introduction

1.1 Film editing and narrative continuity

Editing is one of the main ways for constructing a film (Bordwell and Thompson, 2008, 209), which involves selecting and joining shots together into sequences, and finally into a finished product. It is the editing which unifies and holds a sectional structure of film together (Balázs, 1953, 52). In the majority of cases the director's and editor's ultimate objective is to create a film that is continuous (assuming that coherency and logic is a desired goal) and at the same time dramatically effective (Dancyger, 2011, 371). The dramatic effectiveness of the film is usually achieved by careful planning and execution through editing mutual relations between shots (i.e. place, length, pattern, crosscutting, and juxtaposition) and sequences.[4] It must be stressed, however, that the proper function of editing is to respect and support aesthetic choices made during shooting of the film (Crittenden, 1996, 37).[5] For the narrative clarity it is important that editing does not confuse a viewer and thus it maintains a clear sense of direction between shots; "[...] the sectional picture (or "shot") must be correctly ordered and composed" (Balázs, 1953, 53). However, each editorial transition (i.e. a physical break) between shots may cause a disruptive effect for the audience influencing their flow of attention (Bordwell and Thompson, 2008, 218) and in consequence, understanding of the crucial details of the narrative. Thus, establishing and maintaining linear continuity (i.e. a coherent narrative flow) from one shot to another during the editing process has presented a

[4] Film editor and sound designer Walter Murch, indicates that editing is cutting out fragments that do not work and could interrupt the flow of good elements of the edit. According to Murch an "ideal" cut is the one that satisfies all six criteria at once: 1) Emotion (51%), it is true to the emotion of the moment; 2) Story (22%), it advances the story; 3) Rhythm (10%), it occurs at a moment that is rhythmically interesting and "right"; 4) Eye-trace (7%), it acknowledges what you can call eye-trace – the concern with the location and movement of the audience's focus at any one moment; 5) Two-dimensional plane of screen (6%), it represents planarity – the grammar of three dimensions transposed by photography to two; 6) Three-dimensional space of action (4%), three-dimensional continuity of the actual space (Murch, 1992, 23).

[5] Editing can be used to overcome such problems as uneven performance, wrong emphasis, lack of reaction, mismatched action, discrepancies in pacing, unconvincing acting, junctions between scenes, problems with matching sound and picture (Crittenden, 1996, 89-90).

problem for filmmakers from the early days of cinema (Cook, 2004, 22). The solution to this problem (i.e. preservation of time and space consistency) has been found in the development of continuity editing.

1.1.1 Continuity editing

Continuity editing is characteristic of mainstream feature films (especially Hollywood productions) and dramatic television productions (Hayward, 2000, 94; Rosenberg, 2011, 11).[6] In fiction films, for example, this type of film construction was used to allow the narrative to flow consistently and enhance narrative comprehension (Belton, 1994, 54; Orpen, 2003, 17). There are several strategies a filmmaker can apply in order to create and maintain linear continuity of the film edit. First of all, the editing needs to follow the logic of a chronological storyline (Hayward, 2000, 94) where one event is a consequence of a previous one. Care for the chronology of portrayed events is particularly significant since in motion pictures and television shows actors do not perform scenes in a chronological order outlined in the script. This means that scenes are shot out of continuity (Miller, 1999, 6) which is restored during the editing process. At times, the chronological order of the on-screen events may be disrupted by flashback scenes or cross-cutting to a parallel sequence.[7] For creating the necessary time ellipses showing a large-scale process or extensive periods, montage sequences (i.e. a series of short shots edited into a sequence to condense a narrative) are sometimes used (Bordwell and Thompson, 2008, 229). Narrative continuity is also reinforced by preservation of the screen direction which needs to be constructed along the, so called, axis of action (a 180 degree line). Keeping the camera on one side of this imaginary line allows for

[6] Most "Western" national commercial and popular cinemas rely on continuity editing (Orpen, 2003, 16).
[7] In *Citizen Kane* (1941), scenes are "organised into a flashback structure" which starts with the main character's death and then his life is portrayed via a series of interviews with his friends, associates, a former wife, etc. (Belton, 1994, 55).

continuity in the spatial relationship between objects on the screen and to eliminate potential confusion (Bordwell and Thompson, 2008, 218; Dancyger, 2011, 375).[8]

Another important aspect of maintaining a film's continuity is control over the pace of the shots. By determining the relative length of shots within the sequence (the received wisdom is that shots should never be the same length) the editor creates a rhythm of a particular sequence. When the film has a "proper" rhythm, the transitional points between shots become less noticeable and the whole editing appears to be smooth and compelling for the viewers (Dancyger, 2011, 383). Film rhythm is influenced also by the transitions between sequences. The use of a dissolve (or lap dissolve) device which superimposes a fade-out over a fade-in allowing for smooth overlapping between two sequences, eliminates the need for a straight cut that can cause some puzzlement in the film audience (especially if there is no preparation for the cut). The same solution can also be utilised to imply a change of location.

Editing should also respect the emotional structure of the performances, as cutting into the actor's performance may shatter its already established inner rhythm influencing the meaning and dramatic impact of a particular sequence negatively (Dancyger, 2011, 384). A useful strategy, called matching action, is to use motion in the frame, for example a distinct movement or gesture, to cut to the next shot (Belton, 1994, 57). The more movement in the particular sequence the more opportunities to employ smooth editing (e.g. a change of the camera angle or the size of the subject in the frame) (Crittenden, 1996, 165). In circumstances when there is no physical movement, the editor can use such events as clearing of the throat

[8] Non-Western cinemas, for example Japanese classical cinema, applied different conventions, thus violation of a 180 degree separation line was not considered problematic for spatial comprehension (Orpen, 2003, 16).

by the actor, which provides a natural cut point (Dancyger, 2011, 373). Finally, keeping the action in the central zone of the screen, balanced and symmetrical deployment of the figures in the frame, keeping similar graphics from shot to shot, and keeping overall lightening tonality constant can help in maintaining film's continuity (Bordwell and Thompson, 2008, 218; Dancyger, 2011, 378).

At the very beginning of cinema, editing was either unnecessary (the earliest films were less than one minute in duration) or minimal, as most American, German and French films comprised a series of scenes where one scene equalled one shot (Mast and Kawin, 2006, 51). Yet, filmmakers gradually realised that the control over the pace, rhythm, and mood of the film could provide a necessary emphasis and focus attention on the scene, making the film more dynamic (Crittenden, 1996, 2). D.W. Griffith is usually regarded as the creator of film editing in the "modern" sense. However, Griffith's developments had been preceded by those of Edwin S. Porter. His two films, *The Life of an American Fireman* (1903)[9] and *The Great Train Robbery* (1903) demonstrated that it is unnecessary to show scenes from the beginning to the end, as the action could be edited to appear continuous from one shot to another (Mast and Kawin, 2006, 51). D.W. Griffith considered films to be stories which were told not through words but by moving photographic images (Cook, 2004, 56). For his films, he invented a whole range of dramatic construction tools, including alternate shots of different spatial lengths (i.e. a different subject-to-camera distance), extreme long shots for depicting epic action sequences (e.g. *The Birth of a Nation* (1915) and *Intolerance* (1916)), parallel editing (*The Fatal Hour* (1908) consisting of three parallel actions), and variation in pace. His

[9] The rescue scene (filmed in two successive shots) is shown from two different perspectives one after another (inside and outside the building) rather than cutting between the two.

innovative editing techniques and developments in the film narrative construction influenced the work of his contemporary and future filmmakers (Dancyger, 2011, 10).[10]

Despite unexpected twists and turns in the plot, the linear narrative, which is a goal of continuity editing allows the audience to be aware of what kind of resolution to expect. However, continuity editing is not the only style of film editing. Since the development of editing techniques, some filmmakers have created alternative approaches to film's temporal and spatial dimensions.

1.1.2 Dynamic editing

In dynamic editing, the film narrative tends to be random and intuitive rather than developmental and determined (Dancyger, 2011, 395). Thus, frequently there is no flawless cause-and-effect storyline, and usually the narrative is more focused around feelings than action. This style of film editing is mainly present in European art cinema (there are however exceptions) where codes and conventions (with respect to technique and narrative) are intentionally challenged (Hayward, 2000, 17).

During the 1920s, Soviet filmmakers, Lev Kuleshov, Sergei Eisenstein, Vsevolod Pudovkin, and Aleksander Dovshenko developed their own montage aesthetics exploring the possibilities provided by non-linear editing, based on classic principles of Griffith's continuity editing. Griffith's belief that introducing cuts and fragmentation of the film material can lead to more compelling and dynamic results as opposed to unedited scenes (Dancyger, 2011, 12),

[10] Some of the techniques used and refined by Griffith, such as close-ups, sequencing of action, parallel action, and camera movements had been used before him by a group of British pioneer filmmakers such as R.W. Paul, Cecil Hepworth, James Williamson, G.A. Smith and Alfred Collins (Crittenden, 1996, 1).

was further explored by Pudovkin. He saw a single shot as the building block of a film (i.e. a raw material) which can be used to create any desirable effect: "This material [shots] from which his [director's] final work is composed consists not of living men or real landscapes, not of real actual stage-sets, but only their images, recorded on separate strips that can be shortened, altered, and assembled according to his will" (Pudovkin, 1960, 89). In his works, Pudovkin experimented with juxtaposed shots and their influence on the audience, however among all Russian revolutionary filmmakers, it was Eisenstein who achieved considerably more in the field of film editing than his colleagues.[11]

For Eisenstein, film editing was a process that functioned according to the Marxist dialectic where one force (thesis) collides with a counterforce (antithesis) to produce a wholly new phenomenon (synthesis) (Cook, 2004, 148). Consequently, he edited his films (e.g. *Strike* (1925), *Battleship Potemkin* (1925), and *October* (1928)) to achieve the highest intensity of collision and conflict between shots and sequences, as it is the collision where the meaning is created (in the spectator's mind) (Hayward, 2000, 96). Unusual camera angles and fast editing were also used to amplify the impact of his films, which were supposed to alter audiences' consciousness on perceptual, emotional and intellectual levels (Bordwell and Thompson, 2008, 235). Eisenstein deliberately distanced himself from continuity editing which was predominant in mainstream Hollywood productions. Thus, *Strike*, *Battleship Potemkin* and *October* can be characterised by the absence of: a central protagonist (with the proletariat being the main character), conventional plot, the lack of compelling action and the unified structure (Mast and Kawin, 2006, 201).

[11] Eisenstein distinguished five editing types: 1) metric montage, 2) rhythmic montage, 3) tonal montage, 4) overtonal montage, and 5) intellectual montage (Cook, 2004, 150; Dancyger, 2012, 14).

Dynamic editing has been used by many other filmmakers associated with avant-garde and art cinemas, for example Luis Buñuel and Salvador Dali in the surrealist short film *Un Chien Andalou* (1929) [trans. *An Andalusian dog*], or directors of French New Wave, François Truffaut (*Shoot the Piano Player* (1962)), Alain Resnais (*Last Year at Marienbad* (1961)) and most notably, Jean-Luc Godard (*Breathless* (1960), *Weekend* (1967)) who was then considered the most stylistically radical of all New Wave directors (using several contradictory ideas and filmic methods at the same time).[12] When it comes to the editing practices, in opposition to traditional narrative established in the 1930s, 1940, and 1950s (i.e. smooth camera moves and invisible editing), clarity of film discourse had been avoided. Continuity editing techniques had been fundamentally rejected in favour of jump cuts, illogical sequencing, and erratic camera movements to bring the attention of the viewer to the artificiality of the film making process (Cooke, 2008, 320).[13] This is how Godard described his view regarding film narrative: "A story should have a beginning, a middle, and an end...but not necessarily in that order" (Archer, 2010, 26). It must be stressed, however, that new editing aesthetics were helpful in concealing defective footage. Most directors of the New Wave did not have experience in the practical aspects of film production, so they made many mistakes which due to low budget and tight schedules were impossible to fix. Thus, the cinematic effect which resulted in new aesthetics was also an economic necessity (Cook, 2004, 446). Nevertheless, some editing techniques and general approach to the film narrative (e.g. non-linearity of the narrative), established by the New Wave movement were also used by other filmmakers such as Akira Kurosawa in *Rashomon* (1951), Federico Fellini in *La*

[12] Prior to the New Wave, French filmmakers used continuity editing similar to the Hollywood model, yet their editing style displayed a greater affection for longer takes and more limited reliance on shot/reverse-shot and close-ups (Orpen, 2003, 61).

[13] This can be observed in Godard's *Breathless* (1960) when Michel drives a stolen car and then is chased by the police or when he introduces his girlfriend. Acceleration of action in this film is replaced by the increase in the number of jump cuts.

Strada (1954), Bernardo Bertolucci in *La Commare Secca* (1962), Andrei Tarkovsky in *Solaris* (1972), Andrzej Żuławski in *Possession* (1981), Sergio Leone in *Once upon a Time in America* (1984), Krzysztof Kieślowski in *Three Colors: Red* (1994), Tom Tykwer in *Run Lola Run* (1998), Wong Kar-wai in *In the Mood for Love* (2000), Alejandro González Iñárritu in *Amores perros* (2000), David Lynch in *Mulholland Dr.* (2001), Darren Aronofsky in *The Fountain* (2006), among others.

The montage editing techniques such as jump cuts, non-diegetic inserts, breaking the 180 degree system, the lack of events chronology in the storyline, are also at times incorporated in mainstream cinema, e.g. *Citizen Kane* (1941), *Crimes and Misdemeanours* (1989), *Natural Born Killers* (1994), *Pulp Fiction* (1994), *The Thin Red Line* (1998), *eXistenZ* (1999), *Memento* (2000), *Solaris* (2002), *Sin City* (2005), *Michael Clayton* (2007), *The Social Network* (2011) and many more. Dynamic editing is often used in documentaries, television, advertisements and music videos, where concepts of matching and continuity are either less prominent or simply not used at all. In recent years, the two approaches (i.e. continuity and dynamic editing) are often used together. Techniques characteristic for feature films are also applied in documentaries and music videos, while feature films make use of editing solutions from documentaries, music videos and even video games, e.g. *The Matrix* (1999) (Rosenberg, 2011, 12).

1.1.3 Approaches to editing

There are two main approaches to the function of editing with respect to film narrative (i.e. spatial and temporal links between shots). For some filmmakers, such as Jean Renoir (*The Rules of the Game* (1939)), Maximillian Ophüls (*La Ronde* (1950)), and Stanley Kubrick

(*2001: A Space Odyssey* (1968)), the art of filmmaking lies in avoiding editing. For others, such as Sergei Eisenstein (*Battleship Potemkin* (1925)), Orson Welles (*Citizen Kane* (1941)), and Sam Peckinpah (*The Wild Bunch* (1969)) the opposite is true (Dancyger, 2011, 371). The first approach refers to films that respect the continuity of real time, and use few shots or even one single shot. The outstanding example of the latter is Alexander Sokurov's *Russian Ark* (2002). The film consists of one continuous 90-minute shot taken in St. Petersburg's Hermitage Museum. Shooting the entire film in an uncompressed HD resolution required that the camera transferred the data not to a tape but directly to a hard drive (Mast and Kawin, 2006, 705). An earlier example is Alfred Hitchcock's classic film *Rope* (1948). In this case, there are hidden cuts that allowed transitions from one roll of film to another. Both examples, however, are exceptions to the usual approach to editing (Rosenberg, 2011, 4).

The opposing approach involves rapid cutting and intense editing that can be found especially in action/adventure cinema.[14] The action film is a visual spectacle with physical action, fast editing, explosions, and state-of-the-art special effects (Neale, 2004, 71). Frequently, these elements take priority over the narrative meaning (Bean, 2004, 17). Since the beginning of the film medium, movement (which added the dimension of time) has been a main attraction for the audience and its power has been utilised in action sequences (Dancyger, 2011, 287), which usually are the strongest selling point of action cinema. The visual appeal of action sequences has been found to be a useful device by many filmmakers and consequently this type of film sequence is frequently found in films of different genres, such as western,

[14] This term is currently used to describe the trend in the 1980s and 1990s Hollywood productions such as the *Alien* films (1979,86, 93), the *Indiana Jones* films (1981, 84, 93), the *Rambo* films (1982, 85, 88), the *Die Hard* films (1988, 90, 95), the *Terminator* films (1984, 91) (Neale, 2004, 71).

science-fiction, horror, thriller, comedy and even war films (e.g. *Saving Private Ryan* (1998)) (Hammond, 2004, 153).

1.1.4 Action sequence

The action sequence is one of the essential elements of the action cinema (Purse, 2011, 56). The editing in such sequences is typically faster than a traditional film scene. It is usually built around the clash of characters with opposing goals. During the course of the action the urgency to reach the characters' goals increases, which manifests itself in accelerated movement within the frame. The survival of one of the characters may be central to the action of the sequence, and thus many action sequences are fights, assassination attempts, or various types of chases.[15] Action sequences are often the turning points of the film plot, and the audience has to be deeply engaged in the on-screen events (Dancyger, 2011, 287-88). Achieving this goal in the action sequence dictates the use of certain editing techniques; close-ups and subjective camera placements are used to help viewers with identification and emotional involvement with characters (Dancyger, 2011, 288). The conflict between the characters is additionally increased by crosscutting.

Movement within the shots, movement of shots, and variations in the length of shots increase excitement. Manipulation of the pace of the sequence and generally increased cutting as the sequence approaches its climax, intensify anticipation and tension (Balázs, 1953, 129). At

[15] Chase sequences, particularly car chases, are the most identifiable elements of the action cinema, and their history is closely linked with the origins and developments of American cinema. The attractive nature of chase sequences for the audience was utilised as early as in *The Great Train Robbery* (1903) with a dynamic crosscutting from the pursued outlaws to the pursuing group. During the following years, the chase film became one of the earliest models for narrative construction (i.e. *Personal* (1904), *The Lost Child* (1904), *Jack the Kisser* (1907), and Griffith's *The Curtain Pole* (1909)). In the 1970s, a car chase became one of the most essential elements of Hollywood action cinema (i.e. *Bullitt* (1968), *The French Connection* (1971), *White Lightning* (1973), *Mr. Majestyk* (1974), and *The Driver* (1978)) (Romao, 2004, 130).

times, long shots are used to follow the action, but the impact of the action sequence relies on the combination of close-ups, subjective shots and increase of the pace of editing. There are, of course, exceptions to the common practice of editing in action sequences when they are filmed in one continuous shot, for example, in *Hard Boiled* (1992), director John Woo used a long take (two minutes and forty seconds) in the hospital shootout sequence. Most action sequences fall somewhere between these two extreme categories of editing.

Recent research shows that thanks to cutting (according to continuity editing principles), a film editor is able to hide joins and make them less noticeable (the so called edit blindness phenomenon) than in editing which does not apply the continuity system (Smith, 2008, 1-17). Continuity editing may appear smooth, logical and linear, reinforcing a narrative coherence. Yet, as soon as editing becomes expressive, the supposed "invisibility" of continuity editing becomes compromised and the cuts noticeable (Orpen, 2003, 117). This is especially apparent in action movies, where the speed and abruptness of the editing, make cuts visible, and for some viewers even disturbing. As observed by David Bordwell, the speed and awkwardness of the cutting makes some action sequences incomprehensible (2002, 17). This practice can be observed, for example, in the opening scene of *Quantum of Solace* (2008), where the car chase sequence (lasting approximately four minutes) exhibits extremely rapid and expressive editing. Breaks in edit unity are noticeable, especially if the change of angle is accompanied by change of direction of the movement in the frame (Balázs, 1953, 53). But filmmakers in order to smooth the visuals can rely on resources other than continuity techniques. For example, the film soundtrack has the potential to contribute linearity to the filmic

experience.[16] It is also aimed at making images truthful for the audience, at the same time soundtrack increases the emotional quality of the action sequence's most intense moments (Purse, 2011, 69).

1.2 Sound in Film

The introduction of sound as an integral component of the film medium was not simply an extra feature that supplemented images; it completely transformed the phenomenology of film (O'Brien, 2005, 3), becoming a dramaturgical element in the storytelling. Sound in film may be used directly, to tell the story, or indirectly, to enhance it. In situations when sound influences the course of action, its dramaturgical role increases significantly (Balázs, 1953, 200). Sound may function in film as a diegetic sound, which has its source in the story space of the film (i.e. dialogue, sounds produced by objects in the story or music coming from the instruments in the story), or as a non-diegetic sound (i.e. sounds that come from a source outside the story space, e.g. musical score) (Bordwell and Thompson, 2008, 254). The diegetic sound, however, depending on whether its source is visible within the screen, may function as either on-screen or off-screen sounds.

Within the temporal coexistence of sound and film, two major approaches can be distinguished: the synchronous sound (where sound matches the image), and the asynchronous sound (where sound does not match the image) (Bordwell and Thompson,

[16] In action cinema soundtracks are usually loud Dolby Digital or THX aural spectacles created to attract the audience (Hammond, 2004, 153).

2008, 258).[17] Both approaches to sound can be applied consistently and simultaneously allowing for a creative enhancement of the film images; however, unlike the synchronous sound, the application of the asynchronous sound became a subject of various aesthetical deliberations during early sound cinema (Cook, 2004, 226). In 1928, Soviet filmmakers Sergei Eisenstein, Vsevolod Pudovkin and Grigori Alexandrov prepared and signed a joint statement on sound in film, in which they declared that sound used in a synchronous manner would destroy the culture of montage because "[...] every mere addition of sound to montage fragments increases their inertia as such and their independent significance" (Weis and Belton, 1985, 84; Taylor and Christie, 1994, 234). These creators were of the view that only contrapuntal use of sound in relation to the visual montage would afford a new potentiality of montage development. Eisenstein further condemned the naturalistic use of dialogue and sound effects in film (i.e. non-creative solution), pointing towards a non-synchronisation practice as the only way out of an artistic impasse. In practice, however, it has been noted that the use of counterpoint on the larger scale is either impossible or negatively influences the integrity of the film (Helman, 1964, 179).[18,19] Sound which is recorded synchronously with images functions mainly as a naturalistic component, highlighting the reality of the picture. From the dramaturgical point of view, however, the asynchronous sound which is independent from the images can provide the viewer with a parallel meaning. As Balázs indicated, in this case, sound becomes a commentary to the scenes (1953, 218). It is because sound more than image can become a subtle tool of affective and semantic manipulation (Chion, 1994, 33-34).

[17] Chion indicates that loose synchronisation, in general, results in a more poetic than naturalistic effect (Chion, 1994, 65).
[18] Even in Eisenstein's films asynchrony of sound is used as a special effect only.
[19] Alicja Helman is a Polish film theorist and historian, author of several books on film and film music.

There are three main sound parameters that can be manipulated by a filmmaker in order to create a desirable effect in the aural component of a film: loudness, pitch, and timbre. This classification of sound is based on the musical model which, according to Altman, assumes that all film sounds exhibit the nature of musical notes emitted from the score and perceived in an instant and direct fashion. As not all film sounds can be represented by traditional musical notation this approach does not seem universally appropriate (1992, 15-16). Nevertheless, manipulation of those three, musical parameters (i.e. loudness (e.g. contrasts), pitch (i.e. low, mid and high frequencies), and a selection of a particular tone quality) may create an overall sonic texture for the film (Bordwell and Thompson, 2008, 247).

There are also additional aspects of sound that need to be considered such as space, rhythm and fidelity. Space may be understood as sound which has a spatial dimension, as it comes from a certain source (i.e. recording in a specific three-dimensional space) and can suggest a sense of spatial distance and location (Altman, 1992, 24; Balázs, 1953, 214; Bordwell and Thompson, 2008, 254).[20] Rhythm may refer to speed and regularity of sound events (all three components of the film soundtrack have their own independent rhythms, however, musical rhythm is most recognizable). Fidelity refers to the quality of the recording (i.e. faithfulness to the recorded source) (Bordwell and Thompson, 2008, 251-253).

1.2.1 Construction and editing of soundtrack

Film soundtrack consists of three major components: dialogue/narration (usually telling the story), music (pre-existing or originally composed), and noise (which may include Foley

[20]Altman indicates that sound has a spatial quality as it is always recorded in a particular three-dimensional space. This, however, does not concern sounds generated electronically.

effects[21], one or several layers of sound effects and ambiences) (Bordwell and Thompson, 2008, 248). In terms of the coexistence of soundtrack components, three possibilities can be noted: 1) a naturalistic use of all three elements (i.e. dialogue, music, sound effects); 2) dialogue and sound effects used in a naturalistic way, whereas the music has greater freedom and functions as a underscore (this is the most common situation); 3) an artistic composition of all three elements, this scenario, however, is the least common (Helman, 1964, 178).

Some theorists (Balázs, 1953, 205; Gorbman, 1987, 18; Lissa, 1964, 279; Schaeffer, 1961, 53) distinguish a fourth element, silence. The inclusion of sound as an integral element of film production brought a new dramaturgical value of silence for the film narrative (Perkins, 1993, 54). Thus, silence became not merely an absence of music or other sounds but a vital element of the composition which could artistically fill some spots of the auditory field (Helman, 1964, 178). For Balázs, the appearance of silence is one of the most specific dramatic effects of sound in film. Not many arts are capable of reproducing silence (i.e. sculpture, literature or painting), not even the sound-based medium such as radio drama can do it, because as soon as the silence appears the performance is ceased (1953, 205). The exception is, of course, theatre where silence can be a dramaturgical element. According to Michel Chion, silence in film is never a natural emptiness but a product of a contrast with a sound heard beforehand (Chion, 1994, 57).

Film soundtrack components are recorded separately from images which allows for additional editing and manipulations of sound events during post-production: "with the introduction of sound cinema, the infinity of visual possibilities was joined by the infinity of acoustic events"

[21] Film sound effects produced by performers in studio.

(Bordwell and Thompson, 2008, 247). The inaudible sound editing techniques developed in the same period as invisible editing practices (i.e. continuity editing) (Altman, 1985, 47). A carefully constructed soundtrack can guide the viewer through the images and direct their attention towards specific on-screen events within the scene (i.e. punctuation). It may make the meaning of the scene clearer or, alternatively, emphasise its ambiguity. Its role becomes even more pronounced when the sound event linked to a visual element may anticipate that element, and relay the audience's attention to it (Bordwell and Thompson, 2008, 246). Careful selection and placement of sounds may expand the emotional or physical realism of a film (i.e. amplification) (Dancyger, 2011, e18). Overall, the sound design of a film soundtrack may add an additional layer of narrative articulation to a film (Whittington, 2007, 220). Consequently, sound editing is an integral part of the film editing process (Belton, 1994, 53).

Sound editing usually takes place between film editing and mixing of the whole soundtrack (Holman, 2002, 174).[22] In the most basic sense editing can be divided into two main stages: 1) organisation of sounds into cut units or tracks (if they occupy more than one track of the multi-track recorder or a Digital Audio Workstation, DAW); 2) montage of sounds in a logical order (the logic here is dictated by the desired approach to the role the sound is going to fulfil in the storytelling). Of course, sounds are further grouped by type, such as dialogue, music and sound effects. Each of these types is further separated into more specific collections (e.g. different ambience effects). Typically, sounds are subjected to various modifications (including sound processing and equalisation), then several different sub-mixes can be prepared in order to achieve a final mix of a film soundtrack. In contemporary practice, soundtrack components are divided into *stem mixes* (i.e. stereo audio files including sounds of

[22] The first film that used post-synchronisation of sound was King Vidor's *Hallelujah* (1929) (Cook, 2004, 227).

a certain type) which provide the audio mix engineer with flexibility when balancing music with dialogue and sound effects.

Chion indicates that film editing practice has created a specific unit of cinema, the shot, whereas sound editing has not created a universally recognised sound unit: "Unlike visual cuts, sound splices neither jump to our ears nor permit us to demarcate identifiable units of sound montage" (Chion, 1994, 41). There are, however, inner distinguishable units within the soundtrack that operate by analogy with linguistic units in dialogue, or in musical accompaniment. Sometimes when music is used as the only sound component for a particular scene (e.g. the castle attack scene from *Run* (1985)), or the music itself exhibits distinctive rhythmic patterns, musical units become consciously detectable by the audience. According to Chion, these units are not specific to the cinema, and, for this reason, the visual unit remains a prominent component of the soundtrack montage (1994, 45). At times, however, it is a musical unit of rhythm that becomes a "yard stick", an editing unit for visual montage.

Music, as observed by Siegfried Kracauer, is not just sound: "[...] it is rhythmical and melodious movement – a meaningful continuity in time" (1997 [1960], 135). Awareness of the musical rhythm may be higher than sensitivity to visuals (i.e. excluding music which is solely based on timbre-oriented drones or sound design used in the function of an underscore), and may also be higher than rhythms of other soundtrack elements. Thus, music reaches the consciousness of the audience in a form of concrete rhythmic forms and shapes (units) (Lexmann, 2006, 29). Consequently, taking into account only the rhythmic component of the musical structure, it does not seem always appropriate to edit music in the same way as dialogue and sound effects.

In the broader sense, music has its own dramatic significance "creating tension and resolution through highly coded structure and syntax" (Gorbman, 1987, 2). Thus, the problem of obtaining a musical sense during editing of the soundtrack makes music predestined for an individual treatment. Another reason to treat music differently to other soundtrack components is its role in the communicative process. As suggested by Nicholas Cook: "words and pictures deal primarily with the specific, with objective, while music deals primarily with responses – that is, with values, emotions, and attitudes" (1998, 22). Thus, music is sometimes capable of expressing psychological elements in a much more effective way than, for instance, dialogue. Zbigniew Preisner reported that at times Krzysztof Kieślowski used his music instead of dialogue (Paulus, 1999, 67). This practice is also reportedly used by director John Erman (Karlin and Wright, 2004, 364).

When the music is not present in the film's soundtrack, however, ambient sounds and (quasi-) dialogue can perform many of its typical functions such as providing continuity (Lipscomb and Tolchinsky, 2005, 401). There are also examples of film productions where sound effects successfully replaced a musical score. The soundtrack of the Polish film *Człowiek na torze* [trans. *The Man On The Railroad Track*] (1957) features a complex structure of dialogue and sound effects used by the film director (Andrzej Munk) as a primary means of expression in the movie (Helman, 1964, 181).[23] For example, during the inquiry concerning the death of old engineer Orzechowski, flashbacks of several witnesses are presented. In the testimony of the station master Tuszka, during an assembly of railway workers, naturalistic sounds of trains are clearly audible indicating localisation of the scene. Later, when the plot develops and tension intensifies, the testimony is given by a young engineer Zapora. In his story, during the same

[23] The only scene with music is the one in the park when Zapora meets engineer Orzechowski (diegetic music).

assembly, there are no audible environmental sounds (i.e. trains), directing the attention of the viewer to emotions of the portrayed characters. Another example is Alfred Hitchcock's film *The Birds* (1963). Similarly to the previous example, there is no traditional musical score here, and the soundtrack comprises a combination of natural sounds and electronically treated bird sounds. Used in a *musique concrète* fashion, various sounds were organised to provide a rhythm and pace for the image (Smith, 2002 [1991], 253), imitating the functions of music (Weis, 1985, 299).[24] There are also examples of films in which the difference between a musical accompaniment and sound effects is difficult, if not impossible, to detect.

In 1956, Louis and Bebe Barron created an all-electronic (generated, edited and processed sonic materials) experimental score for the science-fiction film *Forbidden Planet* (Lack, 1997, 313). The Barrons worked on the score as a team, where Louis designed and built all sound-producing circuits and Bebe identified fragments for additional development. In the next step, the selected material was further manipulated by the couple (Wierzbicki, 2005, 38). Sounds created and edited that way (solely by the Barrons) function in the film as both a subsidiary "musical" accompaniment as well as sound effects synchronised with the screen events (e.g. the space craft landing sequence, cue #4). The creators of sound for this film also employed extensively a reverb effect to evoke a sense of space and size (Brophy, 2004, 108). A similar approach, in terms of sound treatment, had been chosen by Andrzej Markowski in his score created for *Milcząca Gwiazda/Der Schweigende Stern* [trans. *Silent Star*] (1959).[25] In contrast to its predecessor, the score comprises orchestral sequences (e.g. opening and closing) and

[24] There are two scenes in this film where music was used in its diegetic function (i.e. Melanie's piano performance and the song sung by schoolchildren).
[25] The film was an East-German-Polish co-production.

electronic music produced in the Polish Radio Experimental Studio.[26] Electronic components of the score were realised by both electronic means (i.e. sound synthesis) as well as manipulation (of the pitch and time by changing the speed of the tape) of natural sounds recorded with a microphone (Hayward and Lewandowski, 2010, 191-192). In both films, which were innovative at the time, electronic sounds and effects provided a unique and suggestive support that corresponded well with the futuristic scenarios. Electronic music, particularly in science fiction films, was used both emotively and dramatically, blurring the boundaries between music and sound effects and sometimes even dialogue (Lack, 1997, 314).[27]

1.2.2 Sound design and technology

The aesthetic approach towards the role of film soundtrack, as well as mutual relations between its components, has gradually changed with technological developments. Altman indicated that the early days of sound film were: "[...] marked by limitations of the carbon and condenser microphones then in use" (1985, 46). A fragile nature of the microphone construction, sensitivity to wind and other ambient noises, dictated specific recording conditions. Thus, until 1933, it was rare for music and dialogues to appear at the same time on the soundtrack (unless they were recorded simultaneously). Significant implications for film sound had the introduction of magnetic tape recording during the 1950s with a related method of post-synchronisation (Lexmann, 2006, 40) and portable sound recorders, most notably the Nagra III developed in 1958 (although it should be acknowledged that the first devices which allowed for recording sound on a magnetic tape were developed by German scientists during

[26] The Polish Radio Experimental Studio in Warsaw was established in 1957 by Patkowski and Szlifierski. It was the fourth professional centre of experimental music in Europe. The studio was used for musical composition (*musique concrète*) by Rakowski, Piechurski; as well as theatrical and film music by Markowski, Kotoński.
[27] Electronic music also provided the "sound" of technology in the science fiction genre (Sobchack, 1998).

the Second World War).[28] The latter tape recorder became a standard device in the film production practice during the 1960s. Nagra III featured a system, *Pilotton*, which allowed for synchronisation of audio recordings with moving pictures. In the 1962, the first synchronisation solution was replaced by a more sophisticated invention, *Neopilot* (additional information can be found at the producer's webpage).[29] The ability to synchronise the sound recording with the image and the portability of the device (i.e. small size and battery operation) allowed for establishing a new approach to sound recording which could now be done anywhere (Lack, 1997, 154). In comparison with the equipment used by film studios, the device was inexpensive and reliable. For freelance sound recordists (the breakup of the Hollywood studio system resulted in freelancing becoming common), the portable recording equipment made work possible (Whittington, 2007, 31), becoming a standard *cinéma vérité* equipment (Altman, 1985, 49).

The introduction of new sound formats such as Dolby Stereo and Dolby Digital improved the fidelity of the sound, expanded its dynamic range allowing also for its multi-channelled deployment which impacted the realism of the cinematic experience (Whittington, 2007, 1). Finally, computer technology (i.e. DAWs) has allowed for the construction of complex multi-layered sound montages of all soundtrack components without loss of quality. Those technological changes not only provided filmmakers with improved sonic fidelity of the soundtrack, but also enabled creative control over its components (i.e. interrelations of the dialogue, music, and effects) to obtain a potent tool of dramaturgical expression. The expressive potential of sound has been used by many film directors such as Orson Welles,

[28] Nagra is a trademark for professional portable audio recorders developed by Stefan Kudelski.
[29] http://www.nagraaudio.com/ [Accessed 15/05/2012]

Robert Altman, Alfred Hitchcock, Jean-Luc Godard, Andrei Tarkovsky, the Coen brothers, and David Lynch. Godard, for example, emphasised jumps and discontinuities as dramaturgical means by cutting sounds and images simultaneously (Chion, 1994, 42). However, he did not edit or mix sounds within the track once they were recorded, which resulted in a sonic texture that was "continuously audible" (Williams, 1985, 337). On the contrary, Lynch sometimes designed the sound for his own films (Donnelly, 2009, 113; Rodley, 2005, 46). His experimentation with elements of the soundtrack (e.g. various speeds of the track or reversing the track) resulted in a very imaginative sound design. As pointed out by a his collaborator, composer Angelo Badalamenti, in films such as *Lost Highway* (1997) and *Mulholland Drive* (2001), the sound design becomes "musical" (Schweiger, 2002, 26). In fact, Lynch describes himself not as a director but a "sound-man" (Davison, 2004, 170). In *Stalker* (1979), director Andrei Tarkovsky and composer Eduard Artemiev created a distinctive sonic world by merging electronic and natural sounds. Music and sound design provide support for images and the parallel expression (Smith, 2007, 43). The "sound-sensitive" approach to filmmaking, where the soundtrack becomes the prioritised element of the construction of film, is a feature of the Coen brothers' productions. The Coens begin the cooperation between a sound editor, a mixer and a composer at the script stage, which assures that their productions have greater aural unity than mainstream image-centric filming (Barnes, 2007, 27). For example, in *Raising Arizona* (1987) sound editor Skip Lievsay and composer Carter Burwell used reoccurring sound elements and musical themes to a cyclic construction of the film narrative. Despite these examples, most directors still leave sonic decisions up to the sound crew (Weis, 1995, 56).

The new possibilities regarding a creative arrangement of film soundtrack elements became of interest to score composers, too. Control over soundtrack components not only allowed for careful consideration of the placement and coexistence of dialogue, music, and sound effects from the perspective of their acoustic properties (e.g. orchestration of film music needs to be done so that the used instruments not interfere with the frequencies of dialogue and main sound effects), but also facilitated their coexistence so that music could become more closely integrated with sound effects and dialogue, creating a homogeneous entity. At times, score composers also become either co-authors or creators of a film's sound effects, thus influencing the overall aural experience. For example, in *Do widzenia do jutra* (1960) [trans. *Good-bye, Till Tomorrow*], the composer Krzysztof Komeda had the opportunity to create all the film's sound effects, including city sounds (Helman, 1964, 183). Sound for film was also a particular concern for Tōru Takemitsu. Often the composer was the author of sound effects e.g. *Kwaidan* (1964) that provided a secondary narrative for the film (D'Escrivian, 2009, 69) or created a corresponding atmosphere for the images as in *Woman in the Dunes* (1964) by electronically altering sound of a string orchestra (Lack, 1997, 163). In *This Filthy Earth* (2001), David Burnand, who acted as a composer of the score, was also one of the sound designers for the movie (Mera and Burnand, 2006, 178). The composer used both musical and concrète sounds, e.g. electronically generated drones, distorted prepared piano sounds, glitches, scratches and digitally treated voices and sounds.

The conceptual approach to the design of the overall soundtrack obviously requires careful consideration of all the film's audio components and their placement in order to avoid unnecessary duplications and conflicts (i.e. sound masking or sound cancelling) (Whittington, 2007, 2). The person responsible for this task is typically a film sound designer, who while

working closely with a director and producer is also in charge of the formation of all non-musical elements of the film's soundtrack (i.e. sound recording and/or creation).[30] Sound design evolved from the sound montage technique used by Walter Murch in George Lucas' first feature film *THX 1138* (1971). Through the skilful use of editing and extensive re-recording, Murch experimented with the sound perspective, tape-speed, and the application of audio filters throughout the film (Whittington, 2007, 19). For instance, sound of the jet cycles (in the tunnel chase sequence) was created by the addition of the Doppler shifting on top of the distorted recording of screaming voices (LoBrutto, 1994, 85). Murch was also responsible for the preparation of a temporary soundtrack for the film which was completed from manipulated (i.e. recorded backwards, slowed down, and layered) recordings of concert music (for more details on temporary tracks see section 1.3.2).[31] The temporary score was later transcribed and recorded by Lalo Schifrin (Isaza, 2009).[32] However, it must be stressed that manipulations of sound for film were done as early as in 1933 when, for the *King Kong* movie, the sound of the gigantic ape was achieved by the reversed recording of the roars of a lion recorded at the San Diego Zoo (Weis, 1995, 56). The integration of sound design with the score for this film had been extraordinary at that time. Nevertheless, this approach to sound in film was later used more widely in the horror genre (Hayward, 2009, 8).

In horror movies, the music and sound effects often create a coherent atmospheric entity (Donnelly, 2005, 94). Nevertheless, looking more broadly, sound montages in films from the

[30] The term "sound designer" was established by Walter Murch in the 1970s. A sound designer merges the duties of a sound recordist, editor, and mixer. The process of sound design involves a great deal of creativity. In contrast, the term "sound editor" relates to the person who organises and edits the already recorded sound material.
[31] Pre-existing music temporarily cut into a film's soundtrack.
[32] Throughout the thesis, references without page numbers provided are the Internet sources unless the reference is made to the whole book/journal article.

1970s such as *The Conversation* (1974), and especially *Apocalypse Now* (1979) where the electronic score composed by Carmine Coppola was used as sound effects, and sound effects prepared by Murch were used as music, repositioned the status of sound design, elevating it beyond the rank of the craft (Whittington, 2007, 20).[33] This innovative approach to film sound inspired new sound effects designers such as Ben Burtt who created the sound world for the *Star Wars* original trilogy (1977, 1980, and 1983). An interesting aspect of the sound design for *Star Wars* was that the sounds prepared for the devices and vehicles used by the opposing forces were distinctive and clearly identifiable, for instance Darth Vader's lightsaber is pitched in a minor key whereas Ben Kenobi's is in a major key, thus during the duel scene a dissonance can be heard, to additionally highlight the battle between the good and evil (LoBrutto, 1994, 144).

Digital technology has significantly extended the possibilities of sound design for film, and has facilitated the creation and manipulation of sound events into more complex sonic structures. A milestone both for music production and film post-production was the introduction in 1979 of the NED (New England Digital) Synclavier, a powerful musical instrument that offered sound editing features, frequency modulation synthesis (FM) and additive synthesis combined with a sampler (with a RAM expandable to 768MB), a digital multi-track sequencer, digital hard-disk recording, and music notation printing.[34] The third incarnation of the Synclavier, with the Direct-To-Disk recording feature (i.e. Post Pro version) available in 1984 became used for film post-production, but mainly on big-budget Hollywood

[33] Preparation of the soundtrack for *Apocalypse Now* took one year (Murch, 1992, 9).
[34] A full specification can be found at: http://www.vintagesynth.com/misc/synclav.php, http://www.500sound.com/SyncII/SyncII.htm, and http://ned.synthesizers.fr/documentation.php [Accessed 12/05/2012]

movies due to its high price (Milner, 2009, 324).[35] The instrument allowed for all sound effects for the particular screen production to be recorded and stored on a hard disk and then played back locked to the picture via a SMPTE. The Synclavier also featured special software which allowed for time compression of the recorded material. All operations were done digitally and cutting and splicing an analogue tape became unnecessary. This powerful machine was a predecessor of the contemporary computer-based DAWs. It is noteworthy that despite the current omnipresence of DAWs, the Synclavier is still used by some composers (e.g. Mark Snow), production companies (e.g. Skywalker Sound) and sound designers. The Synclavier was used by sound engineer Christopher Boyes to create sound effects for James Cameron's *Avatar* (2009) (Jackson, 2010, 25).

Today, the same digital music production technology (more affordable in comparison to the devices such as Synclavier or Fairlight CMI and thus widely available) allows score composers to develop their own music incorporating sound effects, and allows sound designers to enhance sound effects in film (Donnelly, 2009, 105). The use of digital technology encourages the amalgamation of music and sound design into a recorded and edited form (Mera and Burnand, 2006, 5). Presently, merging music with sound effects becomes a frequent aesthetic choice for filmmakers. Consequently, the sound design increasingly performs complex non-diegetic tasks within the film narrative traditionally reserved for the musical score (D'Escrivian, 2009, 72). However, this new aesthetic approach to film sound has been influenced not only by developments on the technological side. The profound change of perception towards film sound, according to Whittington, has originated

[35] At the same time Fairlight CMI produced in Australia offered similar capabilities, yet it was less advanced and reliable than its American counterpart.

from the juxtaposition of tonal and non-tonal concert music applied by Stanley Kubrick in his *2001: A Space Odyssey* (1968) (2007, 37). Yet, regardless of the narrative potential of complex sound structures developed from non-musical sound effects, the solely non-musical sonic scoring is rarely used in feature film productions (Hayward, 2009, 10). As regards the overall approach to soundtrack in mainstream Hollywood cinema, even though (especially in the action film genre) directors care about the clarity of the sound and desire it to be noticed by the audience (Wierzbicki, 2009, 209), the image is still the dominant means for storytelling. Filmmaking with the sound oriented approach has increased in recent years, yet it still remains a relatively uncommon practice (Barnes, 2007, 15).

1.2.3 Soundtrack and narrative continuity

Chion indicates that the most common function of film sound is unifying and binding the flow of images together (1994, 47). Vision in cinema is limited by constraints of the screen, whereas the listening field does not have this limitation: "[...] sound can always be heard in the whole space, in each shot" (Balázs, 1953, 53). As no sound remains neutral in its effect in correspondence to images (Crittenden, 1996, 110), soundtrack can become an influential component of film which may control the way the audience interprets the film's visual component. Since an auditory continuity appears to compensate for visual, spatial, or temporal discontinuity (Gorbman, 1987, 89), film soundtrack is also used as a bridging device to bring together scenes and sequences providing continuity in compound narratives (Belton, 1994, 53). Consequently, an overlapping or dissolving sound such as a repeated word or sound effect between two scenes can suggest a transition (Dancyger, 2011, e23).

Within a film sequence a sound which continues uninterrupted over the transitions between shots will mask these transitions, maintaining a sense of narrative continuity. Thus, despite discontinuity in the on-screen action, the soundtrack can create an illusion of continuous flow of action in the viewer's mind. Of all soundtrack elements (see, section 1.2.1) music has perhaps the greatest power to support or even create the illusion of continuity, as it can have its own inherent coherence which is more pronounced and instant than other elements used for creating the film narrative (Crittenden, 1996, 119).[36] Additionally, the unifying effect of non-diegetic music is also related to the fact that it is independent of real time and space (Chion, 1994, 47).

In the early 1930s, composer Virgil Thomson suggested that film needs music to provide continuity which film itself does not possess (Neumeyer, 2000, 10). This controversial notion seems to be exaggerated when it comes to the majority of mainstream cinema (with the exception of some specific cases of experimental approaches). It must be stressed that Thomson expressed this view in relation to silent films several years before he had scored his first (documentary) film, *The Plow That Broke the Plains* (1936). Yet, as early filmmakers paid little attention to visual rhythms, and the editing was erratic, often without a sense of logic (London, 1936, 72), music's ability to convey continuity was utilised by exhibitors and producers to mask this weakness of film. Thus, music and other elements of film sound became useful for maintaining narrative linearity, gluing the montage and preventing it from falling apart (Provenzano, 2008, 84), and for providing formal and rhythmic links between shots, and transitions between scenes (Gorbman, 1987, 73).

[36] Although film sound is constructed from many pieces during post-production it is typically perceived as the whole by the film audience (Holman, 2002, xviii).

1.3 Film music

Film music, in terms of its relationship to narrative, can be divided into two main categories: music which is contained within the film action and is a part of film narrative world (i.e. diegetic, source, intrinsic or realistic music); background music, which creates a mood for the scene and/or provides details of dramatic development and aspects of characters (i.e. non-diegetic, background, underscoring) (Kassabian, 2001, 42) (Cooke, 2001, 9).[37] The importance of music among other soundtrack elements is related not only to music's unique ability for transmitting emotional messages (Cohen, 2001, 149-268), but also to its unifying capabilities for film narrative. Both factors may have a profound effect on the interpretation and understanding of the film (of course in some circumstances those aspects of a musical score can be performed by other film sound elements). In most cases, music possesses natural continuity and formal cohesion, whereas the visual component of film consists of constantly shifting images and what keeps them together (in narrative cinema) is a story-line (Lissa, 1937, 89).[38] Thus, music often proves to be a suitable solution for two issues related to the film medium: 1) it supports and intensifies on-screen action, and 2) it provides a needed continuity for the recurrently changing images (Burt, 1994, 205).

1.3.1 Music as an agent of continuity

The continuous character of music allows it to function as an agent of continuity. By developing a specific musical device (e.g. a theme, a certain type of rhythmical material or other unifying musical element) a composer may contribute to maintaining a necessary

[37] Winters suggests that background music plays a constitutive role in shaping audience's construction of the diegesis, but also it has a potential to play an active role in the film narrative despite the fact that it remains unheard by film's characters (2010, 224-244).

[38] Chion argues that the term "the image" seems inappropriate as film consists of thousands of singular images. Thus, "the image" in cinema refers not to the content but to a container (1994, 66).

continuity in film. According to Aaron Copland, the reason for the unifying feature of music is the obvious one, that it exists in time (Cooke, 2010, 87). It is, however, noteworthy that, according to Chion, music can provide unity in film not because it exists in time but because it is independent of constraints of time (1994, 47). Regardless how the reasons for music's unifying ability are understood, in order to fulfil its function of providing continuity music (which is restrained by the structure of the film, i.e. usually there are relatively short spans available for the music without disruptions) has to retain its own cohesion in the first place.

1.3.1.1 Structural means

There are three main formal means used by film composers to create continuity within a film score (Prendergast, 1992, 219). The first is employment of a single theme throughout the entire film. At least two expositions of the main theme are needed, however, usually the theme appears more frequently. This particular type of thematic organisation is typified by *The Informer* (1935) with music by Max Steiner. Other examples of the mono-thematic approach might be *Laura* (1944) with music by David Raksin, *High Noon* (1952) with music by Dimitri Tiomkin, *Gunfight* (1971) with music by Laurence Rosenthal, *The Long Goodbye* (1973) with music by John Williams, or *Das Boot* (1981) with music by Klaus Doldinger. Sometimes, a whole cue[39] is based on a constant repetition of the theme, e.g. *Bram Stoker's Dracula* (1992) by Wojciech Kilar (cue #6 *The Storm*). Often the theme in a mono-thematic score has a longer phrase which consists of several smaller contrasting units, i.e. antithetic theme (Helman, 1964, 139). A good example is *La Strada* (1954) with music by Nino Rota, where a theme consists of two main sections, lyrical and rhythmic associated with different plot elements. The described approach is consistent with Schoenberg's observations that

[39] Cue - an individual piece of film music.

musical coherence is connected to recurrence of musical motifs and the role they play in the process of comprehension of music. The latter starts with the recognition of basic musical figures (i.e. motifs) which, despite various modifications, are identifiable throughout the musical piece (Schoenberg, 1993 [1917], 169).

A second and a very common solution for providing continuity in film, especially in Hollywood scoring practice, is adaptation of Wagnerian leitmotif technique.[40] A leitmotif in its primary sense is a clearly defined musical idea which subsequently appears in the musico-dramatic work representing or symbolizing a person, object, place, idea, state of mind, supernatural force or any other ingredient in a dramatic work (Hanning, 2002, 527; Sabaneev, 1932, 200; Whittall, 2001, 527).[41] Wagner combined various methods of thematic manipulation, those of Beethoven's such as the devices of fragmentation, augmentation, diminution and combination, as well as those that resemble Schubert's approach to recapitulate entire themes. In Wagner's music, thematic developments are, in fact, basically passages of motivic variations with frequent harmonic shifts (in accordance with the psychological unfolding of characters) and not actual developments resulting from contrasts of stable tonality as in Beethoven's works (Gutman, 1968, 372-374). Wagnerian technique due to its flexibility became of interest to film composers, however, leitmotifs used in film have been reduced to simple semantic labels (Nasta, 2004, 195). As Kurt London put it: "[...] a title for a predominant mood, a characteristic sentiment, or a delineation of a person, which

[40] There are, however, alternative approaches where music is not associated with the particular film character or situation and is used to create a certain mood or atmosphere.

[41] The term "leitmotif" was used for the first time by A. W. Ambros around 1865, then the term was used by F.W. Jähns in the study of Weber (1871) and by H. von Wolzogen in the thematic guide to the *Ring* published in 1876 (Grey, 1988, 363; Gal, 1976, 166; Whittal 2009). The use of reoccurring musical theme in composition was also not Wagner's invention. The reappearance of certain thematic ideas was already present in many works of Bach, Gluck, Grétry, and Mozart. As a unifying element, leitmotifs were used by Méhul in *Ariodant* (1799), and, a generation later, by Löwe. Reoccurring phrases are also present in Mendelssohn's, Schumann's, and Berlioz's works (Gutman, 1968, 362-363).

may assist the spectator's understanding, and perhaps also shed some psychological light on the film" (1936, 58-59). For Hanns Eisler, this reduction in the essential function of leitmotifs (i.e. sequential exposition which requires large spans of time), even though useful for a composer, does not agree with Wagner's intentions of achieving truly metaphysical significance (2005 [1947], 4-6). His viewpoint may be considered controversial since film is a different medium to opera and direct comparisons may be inappropriate. Eisler also understood film's role as depicting reality only and not actually being an artistic product and thus unable to give the leitmotif in film technique justice (Cooke, 2008, 82).[42] For Aaron Copland, the main problem with the application of leitmotifs in film was that they are used mechanically, routinely applied to save time rather than for artistic reasons (Dickinson, 2002, 45). Indeed, in the filmic context, the introduction of musical leitmotifs is highly conventionalised, usually involving simultaneous presentation of the character and their leitmotifs (London, 2000, 87).

The application of the leitmotif technique to Hollywood film scoring practice was pioneered by European composers with a background in late 19th century music drama and opera such as Max Steiner, Franz Waxman or Erich Korngold (Davis, 1999, 42). In film, themes or motifs are associated with certain on-screen characters and situations. The instantly recognizable shark motif from *Jaws* (1975) can serve as a classic example of the technique.[43] Thus, the same musical theme reappears each time a particular character (e.g. a shark) comes or is about to come into view on screen. In the film context, leitmotifs must be distinctive and

[42] Leitmotif technique was also criticised by Hanslick and Stravinsky (Thorau, 2009, 138).
[43] Louis and Bebe Barron creating their experimental electronic soundtrack for *Forbidden Planet* used the leitmotif approach to create a set of motifs (those, however, were not based on noted pitch and rhythm patterns) for significant characters, locations, and emotional situations reinforcing the film narrative unity (Wierzbicki, 2005, 38).

concise in order to work effectively with onscreen action and dialogue. The reappearing motif often undergoes certain modifications which may be rhythmic, intervallic, harmonic, or relate to the orchestration; and which are related directly to the developing story-line. Variation of the theme's nature can be used to provide the audience with additional information regarding the characters or the circumstances, especially when this is not expressed clearly by the other film components such as dialogue or vision. However, a substantial change of the leitmotif basic shape may result in the loss of its function, as it may become unrecognizable (London, 2000, 88). In the film *Rear Window* (1954) with music by Franz Waxman, the leitmotif associated with the character of a composer reappears several times as diegetic music: during a compositional process, as a finished piece performed by the composer on the piano, and finally, performed by a small instrumental ensemble. The theme serves an important dramaturgical role in the film influencing the behaviour of one of the film characters, a single woman who, thanks to hearing this music, gives up the idea of committing suicide and later decides to enter a neighbour's apartment. Leitmotifs can also be used in association with other more abstract components of the film, such as emotion, plot development, or recurring dramatic themes (Provenzano, 2008, 91).

The overall fragmentary nature of a film score requires unification of musical structures, and the leitmotif technique provides a means to achieve this goal (Lissa, 1964, 307). For instance, Alex North who wrote music for *Spartacus* (1960) and an original score for *2001: A Space Odyssey* (1968) (which was rejected by Kubrick in favour of pre-composed music), used the technique in his film music in an organised and consistent fashion creating symbolic relationships between the musical themes and the film characters. Despite the variety of musical motifs in his music, he was able to achieve continuity and coherence in the

organisation of musical scores (Henderson, 2003, 207). Consequently, leitmotifs when transparent (i.e. used themes must be easily recognizable) may be used as a unifying force (Provenzano, 2008, 91) not only for the musical score, but also for the film as a whole (Donnelly, 2001, 10; Lissa, 1964, 306).

The third method used by film composers to create uniformity within the film score is a developmental form. As characterised by Roy Prendergast, this approach is similar to leitmotif score, and relates to a classical sonata form (1992, 221). The only similarity between sonata form and the developmental score form, however, is in the function of the main theme which operates as the exposition. The theme then undergoes various modifications. Those transformations of the main theme in the mainstream narrative cinema are influenced by a dramatic content of the film plot. Prendergast provides an analysis of David Raksin's theme for *Forever Amber* (1947) showing how the motivic material of the score was derived from the original passacaglia idea and then modified throughout the score (1992, 222-232).

The construction of formal narrative unity within a film can also be aided through dynamic features of the tonal system. Linear (tonal) music depends mainly on an active expectation rather than surprise (Meyer, 1956, 29). The order and stability of tonal structures is based on hierarchical relationships between certain vertical and horizontal combinations of pitches which are frequently disturbed by stress points constructed upon dissonances that create tension which is expected to be resolved. On a larger scale, the progression away from a tonal centre creates a sense of anxiety in the listener, which resolves when the original tonal centre is re-established. Thus, an additional type of unity might arise from careful planning of the lack of tonal resolutions in a musical score in order to exploit the audience's active

anticipation (Cooke, 2008, 85). Unresolved harmony generates a sense of expectancy and engages the audience into the continuing forward movement of the film narrative flow (Brown, 1994, 4).[44]

1.3.1.2 Psychological means

Apart from structural aspects of the musical score that can create an illusion of continuity during a cinematic experience, music is also capable of simulating emotional responses (Lack, 1997, 287). Music has the ability to convey its own attributes to the story-line and to the film as a product. It creates coherence, making new links between words or pictures. It even produces meanings of its own (Cook, 1998, 20). These properties result in film music becoming a part of the complex system of shared implications between other film components. Thus, while creating a cinematic experience, music also interacts with cinematography, acting, editing, dialogue, sound effects. Further, music may contribute emotional properties to the interaction between different components of the medium or it may modify emotional properties of other media. The latter cross-media interaction is a dynamic process during which a new meaning is created by the fusion of other media attributes (Cook, 1998, 97). It has been suggested that music creates a third dimension to the two dimensional image (Hagen, 1971, 155). What it means is that music can capture and reveal to the audience emotions which intentionally or due to the development of the plot cannot be expressed by the dialogue or images.

[44] Neumeyer suggests that the tonal design, i.e. patterning of succession and relationships of key centres may also contribute to narrative unity of the film (1998). Yet, maintaining planned tonal patterning in film is usually influenced by the discontinuous and composite character of film music. Another difficulty relates to sound editing practices (e.g. cutting sections of the music or reorganisation of the original order of the cues).

When the inner world of the film characters is emphasised by music, their feelings become accessible and compelling for the spectator (Provenzano, 2008, 84), as for example in the scene of hallucinations experienced by one of the characters (Dr. Jessup) in *Altered States* (1980). Music can facilitate personal identification of the audience members with imaginary emotional states of characters or the overall atmosphere of a particular scene (Lissa, 1937, 82). Thus, even though cinema has developed practices to support acting in portraying emotions (e.g. the close-up, diffuse lighting), music is the most reliable of them using conventions facilitating recognition of emotions presented in particular scenes (Kalinak, 2010, 19). Not surprisingly, music has frequently been used by directors to strengthen the impact of scenes that are dramatically weak (Prendergast, 1992, 28).

According to Chion there are two main ways the music can produce a specific emotion in conjunction with a situation portrayed on the screen. The first one, by captivating the scene's rhythm, tone, and phrasing, music (including cultural coding) can directly articulate its participation in the feeling of the scene. As the music in this case evokes feelings coming from the content of the images, Chion categorises it as *empathetic* music. The second one is a situation when musical accompaniment remains indifferent to the on-screen situation and progresses in a steady and undaunted manner. This *anempathetic* music creates a contrast in relation to the film scene that, according to Chion, amplifies emotions (1994, 8).

Catherine Provenzano recommends that film composers should have a good understanding of how to manipulate music in order to obtain the desired association by the viewers leading to their emotional response (2008, 85). According to Jan A. P. Kaczmarek, "a composer almost needs to be a psychologist. Music is a very sophisticated tool that defines emotion and

meaning for the picture, and if you have profound knowledge of psychology, emotion and culture you can influence the picture in a very strong way" (DesJardins, 2006, 141). As much as this notion may seem exaggerated, some understanding of human emotions is undoubtedly helpful in the work of a film composer. Further, according to psychological theorists music possesses the influential ability of bringing emotional experiences from memory into awareness, which is related to the function music fulfils in daily life, as part of significant social events (LeDoux, 1992, 269-88). Consequently, a connection between musical elements and emotionally charged memories appears. Music's unique ability to transmit emotional messages is related to the process of pattern creation and the way the brain detects and successively anticipates those patterns. What is more, slight alterations of a structure and tempo within a distinctive pattern can generate a more pleasing response in the listener than the perfectly metronomic one (Levitin, 2006, 171-173). In addition, the temporal aspect of the musical score and image (i.e. congruence with the action) may affect the interpretation of a film (Cohen, 1988, 109). Thus, music may create continuity by its structural means as well as psychological mechanisms in the cognitive perception it relies on. As shown both these strategies may contribute equally to the reception of the work of film as a coherent entity.

1.3.2 Music editor

In Hollywood practice, early decisions regarding placement of the music and its functions (including the support of narrative continuity), which precede the composition of an original score, as well as further necessary adjustments of music during scoring, are done by a music editor. Music editor's role is to support composers in their work.[45] In some cases, a music editor may become a supervisor of the composer's work with a task to ensure that the music

[45] Music editors are still a novelty in Australia and some European countries.

fits the film precisely (Rona, 1990, 62). Their main task is to supply a composer with an approximate evaluation of how many minutes of original music the composer will be required to write (Bellis, 2006, 58), providing the perspective on the available time frame and budget. In addition, a music editor attends the spotting session and prepares spotting notes (Kompanek, 2004, 10); click tracks[46] or visual streamers for the recording session; hires session musicians; oversees the recording of the music; organises equipment; keeps record of the proposed edits (Hannan, 2003, 109); and finally, prepares the film or software for synchronisation of music with the final version of the film (Davis, 1999, 95).

The music editor's job typically starts at the early stages of the film project, especially if the film comprises musical scenes and requires preparation of music pieces that will be used during the shooting. They also prepare and organise permits for the use of licensed music and/or songs which are not written by the composer. Working closely with the film's director, the picture editor and the music supervisor, a music editor is active during several stages of the production, namely pre-production of the film, music composition, recording, and dubbing. Negotiating with the director on the composer's behalf is their other responsibility. For example, they may need to persuade a director that the cue prepared by the composer works well in a particular scene (Karlin and Wright, 2004, 11).

Inevitably, digital technology has influenced the way music editors work, and thus it has become essential for them to have a comprehensive knowledge of how to operate advanced industry standard editing and synchronisation software applications such as Pro Tools[47] and

[46] A click track is an audible metronome signal used during a recording session for synchronising music with film.
[47] www.avid.com/products/pro-tools-software [Accessed 12/05/2012]

Auricle[48] (Davis, 1999, 95). Although, in some cases, the process of editing music may be as simple as locating pieces of music and placing them in several selected spots of the film (e.g. in the opening titles and end credits), at other times the editor's role may extend to the active involvement in collaboration with the composer on the music. This was the case during the scoring for *Black Hawk Down* (2001) where the composer of the original score, Hans Zimmer, prepared tracks of music with different tempi and keys and allowed music editors, Bob Badami and Marc Streitenfeld to experiment and edit them in order to fit the film's structure (Karlin and Wright, 2004, 11).

There is no formal requirement for the music editor to be musically trained, yet musical skills (i.e. knowledge of different musical styles, ability to read the music notation) seem as important in this profession as a good understanding of film making aesthetics (Hannan, 2003, 109). According to Hilary Wyatt and Tim Amyes, it is essential that a music editor approaches their task from the composer's perspective and not a sound editor's (2005, 193) and that all the edits are done in such a way so that they preserve musical sense. Thus, a music editor has to be aware of the structure of music, which influences the selection of edit points. The authors further indicate that the cuts should be introduced on the beat in order to be musical and a careful approach to any transitional sections (i.e. key changes) applied in order to avoid awkward transitions. There are also other techniques that can help a music editor in highlighting important narrative spots, e.g. layering several tracks or adding additional instruments (i.e. sweetening). More complex editing usually requires application of digital editing tools such as pitch-shifting, and cross-fading (Sadoff, 2006, 169).

[48] www.auricle.com [Accessed 16/06/2009]

One of the most crucial aspects of the music editor's role in the process of film production is the preparation of the film's temporary score, a so called temp track.[49] This practice is characteristic mainly for Hollywood cinema; however, temporary scores are at times also used in Europe. For instance, during the production of a short film *Moth* (2002), pre-existing pieces of music were prepared by the composer Miguel Mera to generate a discussion regarding the style and emotional focus of the music, even though the chosen compositions were not used as models for actual cues (Mera, 2008, 38).[50] The temporary score is a combination of pre-recorded music from different sources, such as cues from scores of pre-existing films, concert music or songs. In situations when from the outset of the project the music editor is aware of who is going to compose an original music, the temporary score may be compiled from other films scored by this composer. For example, this was the case in *The Pianist* where Wojciech Kilar's score for *Dracula* was used for the mock-up score (Sadoff, 2006, 175) as well as in Jerry Goldsmith's music from *Alien* (1979) and *Coma* (1978) being used for *Psycho II* (1983), to name just a few (Karlin, 1994, 6).

A mock-up score serves several purposes in Hollywood practice. It helps the director to finish the editing of the film and to evaluate what effect certain types of music will have on the film's reception. Temporary scores are commonly used in order to present a film to the studio executives and the test audience prior to the composition of the original music and the final mix of the film. Further, temporary scores help in establishing the concept for the music and present it to the composer (Karlin and Wright, 2004, 29). As a result, a temporary score

[49] If the budget of the film project does not allow for hiring a music editor, the temporary score may be prepared by a film editor.

[50] In Europe, TV producers and advertising agencies frequently use either recordings as reference tracks or may provide a composer with a list of examples they require to be emulated. At times these descriptions may be very specific in terms of the places where the music should be used and the functions it is to fulfil. This approach can be compared to the spotting notes created in Hollywood practice.

becomes a blueprint for the original music providing a composer with information regarding the director's vision, functions music must perform in the particular scenes as well as specific requirements of the given genre of the film (Sadoff, 2006, 166). Although according to some composers temporary scores as a means of communication between the director and the composer serve their purpose well (Karlin, 1994, 7; Lack, 1997, 288), other composers (e.g. Mark Isham) and authors (Burt, 1994, 221) reject this practice as it often leads to emulation of the model music (Karlin and Wright, 2004, 31). A well crafted temporary score may solve the issue of music's placement within the film narrative and its emotional commentary to the image. Yet, it is hard not to come to the conclusion that the input of the contemporary Hollywood composer to the film production is limited to the automatic filling of an already planned, emotionally and structurally well defined frame. Furthermore, as indicated by Ronald Sadoff, interchangeability of temporary tracks and their functionality result in grounding of clichés and conventions (2006, 166).

1.3.3 Scoring process

Composing for film differs from other forms of musical composition because the majority of the composer's decisions are derived from the structure and requirements of the film. Consequently, the structure of the film music comes from a mixture of genre of the film and the storytelling (Rona, 2002b, 126). Film projects differ and each brings its own unique set of problems, which a composer must tackle and solve during the scoring process. Today's film scoring requires from a composer not only the ability to write music on demand or demonstrating great stylistic flexibility but also having skills of an orchestrator, sound engineer, copyist, music editor, conductor, producer, negotiator, agent, and even an accountant (Bellis, 2006, 125; Karlin and Wright, 2004, 107). Nevertheless, the focus of the

composer's attention needs to be on successfully supporting the on-screen drama and, as a consequence, increasing the overall effectiveness of the film.

Additionally, all the composer's actions are influenced significantly by the intense pressure of time. Thus, an important consideration which a composer must take into account before starting a project is a calculation of the total amount of music to be written versus the number of days available to write it. The amount of music required differs from project to project, but a typical feature film may need approximately 30 to 120 minutes of music (Davis, 1999, 81). Composing two to three minutes of music per day is widely considered to be a reasonable amount (Bellis, 2006, 25; Davis, 1999, 18; Karlin and Wright, 2004, 59) which, of course, depends on the type and complexity of the music as well as the working method. However, even when a satisfactory amount of time has been negotiated with a production company, the shooting and editing processes almost always fall behind the schedule, and the project continues to be edited even as the composer is writing the music. As Tadeusz Baird pointed out: "The composer's situation in film is difficult because music is last in the production chain, thus quite often it results in annoying rush during scoring" [trans.] (1961, 29). Therefore, a composer has to plan tasks in advance to avoid unnecessary delays. Quite often, especially in low budget productions, a composer has to split time between composing and other job-related activities mentioned above. [51] Hence, it is a common practice for composers to have personal assistants who help with their duties (e.g. additional music, orchestration, editing, programming, equipment maintenance, etc.) (Cooke, 2008, 502; Tyson-Chew, 2003, 1).

[51] At times the list also comprises duties of a sound designer and a music editor.

The first step towards creating a score for a particular film is developing a musical concept (Davis, 1999, 135; Karlin and Wright, 2004, 63; Timm, 2003, 41). Producing a consistent musical concept assists in achieving a coherent film score and, as a result, maintains the film's dramatic integrity. During this stage, a composer must define the general functions of music, its style, instrumental colour, and choose appropriate compositional techniques. Even though music is only one component of a very complex motion picture, its role among other elements, such as direction, acting, and cinematography, may be particularly significant (depending on the genre of film and/or dramaturgical functions of the score in the narrative structure of a film).

Musical accompaniment (including the dramaturgical role of silence) can perform a range of different functions in film. Claudia Gorbman stresses that a musical score has a great flexibility in relation to film's diegesis in terms of the array of different functions it can serve (e.g. temporal, spatial, dramatic, structural, denotative, and connotative) (1987, 22). A brief overview of the diverse functions of music in film seems practical in order to outline the considerations a composer must face during the work on a new project. Richard Davis groups various functions of music into three major categories: 1) Physical functions, 2) Psychological functions, and 3) Technical functions (1999, 142-148).[52]

1. Physical functions relate to music impacting physical actions or location of the scene. They include:

[52] There are other classifications available in the literature, for example Aaron Copland's classification (Copland, 2009 [1939], 214-215) or Zofia Lissa's comprehensive overview (Lissa, 1964, 114-236).

a. *Setting the location* of the film through the use of specific instrumentation that suggests the location (e.g. a particular country).
b. *Setting the time period* through a specific instrumentation and its authenticity compared to the music of a particular historical period, which may depend on the project's needs.[53]
c. *Mickey-mousing* referring to the situation when music mimics every detail of action on screen, which may be used as a comic device.
d. *Intensifying the action* referring to the technique used by composers in action scenes (i.e. chase scenes, fights, intense arguments between characters, suspenseful moments) where music closely follows the action onscreen, and often comprises of many congruent points between musical accompaniment and visuals.

2. Psychological functions refer to the intensification of psychological and emotional impact of the film. Music may correspond to the drama in parallel (i.e. doubling the information) or can create a new dimension which is not suggested in the dialogue or action. These include:
   a. *Creating the psychological mood* which refers to setting a specific mood in the score in relation to the film's psychological implications.
   b. *Revealing the unspoken thoughts and feelings of a character* which refers to music commenting on character's inner world (i.e. thoughts, feelings, emotions) that is not expressed verbally or clearly in the action.

[53] In both cases (1a and 1b), however, Davis does not indicate whether the location and period may also be articulated through the use of specific musical genres and styles.

c. *Revealing unseen implications* which refers to music indicating the event that is going to happen.
d. *Deceiving the audience* which refers to music suggesting that something will happen, yet a different event takes place instead.

3. Technical functions refer to music's support to the overall structure of the. These include:
   a. *Creating continuity from scene to scene* which refers to music masking the cut between scenes by beginning in the first scene and continuing in the next. This helps to create a smooth transition.
   b. *Creating continuity of the entire film* which refers to the use of themes and textures that return throughout the film and thus creates the continuity of sound. Continuity also can be achieved thanks to instrumentation that carries throughout the film.

A film composer needs to possess a particular sensibility in order to connect sounds to the onscreen events (Rona, 2002b, 126), and create a desired dramaturgical effect. The choice of an instrumental colour for a particular scene can be as important as selection of melody and harmonic progression in fulfilling dramaturgical functions.[54] For some composers, for example Franz Waxman, orchestration was the main aspect of successful film scoring, and melody, traditionally considered the most important element of film music, was only secondary (Cook, 1968, 421). In *Batman Returns* (1992), motifs of three main characters are

[54] An interesting sonority may be used as a motivic material instead of the traditional melody or the rhythmic pattern providing an effective alternative in supporting the film narrative. The exemplary application of this approach is Corigliano's *motion sonorities* developed and used in the film *Altered States* (1980). According to May, these specific pitch combinations, patterns and non-specific textures were used by Corigliano as a thematic material in traditional music from which developmental procedures were driven (1990, 11).

structurally similar to each other (also all in a minor key). The differentiation between those motifs was achieved by Danny Elfman through orchestration. The motif of Batman uses brass instruments; while Catwoman was given high string glissandi and dissonant clusters. The most distinctive colouristic treatment, i.e. a chorus of voices, pipe organ and full orchestra characterises the Penguin (Halfyard J., 2004, 30).[55] Practically every possible instrumental configuration can be used effectively in film music as long as it is associated with the film plot. The task of a film composer is also to search for new instrumental combinations that could not only correspond well with the film narrative, but also could enhance its dramatic effect.[56] As observed by Roy Prendergast, colour does not compete with the dramatic action and due to its flexibility it can be brought by a composer in or out easily (1992, 214). Additionally, achieving a particular colour can be done much more quickly than developing a musical design.

When all requirements regarding functions of music in a given project are met, the final result of the composer's work can enhance or even manipulate the audience's interpretation of certain scenes, attitudes of characters, or on-screen events (Bolivar, 1994, 28-59). Hence, in order for music to fulfil its functions, regardless of whether the musical score needs to be tightly synchronised with images (e.g. in an action sequence) or its relation to on-screen events is asynchronous (e.g. to establish a certain mood for a scene), the strategic placement of cues with the image is usually vital (Davis, 1999, 89; Lexmann, 2006, 16).

[55] A similar approach can be observed in Kilar's music for *Dracula* where the same lyrical theme is associated with the character of late Elisabeth (Dracula's wife) and her embodiment, Mina. The difference between the two characters was highlighted by instrumentation (flute versus strings).

[56] It was observed that in European countries, mainly in France, Italy, and Poland, the opposition towards the norms set by Hollywood was also manifested by the reduction of traditional symphonic scoring in favour of smaller instrumental ensembles (Helman, 1964, 111). This view at least in the Polish context requires some reconsideration. Composer and educator Lucjan Kaszycki whose career peaked during the 1960s and 1970s, stresses that smaller instrumental ensembles used by film composers often had been related to the budget limitations and thus their use was driven by prosaic rather than artistic reasons (Gronau et al., 2012, 105).

Any simultaneous coexistence of musical and visual components in time will always result in a certain effect depending on the dynamics and structure of the music (Gorbman, 1987, 16).[57] The joined product (i.e. meaning and structure) of the auditory and visual components occurring at the same time has been termed by Chion as *Synchresis* (Chion, 1994, 63). *Synchresis* has mainly a spontaneous character, yet its effect can be influenced and oriented by cultural habits. It can also be manipulated by a filmmaker to create various audio-visual effects. As Helman observed, the coexistence of the musical and visual components in time alone is not enough for their (dramaturgical) integration (1964, 166). Therefore, among the numerous demands a film composer faces, dealing with the problem of synchronising music to film can be a significant one (Karlin and Wright, 2004; Davis, 1999; Adorno and Eisler, 2005 [1947]; Tyson-Chew, 2003).

In a typical Hollywood production, decisions regarding the placement, length, timing, and style of music all the way through a film project are made during a spotting session. At this meeting, the director, producer, composer and music editor screen the film scene by scene to decide in which places the music is needed, where it will begin and end and, finally, what particular dramaturgical function the music will fulfil. Usually, the spotting session takes place when the fine cut (the final edited film) is available. As a result of this meeting, a music editor prepares a detailed list (the so called spotting notes or breakdowns) of all scenes with music (the cues) (see also section 1.3.2 for a more detailed description of the music editor's role). Breakdowns may also contain further information regarding the character of the music

[57] The integration between the two media is influenced by the degree of their isomorphic relationship (i.e. duration, intensity, proximity, etc.) (Coulter, 2010, 28).

and specific moments in the scene that must be accented by music (Davis, 1999, 99). The spotting notes are an outline for a composer to which they will later create the musical score.

Over the last decade, however, formal spotting sessions are generally organised less frequently. Therefore, the most important decisions regarding music are often made during the preparation of a temporary score – pre-existing music temporarily cut into a film's soundtrack by a music editor (Karlin and Wright, 2004, 33). Since a composer is usually not involved in the process of creating temp tracks and receives film material with a temporary score as a reference, they are forced to take timings of the cues and other vital information regarding the music directly from them. It must be stressed, however, that individual temporary cues have a tendency to function within a particular scene only, and seldom they can reflect the narrative issues relevant to the whole project (Mera, 2007, 104).

Thus, when a composer starts to work on a new soundtrack that requires music which precisely accents specific moments in a given scene, they must resolve several technical issues. These include establishing an appropriate tempo for the music as well as choosing the meter and meter changes, if such changes are required, in order to achieve a needed correspondence with the image.[58] Frequently, the development of the plot or the way the shots have been edited suggests certain rhythms which a composer must follow (Davis, 1999, 154). Therefore, before writing begins, a composer must construct a tempo map (i.e. succession of tempo changes stored in a sequencer or other synchronisation devices) for each cue (i.e. each

[58] The simple technique to achieve a relative synchronisation of the music with images is to change the time signature for shorter or longer in appropriate bars to reach the sync point earlier or later, respectively. In situations when the synchronisation with certain on-screen events has to be precise to the frame, a manipulation of the tempo of music is needed. The change of the tempo has to be executed in the preceding hit point bar or bars.

individual piece of music). A tempo map constitutes a framework which will later be filled with music.

The process of creating comprehensive tempo maps can be difficult and time consuming (depending, of course, on the structural complexity of a particular sequence). The complexity of this task is influenced by the function which the music performs in a given sequence. If there is a need to intensify the drama (e.g. in an action sequence), it is likely that the temporal structure of the whole scene may be very complex. In this case, a composer will have to deal with many hit points (i.e. specific moments in the film which the music must highlight). Graeme Revell stresses that in contemporary (Hollywood) films a composer is asked to hit every cut, and it is necessary to find a way to accomplish it without compromising the musicality of the score (Karlin and Wright, 2004, 159). For example, the opening sequence of *The Matrix* (1999) features music that highlights many hit points (when Trinity fights police officers and later is chased by the agent). In a situation when, for dramatic reasons, the music does not follow the film narrative closely, less precise synchronisation is needed. However, this means that several hit points may still occur. The music must flow with the edit and the action has to fit to very specific durations and all transitions within them, yet there is no formula which determines the length of the phrase or number of beats in the bar to achieve a needed synchronisation (Rona, 2002b, 126). All the durations, hit points and transitions, in the majority of cases, must be calculated.[59]

[59] In some European countries, particularly in France, by the end of the 1950s there was a tendency to deviate from the norms established by Hollywood during the 1930s, 1940s, and 1950s. Cinematic realism became an ultimate objective and thus new techniques for camera placement, film editing, and new styles of acting developed. Many filmmakers started to be interested in using music not as a simple illustration of what was seen on the screen, but to play it against the image, to enhance the film narrative (Wierzbicki, 2009, 165-169). Frequently musical accompaniment was cut off unexpectedly, to draw attention to its intrusive nature. At times, non-diegetic music was not used at all (Cook, 2008, 320). This apparently new approach of using music in the

Another significant aspect that influences work during this stage is that musical structure and texture should not interrupt or obstruct the dialogue and sound effects, as appropriate proportions of all the film's soundtrack components (i.e. a creative coexistence that enriches the artistic concept rather than just a necessity) are responsible for the effective storytelling. As Jeff Rona observed: "Film scores need to leave some room to accommodate other sonic and non-sonic elements in the film" (2002b, 126).[60] The interaction between elements of a soundtrack is also influenced by genre of the film. In action films, for instance, composers must be prepared to accommodate huge sound effects (e.g. explosions) that may appear in the soundtrack (Karlin and Wright, 2004, 179).

Composer should be aware before the composition starts what kind of sound effects will be used in scenes with music. This knowledge will help not only to structure the music to avoid doublings with sound effects (unless this is a desired effect) but also determine certain decisions regarding orchestration. Thus, in order to successfully accommodate both sound sources in a soundtrack, a composer must be aware of what frequencies sound effects occupy in order to choose instruments (with frequencies of music below or over the frequencies of sound effects) so that they do not mask each other out. This issue is particularly relevant when it comes to the use of percussion instruments (Gronau et al., 2012, 233). Sound effects with a sonic characteristic similar to percussive instruments used by a composer may become confusing for the audience. To avoid such an aural confusion James Newton Howard while scoring *Vertical Limit* (2000) used low frequency drum sounds so that they were more felt

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contrapuntal way had already been used by soviet composers during the 1930s, (i.e. Yuri Shaporin and Dmitri Shostakovich).

[60] The sound design is increasingly inculcated as an element of the score, which is routinely done without the composer's involvement.

than heard and did not compete with other elements of the film soundtrack (Karlin and Wright, 2004, 179), for example the helicopter sequence (the arrival of the rescue team).

Therefore, precise mapping of the musical accompaniment to the film narrative structure can be crucial for successful integration of audio and visual components. The task of creating comprehensive tempo maps and a subsequent composition of music is however complicated further by the film editing process, which results in numerous changes to film scenes, sequences and, in some cases, even to the concept for the score (if, for example, the director or producer decides that the composed music does not properly support the story or the concept of the film genre has been altered).[61]

1.3.4 Film editing and its impact on a musical score

Frequent editing changes to visual materials during the film production process are an unavoidable part of the filmmaking routine. They usually take place throughout the whole process of scoring and the composer is constantly asked to rethink, redo, modify, and restructure music (Rona, 2002b, 162). Editing changes are frequently done until the very last moments of the recording session (Karlin and Wright, 2004, 106). David Shire observed that: "[...] any soundtrack composer must allow for adjustments, both big and small, even during those moments when the baton is already in hand" (Silva, 2007, 114) and in some cases, even beyond it.[62]

[61] In 2009, John Corigliano's score for *Edge of Darkness* (2010) was rejected in favour of Howard Shore's. The film was produced by the independent producer who sold film to Warner Bros. After shooting additional action sequences film was reshaped into an action thriller which needed a new and more adequate music to match the genre (Gasser, 2009).

[62] Several years since the premiere of the original film, a director's cut version is frequently being released, e.g. Francis Ford Coppola's *Apocalypse Now Redux* 2001 [1979].

There are several causes of editing changes. Firstly, the alterations are an inherent part of every creative process. As Pudovkin said: "[...] editing is the creative force of filmic reality" (1960, 26). For the filmmaker, it means that it is possible to manipulate space, time, emotions and their intensity to the extent limited only by individual instincts and creative abilities. For instance, constructing a scene from longer shots can provide a feeling of peaceful viewing (e.g. *Stalker* (1979)). Alternatively, by shortening the shots and by unexpected cuts, an editor can increase the speed of the action and accumulate more directly the dramatic tension of the image (most of action sequences are constructed that way) (Lexmann, 2006, 28).

The problem of intensification of the cinematic experience through editing is especially apparent in the action/adventure genre (see section 1.1.4). There is a tendency to increase action elements of the film productions (suppressing the human element in favour of subsequent series of spectacular action sequences) (LaSalle, 2008, 1) at the same time increasing the complexity of the structure of the film. David Bordwell has observed that this is a steadily growing tendency particularly in Hollywood (2002, 16-17). An average length Hollywood production between 1930s and 1960s contained from 300 to 700 shots, and thus an average shot length (ASL) oscillated around eleven seconds (e.g. *Back Street* (1932) has an ASL of 19 seconds, whereas *Fallen Angel* (1945) has an average of 33 seconds). The tendency to faster cutting in film in the mid 1930s can be explained as a wish to return to cutting practices in American silent films from the 1920s (where an ASL was usually around 5 seconds) (Salt, 1985, 40).[63]

[63] In silent films editing was unrestricted whereas in early sound films editing practices became restricted by the recording technology. Thus, editing techniques such as crosscutting, close-ups, and expressive camera movements were temporarily eliminated (Cook, 2004, 223).

In the 1960s, some American and British filmmakers applied faster cutting rates (e.g. *Goldfinger* (1964) has an ASL of 4 seconds and *The Wild Bunch* (1969) 3.2 seconds). In the middle of the 1970s most films in any genre comprised at least a thousand shots. Action films from the 1970s had a tendency to be edited more rapidly than other genres, yet even films such as the comedy *National Lampoon's Animal House* (1978) have an ASL of 4 seconds. In the 1980s, most films had an ASL between 5 and 7 seconds, however films such *Raiders of the Lost Ark* (1981) or *Lethal Weapon* (1987) had between 4 and 5 seconds. There were, however, also action films with an ASL below 4 seconds, for example *Top Gun* (1986) (Bordwell, 2002, 16-17).

During the 1990s, many films contained between 2000 and 3000 shots (e.g. *JFK* (1991)). By the end of millennium, 3000-4000-shot movies became common (*Armageddon* (1998), *Sleepy Hollow* (1999)), with an ASL of 2.7 seconds (Bordwell, 2002, 16-17). Bordwell stresses that today's films tend to be edited more rapidly than at any time before in American filmmaking history. What is significant, however, is that this editing trend also influences the duration, complexity and the overall temporal structure of the action sequences. In 1981, Steven Spielberg used 210 shots to construct a seven and a half minute long horse/car chase sequence in *Raiders of the Lost Ark*. In 2007, director Paul Greengrass created a twenty-minute chase sequence with approximately 640 edits in *The Bourne Ultimatum* (Dancyger, 2011, 294, 298). The music in action sequences is usually fast-paced throughout the whole sequence, yet the rhythm and tone of the score shift as each stage of the sequence unfolds (Purse, 2011, 70). Consequently, from the composer's point of view, highlighting the action and at the same time providing a required continuity may present the greatest challenge. In *The Bourne Ultimatum*, during the chase sequence in Tangier the music closely follows on-

screen action providing continuity for the edit, however, the fighting scene between Bourne and Desh (the end of the sequence) does not use music. It must be stressed that there are action sequences that do not use music at all, for instance the famous San Francisco car chase in *Bullitt* (1968) and the chase sequence in *The French Connection* (1971) feature only naturalistic sound effects.

Secondly, computer technology (i.e. non-linear editing) facilitates effortless generation of numerous versions of scenes (Cooke, 2008, 473; Rona, 2000, 130). From all influences technology has had on the narrative techniques of film, introduction of digital non-linear editing systems into post-production was probably the most significant (Lack, 1997, 343). The non-linear computer based editing systems introduced from the early 1990s, such as Avid or Final Cut Pro, allow a director or a film editor to increase the speed of the workflow and to integrate the edited material with computer special effects.[64,65] The digitalised film material can be edited (i.e. cut and joined) in any order, and changes to the order of shots can be done indefinitely without any impact on quality. What is even more important, the digital editing systems allow one to assemble and preserve alternative versions of the edited scenes (Fairservice, 2001, 335; Murch, 1992, 79). In fact, this very possibility encourages the editors and directors to view potential changes in a sequence and to create numerous versions of the edited sequence (Rona, 2000, 130).[66] This particular aspect of film production has important implications for a composer's work, as they must compose different versions of the cues or

[64] Avid (www.avid.com), Final Cut Pro (www.apple.com/finalcutpro) [Accessed 12/05/2012].
[65] Among many advantages of digital systems as compared to pre-digital systems (i.e. Moviola), Murch particularly stresses the reduction of editing costs and a noise-free working environment (Murch, 1992, 77-79).
[66] Linear editing is a method developed to edit film material on a videotape that could not be physically cut and joined. The selection, modification and arrangements of images and sounds have, in linear editing, a predetermined structured sequence. The editing could only be made by copying from an original source. Significantly, in contrast to digital non-linear editing systems, each copy reduces the quality of the edited material (Fairservice, 2001, 335).

continuously correct the previously composed material while not working on the cues that are yet to be scored. Cooke indicates that advances in editing of both sound and image resulted in today's composers being under greater pressure to meet short deadlines and to revise their work on the spot than the composers of the previous generations (Cooke, 2008, 473).

In addition, the fact that changes can be made easily also influences the logic and the flow of the montage. In the digital domain, sequence edit may be rushed and not well developed, whereas the handmade editing in the analogue domain required careful planning before the actual cut was made. In the pre-digital era, during the editing process, film had to be cut and joined physically. Every time the two shots were joined together a frame was lost in the process (i.e. the join consisted of an overlap). Consequently, when the attached shots were taken apart and reattached again, or there was a change in terms of shots duration that later needed to be extended, even more frames were lost. In order to re-establish the original length of the edited material, black frames would be added resulting in sudden losses of picture and sound during projection. The fixing procedure also needed to be ordered, generating additional expenses and delays (Fairservice, 2001, 334). As mentioned before, the limitation of the drop in the quality is no longer problematic in digital editing and careful planning has been replaced with experimentation. Thus, the lack of the well thought through structure of the edit may also contribute to problems with creating a corresponding musical accompaniment.

Moreover, the editing of film is an entirely different process from that of editing music. In film, shots can be put together and rearranged freely whereas editorial decisions regarding musical accompaniment are influenced by music's tempo and logic. As observed by London,

there is a "discrepancy in a film between the scenes and the musical accompaniment, because the speed at which these pictures change is not in keeping with the character of music, which needs a certain time to develop" (1936, 75).[67] Thus, the outcome of the film editing process may result in changes to the original structure of film sequence, impacting the flow of the music. The editing of music in order to integrate it with the restructured images may result in unmusical changes to the cue. These unnatural disruptions in the flow of the music (if noticeable) may diminish the quality of the audience's perception (Helman, 1964, 167). The lack of respect towards a musical score (and other soundtrack components), even though the majority of filmmakers recognise its importance, can be ascribed to the inevitable tendency to consider the visual aspect of the film as the most important. Without doubt this is related to the proportion of the film budget spent on the visual side of the project versus the sound.[68]

Usually, editing changes are not radical; however, often subtle alterations of visual material can be even more difficult to tackle by a music editor or a composer. From the composer's point of view, cutting a few frames from the film material can sometimes have greater implications for the accompanying music than cutting several seconds (Bell, 1994, 30). The source of this problem lies in the lack of a simple correspondence between the time units in film (i.e. minutes, seconds, and frames) and music (i.e. bars and beats). Additionally, even though both film and music belong to the temporal arts which take place and develop through real time, and both have strong foundations in rhythm, there are significant differences in

[67] Lack of correspondence between the musical accompaniment and the structure of the film was already present in the silent era, when the transitions from one scene to another were problematic for the illustrators and/or conductors who were responsible for providing musical accompaniment. Often the easiest way to solve the issue of a rough change from one musical piece to another was simply to compose a short connecting piece (Prendergast, 1992, 11). However, conflicts between music and action are not limited to film; they can also be found in opera.

[68] As Australian film director Mario Andreacchio points out: "[...] the sound becomes like an add-on". This quotation comes from an interview conducted by the author (see section 9.3.2).

terms of their temporal structure. Music is connected with rhythm much more directly than a film image. In the former, rhythm is one of the most important elements that influences and shapes its meaning, whereas the rhythm of visual material, in most cases, is only a modifying factor influencing the perception of elements of a film image (Lexmann, 2006, 29).

Finally, collaboration between the director and the composer may be particularly difficult during the film production (Manvell and Huntly, 1975, 233). Only a small number of directors are musically literate, and thus they must often rely on composer's opinion regarding vital aspects of the music and its application (Chanan, 1991, 32). Consequently, the scoring process is the area in which directors frequently feel that they do not have enough control (Bell, 1994, 29), and this situation may lead to frequent changes to the musical concept. Further, the process of making a film is typically long and exhausting, lasting for months or even years. Sometimes, the director who hears the musical cue over and over during the editing stage may become tired of it and may ask for a new one (Burnand, 2006, 180) or they may not be convinced that the cue modelled on a temporary score provides needed features (Mera, 2007, 107). As a result, in most cases music already composed and synchronised with images needs to be rewritten several times. Since film composers work within tight time schedules (usually a composer is brought in the last stages of post-production), each change in the film score can result in delays and stress, influencing the outcome and quality of their work (Baird, 1961, 29; Tyson-Chew, 2003, 1). It is important to point out that rewriting music is an immensely time consuming task and is responsible for delays on the composer's side (Kompanek, 2004, 75).

The changes to the film and its final form happen also as suggested or even demanded by investors, distributors and broadcasters after initial screenings. For instance, due to negative

responses to a preview of *Altered States* (1980), many of John Corigliano's cues which had been accurately synchronised with the images were reshuffled and used in different scenes of different timings (Larson, 1985, 341). Film director Andrzej Wajda stresses that composers working for film are aware that their music, even the one written for a particular scene, due to manipulations of a film editor or director may be used in different film scenes (Stachowski, 1994, 99). It is also a frequent scenario that not all cues prepared by a composer and approved by the director would survive a post-production filtering process. The analysis of production materials of Trevor Jones's music for *Sea of Love* (1989) shows that many cues were unused (or altered) in the final cut of the film (Sapiro and Cooper, 2008, 18).

All these reasons forced composers to seek and create ways to tackle the issue of changes in a musical score resulting from editing practices, from suggestions of the director/producer and, above all, from the differences between temporal and formal structures of the film and music. Consequently, a number of solutions to this complex problem have been proposed; from simple ones such as opting for less precise synchronisation, to more sophisticated methods based on new musical resources and technology.

1.3.5 Selected solutions to mapping and synchronisation problems

A possible way to overcome the problem of rough changes in the musical score is to cut a film to the music. According to Igor Stravinsky, who was known for his reservations towards film music, recreation of a complete musical form in film is the only way of achieving an interesting art form (Dahl, 2003 [1946]). Occasionally, the whole film structure, with respect to construction, can be based on the musical form. A good example of this practice is *The Red*

Violin; the construction of the film resembles a musical rondo form (Cohen, 2002, 225), where scenes from the preparations for and the auction in Montreal function as a recurring episode.[69]

There are a number of prominent examples of film productions where the structure of the film edit was adjusted to the music. Sergei Eisenstein during filming of *Alexander Nevsky* (1938) cut shots to the previously composed music by Sergei Prokofiev (Prendergast, 1992, 50). Orson Welles during the production of *Citizen Kane* (1941) also edited some sequences of the film to music composed by Bernard Herrmann (Karlin, 1994, 5). The same approach was used by Ridley Scott during post-production of *Gladiator* (2000). The opening fighting sequence was adjusted to the music composed by Hans Zimmer (Karlin and Wright, 2004, 8).

Perhaps the most conspicuous examples of this practice, in the history of cinema, are Stanley Kubrick's *2001: A Space Odyssey* (1968) and *The Shining* (1980) (see also section 3.4). The soundtracks for these films were constructed almost exclusively from pre-existing autonomous compositions (Donnelly, 2005, 40; Powrie, 2006, 4). The films were not only adjusted in several scenes to the music of Penderecki and Ligeti (among other composers such as Bartók and Strauss) but also Kubrick allowed it to dictate the development of the film sequences. However, referring to information provided by Gordon Stainforth, music editor for *The Shining*, Barham suggests that in the case of this film the audio-visual integration was, in fact, a result of an opposite process (2009, 142). The editing of music was accomplished after the final cut of the film was completed. The music editor had been provided by Kubrick with a detailed list of places where he wanted the music with the descriptions of the type of the music that was required. The selection of the particular sections of the pieces was done by

[69] The problem of the transfer of musical form to film is discussed in more detail by Zofia Lissa (1964).

Stainforth and then approved by the director. Use of pre-existing continuous concert music pieces required editing to cut out sections that could be fitted to the film sequences, thus the third movement of Bartók's *Music for Strings, Percussion and Celeste* (1936) had to be significantly shortened (Barham, 2009, 156). The edits concerned also other compositions used in the film and were done carefully by the editor to preserve music's original phrasing (Barham, 2009, 152). Consequently, in some scenes, in order to accommodate the music within the structure of film sequences changes to the film edit were introduced, for instance, the bedroom sequence with Jack and Danny was extended (a continuous section from bar 1 to bar 45 of the third movement was used in this scene). Thus, Donnelly's suggestion that the large parts of *The Shining* were cut to the music (2005, 45) seems unjustifiable or true to a small degree only (even though the interactions between music and dialogue, particularly in the bedroom scene suggest the opposite).

Undoubtedly, the approach to cut film to fit the music minimises changes to the music, however, situations when a director allows for adopting image to previously composed music during the editing stage are relatively rare (Lexmann, 2006, 149). Thus, over time, composers have developed different approaches to tackle the problem of flexibility and accurate synchronisation of music with film. The following sections discuss in more detail some of the solutions most relevant to the current research project.

1.3.5.1 Erik Satie

At the beginning of the 1920s, while scoring René Clair's *Entr'acte* (1924), French avant-garde composer Erik Satie came up with an idea of how music can be synchronised with film. *Entr'acte* was Clair's second film designed originally as an interlude piece presented between

the two acts of the ballet *Relâche* (1924) (Marks, 1983, 246).[70] The film was supposed to break associations with literature and theatre by developing an anti-narrative form. Interested in developing a new language for the cinema, in *Entr'acte*, Clair used a wide range of effects such as rapid-fire editing, dense juxtapositions, and manipulations of tempo (i.e. changes from slow to fast and back) (Marks, 1983, 245). The unconventional nature of the film allowed Satie to contribute to an ongoing discussion regarding new forms and meanings resulting from an artistic combination of music with moving images (Marks, 1997, 167).

In the continuous score for *Entr'acte*, lasting approximately twenty minutes, Satie broke with the prevailing approach to film music as entertainment, where music was supposed to underline and interpret the narrative providing the mood and support for characters and action (Marks, 1983, 248). Consequently, the composer rejected or rather distanced himself from the conventions of musical accompaniment and did not compose a series of action and mood pieces, avoiding at the same time the use of the leitmotivic approach and functional tonality (Kalinak, 2010, 49).[71,72] The score comprises ten main sections (i.e. I-X cues).[73] Each cue is constructed from a number of brief repetitive patterns grouped into four and eight-bar units (Marks, 1997, 169). [74] The tempo and the number of repeats (the sections of the music could be extended by increasing the number of repeats) are not clearly indicated and the final synchronisation of the music was left to the conductor (Lack, 1997, 38). The technique of composing from short juxtaposed, shifting and contrasting motifs, allowed Satie to provide

[70] Satie also composed music for this ballet.
[71] Kalinak indicates that even though some sections of the score rotate around tonal harmony, there is a striking absence of clear tonic chords to reinforce keys centres (2010, 49).
[72] Satie did not reject all conventions of the film score, for example, the use of quotations from well known sources, in this case Chopin's *Marche funèbre* Op. 35, was a staple of silent film accompaniment.
[73] With the opening A major 'module' recurring and appearing at the end, the form of the *Entr'acte* loosely suggests a rondo.
[74] Repetition as a means of progression was used by Satie also in his earlier compositions, e.g. *Vexations* (1893).

correspondence for the montage changes in the film. Not all film shifts are highlighted by the music, as the speed with which the images change made it impossible (Marks, 1997, 174). It was due to the accompaniment being, in fact, semi-synchronised during the film projection. The tempo of the music never loses its momentum, which provides a unifying element for Clair's combination of Dada images. Due to its coherent character and the consistent style, music provides a needed support for the film. The repeating opening motif in sections II, V, VII, and X also provides a sense of continuity for the score (Orledge, 1990, 242) and the whole film.

In this case, music does not interpret the film, but thanks to its construction it corresponds with and emphasises the film's structure (Marks, 1997, 172), capturing the dynamism of the cinema time (Lack, 1997, 39). Satie's score for *Entr'acte* was described by Douglas W. Gallez as a useful model for composers and filmmakers (1976, 36-50). Of course, *Entr'acte* was an extraordinary film whose unusual character forced the composer to reflect it in his music. Yet, as an avant-garde composer Satie used the opportunity presented by this film to compose unusual music also to fulfil his own desires (Marks, 1983, 245). The score is generally non-linear, thus the second phrase of the music does not depend on the previous one, chords and tunes succeed each other rather than progressing (lack of functional relationships), and repetitions do not have a direction. Further, tonality is not used by the composer as an organising force on a larger scale, but rather as a medium which allows music to flow (Nyman, 1999, 35). The construction of the music (i.e. segments/modules that could be repeated) provided a degree of flexibility needed to achieve a nearly precise synchronisation between the score and the film. What was, however, truly revolutionary about Satie's score for *Entr'acte* was that the music's structure became an equivalent of the film

cutting from image to image (Orledge, 1990, 242-243), showing a new approach to the integration between the two media.

The score for *Entr'acte* cannot be considered a fully practical model for film music, nevertheless Satie's ideas had influenced a number of composers not only in France, such as Henri Sauguet, Georges Auric, Darius Milhaud, Maurice Jaubert, but also in America including Virgil Thomson, Aaron Copland, and George Antheil (Gallez, 1976, 48). For example, Wilfrid Mellers pointed out that Thomson's music lends itself for the film as it depends on short phrases that can follow the changeability of the film cutting which is the solution based on a musical-visual collage technique adopted from Satie (1964, 215-16). The relation of time and space in Satie's music, according to Alan Gillmore, concerns also the early music of John Cage and the hypnotic nature of so called minimalist music (Gillmore, 1988, 36).

1.3.5.2 Joseph Schillinger

During the 1920s and 1930s, Russian-born composer, theorist, and educator Joseph Schillinger developed a system, *The Schillinger System of Music Composition* (Schillinger, 1978 [1941]), in which general principles of musical construction (both tonal and non-tonal) can be generated and analysed algorithmically using mathematical formulae (Lewis, 2008, 59) (see section 3.2). The application of mathematical logic to all materials of music and to their functions was inspired by the Russian constructivist movement of the first half of the twentieth century (Stephani, 2011, 31), which rejected the idea of autonomous art (where the artist was no longer seen as an inspired genius but rather an engineer who organises materials and shapes them into new forms with a utilitarian purpose) (Elder, 2008, 267). Fascinated by

new technologies and experimentations associated with the arts (Brodsky, 2003, 45), in 1929 Schillinger composed the *Airphonic Suite* for Theremin and Orchestra performed in Cleveland, Ohio with Lev Sergeyevich Termen (known in the Western Europe and the USA as Léon Theremin) as a soloist. The work is the first known piece for an electronic instrument and orchestra (Manning, 2004, 8).

Schillinger believed that his system brought the solution for the issue of synchronisation between aural stimuli (i.e. soundtrack) and the film images, offering a concise method of musical scoring for film sequences where the musical accompaniment fits the time and mood of motion pictures (Brodsky, 2003, 55). Achieving this goal is possible by combining techniques described mainly in Book I, *Theory of Rhythm* (pp. 1-95), and Book IV, *Theory of Melody* (pp. 223-352) included in Volume I. In a broad sense the system is based on mathematically created musical patterns, and building complex units from simple ones. For Schillinger, time was the fundamental dimension of music. Thus, methods of creation of rhythmic patterns (i.e. by interference of pulses, and master time signature technique, and further, through the combination of the two), and their permutations (i.e. through general permutations – all possible combinations of a group, and circular permutations – re-ordering of elements of a group) described in the *Theory of Rhythm*, can be applied to generating melodic structures, counterpoint, harmonic progressions, distribution of the parts in the score, and other processes of composition.

Using techniques described in *The Schillinger System of Music Composition* a composer is able to create various rhythmic and melodic structures of diverse complexity yet flexible in terms of temporal expansion and contraction, a feature particularly useful for film composers.

Additionally, thanks to the Psychological Dial tool described in Book XI (Schillinger, 1978 [1941], 1410-1477), the music through manipulations of melodic direction, speed and configuration can aim to represent certain feelings and emotions.

In order to test his concepts regarding synchronisation of music with film, Schillinger attempted to create a film in cooperation with Mary Ellen Bute, an American pioneer animator (1906-83), who undertook the task of animating visuals for the film (Moritz, 1996, 29). The film, however, was never completed. Nevertheless, Schillinger's system had found a practical application in film scoring. A number of Schillinger's private students (e.g. Franklin Marks, Leith Stevens, Vic Mizzy, Herbert Spender, Edward Powell, Lennie Hayton, Frank Skinner, John Barry) who worked in Hollywood found the mathematical system of creating musical motifs to be useful in situations of pressure and time constraints or to overcome writer's block (Stephani, 2011, 58).[75] However, more than dealing with challenges with synchronisation, Schillinger's system proved to be useful as a tool facilitating writing music suggesting a specific emotional reaction required for a particular film scene (through the use of Psychological Dial tool).[76,77]

1.3.5.3 Aaron Copland

Copland's output as a film composer is relatively small as it comprises only six feature films and two documentaries, composed between 1939 and 1961. Nevertheless, his influence on

[75]According to Matthews, Barry used Schillinger's method to write the theme (in only 10 minutes) for *Born Free* (1966) (2011, 1). The music (original song and score) for this film received two Academy Awards.
[76] The application of the Psychological Dial is described in the Master's Thesis by Stephani (2011).
[77] Schillinger suggested that the use of the dial tool is valuable for composition of programme, stage or film music. However, Arden indicates, that the tool cannot be universally applied. In contemporary film scoring the extreme tension is often expressed by the use of the sustained bass sounds (i.e. drones). Such a drone, according to Schillinger's system would be classified as a suggestion of balance, passivity and contemplation, and thus quite opposite than intended (1996, 52).

American cinema has been a significant one and Lerner observed that "[...] several elements of the Copland sound persist in the widely understood musical vocabulary of today's Hollywood" (2001, 477). Copland, fascinated with the music of Stravinsky (Pollack, 2000, 65) and the post-impressionistic music of Ravel, Satie, Poulenc and Honegger (Smith, 1953, 39), introduced a modernist idiom to American film music, promoted the use of dissonant harmonies as well as efficiency and sensibility in selection of the orchestral colour and musical style to match the individual requirements of a particular film project (Pollack, 2001, 400). Copland's scores were nominated several times for the Best Original Score (i.e. *Of Mice and Men* (1939), *Our Town* (1940), *The North Star* (1943)), and finally, in 1950, music for *The Heiress* (1949) brought him the Academy Award for the best score.

Copland became interested in film scoring when the fully synchronised sound was still a new phenomenon; unlike other composers working in Hollywood (e.g. Hugo Friedhofer, Dimitri Tiomkin among others) he did not have experience as a performer, arranger, or conductor for the pre-synchronised "sound" cinema (Lerner, 2001, 483). Thus, his colleague, Virgil Thomson's two film scores for *The Plow That Broke the Plains* (1936) and *The River* (1937) became models for Copland's early film music (both Copland and Thomson were active members of the League of Composers).[78] Yet, perhaps the strongest influence on Copland's film music came from neo-baroque and neo-classical works of Stravinsky, which is particularly noticeable in the application of non-functional diatonic harmonies (the lack of progressive harmonic motion), omission of functional cadences (McGinney, 2003, 32), and adaptation of Stravinsky's block form (used in his ballets, e.g. *Petrushka* (1910-11) and *The Rite of Spring* (1913)) as a means of structural organisation for the music. Describing his

[78] Thomson indicated that Copland adopted and redefined his musical vocabulary (1971, 55).

general approach to the composition of music Copland said: "I don't compose [...], I assemble materials" (Pollack, 2000, 11).[79] This method of assembling music from structural blocks (modules) had been consequently utilised in his film music.

The best example of Copland's assembly technique of music from modular components can be observed in the score for *The Red Pony* (1949), which is also one of his largest works (Pollack, 2000, 429). As with Stravinsky's compositional technique, the score for *The Red Pony* consists of movements that are a result of successive textural blocks or superimposed thematic and melodic layers (McGinney, 2003, 7). The majority of the cues (a total number of cues in the film is 32) were assembled from smaller units (motifs or melodic fragments) grouped successively to form larger musical structures (blocks).[80] Most of the music for *The Red Pony* can be divided into two main cue groups: 1) cues that are more formally autonomous (less dependent on the film action and more musically logical) providing a general mood for the images, yet also at times interacting closely with the film images, e.g. cue *Walk To The Bunkhouse* or cue *March Dream*; 2) cues that are constructed from successive thematic and textural blocks arranged according to the structure and development of the film action, e.g. cue *The Sick Pony,* cue *The Operation,* and cue *Buzzard Fight* (McGinney, 2003, 90, 92).[81]

[79] Melodic material was usually developed by Copland through combinations of short (module like) motifs that expand with each successive repetition, e.g. *Fanfare for the Common Man*. Modulations are usually brief, based on juxtaposition of key areas. Composer also frequently recycled materials from earlier compositions and sketches (Pollack, 2001, 402).

[80] The modular structure of Copland's score is also evident in his indications regarding materials that are to be repeated (McGinney, 2003, 33).

[81] The comprechensive analysis of all *The Red Pony* cues can be found elsewhere (McGinney, 2003), (Tucker, 1989).

In terms of synchronisation of music with images, Copland included his customary stopwatch and verbal cues in the score. However, in two of his pieces, *Walk to the Bunkhouse* and *Dream March* he also employed the more precise click-tracks (Pollack, 2000, 430). Nevertheless, the modular construction of his music and its flexibility provided a more precise means of synchronisation of musical structure with film, both during compositional and editing stages. Often cues were divided into two or three parts which allowed Copland to synchronise smaller time units rather than trying to maintain synchronisation over the longer time spans during the scoring and recording, e.g. cue *Walk To The Bunkhouse* (McGinney, 2003, 44). The flexibility of Copland's approach was essential for the cues whose structure was derived from the unfolding filmic action such as cue *Buzzard Fight* (Tom searches the land surrounding the ranch for his runaway pony and later fights with birds). The development of this cue, in fact, the most complex in the score (divided into three sections), follows the on-screen action shot by shot (McGinney, 2003, 110). Unlike other cues (constructed from a succession of repeated units), *Buzzard Fight* is assembled from a set of six motivic, rhythmic, and gestural cells used by Copland to generate short patterns, usually two-bar in duration. Many of those cells reappear in parallel with certain film shots, a particular cell with a particular shot. It can particularly be observed when Tom finds the body of the pony and fights with buzzards. It is clear that the modular structure applied by Copland, as described by McGinney, helped in synchronising music with the structure of the sequence (the original score of this cue reveals markings done be the composer regarding the synchronisation points, for example bars: 59, 62, 63, 64, and 66). Indeed, in many instances during this sequence the synchronisation between images and music is quite precise. Further, the use of two-bar short units that form the basis for the construction of longer musical

structures is similar to the strategy that became characteristic for Herrmann's film and television music.

The method of constructing the cues from modular components allowed not only for synchronisation of the musical accompaniment to the film during scoring, but also enabled Copland to achieve its subordination to the narrative of *The Red Pony* (which was one of Copland's own principles when it comes to composition of film music) (McGinney, 2003, 12). A modular structure also proved useful in adapting recorded music to the changes in film sequences due to editing (i.e. *March Dream*, *Circus Music*, *Tom's Friends*, and *The Sick Pony*) (McGinney, 2003, 171). The use of small cells allowed for precise adjustments, yet at the same time minimised illogical cuts done by the editor. For example, the cue *Morning Training* was too short in the final edit, and thus bars 35-34 and 19-26 were added again at the end of the cue (by the editor) to extend its duration (Tucker, 1989, 91). Finally, the modularity of *The Red Pony* score allowed Copland to rearrange and compile composed material into a concert suite, *The Red Pony: Film Suite for Orchestra*. For this purpose, however, the composer used only fragments from the cues which were autonomous of the film action. Consequently, fragments of cues such as *The Sick Pony,* cue *The Operation,* and cue *Buzzard Fight* were not used in the suite. Copland's assembly technique used for compilation of the suite is particularly noticeable in the last movement, *Happy Ending*, e.g. bars 10, 28, 53 and 82 (Copland, 1948), with clear divisions between structural blocks of the movement.

1.3.5.4 Bernard Herrmann

The use of modular components as building blocks for the construction of film music can also be observed in the scores of Bernard Herrmann. Around 1950, Herrmann intentionally

customised his compositional technique to complement the needs of scoring for film and television. In order to match the temporal structure of film, timings and durations of musical cues need to be precise. Herrmann understood that in order to provide the required temporal correspondence for the images, the formal structure of the music must be planned at the bar level, rather than in terms of melody or theme (which is a common approach in film scoring) (Rosar, 2003, 138-139). It is likely that the final formation of Herrmann's method, termed by Fred Steiner as "module technique" (Steiner, 1974a, 34), was a result of cooperation with Alfred Hitchcock, who was not interested in the common one-to-one relationship between music and filmic action. Thus, Herrmann had to find a solution that would allow for merging standard musical forms with the ability to accent precisely narrative developments (Brown, 1994, 173).

The bases of Herrmann's film music were short motifs, usually with a distinctive rhythmic character. Short phrases were used by the composer as cells which were later combined into building blocks (modules). Those modular components usually would contrast with each other when it comes to an internal design, contour, dynamics, applied harmony and orchestration (Steiner, 1974a, 34). In his music, the length of the modules typically varies from two to six bars. The motifs are extended into a form of "themes" by means of repetition. For example, a melody in *The Trouble with Harry* (1955) is constructed primarily from a number of repetitions of a three-note cell. In *North by Northwest* (1959), the whole film's overture is constructed from multiple repetitions of few short motifs extended by a chromatic progression and changing orchestration (Brown, 1994, 154, 159).

The eight-bar phrase, a common structural model for grouping consecutive melodic notes, in Herrmann's case is constructed from two-bar augmentations (i.e. (2+2)+(2+2)). According to Rosar, one bar is usually "[...] but not always followed by a contrasting bar, then the two bars are either repeated, or repeated with slight variation, resulting in a four-bar unit which is repeated (sometimes with slight variation), yielding eight bars" (2003, 137).[82] Eight-bar phrases are always unified by a rhythmic ostinato, e.g. cue *Fire Engine* from *Fahrenheit 451* (1966). However, the eight-bar modules do not have to follow a predetermined line of a melody and can be cut should the need arise (Bruce, 1985, 35). Occasionally, Herrmann used longer more developed themes such as the twelve-bar *Psycho Theme* which appears three times in *Psycho Prelude* (Brown, 1994, 64).

The score for Hitchcock's *Psycho* (1960) provides a good example of Herrmann's modular technique. Out of all 40 cues several are particularly interesting. In cue #1, *Psycho Prelude* (main title credits) the composer used five cells for a construction of modular components: the five *staccato* chords (the beginning, bars 1-3); an accented semitone ostinato (which unifies the entire piece and provides a drive); and three additional short motifs, each distinct in length and character (Steiner, 1974b, 29).[83] The module consisting of five *staccato* chords was used by Herrmann six times and divides the whole prelude into six larger blocks that can be further divided into smaller segments (e.g. the section between the first – bars 1-3 – and the second repetition of chords – bars 25-27 – can be divided into several smaller units). This construction of the music allowed for adjustments in the duration of the piece and reuse of its

[82] A similar model can be found in Debussy's music (i.e. *La Mer*, *Trois Nocturnes*, and *Images*). It is thus possible that Herrmann's approach was inspired by Debussy's music (Rosar, 2003, 137). The examination of the *La Mer* score seems to confirm the hypothesis.
[83] Steiner's analysis of the chosen *Psycho* cues consists of a number of reductions of Herrmann's original score.

material in a number of additional scenes, e.g. cue #7 *Patrol Car*, cue #10 *The Rainstorm* and cue #25 *The Search (A)*, providing storyline links throughout the film.

A similar approach to the use of modular components as a building elements can be observed in cue #21 *The Water* (Norman cleans after a bloody murder). Here Herrmann used three elements: fast slides in the lower register, rapid tremolo figures in the violins (playing alternately *sul ponticello* and *sul tasto*), and *crescendo-decrescendo* trills in the mid-range providing a binding element for the whole cue (Steiner, 1974b, 39). Modular technique also allowed Herrmann to construct more extended and complex pieces from relatively simple elements. Cue #15 *The Peephole* (Norman watches Marion undressing, through a hole in the wall between his office and cabin 1) demonstrates this scenario. The composer used only two simple modules, i.e. a rhythmic ostinato and a two-note motif (a variation of a semitone motif from cue #5 *Temptation*) (Steiner, 1974b, 35). The modular technique can be traced in many of *Psycho* cues even in cue #17 *The Murder*, perhaps the most famous of all. The cue comprises three major segments: 1) high pitch strokes (eight bars); 2) ascending *glissandi* section (eight bars); and 3) chords section (twenty one bars). The memorable effect was achieved by successive introduction of a three-note (one-bar long) module. Appendix 1 comprises a simplified notation of the first eight bars of cue #17. Material from this cue was also used in cue #30 *The Knife* (the scene of killing the private detective). The cue was edited (i.e. shortened) to fit the duration of the scene. It appears the third time when Norman tries to kill Marion's sister and is caught.

Herrmann also used leitmotif technique in the score for *Psycho*, however, to the limited degree only. In cue #14 *The Madhouse* (a conversation between Marion and Norman),

Herrmann introduces a leitmotif which is associated with Norman and his relationship with his mother (i.e. F, Eb, D). The three-note leitmotif undergoes various modifications as the conversation continues (i.e. inversion, retrograde motion, enharmonic changes) (Steiner, 1974b, 33). Norman's leitmotif is also used extensively in cue #24 *The Swamp* and cue #40 *Finale* (played by violas) (Steiner, 1974b, 39, 41).

According to Herrmann: "the short phrase is easier to follow for audiences, who listen with only half an ear" (Brown, 1994, 291). Yet, the brevity of motifs is what allows for flexibility in Herrmann's modular technique (Bruce, 1985, 35). Building blocks constructed from short and easily manipulable phrases seem to suit better (at least in some situations) the rapidly changing nature of the film with its edited flow of images than the standard approach based on themes. The suitability of Herrmann's approach in terms of adjustability of the musical structure to the film's structure was confirmed by the editor Len Engel who indicated that short four-bar phrases were easy to cut (Smith, 2002 [1991], 179). Operating on a bar level during planning of the cue allowed Herrmann to calculate the number of bars and time needed to compose the cue when the duration and the tempo were established (Rosar, 2003, 138).[84] Finally, avoidance of the fully developed melodies (themes) allowed Herrmann to provide an effective accompaniment for the narrative which remained "transparent" when necessary, i.e. did not draw attention to itself, blending with other soundtrack elements of the film.

It has been suggested that the effectiveness of Herrmann's film music was a result of his limited capacity as a composer (Chanan, 1991, 32). This view, however, seems to be

[84] Herrmann's approach shares some similarities with Schillinger's "mathematical" system of composition, i.e. the planning of a composition begins by devising its rhythmic structure, and from that the durations of musical ideas are established arithmetically according to certain numerical formulae (Rosar, 2003, 138).

unjustified if one considers Herrmann's experiences in CBS radio (1936-1940) (Thomas, 1997, 188).[85] During these years, working as an assistant to Johnny Green, Herrmann composed a considerable amount of music for different radio theatre productions developing an immediate and economical style of composing with respect to melodic and harmonic language as well as instrumental recourses (Cooper, 2001b, 440).[86] It must be stressed that creating music for the radio (which is a sound-based medium) can be even more restrictive than composing for film or television, and may require particular skills and talent for limiting available compositional means.

1.3.5.5 Technological aids

From the beginning of the cinema, film music has always been impacted strongly by the development of technology. Firstly, technology influenced the way music was orchestrated, recorded, edited (i.e. tape manipulations) and finally mixed. As Tadeusz Baird emphasised: "Technology enhances possibilities available to a composer and becomes a codifying and expanding factor of his artistic vocabulary" [trans.] (1961, 27). Secondly, technological developments also influenced the compositional process itself, both indirectly (i.e. structural organisation of the musical material) and directly, offering new tools (e.g. digital audio MIDI sequencers). The latter had not been fully utilised until the digital revolution of the 1990s.

Advances in computer technology now offer composers new options for synchronising music to moving pictures (Cavacas, 1993, 116). Most software sequencers allow for the tempo manipulation of music in order to match specific moments in the images (Davis, 1999, 162),

[85] Cooperation with Welles in CBS radio brought Herrmann his first film commission, *Citizen Kane* (1940).
[86] Steiner observed that Herrmann's scores often look simple, yet produce needed dramatic effects (Steiner, 1974b, 31).

which is useful when strict synchronisation is required.[87] Without technology, keeping up with rapid changes that take place during film editing can become difficult (Karlin and Wright, 2004, 106). Computer technology also allows for digital manipulation of audio material and its editing (i.e. time stretching, pitch correction), features that are commonly used by both film composers and film music editors. In addition, specifically designed time processors (e.g. Auricle) which help to make timing and synchronisation manageable are now widely available.[88, 89]

With the development of electro-acoustic music, a new way of constructing musical structures from larger musical units emerged. Compositional process involved changes of tape speed, tape direction, creation of tape loops (that could be combined into various patterns and textures), cutting, splicing and mixing sections of sounds recorded on tape (Kostka, 2006, 246; Miranda, 2004, 3; Taruskin, 2010, 176). Helman has pointed out that the new possibilities brought on by electronic music and *musique concrète* solved (theoretically at that time) the main problems in relation to sound and vision integration as they allowed for creation of the whole film's soundtrack (1964, 37, 50). This is not surprising as the *concrète technique* was, in fact, a result of experiments with sound recording for radio and film, and thus having been inspired by these media it lends itself for applications in situations where music needs to interact with other components. The key influence on the development of this

[87] In Logic Pro, for example, there is a dedicated tempo track which allows for precise adjustments of the project tempo in specific spots of the timeline. It is possible to program both sudden and gradual changes.
[88] www.auricle.com [Accessed 16/06/2009]
[89] Before any software solution for calculation of tempo variations within the cue was available, composers used click books. The first click book was assembled by pioneer music editor Carroll Kundson in 1965. The click book deals with three parameters: the click tempo, the number of beats, and the total timing. With the knowledge of any two of three parameters, it allows a composer, to determine the third one (Lustig, 1980, 62). A newer and updated version was prepared by Alexander R. Brinkman. Brinkman's click book consists of tables of timings (i.e. each page is dedicated to a particular tempo) calibrated in film frames divided into eighths of a frame (Karlin and Wright, 2004, 114).

technique was of course the nature of film montage which redefined the concept of time in modern art as a flexible presence and arbitrary succession of moments (Kramer, 1988, 70).

The good example is music and sound design prepared for *Milcząca Gwiazda/Der Schweigende Stern* [trans. *Silent Star*] (1959) by Markowski. During that time the use of *musique concrète* and electronic music in film was complicated. The time schedules in film industry have always been tight whereas creation of music and sound design using these means required a considerable amount of time, needed for generation of sounds, editing of recorded tapes and montage of the final soundtrack. Today, however, after digital revolution the situation has changed. The use of techniques borrowed from electro-acoustic music reinforced by digital means can be illustrated by several cues from Graeme Revell's soundtrack to *The Craft* (Revell, 1996) and François Tetaz's music for *Rogue* (Tetaz, 2008), among many others. In both cases the final cues had been achieved by computer manipulation and editing of pre-recorded material which corresponds with Copland's compositional strategy applied in *The Red Pony* (1949) for assembly of several film cues (e.g. *Walk to the Bunkhouse* constructed from three sections) from previously recorded orchestral building blocks.

This technique provided the solutions for two different issues: budget limitations; and fitting music to picture. In the case of *The Craft*, the creators requested from Revell an orchestral score while providing a minimal budget for hiring an orchestra (DesJardins, 2006, 221). In order to meet the filmmakers' requirements, the composer decided to record blocks of Penderecki-type sonoristic textures with an orchestra during a one-day session. Later, the modules were recombined at the composer's studio (however, this approach was used in a

certain number of cues only, e.g. *Maggots, Fear,* and the beginning of the cue *Lightning strikes*). In the scoring for the movie *Rogue*, Tetaz applied a similar approach (2008). During the recording session, blocks of non-tonal string textures consisting of *pizzicati*, *glissandi*, and *col legno* articulations were recorded separately. During the post-production process, recorded modules were recombined to fit the picture. Examination of the recording confirms a montage character of the cues, especially those related to action sequences such as *Fight*, *Cracking the Tinny*, *The Attack* (Part II), *The Attack* (Part III) and the re-use of modular components in various cues, for example *Bite*, *Cracking the Tinny*, *Crossing* (Part III), *The Attack* (Part I). The composer observed that this approach enabled a certain amount of flexibility in fitting the music to the picture (Tetaz and Carrik, 2008, 63).[90]

There are also software applications that allow for composition of music from building blocks such as Music Sketcher, where a composer by using an in-built library of short musical sections can combine them to construct a musical piece (Miranda, 2004, 183-185), or the SSEYO's Koan generative music system. In the latter, compositions were also based on pre-prepared blocks; however a composer could also create their own sections.[91] Moreover, there are experiments with algorithmic music composition and creating applications that automatically compose music for video games or film; for instance AMEE (Algorithmic Music Evaluation Engine) (Hoeberechts et al., 2007) or Scorebot (an Automated Film Scoring Application) (Pierce, 2004). There is also an attempt to create a software environment which supports early stages of composition for film (QSketcher), offering workspace that can be configured to the individual needs of a user helping to overcome limitations of the current

[90] The borrowings from Penderecki's compositions, especially those written during his sonoristic phase are obvious in Tetaz's score for *Rogue*, however, with the predominant use of string orchestra one can also link the *Rogue* score to "coldness" of Herrmann's music for *Psycho* orchestrated exclusively for strings.
[91] Noatikl software is a successor of the Koan system, see: http://www.intermorphic.com/ [Accessed 12/05/2012]

compositional software tools (Abrams et al., 2001; Abrams et al., 1999). An important aspect of the mentioned software is that it addresses the issue of mapping music to the visual component (for more on the use of technology in music see section 2.1.3.3).

At this stage, however, it is highly unlikely, especially having in mind the complex nature of scoring for film (Bellis, 2006), that a virtual composer will replace a real one anytime soon. Besides, as Collins points out, waiting for technology to bring ready to use solutions should not stop creators from developing their own methods (2008, 101). Thus, composers are advised to practise composing in non-linear manners and technology should be used to support them at composition and implementation stages. This approach seems to offer the most promising results when it comes to reaching a balance of technological dependence versus creativity. Despite the omnipresence of computer technology in film scoring practice the compositional approach to film scoring in the majority of cases is still traditional (i.e. note-based), and often rooted in the functional harmony. As a consequence, traditionally structured music frequently does not allow for the same degree of non-linear editing treatment as in the case of film material, leaving composers disadvantaged in comparison to filmmakers as regards the use of digital technology.

1.3.6 Conclusion

Having reviewed the approaches of Erik Satie, Joseph Schillinger, Aaron Copland, and Bernard Herrmann to the problem of synchronisation of a musical score with film and its subsequent adjustments influenced by film editing, several similarities can be observed. Firstly, some of the approaches are based on the application of short rhythmic and melodic

phrases that can be easily extended, by means of repetition, or shortened, by reducing some elements of the structure (e.g. in works by Erik Satie and Bernard Herrmann and in mathematical processes described by Joseph Schillinger).[92] Secondly, in some of them, a musical form is structured from larger building blocks consisting of melodic phrase fragments, ostinati, motivic or rhythmic cells (e.g. as used by Aaron Copland and Bernard Herrmann). Thirdly, in some, harmonic functions are either selectively used and/or deliberately avoided (e.g. as in works by Erik Satie and Aaron Copland). Additionally, in the contemporary film scoring practice digital technology can be applied allowing for various modifications of the recorded material in order to match the music with on-screen events (as per examples of Tetaz's and Revell's works). Each of the described approaches to the construction and manipulation of the musical structure allows for greater flexibility in editing music to match the moving pictures. Thus, it seems reasonable that the combination of some elements of these approaches could provide greater flexibility and adjustability of the musical score in addressing issues related to film editing than either of them alone.

Further, as already indicated (see section 1.2.1), film soundtrack is a compound entity where three major components (i.e. music, dialogue, and sound effects) share the same aural space. As observed by Chion: "We can pile up as many sounds on the soundtrack as we wish without reaching a limit" (1994, 67). Consequently, contemporary film soundtracks are often very complex (usually multi-channel) aural constructs (e.g. in action films), where the dramaturgical effectiveness of a musical accompaniment is determined by its place in the overall structure of the film sound (Reay, 2004, 31). Current directions in contemporary

[92] Mathematical processes were not used in the present work for generation and manipulation of modular components.

cinema frequently blur the border line between the roles of the individual soundtrack components (Lipscomb and Tolchinsky, 2005, 401). This is especially apparent when it comes to the functions and coexistence of music and sound effects. As observed by Donnelly: "These two aspects of film sound, distinct since the coming of synchronised sound cinema, have converged and cross what once was a fairly impermeable membrane between these two sonic aspects" (2009, 120). However, as much as the issue of mapping is universal for all film's soundtrack components, the problem of changes and adjustability concerns mainly score-based music and its structure. For this reason, and as indicated before, this research project is not focused on sound design for film.

Moreover, contemporary film music is often not solely the work of a composer, but is also influenced by a music editor and a sound engineer. Thus, the structural flexibility of a modular score which for a composer or music editor facilitates the process of synchronising music to film, at the same time may provide a sound engineer with the ability to rearrange music to integrate with other soundtrack elements securing the soundtrack's dramaturgical effectiveness. Moreover, the work with interchangeable modular components does not necessarily require music literacy (i.e. loop-based technique). Therefore, it is also possible to engage a director or even producer with the creative process of generating the score.

In conclusion, it would appear that there is a need for a new method (or a work paradigm) of composing for film that would: 1) offer composers an opportunity to make full use of the non-linear editing facilities and match the workflow of the filmmakers (i.e. rearrangement of musical structures with similar ease to manipulation of film material); 2) address issues related to combining music with other soundtrack elements (including the interplay with a

film sound design); 3) facilitate further modifications of music (done by music editor and/or film editor or perhaps even the director); 4) facilitate creative efforts of a composer but also provide a friendly "environment" for a director and the producer allowing for their possible involvement in the creation process (even if only symbolic). However, to the author's knowledge, a systematic method addressing those issues has not hitherto been developed and the present research project aims to contribute to creating such a method.

Chapter 2: Research Methods

2.1 Research questions and definitions

This thesis addresses one main research question [RQ.1] and six subsidiary questions [SRQ.1-6]: The latter are extensions of the main research question and relate to its more specific applications.

2.1.1 Research question

The present thesis aims to address the following research question [RQ.1]:

RQ.1 How can a new and flexible compositional method that is practically suited to the needs of film scoring, especially targeting the issue of the changes which result from film editing, be developed?

2.1.2 Subsidiary questions

The thesis also aims to address six subsidiary questions [SRQ.1-6]:

SRQ.1 How can the modular approach impact the speed of the composer's work?

SRQ.2 How can the modular approach eliminate the need for creating complex time maps of the cues?

SRQ.3 How can the modular approach enable the film and/or music editor to work on music independently of the composer?

SRQ.4 How can the modular approach secure coherence and musical logic of the piece edited without the composer's involvement?

SRQ.5 How can the modular approach (based on modules that can be rearranged during the post-production process) provide the level of control the directors need?

SRQ.6 How can the modular approach allow for last-minute changes in the already composed and recorded sections of music?

2.1.3 Hypothesis

It is hypothesised that such a method may be created by developing and combining three approaches expressed in the following order:

- developing and applying a modular structure for the music;
- using non-linear properties of music;
- and using computer technology where individual modules can be layered, mixed and modified to accommodate changes in duration.[93]

The next sections explain these three approaches in more detail.

2.1.3.1 Modularity in music

Flexibility of musical structure is an important element in responding effectively and efficiently to changes during film post-production. This flexibility in the musical structure can be achieved by constructing the music from interchangeable modular components that are easy to manipulate. For the purpose of this thesis, a module was defined as a standardised exchangeable element that is designed for easy assembly or flexible use. Each module can be

[93] The Digital Audio Workstation (DAW) environment provides a suitable platform for creation and manipulation of the modular components. Yet, flexibility of the musical structure is directly related to the design of modular components (i.e. capacity for the potential edits) and their interchangeability (i.e. use in various configurations) and thus the use of technology needs to be preceded by the development of the modular structure.

used to construct a more complex structure. Modular systems are widely utilised in almost all branches of industry from architecture to car making. They allow for an increase of productivity, reduction of the production time, improvement of the quality, reliability and importantly, they decrease the costs. These particular features of modular systems will be integrated as part of the newly designed method. A detailed explanation of the concept of modularity can be found elsewhere (Ericsson and Erixon, 1999, 17-18).

Modularity is also present in various kinds of arts including music. The concept of composing music from prefabricated elements can be found as early as in the eighteenth century European *ars combinatoria*. This mathematical concept allowed for writing compositions from pre-prepared musical elements chosen by chance processes (i.e. tossing a dice). The system had been used as an established method of composition during that period, yet at the same time, *ars combinatoria* made it possible for a musically illiterate person to become a composer and write marches, polonaises and waltzes (Hedges, 1978, 180-187).

More recently, the application of modular components as building materials (i.e. small units as well as their larger configurations) for a musical work has been utilised by composers of concert music. For example, Igor Stravinsky applied modular structures "cells" in his ballet *Petrushka* (1911, rev. 1947). The musical organisation of the ballet can be described as a montage of repeated and juxtaposed blocks. The structure is directly related to the programme of *Petrushka*, yet at the same time, it allowed Stravinsky for incorporation of a number of folk and popular tunes (Cross, 1998, 29). Music is mainly based on melodic repetitions, pedal points, and ostinati, and thus the building blocks tend to have a static character. Dynamism of the music is produced by intensification of the melodic and rhythmic patterns (i.e.

simultaneous layering of distinct musical ideas) within the block structures, and by verifying the rate of change of blocks (i.e. more changes per unit of time). Despite the overall discontinuity of formal structure (i.e. juxtaposed blocks) of *Petrushka*, Stravinsky used various devices to create a sense of relative coherence and continuity of the work. Thus, blocks are connected melodically (e.g. all melodic ideas but one are characterised by a rising perfect fourth), rhythmically (constant pulse across constant metre changes), harmonically (all blocks share diatonic D scale or diatonic-octatonic interactions) (Cross, 1998, 31). Similarly, in *The Rite of Spring* (1913), the structure of the music is built from a number of self-contained building blocks, each with distinctive motifs and characteristic sharp edges between blocks (Hill, 2000, 61). Despite the presence of clean cuts between the blocks, they are however not entirely independent. Similarly to other compositions such as *Three Pieces for String Quartet* (1914) it is the content of blocks in *The Rite of Spring* (i.e. tunes with identifiable intervallic shapes, scale-degree identities, goal pitches, and defining durational patterns) that establishes continuity and connection between them (Horlacher, 2011, 32).[94]

A different approach to the modular concept can be observed in *Klavierstück XI* (1956) by Karlheinz Stockhausen. The piece contains nineteen fragments (modules) on a single sheet of paper whose succession is decided by the performer. When the chosen fragment has already been played twice, the performance ends (Hopkins, 1977, 40). A somewhat comparable but a more controlled approach (i.e. ten segments must be played in any order and within a given time frame without any omission or repetition before the next segment begins) was utilised by Kazimierz Serocki in *A piacere* (1963) (Thomas, 2005, 150). The modular approach to

[94] Stravinsky's influence in terms of construction from distinct building blocks (i.e. pitch, rhythm, timbre) can be observed in Olivier Messiaen's *Couleurs de la Cité céleste* (1963), and *Et exspecto resurrectionem mortuorum* (1964). The number of musical blocks and fragments makes the process of their interlocking less obvious than in Stravinsky's case (Cross, 1998, 49-51).

construction is also present in several of Krzysztof Penderecki's works belonging to the composer's sonoristic phase, such as *Threnody* (1960), *Polymorphia* (1961), and *De Natura Sonoris* I (1966).[95] Sonorism is used as a primary element of these compositions, and traditional musical elements such as theme, melody, harmonic progression or contrapuntal relationships were replaced by "sound objects" and their transformations. The vertical and horizontal dimensions of the compositions are a result of the successions or aggregations of those "sound objects" (modules). The modularity of Penderecki's compositions from that period is particularly visible in the notation, for example in *Threnody*, rehearsal numbers 6 (pp. 6-7) and 10 (pp. 8-9) (Penderecki, 1960).

Manipulations of textural orchestral blocks (modules) for the formal organisation of the piece can be also observed in Witold Lutoslawski's *Jeux Vénitiens* (1961). The first movement of the composition comprises eight self-contained boxed segments (A-H). Sections A, C, E, G function as a refrain (the instrumentation increases with each repetition) for the episodes (B, D, F and H). The beginning of each section is marked by a collection of percussive instruments (i.e. side-drum, claves and xylophone). In the last movement (IV), the composer organised the textural blocks in such a way that they are overlapped and superimposed resulting in a dense sound mass (Bodman Rae, 1999, 83). Further, simple patterns (repeated *ad libitum* by individual players within the instrument group, e.g. the beginning of *Symphony* No.3 (1983), pp 1-2 woodwind instruments) used for construction of complex textural combinations in Lutoslawski's controlled aleatory technique may, in fact, be considered modules.

[95] The term "Sonorism" (coined by Józef Chomiński as "Sonorizm") is associated with a distinctive style within Polish concert music of the 1960s (Penderecki, Górecki, Kilar, Serocki, Szalonek, et al.) that explored contrasts of instrumentation, timbre, texture, articulation, dynamics, movement and expression as a primary factor of a composition.

Modular structures are also present in the music by composers associated with minimalism. In 1954, Terry Riley composed *In C*, which consists of a single page of score containing 53 modules of different durations (Potter, 2002, 109).[96] Each module can be repeated *ad libitum* before moving to the next one, however, omissions of modules are also allowed (Taruskin, 2010, 363). Thus, despite the brevity of the score (the duration of the entire piece is not specified) the performance may last for less or more than an hour. Among all 53 modules, only one, no. 35, has a distinctive thematic character. It is the longest of the whole collection (i.e. 30 beats), which allows for a diverse rhythmic vocabulary and harmonic content (Carl, 2009, 66). Combinations of modular components of the composition produce diatonic collections, yet a repetitive nature of their appearance prevents them from being associated with certain tonalities (Johnson, 1994, 745).

Modular construction is one of the primary stylistic devices used by Philip Glass since *String Quartet No.1* (1966). The composition is a ternary rondo in two movements. Here, repetitions of cells (modules) reoccur in different voices of the piece. Each of four instruments realises repeating patterns which differ in duration. As a result, modules regularly overlap producing a diverse range of textures. The whole composition employs only eight different sections of the material (Potter, 2002, 275). Similarly, the modular technique can be found in Wojciech Kilar's music, especially in the compositions from the third period, such as *Orawa* (1986) or *Piano Concerto No.1* (1997). These pieces feature repetitions of motifs and musical phrases together with wide harmonic and textural planes. Yet, in contrast to minimalistic pieces of other composers, Kilar's music can be distinguished by a clearly articulated development of

[96] The roots of minimal music can be found in some works from the 1950s by Cage and Feldman. In fact, many so called minimalist techniques appeared earlier and can be traced back to Stravinsky's treatment of layered ostinati and his manipulation of intervallic cells.

the form and evolution of expression (Polony, 2005, 171). A broader reference to the application and stages in the development of modularity in concert music can be found in the work of Saunders (2003, 63-73).

Modularity has also been utilised in film and TV music, by Aaron Copland in *The Red Pony* (1949), Bernard Herrmann in *North by Northwest* (1959), Philip Glass in *Koyaanisqatsi* (1982), Ennio Morricone in *The Mission* (1986), and Wojciech Kilar in *Bram Stoker's Dracula* (1992), to mention only a few. In addition, creation of music from modular components consisting of rhythmic patterns, melodic themes, and sampled sequences can be found in other genres of popular music, for example electronic rock (i.e. Tangerine Dream), or jazz (i.e. Nik Bärtsch's Ronin).[97] Further, working on the building block level (frequently with pre-fabricated loops) in conjunction with editing techniques such as cutting, pasting, and mixing various sounds together is widely utilised by DJs (Miranda, 2004, 3).

2.1.3.2 Linearity and non-linearity in music

In the present work, the flexibility needed for the manipulation of modular components during a compositional process requires that modules can be freely combined on the vertical and horizontal planes. However, tonal language (i.e. functional harmony) was found to be a major problem in obtaining this flexibility and in manipulating the modular components during the compositional process (D'Arcangelo, 2001, 3).

Tonality is based on a set of hierarchical relationships between pitches, supported by other elements such as durations, dynamics, timbres, etc. (Kramer, 1988, 25; Meelberg, 2006, 27).

[97] Modularity is also present in music of non-Western cultures e.g. Indonesian gamelan music.

Constant departures from a tonal centre (tonic), and returns to it, determine that tonal motion is goal-directed.[98] Progression in tonal music is defined primarily by voice leading rules which take place on the horizontal level of the musical structure. Those changes happen over time in a linear manner, where the progression of musical events is characterised by a cause-consequence relationship (earlier events determine later ones and later events result from former ones). Thus, changes on the vertical level of the musical structure (i.e. chords) are more independent of time as they rely on simultaneity of events (there are no inner melodic voices), whereas horizontal ones (i.e. melody or polyphony) - on succession of interdependent events (Agawu, 2009, 25; Collins, 2008, 87). The horizontal changes may create an expectation that once something begins to progress in a particular direction, it will continue (Snyder, 2000, 64) until it reaches the goal. Tonal linearity characteristic of European music of the eighteenth and nineteenth centuries is reinforced also by cadences that signify closure points (i.e. a goal of a progression) (Snyder, 2000, 232).

Composing for film requires (apart from considerations in terms of functional and aesthetical aspects of the score) that the structure of the music fits (i.e. synchronises with) the structure of film images. The existence and development of music in time imposes a significant difficulty in successful fulfilment of synchronisation. The linearity of melody in tonal music does not lend itself well for non-linear editing processes (unless a composer constructs asymmetrical melodies formed from bars of different time signatures). Additionally, even though vertical collections (as abstract harmonic structures) generally allow for greater freedom of change (though the rate of harmonic rhythm also plays an important role here), in the tonal system

[98] However, the relationship between tension and resolution created during various departures from a tonal centre does not necessarily have to lead to music that is predominantly linear and goal-directed (Meelberg, 2006, 186).

this freedom may at times be limited by the interdependence of chords as a result of their syntactic functions (e.g. at the simplest level, I-IV-I, I-V-I, I-IV-V-I). The sequential use of different chords based on contrasts creates syntactic organisation which complements similarity-based (i.e. the repetition or variation of musical events) coherence of the music (Aniruddh, 2007, 261). The complete functional syntax (i.e. I-IV-V-I) constitutes a stable harmonic structure in the tonal system (Swain, 2002, 69) which due to film editing and subsequent adjustments of music may become compromised. Consequently, the integration of linear musical structures within the non-linear film edit may impose problems. Thus, in a situation where tonal music has to be adjusted to the re-edited structure of a film scene (assuming that the changes are substantial), a composer faces the following scenarios: 1) to refuse adjustments of the musical cue, 2) to accept the necessity for re-scoring or adjustments and their influence on the project time frame, or 3) to find another suitable solution that would allow to structure the music in such a way that it will reflect film's non-linear nature and editing practices.

Of course, choices of the film composer are typically pragmatic and directly related to the needs of a particular film project. There is no one suitable approach that ultimately fits all possible filmic situations. However, when synchronisation of the musical score with a complex film sequence has to be precise to the frame (a frequent scenario in action sequences), then tonal linearity may influence the completion of the task significantly. Departure from functional relationships of tonality (both towards modality and non-tonality), on the other hand, can provide freedom of manipulation of the elements of musical structure on horizontal (non-linear successions of events) and vertical levels (i.e. chord structures without functional relationships). For this reason, the third scenario seems to be a suitable

option for achieving the goal of flexibility in a musical structure constructed out of modular components. Additionally, in the tonal system various dimensions of a composition (i.e. pitch, rhythm, dynamics, timbre and form) are usually mutually linked, whereas in non-linear works, those associations are not clearly defined, which may also facilitate flexibility of the modular approach.

It needs to be stressed, however, that linearity may also be present in non-tonal music. Temporal linearity in this type of music may be produced, for instance, by voice leading prolongations, such as those in Schoenberg's *15 Gedichte aus Das Buch der hängenden Gärten* Op. 15 (Forte, 1992, 285-382). However, to create the sense of linearity there is also a need to establish a point of arrival, a goal. Even though many twentieth century pieces demonstrate a high level of linearity, only in some cases is it goal-directed. As Jonathan Kramer indicates, most non-tonal linear prolongations function on low hierarchic levels, but not in the middle ground and background ones, thus this type of linearity differs from the tonal (1988, 39).[99] For instance, music can have closures, but in order to establish a higher-level linear succession, they need to be progressive and hierarchical, establishing a gradual series of intensities (Snyder, 2000, 64).

For the clarity of this investigation it is important to explain the terminology being used here. Music that is tonal is understood to have three elemental qualities: 1) a tonal centre, 2) functional chord relationships, and, 3) the hierarchical relationship of the latter.[100] In all

[99] There are also examples of non-linearity in tonal music, see section 2.6 (Kramer, 1988, 40).
[100] There are, however, other more broad concepts of tonality. Tymoczko, for instance, proposes five features of tonal music: 1) conjunct melodic motion (i.e. melody moves by short distances from note to note); 2) acoustic consonance (i.e. preference of consonant harmonies); 3) harmonic consistency; 4) limited macroharmony (i.e. the tonal collection of notes heard over moderate spans of time); and, 5) centricity (2011, 4).

places where the present work refers to the *traditional* approach it indicates music composed according to functional harmony and traditional voice leading rules.

For the purpose of this work, *non-tonal music* is the preferred term (to *atonal*) and is defined as music that does not apply functional harmony and traditional voice leading rules. It may, however, use diatonic, octatonic, or other collections (or their combinations) to create stable harmonic areas. Given the functions of film music, and the compositional means necessary to realise those functions in supporting a film narrative, non-functional centricity should not be ruled out. As observed by Joseph Straus, music can be organised around referential centres even without the properties of a functional system (1999, 131). In cases where the functional system is absent, music has to apply other contextual means to create centricity such as the prominence of a certain pitch, repetition, accent, duration, etc. It is also possible that the manipulation of modular components may result in intentional or unintentional appearances of the horizontal and vertical structures similar to those characteristic of the tonal system.

2.1.3.3 Technology and music

Music and technology have been closely linked throughout history and, as Brian Eno, pointed out they seem to be inseparable (2011). Technological sophistication has always played a role in the construction and development of musical instruments (i.e. any device or object that is capable of producing sounds considered to be music, except for human voice and body parts used as a sound source). Conversely, developments of new tools and techniques have had an influence on the compositional process, a composer, a performer and the audience.

In relatively recent history there have been several major developments in technology that have impacted significantly not only on music but also other arts including film. In 1877, Thomas Edison produced and patented the first mechanical device, a phonograph cylinder, which could record and reproduce sound.[101] From that moment onwards, sound has been transferred from the time to the space dimension (Eno, 2006, 127). However, the recording quality of Edison's invention did not allow for recording music in its full spectrum. In the following years, other sound recording devices emerged, among them those invented by Alexander Graham Bell and Emil Berliner, whose disc phonograph became the standard for commercial disc recording until the development of stereophonic recording in the 1950s (Mumma et al., 2002, 366). In the late 1940s, a magnetic tape became the main recording medium and allowed for editing of recorded martial through cutting and splicing of the tape (Russ, 2009, 18). A good example could be Glenn Gould's heavily edited piano recordings, where desirable performances had been achieved by experimenting and splicing various takes (Katz, 2004, 42).

Tape editing provided new possibilities for composers as well. In 1948, Pierre Schaeffer started to use recording techniques as a basis for composing (Manning, 2004, 20). In *musique concrète*, material for mixing and manipulations could be obtained by custom made recordings or taken out from pre-existing recordings. Then, by the means of experimenting with isolated sounds the structure of the sound compositions was achieved. The use of the word *concrète* by Schaeffer indicated that a composer was working directly with the sound material, which was considered to be a raw element of music, as opposed to composers who were using a symbolic system of notation. At last composers could embrace the working

[101] Although there were earlier attempts to record sound by Édouard-Léon Scott de Martinville in 1857.

paradigm of other artists such as painters or sculptors and work directly with their material (Eno, 2006, 129). This also influenced how the properties of the material began to be perceived. Schaeffer was of the view that abstract properties of sounds should be considered more important than narrative or values of meaning associated with the sound sources (Emmerson and Smalley, 2001, 60). The process of listening that focuses on the character of the sound itself, independently of its origin and of its meaning (i.e. only inherent qualities of sound) had been termed by Schaeffer as *reduced listening* (Schaeffer, 1967, 270).[102] Nevertheless, it must be stressed that *musique concrète* could not have existed without audio editing.

Even though editing as a part of music production and composition has been present since the late 1940s, it was the application of digital technology that changed the way music is created (Peck, 2004). Computers increasingly become tools of choice for composers, providing them with vast possibilities in terms of synthesis of new sounds, instant feedback of the progress of the compositional process, manipulation of the recorded material, music publishing, and performance strategies. New technological tools promote new ways of thinking about the music and consequently impact on the end product of the compositional process (Rona, 2002a, 134). Thus, today, the recorded material can be moved around, organised, edited, and duplicated with no loss of fidelity (Shepherd, 2004, 22). Examples of technological advances in compositional and music production are the DAWs (i.e. Digital Audio Workstations), such

[102] Chion distinguishes three modes of listening: 1) casual – listening to the sound in order to gather information about its source, 2) semantic – which refers to a code or a language to interpret a message, 3) reduced – term originally introduced by Schaeffer, describes listening that focuses on the sound itself (1994, 25-33).

as Pro Tools, Logic Pro, Cubase.[103] These software packages include a variety of options for recording and modifying sounds, enabling editing using several kinds of music notation, and allowing for the control of sound-producing instruments (software synthesizers and samplers) that can be played in real time or used to play back notational information to sound (Danielsen, 2010, 213). They also allow for recording audio directly to the computer's hard drive, for integration of MIDI and audio material, quick access to the palette of precise editing tools, rearranging sections of the music, and comprehensive sound processing.

Application of multi-track recording and sequencing software did for sound what the word processor did for the written word (Milner, 2009, 297). Thus, work on a musical piece may progress in a non-linear way, i.e. the end section of the composition can be written before the beginning and then combined in a desirable order with other sections of the piece (this, however, does not necessarily imply non-linearity of the music).[104] There are also no clear distinctions between composition, recording and performance using the DAW (Danielsen, 2010, 219). Further, most editing procedures are non-destructive, which means that the source material (the original recording) remains untouched. In the analogue domain, those processes were either very time-consuming or simply impossible, and nearly always resulted in alteration to the original material.

Digital technology has also allowed for the development of virtual instruments both in plug-in and standalone formats (Pejrolo and DeRosa, 2007, 54). These instruments enable easy access to a rich sound palette of instruments from different ethnic backgrounds, time periods or the

[103] Cubase (www.steinberg.net), Logic Pro (www.apple.com/logicpro), Pro Tools (www.avid.com) [Accessed 01/03/2012].
[104] It must be noted though that composers writing on paper, with pencil, often compose in a non-linear way, i.e. writing the end before the beginning of the piece, e.g. Aaron Copland.

creation of new sounds (Prager, 2004, 28). One of the aspects of today's technology is that composers while creating music may work with a sound of the instrument they are writing for (Lack, 1997, 345). For a film composer the possibility to work with a digitalised image which helps to address synchronisation issues may also be beneficial. Further, composers can experiment with the arrangement of the music and create detailed mock-ups of the scores.[105] The latter fulfils an important role during negotiations between a director and a composer. Repeated presentation of the cue demo may convince the filmmaker that the music works in a particular sequence and save the composer from the need for rescoring (Karlin and Wright, 2004, 104, 106). In some instances, the composer can even produce a final score on the computer. The major advantage of this scenario is that the composer/performer has comprehensive control over all aspects of the final score, including quick changes to the music (Russ, 2009, 32). Before the development of digital technology, the notation was the composer's tool, whereas an instrument was a performer's (Danielsen, 2010, 220). The notation was a medium through which a composer transferred information to the performer. Today the DAWs become a compositional instrument as well as an instrument for performance.

There are, however, some disadvantages to application of digital technology in music. The extensive editing capabilities can be overused, detracting from music spontaneity (Milner, 2009, 299). Excessive editing can remove certain qualities and imperfections from human performance which would normally make music interesting, replacing them with an unnatural

[105] Before introduction of digital technology the notated score was created first, with only the composer and the orchestrator knowing what the end result is going to sound like after a recording session. Today, contemporary composers (e.g. Hans Zimmer) work mainly in the computer domain where the main substance they deal with is the sound, and the notation is only secondary and *post facto* (Kompanek, 2004, xvii).

precision (excluding situations where this effect is intended). The "everything can be fixed" paradigm may not necessarily bring satisfying outcomes, and sometimes achieving convincing musical edits can be a laborious process. The same applies to the creation of convincing mock-ups of film scores. Often this is a very time-consuming and exhausting process that at times may overshadow more important aspects of film scoring. At times, the computer model of the score can become too polished, so that it may be difficult to recreate the sound and accuracy with real musicians in the studio.

Music technology is constantly changing providing new tools and possibilities. Thus, today's composers need frequently to update and renew their knowledge in order to embrace the latest technological advances. For the contemporary composer understanding of signal processors, audio effects, and recording consoles in addition to traditional training has become a necessity (Zager, 2008, 45). As much as composers and musicians are liberated from constraints of analogue editing they may become overwhelmed with possibilities, composer Hans Zimmer indicates: "[...] technology doesn't make things faster; it makes it slower if anything because it opens up endless possibilities. Plus you have to learn how to deal with it [technology]. So it does not drive you." (Coleman, 2012). Thus, technology may potentially dominate a composer's method of work and may possibly reduce creativity, by influencing the transition of an original idea from a composer to the medium.

Nevertheless, as observed earlier, computer technology makes various ways of manipulation of recorded material possible quickly and, significantly, in a non-destructive manner. This, in turn, allows for comprehensive manipulation of pre-recorded modules. Thus, the present research project not only sets the compositional process in the computer domain, but also

applies compositional techniques from electro-acoustic music (e.g. splicing and various manipulations of the musical material) to achieve formal structure of the music.

2.2 Significance and contribution to the discipline

The significance of this doctoral project is in aiming to make a contribution to a field that lies in between several, different and distinct disciplines: musical composition, sonic art, music technology, and film editing. In this sense it is an inter-disciplinary or cross-disciplinary study. Whereas each of the disciplines has its own methods, techniques, repertoire, and literature, the point at which they intersect has not, hitherto, been the subject of detailed investigation, particularly as regard the digital domain of non-linear techniques of editing during film post-production. The principal contribution it aims to make is the concept of a modular solution to problem of synchronisation between composed music and moving images. This solution is presented both in terms of theoretical approach and practical, creative application (through case studies).

The history of film music and dramaturgical functions of music in film have already been well documented in a number of scientific sources (Cooke, 2008; Lissa, 1964; Wierzbicki, 2009). However, the practical aspects of the compositional process for film have not been subjected to the same level of research as the theoretical aspects. Similarly, research in the field of musical composition is already well established, whereas compositional practice for film is often neglected in academic studies. Unlike *ex post facto* musicological investigations (often exposed to various levels of over-interpretation), this research project documents the development of a new approach to the composition of film music. An innovative aspect of

this project is that it combines elements of musical composition with musicological enquiry, and thus merges theory with practice during the investigation process.

This project is the first doctoral study that specifically aims to address the problems of synchronising music with visual components during the film post-production stage. Despite the fact that film projects differ from each other (requiring individual methodological treatment) synchronisation is a common problem for all film and media composers (Prendergast, 1992, 151). The current project has the potential to create a method for addressing the problem of synchronisation, while including two aspects:

- a mapping of music to picture (i.e. elimination of a need for creating tempo maps of the cues),
- adjustments and rearrangements of music after the changes resulting from film editing on various stages of the project.

These are two of the noteworthy issues that film composers face in their work. Mapping and adjusting of musical cues to match film re-edits have progressively become more difficult due to the tendency for increasing film cutting rates and the overall complexity of film sequences in some genres of mainstream cinema (see section 1.3.4). Despite technological aids that contemporary composers have at their disposal, at times, those tools are not enough to keep up with accumulating changes in the film material during the production. Thus, often rescoring seems the only option to fit the music to the new film edit, or to present alternative versions of the musical cue requested by the director or producer. Therefore, there is a clear need for establishing a method that would address the problem of changes resulting from film editing, as it could contribute to the improved practice of composing for film. The proposed

method can be applied to film, television, commercials, video games, radio and "library music" (where the flexibility of the musical structure has always been an important issue).

2.3 Methodology

The approach to this thesis is empirical, testing the methodology through musical examples. The methods applied in this thesis were developed based on the achievements of eminent film composers, whose compositional strategies proved to be effective in addressing the issue of frequent changes during the scoring process. More specifically, the author was interested in the application of modular components in the scoring process as developed and practised by:

- Copland through his "assemblage" technique;
- Herrmann through his use of short melodic cells/modules;
- Revell and Tetaz through their modular approach to the treatment of concrète technique and the role of computer technology in this process;
- Glass and Kilar in minimalistic compositions and their application in film music.

Moreover, the author was concerned with the following composers of concert music and particular compositional techniques that could be useful in film scoring for achieving flexibility in the musical structure:

- Lutoslawski's chain technique and general approach to establishing abstract drama of music without the recognised conventions associated with tonal language;
- Penderecki's textural music and his percussive style of writing;
- Corigliano's non metric notation and performing symbols - *motion sonorities* designed for film purposes;

- Ligeti's sound textures and micropolyphony technique;
- The application of 20th century avant-garde compositional techniques in film music by Rosenman, Goldsmith, Goldenthal, and Young.

Additionally, the implications of composing music before a film is shot, in works of Takemitsu, Glass, and Corigliano were also examined.

As observed, film music composition is highly influenced by film requirements, both in terms of the style of music and, more importantly, its structure. However, the process of filmmaking differs from the method of writing the score. This difference may be another reason behind the problem of adjusting music to film. Thus, a synthesis of different approaches that could address successfully the problem of synchronisation (presented in section 1.3.5) may not necessarily be sufficient to provide a suitable solution for this thesis research questions (see section 2.1). Therefore a *three-step* approach that mirrors the film's structure by a simple placement of pre-prepared modular components against the images was added. The approach consists of the following steps (expressed as film/music) which correspond to the general process of making films:

a) shooting/composition of individual modules;
b) selection of shots/selection of suitable modules;
c) editing/arrangement of modules into the piece - the 'final cut' of the music.

It is assumed that by developing the non-linear modular structure of music that in the DAW environment allows for easy duration adjustments and rearrangements in terms of structural complexity, in conjunction with the *three-step* approach to the arrangement of modular components, allows to answer the main and the subsidiary research questions. Additionally, in contrast to the majority of previous methods of addressing synchronisation issues (traditional

and modular), where a certain amount of calculations and construction of tempo maps of the cues are involved, the presented method may allow to minimise the need for time calculations, simplifying the workflow. This, in turn, may permit for a more straightforward and intuitive way of assembling the musical cues during the compositional process. As part of the present investigation, all compositions were created according to the same three-stage approach.

In the first stage, a number of modules were composed. During the second stage, suitable modules were selected and, in the third stage, modules were combined together into the finished pieces. Each time, a slightly different strategy of the development of modular components was applied. Some of them were developed through improvisation, where possible transitions/connections had not been planned beforehand. In other cases, compatibility with other modules was carefully planned. Frequently, the modules were thoroughly constructed to meet particular requirements, such as a specific mood, or a planned development of the compositional dramaturgy. The modular structure usually results in a discontinuous character of the musical flow and this may have implications for the music if it is required to provide a more coherent and continuous support for a film narrative. The possibility of the creation of a continuous and logical flow of the music constructed from modular components was also considered and reflected on during the development of modules.

Modules were created in different tempi, time signatures (various odd metres), textures, and durations. Different types of modules were developed: drones, sequences, ostinati, chords, chord progressions, rhythmic patterns, and short themes. Modules were written for both

unspecified and specified instruments, and combinations of instruments. In the case of combinations of instruments, modules were pre-orchestrated for both homogeneous (e.g. strings) and heterogeneous instrumental groupings (mixtures of different groups of instruments). Frequently, modules developed for a specific instrument, for instance drums, were used to generate "melodic" patterns and, conversely, melodic modules were used to generate rhythmic patterns. In addition, different compositional techniques were used in accordance with specific requirements of a particular case study.

Different approaches to the assembly process of the pieces were tested, including 1) a simple horizontal succession of modules; 2) construction of more complex building blocks from singular components (i.e. vertical and horizontal combinations) and then assembly of the final form of the piece; 3) construction of the form of the piece by adding modules on the vertical and horizontal planes successively. In some case studies, modules were subjected to various modifications including: alterations of the pitch material, in order to achieve variations; augmentation; or division into smaller units.

The assembly process of modular components was completed in the Logic Pro software.[106] In this research, advances in music technology (i.e. the increasing sophistication of digital audio workstations) enabled the application of the modular approach. Thus, not only was the modular material written and recorded both as MIDI and audio data, but also non-destructive editing[107] and automation techniques were applied in order to achieve the formal structure of the pieces. Editing techniques applied in this research project ranged from the most basic ones

[106] http://www.apple.com/logicstudio/logicpro [Accessed 12/03/2012]
[107] The type of editing which leaves original material unmodified. It is particularly significant for a modular approach where prepared components are designed for reuse.

such as juxtaposition (placing two edited modules next to each other), smoothing editorial points by application of faders, morphing from one module to another, cutting and resizing modules, to more sophisticated methods such as time-stretching (i.e. changing the duration of the edited material without changing the pitch). The latter was applied on a limited scale in case studies 1, 2, and 5.

In this research project, the decision was made to avoid tempo manipulations of the music. It was done in order to evaluate whether the flexibility provided by the modular structure of music in its basic outline could compensate for lack of tempo calculations usually required for fitting the music into the structure of the film/media project. At the same time, however, it was assumed that if for dramaturgical reasons tempo change was required (particularly the gradual changes) then such a manipulation would be introduced.

As regards the sound aspect of the research project, all the compositions in the folio, both final versions of the pieces (i.e. *Oxygen*), and mock-ups were created with help of a number of different high-quality virtual instruments (i.e. synthesizers and samplers) which provided:

a) the main sources of sound generation;
b) a substitute for the acoustic instruments;
c) a means of integrating the pre-recorded material (i.e. a string quartet) into arrangements.

Additionally, various kinds and combinations of plug-ins (both Logic Pro native and third party products) were also used to process existing modules. That way a number of variations of modules as well as new ones were created. As the structure of the music was the major

focus here rather than sound, plug-ins used during the research project were not listed and discussed.

The order of the case studies used in this work reflects the chronology of creation of each composition and the music for *Oxygen*. The only exception to this rule is *Oxygen Promo Cut*, included in Cases study 3 (Chapter 6) which was done several months after the completion of the film project. As the research project attempted to formulate a new method of composition for film, the cases studies were designed to address certain issues related to the basic elements of music, i.e. melody, harmony (and the correlation of horizontal and vertical planes), rhythm and colour, all in the context of their significance and functions in film music. The strategy for the order of the problems addressed was to start with a simple musical structure (i.e. a short monophonic piece) and to proceed successively to more complex structures, both in terms of the modular construction as well as the complexity of texture and form (i.e. to a large orchestral composition). The author's intention was so that the useful observations (from the perspective of the set objectives of the research project) that emerged during experiments in one study were applied in consecutive studies, adding tested approaches and techniques together into a uniform method. As film composers often begin their work from developing a basic thematic material for the score, the experiments started with melody and were finalised in the case study of orchestration (usually the last stage during scoring) in a composition which not only combined the gathered knowledge but also applied modular components created for all previous case studies. Therefore, due to the applied methodology, on the conceptual and structural levels, all case studies are closely related to each other.

Since all the music was created and executed in the computer domain, scores which are accompanying this thesis had been prepared *post-facto* and their purpose was to show how modular components were used and how the formal structure of music was achieved in the computer realisations (Volume II, DVD No. 2). However, the scores in this thesis (Volume II, Sections 1 - 4) were optimised to enable live performance of all pieces. Although the four compositions were written as autonomous works they should all be considered film music (i.e. associated with hypothetical film situations). In order to test the flexibility of modular music composed according to the three-step approach (i.e. composition of individual modules; selection of modules; and arranging modules into a final piece), the compositions were subjected to experimental re-cuts to various time-frame durations (mainly to 15 and 30 seconds - the durations commonly used in the media). All mock-ups, as well as modified versions of the pieces discussed in the text, as well as selected Logic Pro files can be found in Volume II (DVD No.2).

Finally, source materials used in the present work can be classified as primary sources (i.e. films, film music recordings, scores) and secondary sources (books, articles, websites) and are listed in the respective sections at the end of Volume I. All these sources have been scrutinised by the author and informed the development of a new modular approach to the composition of film music.

Chapter 3: Literature review

3.1 Research sources in film music studies

Research sources on film music (both primary and secondary) are numerous and are characterised by a wide spectrum of content, approaches and scientific quality. While the primary sources in film music (i.e. the creative outcome of the film music composer) have informed the development of the method in the current project, both primary and secondary sources (various kinds of analytical or critical commentary by people who are not composers of the music but also books and guides written by composers) formed the basis for the theoretical part of the thesis.

3.1.1 Primary sources

Within the primary sources, three main categories can be distinguished: 1) films; 2) film music recordings; and 3) scores. Film DVDs, apart from presenting actual films, often include special feature sections. These can include documentaries about the film making process as well as interviews with film makers and frequently with music composers. Some DVDs also provide films with a music-only track; for example *The Matrix* (Wachowski and Wachowski, 2001), where the composer Don Davis delivers a detailed scene-by-scene commentary regarding the concept of his music, his compositional approach and techniques. This type of sources provides an opportunity for a closer investigation not only of how music has been integrated with the images (as other soundtrack components are extracted) but also gives insides of the compositional process delivered by composers themselves.

The next category of the primary sources are film music recordings. It is noteworthy that in the majority of cases the music included on these CDs is already edited and does not always correspond with the order and number of cues used in the film. There are, however,

exceptions to this rule that provide complete and chronologically structured recordings of all the music used in the particular production such as, for example *Star Wars Episode I: The Phantom Menace* (The Ultimate *Star Wars* Recording) by John Williams. Frequently, the CDs comprise recordings of concert suites which are a compiled version of themes and cues used in the film but prepared by a composer for performance uses, e.g. Copland's *The Red Pony Film Suite for Orchestra*, Kilar's *Suita z muzyki do filmu Dracula* [trans. Suite from the film music for *Dracula*] or Williams' *Star Wars – Suite for Orchestra*.

With respect to the next category of the primary sources, film music scores, there is a limited access to them as the ownership of copyrights usually rests with a production company and not the composer of the score.[108] Among the commercially available scores, John Williams' *Star Wars – Suite for Orchestra* (1997) and John Corigliano's *Three Hallucinations for Orchestra* (1981), are particularly well known. Even though the material included in them is selected and compiled usually from various cues (or their fragments), this type of research sources can provide information regarding many aspects of music, for instance orchestration. Film music recordings can serve as substitutes to scores when the latter are unavailable.

3.1.2 Secondary sources

Secondary sources available in film music can be divided into six main categories:
1) historical sources in film music; 2) sources that focus on theory, aesthetics and analysis of film music; 3) sources addressed at practicing film composers; 4) biographies and interviews; 5) popular sources (including magazines and websites and publications by societies on film

[108] In films where music was improvised the scores had never been created. Others may have been lost or there is no information available on where and by whom they are held.

and television music); 6) books and articles on film theory, editing practices and sound in film – a supplementary category which informed the present research project.

3.1.2.1 Historical sources in film music

The first category of the secondary sources comprises historical sources in film music. Quite often their focus is directed towards particular aspects of film music, e.g. music in the silent era. Martin Miller Marks' *Music and the Silent Film: Context and Case Studies, 1895-1924* (Marks, 1997) is a noteworthy source on this subject. Although this is not a comprehensive history text, using a detailed approach to source materials the author provides an overview of practice of silent film accompaniments and techniques involved in the process of preparation of music for silent film. In this context, the author closely examines five film scores, among them compilation scores such as D.W. Griffiths's *Birth of a Nation* (1915) as well as originally composed ones such as Camille Saint-Saëns' *L'assassinat du duc de Guise* (1908) and Erik Satie's *Entr'acte* (1924).

One of the significant titles in this category is *A History of Film Music* by Mervyn Cooke (2008). The author provides a comprehensive overview of the most important developments in the film scoring history, from the silent era to the present day. The focus of the book is not only on mainstream Hollywood practice (Golden Age, post-war Hollywood and New Hollywood) but also on other national cinemas such as British (Chapter 6), French (Chapter 8), as well as cinemas of other regions of the world (Chapter 9). This wide range survey also touches on music in specific film genres such as documentaries and animations (Chapter 7), and classical and popular music in the cinema (Chapters 10 and 11). The author examines

both technological and aesthetical factors that have influenced the development of film music, omitting, however, the analysis of the discussed scores or notated musical examples.

Another book that is concerned with history of film music is *Film Music: A History* by James Wierzbicki (2009). The book provides a historical overview of film music developments written from the mainstream film industry perspective, focusing, in four main parts, on music during silent era, early sound film, Hollywood classical period (1930-1950), and the post-classical period. The focal point of this book is the issue of how music has been used and integrated with the film productions. Similarly to the previous text (Cooke, 2008), there is no analysis of the musical material and musical examples included. Yet, the author provides an original perspective on film music referring also to press and mass media excerpts.

The present category also includes titles that examine film music composition in specific countries and during specific historical periods. The book *Composing for the Screen in Germany and the USSR: Cultural Politics and Propaganda* edited by Robynn J. Stilwell and Phil Powrie (2008), is divided into two parts: the first comprises six essays about film music practice in Germany under the National Socialist regime; the second contains three essays, looking at the Soviet cinema. Despite the focus of the book on political influences on film scoring (as the title suggests), it also provides insights on theoretical and practical aspects of the compositional practice for film.

3.1.2.2 Sources that focus on theory, aesthetics and analysis of film music

The next category of secondary sources embraces books and academic dissertations that focus on theory, aesthetics and analysis of film music. This category often provides both

comprehensive texts regarding certain aspects of film music (e.g. compositional practice) but also more theory-orientated texts, and is typically targeted at theorists rather than practitioners. Nevertheless, these sources have informed the development of the method created in the present research project by providing information regarding compositional practices for film.

Examples of books in this category include *Composing for the Films* by Hans Eisler and Theodor Adorno (2005 [1947]) and *Estetyka muzyki filmowej* [trans. *Aesthetics of Film Music*] by Zofia Lissa (1964). Both these sources are influenced by Marxist ideology and thus some of the presented views may be seen as politically biased, yet several of their sections can still be considered useful, for example Eisler and Adorno's book presents a composer's perspective regarding Hollywood film industry of the time. In the first chapter Eisler argues that the twelve-tone music which lends itself well for film purposes, due to the reluctance of Hollywood industry, remains not heard. He also criticises the use of leitmotif, use of music for merely illustrative purposes, reliance on clichés and standardisation of interpretation. As many of the presented ideas were, in fact, motivated by Eisler's own agenda and, at times, demonstrate little scientific rigour, the presented information needs to be interpreted with caution. *Aesthetics of Film Music* [trans.] by Zofia Lissa, on the other hand, is centered on dramaturgical functions of music in film (examined in dedicated sections) and the influence of film music on the viewer. The author examines comprehensively how interrelations of various functions of music contribute to overall aesthetical reception of film. Lissa's book is a relevant position particularly as it quotes rare and hard to find sources.

Another example in this category is the book *Unheard Melodies: Narrative Film Music* by Claudia Gorbman (1987), which is divided into two parts. Part one is concerned with theoretical and aesthetical aspects of relations between music and the feature film. In this part, by combining film studies and musicology, the author explains how music (divided into two categories diegetic and non-diegetic) supports film narrative (as a signifier of emotions and a structural binding element for the film, by providing unity and continuity). Using the example of Max Steiner, the author presents the model and rules of classical Hollywood cinema (Chapter 4), suggesting that the music must remain unnoticed (i.e. unheard) in order to be effective. This contrasts with current Hollywood productions, particularly in the action/adventure genre, where music and sound design are clearly heard. Part two of the book comprises three analyses of films (Chapters 6, 7 and 8), with the focus on structure, instrumentation, rhythm and musical organisation of the score (notated musical transcriptions are provided) as well as film sound space.

Another position in this category is *Film Music: A Neglected Art: A Critical Study of Music in Films* by Roy Prendergast (1992). The book is divided into four main parts: 1) History, 2) Aesthetics, 3) Technique, and 4) Contemporary Techniques and Tools (a new addition to the 2nd edition). The book presents a useful introduction to film music, seen from the musician's perspective (the author is a music editor). Numerous musical examples, analyses and focus on technical aspects provide insights into practicalities of composing for film. The author discusses music of such composers as David Raksin, Bernard Herrmann, Leonard Rosenman, and Jerry Goldsmith. However, the list of composers and their works is largely outdated. There is also an omission of such composers as John Barry or John Williams, and films produced in the eighties are not commented on.

Settling the Score: Music and the Classical Hollywood Film by Kathryn Kalinak (1992) is yet another source in this category. The book is divided into two parts. The first presents relevant terms, theoretical and historical perspectives (albeit directed largely to the general audience), whereas the second provides the analyses of selected film scores belonging to the classical Hollywood model. Through a closer examination of scores, for example Max Steiner's *Informer* (Chapter 5) or John Williams' *The Empire Strikes Back* score (Chapter 8), the author attempts to determine how the contemporary film score in its structural and functional aspects had been influenced by classical Hollywood music, and to what degree the model remains influential today. Musical examples are provided both as single system transcriptions and reproductions of original scores, offering a valuable overview of how music was integrated with the film narratives.

Other titles in this category, in which the focus of attention is on the analysis of the "effectiveness" of film music, and the interaction between music and image are *Overtones and Undertones: Reading Film Music* by Royal Brown (1994) and *The Art of Film Music: Special Emphasis on Hugo Friedhofer, Alex North, David Raksin and Leonard Rosenman* by George Burt (1994). The first four chapters of *Overtones and Undertones: Reading Film Music* provide theoretical, historical and analytical foundations for understanding of film music. Particularly appealing is the author's attempt to examine and interpret how music influences the reception of the image. In Chapter 5, Brown provides three analyses of film scores. A strong point of this text is the discussion of various aspects of collaboration between the director and the composer, for example Alfred Hitchcock and Bernard Herrmann (Chapter 6). The final chapter additionally comprises interviews with eminent film composers such as Bernard Herrmann, John Barry or Howard Shore.

Similar in the overall approach is *The Art of Film Music: Special Emphasis on Hugo Friedhofer, Alex North, David Raksin and Leonard Rosenman* by George Burt (1994). The author attempted to provide a guide which explains how music functions in film. In the first three chapters Burt focuses on music in the context of film, looking closely at such issues as whether music should be heard, its associative power, and its role in supporting the narrative. Further he examines selected cues from several films (e.g. *East of Eden* (1955)) supporting them with musical examples. Burt also touches on the dramaturgical role of silence and the sound space of film (Chapter 5). The last chapter comprises an overview of the compositional process for film. As a general introduction to film scoring techniques this is a worthwhile source, yet its limitation is the focus on films from 1940s and 1970 only.

In this category, *European Film Music* (2006) edited by Miguel Mera and David Burnand can also be considered. The book consists of twelve essays that provide perspectives on European film scoring practices. Some of the included texts approach the subject from a general historical perspective, for instance film music in Germany is presented for the period of 1927 to 1945. Others examine specific films or focus on the work of a particular composer, e.g. David Burnand. Even though the editors indicated in the introduction that the book was not meant to provide a complete coverage of European film music tradition, and thus Eastern European or Scandinavian film music traditions are absent, it may act as the reference point to facilitate comparisons between European cinema and mainstream Hollywood practice, at the same time indicating relationships and mutual influences between those two practices.

Further in this category, *The Whole as a Result of its Parts: Assembly in Aaron Copland's Score for The Red Pony*, a dissertation by William Lawrence McGinney (2003), comprises a

comprehensive analysis of Aaron Copland's score for film *The Red Pony* (1949). Based on available sources (including materials from Library of Congress and Aaron Copland Fund for Music), the author presents Copland's method of "assembly", used during scoring to aid synchronisation of music with images. The work examines Copland's cues but also the relationship between the music and film narrative, and comprises numerous noted musical examples and tables which aptly support the examination of the cues.

Aaron Copland's music for *The Red Pony* (1949) was also explored in the Master's thesis *Music from The Red Pony: Film Music by Aaron Copland* by Aubrey Tucker (1989). The author takes a closer look at Copland's compositional output for film (Chapter 5) and examines his original score for *The Red Pony* (Chapter 7), putting an emphasis on the relation between the music and the film narrative. Significantly, in addition to transcriptions of the score's motivic material, the author also included reproductions of fragments of Copland's original manuscript.

Altered States: A Discussion of John Corigliano's Film Score by Daniel Joseph May (1990) is another dissertation in this category of secondary sources. In part two, the author examines closely three excerpts from the film score published by G. Schirmer as *Three Hallucinations for Orchestra* (1981).[109] May explains the background behind the commission and the compositional approach, with the stress put on *motion sonorities* developed by the composer, allowing for achieving unconventional sounds from acoustic instruments, and explores their

[109] There are only three copies of the Corigliano's original score which are not available to the general public.

role as a motivic basis for the film score. Despite the limited scope (only three pieces), this is a valuable source on one of the most influential and unusual Hollywood film scores.

In this category, the doctoral thesis by James Saunders *Developing a Modular Approach to Music* (2003) can also be considered. Although the thesis is not film related, it provides a useful reference source for development and application of modular structures in concert music, particularly in the creation of short pieces.

This category of secondary sources also comprises film score guides. They offer a comprehensive examination of selected film scores, providing an in-depth overview of compositional techniques used, stylistic features of the music, subsequent stages of the compositional process, and often, a broader historical context. Frequently, in score guides the authors provide noted musical examples, detailed lists of the cues, and other information related to the process of scoring for a particular film project. For this reason, this category is particularly useful for researching practical aspects of the compositional process for film. It allows for examination of various compositional approaches to film music and presents the rationale for their application. An example of a score guide is *Louis and Bebe Barron's Forbidden Planet: A Film Score Guide* by James Wierzbicki (2005), a highly informative source on this early (pre-synthesizer) electronic score. The book presents both the social and aesthetic background for the *Forbidden Planet* and discusses compositional techniques applied by the Barrons' during scoring. Wierzbicki delivers a detailed musical analysis of the music, noting significant attributes of the cues but also highlighting differences between the "music" (the film does not have a composed score but a compilation of electronic sounds) that featured in the film and the recording of the soundtrack. Other examples of score guides are

Mychael Danna's The Ice Storm: A Film Score Guide by Miguel Mera (2007), or *Bernard Herrmann's Vertigo: A Film Score Handbook* by David Cooper (2001a).

This category of secondary sources also includes titles which are not exclusively focused on music but rather on a broader relationship between visuals and sound (including the musical score). Michel Chion's *Audio Vision* (1994) provides the analysis of the whole aural spectrum of film, including dialogue, sound effects and ambient sounds. His methodological approach to sound (i.e. its quality, its various components and their interactions, and the correlation with visuals) is thus not focused specifically on music. An alternative approach is presented in Nicholas Cook's text *Analysing Musical Multimedia* (1998). The author attempts to formulate a cross-disciplinary theory for mutual relationships between visual and musical elements of various multimedia. In contrast to Chion', Cook's approach is more music orientated and provides a general perspective on how to comprehend and examine the role of music in different media (including film and commercials). As the present research project was mainly concerned with the practical aspects of the compositional process, these sources played only a supplementary role in providing the background for the thesis.

3.1.2.3 Sources addressed at practicing film composers

Handbooks and guides targeted at composers and film makers belong to the next category of secondary sources. In the majority of cases, these publications are written by experienced film composers. They provide information about film scoring methods, both traditional and current practice, technology, psychological and sociological aspects of the film music business. One of the early examples of such sources is book *Music for the Films: A Handbook for Composers and Conductors* by Leonid Sabaneev (1935). The author intended to provide film

composers with practical remarks regarding a compositional process. From today's perspective, many presented observations are outdated, yet some suggestions proposed by the author can find practical applications also in contemporary practice (e.g. how composers can aid themselves with fitting music to the film structure by careful consideration of phrasing, tempo and tonality of the music). The true value of this book, however, lies in its status as a historical source describing compositional practice in the first half of the 1930s.

Perhaps the most comprehensive book in this category is *On the Track: A Guide to Contemporary Film Scoring* by Fred Karlin and Rayburn Wright (2004). The content of the book is presented in accordance with music production stages, from the initial contact between a composer and a filmmaker, and the conceptualisation stage, to a recording session and dubbing. The authors address comprehensively crucial aspects of scoring such as synchronisation strategies, music in specific genres, compositional process with an emphasis on application of specific compositional techniques, and orchestration, all illustrated with noted musical examples (both transcriptions and reproductions of the original scores), and references to audio recordings and films for further study. The textbook also deals with the specifics of film scoring within the film industry.

Another source in this category is *Complete Guide to Film Scoring* by Richard Davis (1999). In five parts of the book, the author attempted to cover history of film music, a film production process, creation of music for film, business of film scoring, and interviews with composers, orchestrators, agents. The most useful seem interviews with creators as well as chapters describing the basics of film production and music composition, yet, in general, this book lacks depth of Karlin and Wright's book. The historical overview presented in Davis'

book is particularly brief, providing only a general background to the history of film music, often without supplying relevant details.

Another publication in this category is *The Reel World – Scoring for Pictures* by Jeff Rona (2000). In three major sections the author deals with the creative process, technology, and career of a film composer. The author discusses practical aspects of film scoring including structuring the cue, mapping of the music to picture, changes during scoring, creating mock-up of the score, differences in scoring for feature film and television. In many instances the theoretical material presented in the book is supported by the case studies of the author's commissions and interviews with composers. As a general overview of practice of film music composition it is an interesting source, yet its weakness lies in the lack of depth of the presented musical and technical information. For example, sections concerning media orchestration are limited in comparison to books such as *Acoustic and MIDI Orchestration for the Contemporary Composer* by Andrea Pejrolo and Richard DeRosa (2007), which deals with the topic in a very comprehensive way.

In the same category, there are books such as *From Score to Screen: The New Film Scoring Process* by Sony Kompanek (2004), a book which is repetitive at times, yet provides a perspective of an industry orchestrator with practical advice on how to address score preparation, orchestration, recording and dealing with technical problems during scoring. Another text is *The Emerging Film Composer: An Introduction to the People, Problems and Psychology of the Film Music Business* by Richard Bellis (2006). The author provides a down-to-earth overview on practicalities of film music industry. It covers such aspects of the scoring process as spotting the film and recording the music. The author does not go deep into

the techniques involved in the process but the strong point of the book is its pragmatic approach and emphasis on social and psychological aspects of work for the media. The book also comprises interviews with composers (Chapter 9), although not very detailed. Yet another source is *Getting the Best Score for Your Film* by David Bell (1994). The book is not targeted at composers directly but rather at filmmakers, explaining the role of music in film (in its basic functions), the specifics of the composer's work, cooperation with the composer, a compositional process, and orchestration. As the source for musicological investigations, the usefulness of the book is limited, however, it shows which aspects of the composer's work may potentially become problematical during cooperation with a filmmaker.

Handbooks and guides, following books and academic dissertations, are the second most valuable source of information regarding the practical aspects of film scoring. They provide working examples, solutions and suggestions on how to address issues arising during the scoring process for film. They, however, often use language that is vague or imprecise, at times even confusing. Yet, these issues are also present in other sources, for example in Brown's *Overtones and Undertones: Reading Film Music*, where the style of writing is inconsistent and shifts from journalistic to academic. Nevertheless, these shortcomings can be a reflection of changes in the film industry itself and the growing number of practitioners (and thus potential readers) without musical training or education, and thus used to an industry rather than academic language.

3.1.2.4 Biographies and interviews

Biographies and interviews form the sixth category of the secondary sources. The scientific quality of these sources is varied; however, they often give vital insights into compositional

practice and thus provide a valuable addition to the literature on film music. An example of a biography is *Alex North: Film Composer* by Sanya Shoilevska Henderson (2003). The book comprises two major parts. The first deals with North's biography, which encompasses education, composer's compositional approach, personal relationships, and his career in Hollywood. The second part is dedicated to comprehensive analyses of five scores, among them *Spartacus* (1960) and *Under the Volcano* (1984). Cues are analysed in the way that demonstrates how the music functions within the film context. *A Heart at Fire's Center: The Life and Music of Bernard Herrmann* by Steven C. Smith (2002 [1991]) is another example. The book presents the life and career of the composer in three main stages: New York years; Hollywood years; and the years spent in London. Due to the nature of the discourse, the lack of specific information regarding Herrmann's music and the overall anecdotal tone, the book seems to be directed to the general audience.

An example of interviews is *The Score: Interviews with Film Composers* by Michael Schelle (1999). The book comprises fifteen interviews with established Hollywood composers such as James Newton Howard, Thomas Newman and Howard Shore, but also with artists who are not primarily film composers, such as Terence Blanchard or John Corigliano. The professional background of the author (a concert composer) translated into insightful questions and thus the book can be a useful source on practice through the eyes of practitioners. *Knowing the Score: Film Composers Talk about the Art, Craft, Blood, Sweat, and Tears of Writing for Cinema* by David Morgan (2000) is yet another source in this category. In the collection of interviews conducted over almost a decade, the author explores various aspects of film scoring techniques, orchestration, recording, industry insides, and collaborations with directors. The book presents interviews with legendary composers (e.g.

Goldsmith), concert composers working for film (e.g. Glass or Corigliano) and emerging ones (e.g. Cmiral). Even though the book contains interesting and current details on compositional practice, the lack of depth in exploration of specific aspects of the compositional process of individual composers makes it more suitable for the general audience rather than researchers.

Biographies and interviews often document the intricacies of the film music industry, highlighting difficulties during the scoring process due to cooperation with directors, motivations regarding the applied compositional strategies, as well as sources of inspiration for the music. These insights are often missing in aesthetical or analytical works and thus this category cannot be ignored in the scientific inquiry. However, it needs to be acknowledged that these sources are almost uniquely focused on Hollywood composers, providing little insight into European or Asian practice.

3.1.2.5 Popular sources (including magazines and websites and publications by societies on film and television music)

The next category of secondary sources is addressed to the wider film music and film audience. *Listening to the Movies: Lovers Guide to Film Music* by Fred Karlin (1994) is a good example of a well written popular book. Avoiding jargon Karlin explains topics related to the creation of the film score such as, how music is planned, its basic components, how music works in the narrative structure of the film, and the technology involved. The author also presents the method of evaluating film music (Chapter 5), followed by detailed cue by cue analyses of eight film scores (e.g. Bernard Herrmann's *North by Northwest* (1959)). The book also contains composers' profiles as well as an extensive filmography. Another source is *Film Music*: *The Pocket Essential* by Paul Tonks (2001) which briefly, and in an easy to read

fashion, presents the most basic information regarding history, specifics of the film music industry, and the process of creating a score.

This category also contains articles on film scoring available through professional music magazines, such as *Sound on Sound* (e.g. Paul Farrer's column *Notes from the Deadline: TV Music from the Inside*), *Keyboard* (e.g. Jeff Rona's column *Reel World* about scoring for films) and *Audio Technology* (e.g. articles about scoring for particular film projects). They can potentially provide relevant information regarding various aspects of film scoring, yet as these sources are directed to the general audience often they are lacking in in-depth details regarding the practical aspects of the composers' work. Thus, their role in the present work is only supplementary, informing the background of the thesis.

In this category one can also distinguish magazines (e.g. *Film Score Monthly* (http://www.filmscoremonthly.com)), and websites addressed to enthusiasts of film music (e.g. *Cinemusic* (www.cinemusic.net), *Film Tracks* (www.filmtracks.com)), or publications by societies focused on increasing awareness of the artistic and historical values of film and television music such as Film Music Society (www.filmmusicsociety.org). The scientific quality of these sources is varied. Nevertheless, as a supplementary source contributing to the background of the present work this category was found useful.

3.1.2.6 Sources on film theory, editing practices and sound in film – Supplementary sources

As the present project is concerned with the problem of mapping of the music to the visual component of film, and to the subsequent changes to the music resulting from film editing, the

sources on film history and editing practice were reviewed and informed the theoretical background of the present research. These have included works on history and theory of film such as David A. Cook's *A History of Narrative Film* (2004), David Bordwell's and Kristin Thompson's *Film Art: An Introduction* (2008), John Belton's *American Cinema/American Culture* (1994) and classic texts such as Bela Balázs's *Theory of the Film: Character and Growth of a New Art* (1953). For example, David A. Cook's *A History of Narrative Film* (2004) looks into history and theory of the cinema from its origins to the present day. The book elaborates on specific films and directors with much detail presented. A valuable aspect of the book is that it (the 4th edition) comprises material on film in Eastern Europe (e.g. Polish cinema), still a rare occurrence in the recent literature. The author also discusses the role of the digital technology in shaping the contemporary cinema.

Sources on film editing techniques and practices (in the analogue and digital era) also supplemented the present work. These included for example, Edward Dmytryk's *On Film Editing* (1984), Walter Murch's *In the Blink of an Eye: A Perspective on Film Editing* (1992), Roger Crittenden's *Film and Video Editing* (1996), Ken Dancyger's *The Technique of Film and Video Editing: History, Theory, and Practice* (2011) and Don Fairservice's *Film Editing: History, Theory and Practice: Looking at the Invisible* (2001). In some of these sources, for example, Roger Crittenden's *Film and Video Editing* (1996), there are chapters dedicated to sound editing exploring categories of sound, equipment, post-synchronisation, and music (Chapter 6). However, working with music is only explained from the perspective of a film maker and filtered through their needs, and thus, the presented information is not as comprehensive as in sources dedicated to music specifically.

As the music is not a sole component of the film soundtrack, and its construction and interrelations with other soundtrack elements are crucial for the quality of the film narrative, the author also reviewed sources dedicated to sound in film. The examples are Rick Altman's *Sound Theory, Sound Practice* (1992), Elizabeth Weis' and John Belton's *Film Sound: Theory and Practice* (1985), Tomlinson Holman's *Sound for Film and Television* (2002), Vincent Lobrutto's *Sound-on-Film: Interviews with Creators of Film Sound* (LoBrutto, 1994), *Audio Postproduction for Television and Film: an Introduction to Technology and Techniques* by Hilary Wyatt and Tim Amyes (2005) and *Sound Design and Science Fiction* by William Whittington (2007). For example, *Audio Postproduction for Television and Film: an Introduction to Technology and Techniques* by Hilary Wyatt and Tim Amyes (2005), a book targeted at professionals working in industry, informative and pragmatic in approach, explains the basics of audio post-production, strategies of sound production including sound editing, dialogue editing and preparation, and editing of music (Chapter 14). There are also books dedicated to sound design in a specific film genre. For example, *Sound Design and Science Fiction* by William Whittington (2007), explaining the origins of sound design and its techniques in this context. Finally, this category also comprises journals such as, for example *The Soundtrack* and *Mix*.

3.1.3 Conclusion

While reviewing these primary and secondary sources, it becomes clear that most of musicological research has focused on aesthetical aspects and the dramaturgical functions of music in film. Moreover, historical studies are focused primarily on classic Hollywood cinema and scoring; i.e. the prevailing scoring practices of Hollywood films between the 1930s and the 1950s. On the other hand, popular publications and magazines, which could

offer more insight into practical aspects of composing for film, are of limited academic value. For these reasons, the most interesting and reliable sources for research in the field of film music composition are publications directly referring to the practical aspect of film scoring; i.e. manuals, guides, interviews, as well as musicological analyses of particular films and applications of specific compositional techniques in film music, available scores, soundtrack CDs and film DVDs. The following sections form a literature review comprising three major parts: synchronisation of music to picture; tonal music in film (divided into silent and sound periods) and non-tonal music in film.

3.2 Synchronisation of music to picture

Since the beginning of the 1920s, when sound became a part of film production, ideas and contemporary techniques regarding synchronisation of music to picture and the role of music in the motion picture have been developed. As Lexmann observed: "Over the course of the development, synchronisation of music with film image has created its own culture, its own aesthetic norms, its own standard of workmanship, it has become an autonomous category of expression in cinematic language" (2006, 17). Therefore, among the numerous difficulties a film composer faces, dealing with the problem of synchronising music to film is one of the most common and, in some projects, may become crucial.

During the 1930s researchers from the German Film Institute in Berlin conducted a series of experiments that focused on synchronisation of music and film (Borneman, 1934)[110]. The

[110] One should remember that during this time film was used as a strong medium for propaganda both by the Soviet Union and Nazi Germany which drove the developments in this area (Stilwell and Powrie, 2008).

main problem they were interested in was sound montage (i.e. constructing a film according to musical principles). These early experiments, in which Edmund Meisel, the composer of the music for Eisenstein's *Battleship Potemkin* (1925) and *October* (1927) actively participated, were undertaken before the introduction of sound as an integral part of film, which unavoidably affected their outcomes.[111] Consequently, researchers acknowledged that the construction of a film according to musical rules would only be successful if the time of cutting and time of music corresponded precisely (Borneman, 1934, 66).

Further tests were conducted with the film sound after the institute acquired sound cameras. Since there was no available composer, researchers decided to use a suitable pre-recorded piece of music with a sturdy rhythm.[112] One of the experiments focused on a filmic expression of time and rhythm by synchronising the cuts from one shot to another in time, and in the rhythm of the music. A range of rhythmic variations "in the intensity of light in shots of longer duration" were created (i.e. short flashes of light were imposed on the film in places synchronised with the bars of the music) (Borneman, 1934, 66). The main idea behind this trial was to prevent the audience from becoming exhausted due to short cutting which was forced by the quick rhythm of the music. Another experiment focused on expressing time and rhythm in film by moving the camera. This was done, according to Ernest Borneman, not only to show filmed objects from unusual angles, but also to interpret their inner sense and significance by musical movements (e.g. slow-motion or fast-motion were used to represent musical time variations; the curve-movement of the camera was applied to correspond with a melodic shape) (1934, 66).

[111] Meisel's score for the *Battleship Potemkin* [*Bronenosets Potyomkin*] follows the rhythm of the film's edit almost precisely. The composer, similarly to Stravinsky, used musical blocks arranged in sequences (Morris, 2008, 83).
[112] These experiments took place after Meisel's death.

A surprising conclusion of the series of conducted experiments was that the musical accompaniment in film was not as stimulating as it was originally intended to be (Borneman, 1934, 67). The tests, however, were mainly focused on a simple one-to-one relationship of the visual and musical elements; and thus their final conclusion regarding the importance of music in film seems somewhat simplified, since the researchers did not take into account the psychological impact of the film music on the audience. Experiments were also conducted during the early stages of sound film, when a real potential of music in film (as a support for the film narrative, namely a signifier of emotions and a unifying force for the film edit) was yet to be discovered or rather rediscovered by filmmakers. Nevertheless, it is noteworthy that the issue of synchronisation of the film images and music was recognised as one of the important elements influencing the aesthetics of the film as an art form.

In the mid 1930s, Leonid Sabaneev published his *Music for the Films: A Handbook for Composers and Conductors* (Sabaneev, 1935). In his work, the author referred to the tradition of silent film manuals and explained each stage of the film scoring process of the time. Sabaneev was of the view that film music must not draw attention to itself, should remain subordinate to the montage, and yet its coherence and logic should be preserved. Consequently, a close synchronisation of music with picture should be avoided, since it can work against the logic of the musical structure. However, it is noteworthy that Sabaneev's opinion was based mostly on the silent film tradition, where absolute synchronisation of music with corresponding film image was impossible and where musical accompaniment was more autonomous and continuous through the whole film projection. Nevertheless, he points out that composers should use short phrases and sequences that can be repeated, and

importantly that music should be chromatic (i.e. with no clear articulation of a certain key) which facilitates editing (1935, 46).

In Kurt London's book *Film Music: A summary of the Characteristic features of its History, Aesthetics, Technique; and possible Developments* (London, 1936), the problem of synchronising music to picture is presented from two perspectives. The first focuses mostly on technical aspects of physical synchronisation of the two media both in the silent and sound eras. More interesting is the second perspective, which is concerned with London's observations regarding issues and difficulties related to the process of fitting music to picture as part of a compositional process (i.e. connections between the dramatic line and the flow of the music) (1936, 71). According to London, the main source of these difficulties lies in the film structure, which is characterised by segmentation and frequently changing shots (1936, 75). He further claimed that there is a discrepancy between the speed at which the pictures change and the character of the music, as the latter requires time to develop. This discrepancy has made successful application of melodic and rhythmic modulations, difficult, if not impossible (London, 1936, 60). What is more, the directors and film editors may cut films with little respect for logic of visual rhythms. Thus, it may be the case that developmental musical forms are not suitable for this task. Consistent with Sabaneev's view (1935), the solution offered by London is simple: "variety in film images and uniformity in the music". In other words, less precise synchronisation of music with image is recommended (1936, 60).

Hanns Eisler's *Composing for the films*, written in cooperation with Theodor Adorno (2005 [1947]), was the first comprehensive critique of Hollywood's compositional practices. The book provides a theoretical alternative to mainstream Hollywood scoring, and discusses

elements of aesthetics, the dramaturgical role of music in film, and sociological aspects of composing for film. It also presents alternatives to common Hollywood practices. However, it is noteworthy that the authors' criticism of Hollywood industry practices was to a large degree influenced ideologically (i.e. by Marxist thought) and also by conceptualising film music using the aesthetics of high art music. Although some of Eisler's and Adorno's arguments were articulated from a particular perspective, and may be considered to be of their time, one may find some of their ideas still valid and relevant when it comes to the mainstream film industry of our own time. This is because many of Eisler's observations regarding technical aspects of scoring resulted from his practical experiences. According to Gorbman, even though Eisler's film scores frequently do not match his theoretical principles, they include some of the most original passages in "American" film music (1991, 284).

According to Eisler, during the compositional process for film synchronisation needs to be considered as a main factor: "The music must hit definite points; the time of the music and the picture must coincide down to the last detail" (2005 [1947], 109). Thus, in order to achieve precise synchronisation with image, music should be flexible, allowing a composer to occasionally omit or repeat bars or phrases. Like London (1936), Eisler indicates that developmental musical forms are generally unsuitable for film (2005 [1947], 38). He argues that the main reason for this is that the use of the tonal system restricts manipulation of the musical structure. In the motion picture context, where film structure is shaped by its narration, temporal space does not always allow for functional harmonic progression or for employing symmetrically articulated melodies (Adorno and Eisler, 2005 [1947], 8, 41). For example, Prendergast indicates that the linear properties of Leonard Bernstein's music for *On the Waterfront* (1945), particularly the love theme, do not match what is happening on the

screen, and thus compete with the dramatic action instead of supporting it (Prendergast, 1992, 132).[113]

As suggested by Eisler, the solution to this problem lies in the application of more advanced musical techniques, such as those developed by Schoenberg, Bartók, and Stravinsky (2005 [1947], 32).[114] Eisler claims that the advantage of the "new music" over the tonal tradition lies not only in brevity of form (which offers means that are objectively suited for a complex film), but also its inherent flexibility (2005 [1947], 40).[115] He and Adorno argue that, to make music even more suited to the film structure, principles of film montage should be applied to music, particularly because film and music evolved independently and the technology which brought them together was not generated by them (2005 [1947], 71). However, a closer examination of Eisler's Hollywood scores demonstrates that the new musical resources highly prised by the composer were often used to emphasise mood in traditional ways (Gorbman, 1991, 277).[116]

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[113] Cooke indicates that Prendergast's observation reflects a tendency among classically trained composers to structure a film score in a more autonomous way than it might be required (Cooke, 2008, 196), for example Wojciech Kilar usually demands from a director to be provided with at least two-minute spaces for his music, as he is interested in writing formally complete pieces (Podobińska and Polony, 1997, 46). Yet, certainly this is not a norm, as many classically trained composers such as Aaron Copland, John Corigliano, Elliot Goldenthal or Don Davis would write music that prioritises the needs of the film.

[114] Schoenberg's music (even the non-tonal music) is more developmental than the music of Stravinsky and Bartók.

[115] As indicated by Gorbman, the application of short and flexible phrases was precisely what Hollywood composers were already suggesting at that time (Gorbman, 1987, 109).

[116] The echo of Eisler's view regarding non-suitability of the tonal music in film and superiority of the serial technique can be found in the work by Burch who indicates that: "[...] traditional tonal music with its predetermined forms, its strong tonal polarities, and its range of relatively homogenous tone colours can provide only an autonomous continuity existing alongside that of the images, merely running parallel to the dialogue and sound effects or accompanying the images with a musical synchronicity of the sort found in animated cartoons" (1985, 207). He further stresses that: "Serial music, on the other hand, provides the most open form conceivable. In its interstices, every form of sound has a natural place, and it can provide an ideal complement to the "irrational" quality of the concrete image as such as well as to the more rational structures created by the *découpage*."

The process of scoring for film with a focus on problems of synchronisation was also addressed by the theorist and composer Joseph Schillinger (Brodsky, 2003, 55). Some relevant suggestions can be found in his monumental theoretical work, *The Schillinger System of Music Composition* (Schillinger, 1978 [1941]). Being interested in properties of tonal materials, their possible combinations, permutations, and structural relations, Schillinger reduced rhythm, melody, and harmony to geometric phase relationships, all of which were systematically catalogued in the twelve-book work. The foundation for Schillinger's theory is rhythm. Planning of a composition begins by developing its rhythmic structure. Rhythmic patterns created by various numerical procedures are taken as the organising forces of the composition, and are applied to pitch units, scales, harmonic structures, and their progressions. The duration of musical ideas is also determined by the application of certain mathematical formulae. From the viewpoint of compositional practice for film, the most pertinent are: Book I, *Theory of Rhythm* (pp. 1-95); and Book IV, *Theory of Melody* (pp. 223-352) included in Volume I, because the techniques presented in them may be useful in addressing the issues of synchronisation of music with film images.

In Chapter 14, *Rhythms of Variable Velocities*, Schillinger introduces the concept of rhythmic growth series (e.g. arithmetical, geometrical, summation series) for generating tempo fluctuations (i.e. *accelerando*, *rallentando*, and *rubato*) (Schillinger, 1978 [1941], 90-95). Such rhythmic patterns can be created using summation series, e.g. Fibonacci series.[117] While various types of series can be used to create *accelerandi* and *rallentandi*, Schillinger suggested that the selection of the series should depend on whether the "master" time

[117] Fibonacci series is based on a principle of adding every two consecutive numbers in a sequence to obtain the third (0+1=1, 1+2=3, 2+3=5, etc).

signature occurs in the given series. Thus, for a piece with a 4/4 time signature the most appropriate would be the second summation series (i.e. 1, 3, 4, 7, 11...). The application of the summation series could produce acceleration in an existing musical rhythm, which, according to Schillinger, would be useful for stage productions, compositions for the dance, and particularly for film music. In the latter, where synchronisation of musical accompaniment with images often has to be precise, application of the technique of *variable velocities* could provide the solution for execution of *accelerando*/*rallentando* constrained by a precisely defined segment of time (Schillinger, 1978 [1941], 91). Thus, all the tempo changes within the score could be determined by a growth series.

The same techniques used for generation of rhythmic patterns can also be used to generate melodic structures. The procedure concerns both generation of pitch collections for scales and melodic variants of a particular scale (Book II, *Theory of Pitch Scales,* pp.97-179). Variants of a scale (called melodic forms) can be joined together into a sequence to produce melodic continuity. In Chapter 8 of Book IV, *Use of Organic Forms in Melody*, Schillinger explains the use of the summation series (e.g. Fibonacci series) for construction of interval relations within the scale or synthetic mode.

In Book XI of Volume II, *Theory of Composition* (pp. 1273-1477), Schillinger presents three basic approaches to composition: 1) composition of parts or themes without visualisation of the whole; 2) improvisation which leads to excessive repetitions and results in an unstructured form; 3) conception of a whole work preceding creation of its elements (1978 [1941], 1277); but only the last one is described. The whole book is divided into three major parts: 1) Composition of thematic units; 2) Composition of thematic continuity; 3) Semantic

(connective) composition. In this book, Schillinger presents the familiar idea of a thematic unit as the basic building block of a composition. This thematic unit forms a basis for variations, and consequently for the sections of a composition. It can be developed from one or a combination of the following sources: rhythm, scales, harmonic progressions, harmony as a source of melodisation, correlated melodies (i.e. counterpoint), and orchestral resources (i.e. tone quality, dynamics, density, and instrumentation) (Schillinger, 1978 [1941], 1279). Next, Schillinger discusses musical form and how to combine thematic units to establish a thematic sequence (he divides thematic sequences into four main groups: direct recurrence, symmetric recurrence, modified recurrence, and progressive symmetry) (1978 [1941], 1333).[118]

Later, in part II of Book XI, he also stresses the importance of flexibility and adaptability of thematic units for temporal expansion and contraction (Schillinger, 1978 [1941], 1365). In the last part of Book XI, Schillinger introduces the concept of the Psychological Dial tool, which allows for composing music with specific emotional implications that can be transmitted and stimulate "appropriate" emotional responses in individual listeners (1978 [1941], 1410-1477). In Chapter 19, of Book XI, Schillinger writes about problems of composing music for stage, radio, screen, and television, focusing especially on temporal and structural organisation (1978 [1941], 1461). In particular, he stresses that temporal organisation of the plot (of a play or a script) is in hands of people (i.e. the writer and the director) who do not understand specifics of musical construction. At the same time he points out that the coordination of a temporal structure of the plot and the music into one organic entity can be achieved by purely "scientific" methods; but, this is rarely possible in contemporary productions, and thus

[118] A progressive symmetrical form for Schillinger is the most complex one and it allows for gradual transformation of one idea into another.

composers are limited by what is available to them in common practice. Nevertheless, all of these concepts, when combined together, can provide a film composer with a method that may address several important aspects of scoring for film: quick development of musical ideas; synchronisation; and how to generate desired emotional responses.

Another work that refers to the problem of synchronising music to picture is *The whole as a result of its parts: Assembly in Aaron Copland's score for The Red Pony*, by William Lawrence McGinney (McGinney, 2003). This Master's dissertation gives a comprehensive analysis of Aaron Copland's compositional method for the film *The Red Pony*. It is clear from McGinney's work that Copland's view regarding the limitations of functional harmony for film music in many ways corresponded to Eisler's (Adorno and Eisler, 2005 [1947]). In Copland's opinion, film music should serve the narrative aspects of the film, and modern compositional techniques (used by composers considered by Copland to be modern such as Scriabin, Debussy, Ravel and Stravinsky) can help in fulfilling this task. Accordingly, in his film music (as well as in concert works), Copland used melodic and harmonic interactions of pentatonic-whole-tone formulations borrowed from Debussy, but primarily techniques influenced by Stravinsky's music such as juxtaposition of octatonic and diatonic collections, tonal pedals, ostinato device, prominence of tritone (a means by which octatonic scale may be organised into tetrachords), avoidance of leading tones, non-functional progressions (e.g. ii-V and VII-I) for tonal coherence (Murchison, 2010, 33). Neo-classical works of Igor Stravinsky also influenced formulation of Copland's own method of structuring compositions. The movements of *The Red Pony* (1949) were constructed from structural blocks consisting of melodic phrase fragments, ostinati, and motivic or rhythmic cells. According to McGinney, the modular nature of Copland's compositions allowed for flexibility in editing the music to

match the picture (2003, 171). In the film, several cues were divided into sections and then recorded separately. Later, separate sections were combined together into a continuous piece of music. The author observed that this technique proved useful, especially for the longer cues, or when the music had to accent several hit points in a limited time frame. In another Master's dissertation on Copland's score for *The Red Pony*, Aubrey S. Tucker indicates that in the final edit of the film, the duration of the cue *Morning Training* was too short and therefore bars 35-34 and 19-26 were added again at the end of the cue (by the editor) to extend it (1989, 91). Thus, the use of small cells allowed not only for greater precision of adjustments but also minimised illogical cuts done by the editor.

The application of small motivic and rhythmic cells for constructing larger musical units, and their use in film music (dealing with fitting and adjusting music to picture) can be observed in Bernard Herrmann's works. Fred Steiner, in his article "*Herrmann's 'Black-and-White' Music for Hitchcock's Psycho*" (Parts 1 and 2), indicated that module technique (short rhythmic motifs used for musical modules) was one of the characteristic features of Herrmann's film music (1974a, 34). In the analysis of chosen cues from *Psycho* (1960), Steiner shows how the modular technique was used by Herrmann to construct extended compositions from short modules, and how those relatively simple structures were effective dramaturgically (1974b, 26-46). The motivic approach to music composition in *Psycho* was also discussed by Roy Prendergast in his *Film music: A neglected art: A critical study of film music in films* (1992, 138-145). Building on Steiner's analysis, Prendergast looks more closely at how the motifs were used by Herrmann and what metamorphoses they were subjected to during the course of the composition (in relation to on-screen events).

The modularity of Herrmann's music and its particular suitability for film has also been explored by William H. Rosar in his paper *Bernard Herrmann: The Beethoven of Film Music?* (2003). The author presents a general overview of Herrmann's film music techniques and looks for their possible genesis (e.g. in Debussy's music). The method used by Herrmann was a result of his search for a musical form that would suit the specific temporal requirements of film scoring. Thus, he deliberately avoided extended melodies (which was radically different to the common practice of the day) in favour of short structural units often reinforced by ostinati. Rosar stresses that eight-bar structures which, according to Steiner, were a result of modular technique, in fact are constructed from two-bar increments resulting in the formula (2+2)+(2+2)[119] (2003, 137). He also indicates that, in the general sense, Herrmann's technique shares similarities with Schillinger's mathematical system of composition.

A broad perspective of Herrmann's music written for Alfred Hitchcock is presented in the book *Overtones and Undertones: Reading Film Music* by Royal S. Brown (1994, 149-174). The author focuses mainly on Herrmann's harmonic language (e.g. dissonant sonorities and bitonality) and his use of orchestral colours for dramatic purposes. Nevertheless, the book also offers some interesting observations regarding correlations between music and film images. The author indicates that short phrases (one or two bars) used by Herrmann allowed him to construct "themes" that were well suited for the rapidly changing stream of images influenced by film editing. In fact, Brown stresses that Herrmann's non-thematic devices led to the creation of film music suited for film purposes (Brown, 1994, 154-155).

[119] This pattern can be also found in many Mozart's melodies.

Peter Larsen's *Film Music* (2007) contains an analysis of Bernard Herrmann's score for *North by Northwest* (1959). The author indicates that the music is not melodic in character but is constructed from ultra-short cells. Most of its melodic material is based on short motif-like cells that are repeated or sequenced, and linked together into larger units. As Larsen observed, music built from short modules can be divided and manipulated easily in order to match the development of film narration (2007, 133). Thus, the music can be rearranged more quickly when a film sequence is edited during the post-production process (which is confirmed by the deletions in Herrmann's score for *North by Northwest*). In the guide to *Vertigo*, however, David Cooper observed that in this film Herrmann's preference for a regular rather than irregular rhythmic profile of repeated units resulted in their limited flexibility (2001a, 23).

All reviewed sources on Bernard Herrmann's compositional technique for film are consistent with respect to the fact that the composer applied short motivic modules which were adjustable (when needed) to the changes influenced by film edits. In the comprehensive biography of the composer, *A Heart at Fire's Center: The Life and Music of Bernard Herrmann* (2002 [1991], 179), the author Steven C. Smith quotes Fox's music editor Len Engel who admitted that Herrmann's music resulted from his compositional strategy of making it easy to cut and to adjust to film edits. Breaking with the prevailing Hollywood system, Herrmann applied his own compositional strategy where, in a similar fashion to Copland's, modular components articulated the structure of the music.

As observed by Lexmann in the *Theory of Film Music* (2006), from the 1960s onwards film composers became more interested in current developments in concert music, searching for new means of expression. Their interest was focused on avant-garde music which was not

based on traditional approaches to musical construction and thus, from a purely technical perspective, was better suited to the film's purposes. In Lexmann's opinion, the lack of traditional attributes of music, such as melody, regular metric pulsation, rhythm, and tonality, gives greater flexibility during film scoring. For example, in 1980, while scoring *Altered States*, John Corigliano developed a technique based on the application of non-metric notation and use of cues instead of beats, which helped the conductor in synchronising the aleatoric sections of the music to the picture during the recording sessions (Karlin and Wright, 2004, 112).[120] The new structural laws of musical work organisation, based on sound objects and their transformations as an organising force for the music rather than on melody and harmonic progressions, allowed filmmakers to make necessary modifications (sometimes extensive) in order to fit the music to a film edit. On the dramatic and narrative levels, however, this music, in many cases, was not more sophisticated than music composed by traditional means. Donnelly, in *The Spectre of Sound: Music in Film and Television* (2005), noticed that, despite the presence of the dissonant musical style in certain genres of film, this type of music was largely ignored in mainstream film music. The only genre that has made full use of the avant-garde music of the 1960s and its disturbing sounds is the horror genre where the music functions as a central effect (Donnelly, 2005, 51). The use of the sonoristic and avant-garde techniques in mainstream film can be somewhat limited.

There is, however, one exception: Minimalism. As Eaton pointed out in her doctoral thesis, this particular compositional tradition is wide-spread in mainstream feature films (Eaton,

[120] Music for *Altered States* was Corigliano's first experience in composing for film, thus, it is possible that his strategy for synchronisation of music with images in this film was a result of the lack of experience in using available synchronisation methods.

2008).[121] Among several reasons given by Eaton for the popularity of this style, from the compositional point of view, the repetitive and additive modular structures of minimalism are the most important (2008, 94). Such features as ostinati and motivic repetition have been used frequently in film music, and match well with the primary features of this musical style. Further, Cooke indicates that minimalistic music can be composed quickly or even improvised on the spot and is amenable to last minute adjustments (2008, 478).

Advances in computer technology offer composers more options for synchronising music to picture. Davis reports in his *Complete Guide to Film Scoring* (Davis, 1999) that most software sequencers allow for the tempo manipulation of music in order to match specific moments in the images, which is useful when a strict synchronisation is required (1999, 162). Moreover, composers often record their ideas, improvising along with the digitalised video image directly to a sequencer. This method, in Davis' opinion, is practical when a strict correspondence with image is not required and the music has to only provide a certain mood. There are also other computer-based applications that address the problem of synchronisation; for instance Auricle (The Film Composer's Time Processor), which allows for complicated calculations and creation of tempo maps for music.

Computer technology is crucial in contemporary film scoring as it enables composers to cope with rapid changes taking place during film editing. Digital technology enables various manipulations and precise editing of the recorded data (both MIDI and audio). The ability of non-destructive cutting and splicing (in conjunction with time-stretching tools) allows

[121] In the introduction to her work, Eaton quotes Strickland who observed that Minimalism has been a major influence on television and Hollywood (Strickland, 1993, 1).

composers to work more freely and accurately when addressing synchronisation problems. In films such as *The Craft* (1996) with music by Graeme Revell and *Rogue* (2008) with music by François Tetaz, composers used technology for achieving formal structure of the music (through editing) from pre-recorded material. The manipulation of the recorded blocks also was beneficial in maintaining precise synchronisation with the images (Revell, 1996; Tetaz, 2008).

Practical aspects of synchronisation and the application of digital technology are discussed in a number of publications written *by* film composers *for* composers. For example, in the book *Advanced Techniques for Film Scoring* (Hagen, 1990), in Chapter 2, the authors of the computer application (Richard and Ron Grant) present details of the time processor Auricle. The authors highlight advantages of this software and describe how it operates (1990, 11-23). The book *Synchronisation From Reel To Reel* (Rona, 1990) focuses on technical aspects of synchronisation of music with picture, and reviews methods of locking different types of studio equipment. There are also sections closely examining the issue of how music is written to match on-screen events. In the broad sense Rona's approach could be compared to the one in London's book (London, 1936). As much as the solutions presented in both titles are in many instances interesting, they present a somewhat outdated perspective. Many issues indicated by the authors, due to developments in computer technology, have been simplified in the recent years.

Clearly, the problem of synchronising music to picture has been one of the crucial concerns during the film scoring process. The problem of the coordination of musical structure with a film edit has been addressed in various ways, from simple approaches that could allow music

to develop logically, to attempts that focused on structural organisation of the score that could be more closely integrated with film images. Finally, there were solutions that addressed synchronisation issues by applying specific compositional techniques and technological developments in music. The literature also indicates that the use of modular structures helped in fitting music to film in many instances, yet it is not prevalent in contemporary mainstream cinema (excluding its application as part of the minimalistic technique).

It has been demonstrated in section 2.1.3.2 that the problem of mapping music to the temporal structure of a film and its subsequent adjustments stems from the linear properties of functional harmony. Avoidance of functional relationships and traditional voice leading rules may result in obtaining non-linear properties in the music, and these can be helpful for achieving successful integration with the non-linearity of the film edit. The composer's choice of language is, however, dependant on the genre of the film and the aesthetic preferences of the director and the producer. In recent films, however, the musical language used often accommodates tonal and non-tonal systems. For this reason, it seems relevant for this research project to consider briefly the historical perspective on the application of tonal and non-tonal music in film.

3.3 Tonal music in film

According to Kostka (2006, 1) and Brown (1994, 3), the tonal system (not only the tradition of functional harmony codified by Rameau in 1733 but also later developments such as increased chromaticism) remains the foundation for most film, television, and commercials music that draws upon the so called "Western" tradition of concert music and the various

traditions of contemporary popular music. Tonality (especially through the device of functional harmony) is one of the main means used by film composers (Deutsch, 2007, 8). The reasons for its use can be traced to the very beginning of the film medium in the silent era and the later developments of film music in the sound era. As observed by Wierzbicki, the first decade of film was a period of experimentation, whereas the second decade led to consolidation of technological solutions, film content and its presentation (2009, 27). Even though the evolution of film-music practice was a slow process, in time, filmmakers and exhibitors realised that the live (tonal) music with such attributes as the emphasis on melody, thematic material, leitmotif technique, and contrasts resulting from functional harmony, was a suitable solution to address two issues related to the new medium: 1) it provided a needed continuity for the recurrently changing images, and 2) it supported and intensified on-screen action (Burt, 1994, 205).

3.3.1 Silent era

At the beginning of the silent era, music was not an integral part of the cinematic experience (Kracauer, 1997 [1960], 134). Music functioned as a necessary addition rather than a part of the planned artistic concept, thus there was no dramaturgical relationship between music and what was occurring on screen (Marks, 1997, 27). Since musicians from local theatres were responsible for the choice of music being played during the film, one film could have had different musical accompaniments in different cinemas, both in terms of pieces which were used to illustrate a film, the size and type of musical ensemble that performed.[122] During the early days of the nickelodeon, the decision whether to use live musical accompaniment during

[122] The result was very much a montage of disparate materials, as it was not necessary to achieve tonal coherence or motivic development.

the projections (i.e. during the whole projection or only in some places such as in song performances) was left at the discretion of the administrator (Manvell and Huntly, 1975, 23).[123] Music used during those presentations was varied both in terms of location, source and type. Improvised accompaniment to silent films, at first provided by a pianist or organ player, then a piano-trap drummer duo, gave continuity to the succession of film images, supplied location atmosphere and sound effects.[124]

The styles of those musical accompaniments as well as narrative features were borrowed from the 19th-century melodrama (Cooke, 2001, 797). The repertoire commonly used during that time ranged from concert music, opera and, especially, operetta, to popular songs, as well as widely-known folk songs (Altman, 2007, 209; Davis, 1999, 17). As Altman indicates, some theatres kept the older custom of exterior ballyhoo music, others used a phonograph or automatic piano inside the venue (1996, 659).[125, 126] With the nickelodeon boom of 1907-9, film entered a new phrase of mass distribution by means of mechanical reproduction (Singer, 2004, 52). Gradually, with the evolution of the film industry and the growing popularity of film, the choice of the musical component started to be considered more carefully, especially that increasingly musical accompaniments were criticised for use of music which was inappropriate for the on-screen action (Wierzbicki, 2009, 33).

[123] Nickelodeon was the first type of permanent movie theatre (1905-1915).
[124] The role of musical accompaniment in early cinematic presentations was not to provide an appropriate mood or illustrate action, but it had been used as quasi-realistic sound effects to provide sonic representation of sound sources showed on the screen and only occasionally its mimetic or symbolic values were utilised to decorate audience's experience (Wierzbicki, 2009, 22).
[125] Live accompaniment was used only at peak traffic hours. During mornings and nights it was substituted by mechanical devices (Altman, 1996, 659).
[126] It should not be forgotten that one of the functions of music was also to attract the clients of the nickelodeons, and thus a piano player or phonograph was often located outside of the venue in the street (Altman, 1996, 664).

In response, production companies (e.g. *Gaumont* in France (1907) and *Edison Kinetogram* in the USA (1909)) started to prepare and publish lists (cue sheets) with the suggested selection of musical numbers appropriate for their production with the additional recommendation of how the music piece would either start or end at specific moments in the film (Wierzbicki, 2009, 36). In time, more comprehensive anthologies, with musical examples organised by dramatic category (e.g. horror, humorous, etc.), were published. Large portions of the repertoire included in these publications were known pieces by Fryderyk Chopin, Antonin Dvořák, Robert Schumann, Ignacy Paderewski, Piotr Tchaikovsky and others (Davis, 1999, 20). The most popular among these compilations were *The Sam Fox Moving Picture Music Volumes* by J.S. Zamecnik, published in 1913, *Kinobibliothek* by Giuseppe Becce, published in 1919, and *Motion Picture Moods* by Ernö Rapée, published in 1924 (Karlin, 1994, 157). Of these, Zamecnik's compositions were particularly appreciated due to their flexibility (i.e. a close key relation and sections that could be repeated with improvised embellishment *ad infinitum*) and the support they provided for accompanists (Altman, 2004, 368). Those catalogues were used by music directors, pianists and/or conductors to select pieces from well-known examples of music and create a compiled score that would suit the dramatic and film genre requirements. Importantly, these compilations were the precursors of the contemporary temp tracks (Sadoff, 2006, 167).

Most compositions included in film accompaniments were composed decades before the creation of the film. As a consequence, the structure and the emotional content of the music were not a result of the interpretation of the screenplay and, as such, frequently did not fit the action, style, or mood of the given film (Helman, 1968, 14). Despite this, however, these early practices of the conventionalised use of music in film influenced the later development of film

music (Lack, 1997, 5). One such influence was the adaptation of Wagnerian leitmotif technique. In 1911, Samuel L. Rothapfel, a theatre manager, stressed the importance of the main theme in film (Altman, 2007, 212). He started to use characteristic motifs to intensify the emotions of the audience based on the philosophy of Wagner's music. This practice resulted in the reduction of the number of pieces required for a particular film. Due to its simplicity and economy, the leitmotivic approach quickly became an industry standard.

During the era of silent film, original scores were also commissioned, but the practice was rare. In France, Camille Saint-Saëns composed one of the first original film scores, for *L'assassinat du duc de Guise* (1908), while Arthur Honegger composed music for *La roue* (1922) and *Napoléon* (1927). In Germany, Joseph Weiss provided original music for *Der Student von Prag* (1913), Friedrich Hollaender for *Nosferatu* (1922), and Gottfried Huppertz for *Metropolis* (1926). In the Soviet Union, Edmund Meisel composed music for *The Battleship Potemkin* (1925) and *October* (1927), and Dmitri Shostakovich for *The New Babylon* (1929) (Cooke, 2001, 798). In the USA, among composers who were authors of original music for silent film the most prolific was Walter Cleveland Simon. Between 1911-1913 he composed approximately two dozen scores published simultaneously with Kalem films. Joseph Carl Breil was another important figure in the history of American film music of that period. In 1915 he prepared orchestral accompaniment and original music for D.W. Griffith's twelve-reel *The Birth of a Nation*, which included a number of themes and mid-cue synchronisation points. According to Wierzbicki, Breil's music for *The Birth of a Nation* can be considered the first "modern" film score (2009, 58).[127]

[127] New scores for classical silent films are nowadays also commissioned, for example Carl Davis music (1980) for *Napoléon* (Abel Gance) and (1986) for *Intolerance* (D.W. Griffith), and Carmine Coppola for the same title (1981). Australian composer and pianist, Stephen Whittington is the author of live soundtracks for a number of

During the 1920s, the significance of the issue of accurate synchronisation of music with images increased, and thus various devices were employed to achieve this goal. In Germany, Carl Robert Blum developed *rhythmonome* (1926) which recorded sound in the form of a rhythmogram (i.e. rhythmic course of music in a diagram). The rhythmogram was played in synchronisation with the film projector, so that the conductor of the orchestra could follow the tempo of the moving diagram (Cook, 2004, 47). In France, a similar device, the *cinépupitre*, had been constructed by Pierre de la Commune in 1922 (London, 1936, 70). Gramophone recordings also were used to supplement cue sheets for live music. A breakthrough in synchronised sound came with the *Vitaphone* system bought from Western Electronic Company by Warner Bros in 1925 (Gomery, 2005, 38). The system was used in *The Jazz Singer,* in 1927 (Cooke, 2008, 50; Wierzbicki, 2009, 93).[128, 129]

3.3.2 Sound era

Many films produced during the early days of sound cinema featured music in opening and closing credits only, for example *Frankenstein* (1931), with music by Bernhard Kaun (uncredited), *Dracula* (1931) with an excerpt from Tchaikovsky's *Swan Lake* (Act II), which was reused in *The Mummy* (1932), or featured diegetic music only, e.g. *M* (1931), where the main character of a serial killer whistles Grieg's theme *In the Hall of the Mountain King*.[130]

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avant-garde classic silent films such as *Entr'acte* (René Clair), *Anemic CinemA* (Marcel Duchamp), *Emak Bakia* (Man Ray), *Un Chien Andalou* (Luis Bunũel and Salvador Dali) (2009).

[128] The earliest picture with synchronised sound had been produced by Edison (1894).

[129] Introduced in 1928 RCA's Photophone system where sound was directly recorded onto photographic film allowed for the synchronisation to be more easily achieved.

[130] The exceptions were musicals, for example *The Broadway Melody* (1929) or *Sunny Side Up* (1930).

Music was rarely used as underscoring, due to a belief that there had to be a visible source of it on screen, otherwise the audience would wonder where the music was coming from (Larson, 1985, 7; Palmer, 1990, 13).[131]

In time, however, the need for original compositions increased, particularly when filmmakers realised that film needs music that integrates well with the plot and serves narrative purposes, something that was not possible with overlaid musical numbers (Wierzbicki, 2009, 139). The answer to this demand was music influenced by composers such as Johannes Brahms, Giuseppe Verdi, Giacomo Puccini, Richard Wagner and Richard Strauss, often incorporated in a composite manner (Davis, 1999, 40). During the 1930s and 1940s, Hollywood was populated by European composers many of whom brought with them an understanding of the late nineteenth century Austro-German symphonic style (i.e. Dmitri Tiomkin, Franz Waxman, Max Steiner, Erich Wolfgang Korngold, Bronislau Kaper, and Miklós Rózsa). Gorbman suggests that film music is not consciously perceived, and thus in order to influence the narrative with emotive values via cultural musical codes, a musical cue must be instantly recognised (1987, 4). Thus, despite the application of various musical genres, the late romantic style of Wagner and Strauss became a feature of Hollywood practice. Deutsch indicates that the Wagnerian approach of relying on prolonged unresolved dissonances (that only resolve at the end of the work) became part of the language for early film composers such as Steiner and Korngold, and with some modifications is still in use by such composers

[131] During that time some filmmakers expressed their concerns regarding the *talkies*. British documentary maker Paul Rotha suggested that the spoken sound should be used only in documentary films and in newsreels as those are not dramatic forms. He saw in dialogue (or monologue) the main obstacle for the filmmaker as it makes any cutting impossible (Rotha, 1931, 407). Other filmmakers such as Ernst Lubitsch and René Clair experimented with music to enhance or even replace the dialogue (Lack, 1997, 78). In Clair's *Sous les toits de Paris* (1930), the first sound film in France, music dominates over the dialogue and sound effects. In some instances it even functions as sound effects (Gorbman, 1987, 143) as in early silent films.

as Williams or Zimmer (2007, 9). Susan McClary observed that musical procedures of late romanticism used in film music are influenced by the congruency of the two media: "Nineteenth-century symphonies and narrative fiction share many structural and ideological values, making their collaboration in multimedia cinema seem nearly predetermined. Both aspire to deliver the illusion of seamless continuity, to portray the trajectory of a subject overcoming obstacles and securing ultimate goals as though by inevitable means of cause and effect" (2007, 50).

It has been noted that the reason for the predominance of the late romantic style in Hollywood film music is related to the flexibility it provides in terms of application of various motivic and tonal modes of organisation and its ability to accommodate quotations from existing music and imitations of earlier styles (Buhler and Neumeyer, 1994, 383). It does not, however, always address the temporal and structural flexibility of music in matching the on-screen events, especially when linear properties are pronounced. Therefore, tonal processes are frequently simplified and used in highly adaptive ways (such as asymmetrical construction of melody, motivic use of pitch-class cells, harmonic parallelism, avoidance of functional harmonic implications or application of certain compositional techniques such as pointillism or minimal music) in order to integrate music with the non-linearity of the film edit.[132] As Prendergast observed, film music "has almost always been nonlinear" which makes it suitable for application in film (1992, 165) (see also section 1.3.5).

[132] In film scoring, due to constantly changing images which require changeability of musical thoughts, there is hardly ever an opportunity to apply fully developed melodies, such as the ones Aaron Copland aptly described as long, flowing, of satisfying proportions, and with a climactic moment at the end (2009 [1939], 42). Therefore, melody in film music usually has a motivic character (e.g. is built from short, well defined rhythmic or melodic ideas).

Another reason for the dominance of the late romantic style may be related to the fact that all elements in the musical texture are subordinate to melody and this, in turn, provides a comprehensible sense of continuity for fragmentary nature of the film (Kalinak, 1992, 101). The view seems to be justified as frequently reappearing melodic material not only helps to unify the score but also, as a consequence, reinforces coherence of the film narrative acting as an agent of continuity. Composer Lucjan Kaszycki emphasises that melody is the most important component of film music as an expressive device and a carrier of thematic ideas (Gronau et al., 2012, 126). Therefore, film composers tend to start working on a new film production with a development of the basic thematic (melodic) material that later becomes a backbone for the whole musical score (Hurwitz, 2007, 57; Karlin and Wright, 2004, 197). Consequently, it is not surprising that a leitmotif technique borrowed from Wagnerian dramas became common in film scoring. The application of leitmotifs in film was primarily motivated by dramaturgical reasons, helping the film narrative (e.g. a theme associated with the main film characters and possibly modifiable when the situation changes) (Cooke, 2008, 80). Yet, short and easily modified motifs are found by many film composers to be very practical during scoring (Karlin and Wright, 2004, 197).[133] Additionally, when the goal-directed trajectory of a tonal melody is interrupted at a point at which it sounds incomplete, hierarchical interdependence of the tones may create in a listener a feeling of expectation for what will occur next (Aniruddh, 2007, 196), engaging the audience into the plot.[134] Reliance

[133] This can be demonstrated by Bernard Herrmann's preference for creating music built from small cellular musical units. According to Herrmann, this approach does not limit a composer to the 8 or 16 bar frame, and also has the advantage that a short phrase is easier to follow by the audience whose attention is occupied by other elements of the film production (Brown, 194, 191-192).

[134] One of the commonly used film scoring techniques founded on tensions resulting from tonal harmony works in a similar fashion. In dramaturgically important moments, the music builds up to the dominant seventh chord and does not resolve to the tonic. The lack of resolution helps to maintain the audience's engagement in the narrative flow of the film. Often this technique is used for film overtures, for example in *North by Northwest* the overture closes at the end of titles suspended on a seventh chord (Brown, 1994, 4).

on melody as a primary musical element in film music also has aesthetic and commercial implications. As film composer Krzysztof Komeda observed, the melody is what the film viewer remembers after leaving the cinema (1961, 37), assuming that the music was indeed based on distinctive melodic material clearly articulated throughout the film narrative.[135]

Further, in the tonal system, certain kinds of chords according to major and minor properties can have emotional resonance attached to their acoustic resonance (Crowder, 1984, 3; Pallesen et al., 2005, 450). According to Meyer, positive states of joy and calm, considered *normal* by the society, are "associated with the more normative musical progressions, i.e. the diatonic melodies of the major mode and the regular progressions of major harmony" (1956, 227). In contrast, sadness, and distress become associated with chromaticism and its modal agent, i.e. the minor mode. "From a harmonic point of view, the minor mode is both more ambiguous and less stable than the major mode" (Meyer, 1956, 226). Instability and ambiguity of the minor mode are connected with more possible vertical combinations than in the major mode. Consequently, "[...] the tonic chord in the major mode can, with varying degrees of probability, move to any one of six triads, the tonic chord in the minor mode can move to any one of at least thirteen different triads" (p. 226). In the major mode there is only one ambiguous triad built on the seventh degree (in C major B^0), whereas the minor mode has four ambiguous triads (in c minor D^0, Eb+, A^0, B^0).[136] These particular features of the tonal system have an important meaning for film music as they can guide and shape the psychological and emotional responses of a film audience. Thus, even though the association

[135] There are, however, examples of film music where elements other than melody fulfil a thematic function (i.e. *Altered States* (1980)).

[136] The ambiguity of diminished and augmented chords relates to their intervallic structure which in contrast to major and minor triads consists of equal steps of three or four semitones.

of certain emotions with major and minor modes may at times be perceived as simplistic or even naive, film composers continue to use emotional implications of the major/minor modes (Brown, 1994, 7).[137]

At the same time, the eclecticism of Hollywood film music allowed for the somewhat restricted (i.e. influenced by the narrative needs and genre of a film) use of various techniques borrowed from 20th century concert music, including non-tonal music (Buhler and Neumeyer, 1994, 384). This is the most common (with some exceptions) approach in mainstream Hollywood scoring practice. However, as Brown stresses: "Only a handful [of composers] have reached into such areas as atonality, in which each of the twelve notes of the chromatic scale is treated equally, rather than being submitted to a hierarchical structure" (1994, 8).

3.4 Non-tonal music in film

Concurrent with the development of film and film music practices, significant changes can be observed in the evolution of concert music as well. In particular, after 1900 the tonal system began to be extended, and stretched to a breaking point, as composers searched for originality through increasing chromaticism. In the early 1920s, Arnold Schoenberg developed his 12-tone method to avoid any implications of tonality and to establish what he named "pan-tonality". These new musical resources became of interest to some film music composers; however, they have not been used extensively (especially if one considers the most rigorous compositional techniques such as serialism). When used, they have been applied within a

[137] There are other elements of musical compositions which may influence the emotional perception of the piece such as tempo, pitch range, texture or dynamic contrasts. There are also exceptions to the association of a particular emotion with a certain mode, for example the second movement of Beethoven's *Piano Sonata* Op. 111, which has a "sad" and reflective character, is in fact written in C major.

conventional score as an extension of the conventional means necessary to highlight certain aspects of the film narration, usually paranormal, for example *The Sixth Sense* (1999), cue *Suicide Ghost*. This could perhaps be explained by some composers' conviction that the use of a non-tonal language can lead to the alienation of the majority of the audience (Lack, 1997, 332; Gronau et al., 2012, 141). Moreover, as indicated above, during the studio era (1910-1950), producers accustomed to the well established relationships between music and drama accepted radical changes reluctantly (Kalinak, 1992, 78). This situation was then and still is influenced by a long-standing practice of temporary soundtracks (constructed from cues taken from scores of pre-existing, usually commercially successful films), which limits application of music into a realm of widely accepted clichés and conventions (Sadoff, 2006, 166). Therefore, apart from specific film genres and projects, the application of the non-tonal system to film music, in most cases, has resulted from the individual interests of composers who brought elements of non-tonal music to their film music.

From the beginning of the 1940s, film composers increasingly started to incorporate new musical ideas into the traditional vocabulary of film music. At that time the use of modern techniques associated with Schoenberg and Stravinsky was already decades behind innovations in the field of concert music (Cooke, 2008, 194). In the early 1940s, Hanns Eisler composed twelve-tone scores for the experimental films *Eis* and *Regen*, and Scott Bradley used the twelve-tone method in the cartoon *The Cat That Hated People* (1948) (Cooke, 2008, 298; Huckvale, 2008, 31). Eisler also indicated the importance of Stravinsky's, Bartók's and Schoenberg's achievements, however, not because of the increase of dissonances in their music, but because they side-stepped the traditional tonal system (2005 [1947], 32-33). This, in turn, could result in music which is structurally better suited for film requirements. For

example, the avoidance of functional, diatonic harmonies and omission of traditional functional cadences, can be observed in Aaron Copland's score for *The Red Pony* (1949), constructed from building blocks in the Stravinskian fashion(McGinney, 2003, 32).

Bernard Herrmann, often regarded as the most influential film composer of the era, relied on dissonant harmonies and harmonic ambiguity for high levels of suspense sustained for longer periods than standard (tonal) harmonic solutions. The approach can be observed in scores written for Alfred Hitchcock, such as *The Trouble with Harry* (1955), *Vertigo* (1958) *North by Northwest* (1959), and *Psycho* (1960). Increasingly, Herrmann was relying less on dramatic transitions from major to minor modes, familiar for film scores, in favour of chordal language which simultaneously featured major/minor harmonic implications (Brown, 1994, 152-155), for instance minor major seventh chord, e.g. Bbm $^{(maj7)}$ used in *Vertigo* (1958) and *Psycho* (1960).[138]

In the 1950s, new approaches to concert music began to oust the dominant style of Korngold and Steiner in film music. During that time, perhaps the most influential figure was Leonard Rosenman. His body of work encompasses over one hundred feature film and TV scores. Rosenman's achievements stand out thanks to the successful application of musical techniques, such as dodecaphony, microtonality, *musique concrète*, and music genres, such as electronic music, cool jazz and hard bop jazz (Burlingame, 2008, 3). Prendergast described Rosenman's style as a combination of expressive possibilities of dissonance and contrapuntal textures (Prendergast, 1992, 108). In the score for *East of Eden* (1955) he achieved a

[138] In his music, Herrmann also extensively used half diminished seventh chords and fully diminished seventh chords. The latter play a prominent role in the *Psycho* score.

successful fusion between American folk style and non-tonal style which are coherently combined (Palmer and Steiner, 2008, 698). Tony Thomas observed that the style of Rosenman's music in this film is close to the style of Alban Berg (1997, 279). In the same year (1955), inspired by Schoenberg's *Piano Concerto* Op. 42, he composed music for *Cobweb*, the first major studio production scored primarily with the use of the twelve-tone method (Brown, 1994, 177; Huckvale, 2008, 31).[139] The plot of this picture focuses on the neurosis of patients and staff members in a mental institution. Rosenman's approach to the *Cobweb* was unprecedented in the mainstream Hollywood practice of that time to the degree that the musicians working on that project were certain that the score would be rejected by the producer and the director of the film (Prendergast, 1992, 121), but this did not happen. Despite the use of total serialisation in some avant-garde music of that time, Rosenman decided to use serial technique only to control pitches and not other elements in the score (Prendergast, 1992, 119).[140] Rosenman also applied twelve-tone and *musique concrète* techniques for a science-fiction film *Fantastic Voyage* (1966). The score written for a large orchestra is based on a four-note motif, which is constantly modified through gradual changes in rhythm, harmony, counterpoint, and timbre. Only the end sequence of the film features a cue that is tonal (Feisst, 2008, 37).

Another composer who was interested in expanding his musical vocabulary beyond the traditional tonal system and was predominantly associated with the science-fiction genre was Leigh (Amadeus) Stevens. He was the author of scores to such films as *Destination Moon* (1950), *When Worlds Collide* (1951), and *War of the Worlds* (1953). In the latter, Leigh

[139] Rosenman studied under Schoenberg in Los Angeles.
[140] Rosenman's decision seems logical as this approach allowed him to have freedom in many parameters of the score such as rhythm, dynamics, register, articulation and the row form. The application of integral serialism would certainly restrict formation of a dramaturgically adequate accompaniment for the film.

experimented with quartal harmonic devices characteristic of Schoenberg, Hindemith, and Bartók. Leigh studied under Schillinger, and it is possible that he utilised Schillinger's *The Harmony of Fourths*, described in Chapter 5 of *The Schillinger System of Musical Composition* (1978 [1941], 1134).[141] As Rosar observed, however, Schillinger used chords constructed from superimposition of a perfect fourth and an augmented fourth whereas Stevens used only perfect fourths for his chords (2006, 403).[142] He also used chord progressions in tritones, following the principle of two tonics. Schillinger, on the other hand, never combined two tonics with quartal harmony in his system. Stevens' music composed for films preceding *War of the Worlds* was more conventional by Hollywood standards, being primarily melodic with an emphasis on orchestral colour (Rosar, 2006, 397). In all three scores Stevens used the novachord (i.e. an electronic polyphonic instrument manufactured by Hammond company between 1939-1942), yet the orchestration relied mostly on impressionistic textures (Cooke, 2008, 201).

As regards the use of electronic music in Hollywood productions perhaps the greatest achievement of the decade was the entirely electronic soundtrack for *Forbidden Planet* (1956) composed and performed by Louis and Bebe Barron. Initially, they had been hired to prepare electronic effects (i.e. sound design) for the film, which was planned to have a conventional music (Wierzbicki, 2005, 27). All sounds used in the soundtrack were produced with electronic circuitry constructed by Louis and then subjected to extended modifications. Even though the innovative non-tonal sonorities that the Barrons created were foreign to

[141] Schillinger claimed that harmonies built on intervals of a fourth remained (at that time) an unexplored field of musical harmony. Thus, even though previously used by composers such as Schoenberg, Scriabin, Ravel, and Hindemith, quartal harmony had never been subjected to systematic treatment (i.e. formulation of basis for the progressions and voice leading rules) (1978 [1941], 1134).

[142] Successions of quartal chords were also used by Steiner in the score for *King Kong* (1933) and by Rózsa in *Quo vadis?* (1951) and *El Cid* (1961).

Hollywood norms (Wierzbicki, 2009, 167), the score was accepted by the MGM studio (see section 1.2.1).

An expressionistic style of writing based on the non-tonal system was used by Ernst Gold in *On the Beach* (1959) (Burt, 1994, 45). In this post-apocalyptic vision taking place after the Third World War, for some cues, the composer used twelve-tone technique to evoke a chain reaction, tragedy, and to illustrate a lifeless landscape after a nuclear conflict. Attempts undertaken by Leonard Rosenman, Ernst Gold, Leigh Stevens, and Alex North (his symphonic-jazz style) demonstrated that a dissonant musical language can increase the dramatic impact of music in film (Henderson, 2003, 1), which was exploited in certain film genres (i.e. horror, psychological dramas or *film noir*). This phenomenon is consistent with Eisler's claim that the "new music" (i.e. Stravinsky's, Bartók's and Schoenberg's) is capable of expressing extreme emotions with a much higher intensity than traditional music (2005 [1947], 40).

In the 1960s and the early 1970s, the medium of television had a significant influence on film music. Due to a demanding schedule of weekly episodes composers had to work quickly and efficiently. Thus, methods of non-tonal writing (including twelve-tone method) allowed for quick composition of suspenseful scenes (Davis, 1999, 57). The socio-political context of the Cold War also contributed to changes in the harmonic language of film music. During this time, dissonant and non-tonal music became acceptable within certain film genres; mainly science fiction and horror. Films which belong to the horror, science fiction and fantasy genres have always allowed composers to use unique and experimental scoring techniques (e.g. electronic music, chromaticism, polychords, tritones, other avant-garde melodic and

harmonic procedures), as those experiments were justified by the content of the plot (Larson, 1985, 355).

The achievements of Stanley Kubrick, and the films *2001: A Space Odyssey* (1968) and *The Shining* (1980) in particular, strengthened the relationship between science fiction and horror genres and avant-garde music of the 1960s. These films were scored, in a large part, with pre-existing autonomous non-tonal compositions; however, the novelty of Kubrick's approach lied in the way music was integrated with the structure of both these films. In the former film, Kubrick used fragments of György Ligeti's *Atmosphères*, "*Kyrie*" from the *Requiem* and *Lux Aeterna* (Steinitz, 2003, 161).[143] In *2001: A Space Odyssey*, the music is used in ways that fit the conventions of science fiction films, i.e. the rational, human elements are accompanied by tonal music whereas alien and unknown by dissonant and non-tonal pieces. Yet, for example, in scenes featuring encounters with the alien monolith, Ligeti's music (i.e. *Requiem*) does not precisely match the on-screen action making a viewer perceive images differently than when the music follows the events on the screen (Scheurer, 1998, 181). According to Irene Paulus, the creative way in which Kubrick combined the music with picture deserves particular acknowledgment, comparable to giving him the credit usually reserved for composers (2009, 110). However, Kubrick used Ligeti's music without seeking or receiving his permission which may lead to reservations in applauding his methods.

In *The Shining*, Kubrick decided to use fragments of Penderecki's sonoristic music, i.e. *Polymorphia* (1961), *De Natura Sonoris* No.1 (1966), *De Natura Sonoris* No.2 (1971),

[143] Also *Also Sprach Zarathustra* (1896) by Richard Strauss, *The Blue Danube* (1866) by Johann Strauss II and *Gayane* Ballet Suite (*Adagio*) (1941-42) by Aram Khachaturian.

Utrenja (1970), *The Awakening of Jacob* (1974) and third movement of Bartók's *Music For Strings, Percussion and Celeste* (1936) as the most suitable for some parts of the film.[144] In the final maze scene (Jack chases Danny) sections of *Utrenja* and *Polymorphia* were layered (as many as four times at the same time) to increase the impact in the final sequence of the film (Barham, 2009, 143; Lionnet, 2004, 46). The sound of the extended performance techniques of Penderecki's sonoristic compositions used in *The Shining* often blends with ambient sounds of the film soundtrack forming an almost indistinguishable entity. This was, at the time, an unconventional approach for Hollywood practice typically characterised by a clear distinction between soundtrack components. The application of music that does not rely on melodic and harmonic structures allowed Kubrick to support the story in an alternative way to mainstream cinema. This clearly contrasts with the situation in contemporary films where the music frequently dubs what occurs on the screen and does not add an additional commentary to the narrative of the film.

In 1974, David Shire composed a twelve-tone score for the thriller *The Taking of Pelham One Two Three*. The composer prepared a row that consisted of major triads, minor seconds, and their inversions, thus the series contained major sevenths which allowed him to achieve a dissonant-sounding jazz style music, meeting his objective for this film (Karlin and Wright, 2004, 235).[145] While the language used by Shire was non-tonal, the instrumentation was jazz-funk orientated, which was supposed to relate to a metropolitan setting (Cooke, 2008, 199). Serial technique was also used by Miklós Rózsa for highlighting satanic elements in *King of*

[144] Even though *The Shining* dates from Penderecki's neo-romantic phase, it uses the much earlier, sonoristic style of the 1960s. Film soundtrack also featured music of Ligeti *Lontano* (1967), and *Rocky Mountains* by Wendy Carlos and Rachel Elkind as well as electronic version of the *Dies Irae* from Berlioz's *Symphonie Fantastique* (1830).

[145] A complete twelve-tone row and permutations for *The Taking of Pelham One Two Three* can be found in Karlin and Wrings (2004, 246).

Kings (1961) for instance, in the temptation of Christ scene. Jerry Goldsmith also often used dissonant musical language. The score for *The Omen* (1976), for which Goldsmith received the Academy Award for original score, used twelve-tone procedures yet without a strict application of the system (Karlin and Wright, 2004, 236). The composer used an ostinato motif in C minor and changed it by transposing its intervallic structure, modifying the rhythm and treating it in a quasi-serial way.

In the 1980s, John Corigliano composed music to the film *Altered States*, influenced by Polish sonorism of the 1960s. To highlight the images of hallucinations, the score included textural music (i.e. overlapping clusters) and microtones. Further, individual players employed flutter-tonguing and multiphonic techniques. Corigliano also utilised two pianos tuned a quarter tone apart and other unconventional effects such as wind instruments whistling and blowing through the mouthpiece (Timm, 2003, 251). Moreover, aleatoric procedures and non-metric notation used by Corigliano helped the conductor to synchronise the music effortlessly to the picture during the recording sessions (Karlin and Wright, 2004, 112). His score for *Altered States*, which brought him the Academy Award nomination (Struble, 1995, 310), built a foundation for a more extensive application of dissonant and non-tonal music by other film composers in the 1990s.

Corigliano's approach was developed further by his student Elliot Goldenthal, who is the composer of music to numerous science fiction, action, and horror feature films, such as *Alien*^{3} (1992), *Sphere* (1998), and *Final Fantasy* (2001). His scores incorporate elements of non-tonality, minimalism, experimental orchestration, 20th-century avant-garde music, and electronic music (Cooke, 2008, 502), particularly evident is his fascination with Polish

sonorism of the 1960s, perhaps inculcated by Corigliano. At the end of the 20th-century, featuring non-tonal and electronic music became a standard in the horror and science fiction genres, as exemplified by such movies as Christopher Young's *Species* (1995), John Frizzel's *Alien Resurrection* (1997), Michael Kamen's *Event Horizon* (1997), Don Davis' *Matrix* (1999) and Howard Shore's *The Cell* (2000). Non-tonal music was also present in a number of movies from other genres; for example Fielding's music for *Straw Dogs* (1971), Goldenthal's music for *Michael Collins* (1996) and *The Cob* (1994), Danna's *Felicia's Journey* (1999) or Greenwood's *There Will Be Blood* (2007). However, often, in film music of such film composers as, for example Goldenthal, where tonal and non-tonal music are combined, it is difficult to make a clear distinction between those two approaches.

Non-tonal music is commonly used in horror and science fiction films to achieve a dense texture of music and to intensify the level of suspense. Economic factors may also drive its application. In particular, the use of aleatory techniques may, in some instances, allow for recording of music in a shorter time than conventional compositions, and thus may potentially reduce the amount of money required for completing the recording session. For example, the music for *Altered States* (1980) had to be completed in a very short time, yet it was supposed to emphasise a high level of motion activity in the film. To avoid the time-consuming process of creating a detailed score, John Corigliano developed a number of simple symbols, called by the composer *motion sonorities* (e.g. movement I, mm. 18-19, string section sonority, or movement III, m. 11, boxed sonority for horns) (Corigliano, 1981), that resulted in the intense activity in the orchestra necessary for the requirements of the film (May, 1990, 11; Schelle, 1999, 172).

In conclusion, non-tonal music is used in film, however, its application is limited to certain film genres or it is employed at the local level only for certain cues to highlight some unusual aspects of the plot by using specific sonorities. Nevertheless, as demonstrated by the literature review, the use of non-tonal music and its non-linear properties may help in solving problems with synchronising music to picture as well as subsequent changes resulting from film editing and build the ground for future musical experiments and research.

Chapter 4: Case study 1 - *Collection Basket*

4.1 Rationale for the composition

Collection Basket Version 1 (v1) is a short composition for solo clarinet (approximately two minutes in duration) that focuses on melody and the problem of coherence in music constructed from modular components. The accompanying scores can be found in Volume II, Section 1. Audio examples and Logic files can be found in Volume II, on DVD 2, Folder 01 and Folder 07-01.

A melody line can provide a smooth transition over the highly edited and disjunctive sequences (Belton, 1994, 53), thanks to its structural and aesthetical principles such as continuity and coherence (Kliewer, 1975, 292), aiding perception of the film. According to Eisler, however, the use of melody in film music results in constant conflicts with objective requirements of the visual drama (Adorno and Eisler, 2005 [1947], 8). These conflicts come from the irregular structure of film and the regularity of melodic phrasing that is typical for symmetrically articulated tonal melodies.[146] David Raksin addressed this issue by constructing asymmetrical melodies formed from individual bars of different metres (Prendergast, 1992, 154). For his dramatic scoring, instead of developed melodic lines, Bernard Herrmann preferred thematic structures built from small cellular units (modules) that could be efficiently transformed throughout the score (Rosar, 2003, 133) and adjusted to the film edit. A modular structure, however, usually results in a non-linear (discontinuous) character of the musical flow. This, in turn, influences the coherence of the music which in certain film situations may be necessary to provide a unifying element for the narrative (see section 1.3.1).

[146] The main places for fully developed melodies and more autonomous structures are at the opening and closing credits.

Eisler's observation regarding limitations of tonally articulated melody (i.e. difficulties in handling the melodic material within the limited time frame), connects with Raksin's approach for constructing an asymmetrical structure of melodic material and Herrmann's approach of linking small units into a larger form. *Collection Basket* engages with these problems in order to answer the question: "is it possible to achieve a coherent musical discourse, motivic in character, from a set of pre-composed modules?". Of course, such a task is achievable by applying modules whose possible connections and development are planned beforehand. However, the present author was interested in examining if coherence and logic of the music can be achieved when modules used in the process of assembly are structurally and thematically unrelated. The experiment was also intended to investigate whether a three-step approach to a composition (i.e. composition of modules / selection of modules / montage of modules) can be applied. For the clarity of the experiment, the author decided to focus on a monophonic medium and a relatively short duration, not longer than three minutes.

4.2 Methodology

The first version (v1) of *Collection Basket* was composed during a two-week period in 2008. Following the main methodological assumption (See Chapter 1, 1.5 Methodology), the process of composing the piece was divided into three stages: composition of individual modules, selection of modules, and assembly of modules. During the course of the experiment two additional versions of the piece were created.

In order to meet the objectives of the experiment, the author decided not to compose a set of modules in the conventional linear way (i.e. planning possible relations between particular

modules at the beginning of the actual compositional process). The idea behind this procedure was to obtain modules that were not designed to fit together. In order to achieve this, the author decided to develop modules through a process of improvisation. As observed by Frederic Rzewski, the compositional process may be an editing procedure, where errors are rectified and only the best ideas are chosen (2006, 267). During free improvisation, however, ideas are not evaluated, filtered, or subjected to conscious "rules and regulations". This strategy was chosen in order to develop modular components not intentionally related to each other. Moreover, it was crucial for the purpose of this work that the modules themselves were not manipulated (e.g. by transposition, or pitch correction) in order to fit more easily together after they had been written.

During the first week of the experiment, all improvisations were recorded (MIDI data) directly into the Logic Pro 8 software sequencer with an 88-key midi controller as continuous performances.[147] Each day at least two performances were recorded by the author. After several days, all recorded material was reviewed, and certain fragments from four different performances were chosen. Decisions were then made regarding the time signature and the duration of selected modules. All modules were one to two bars in length. The composition (version 1) was assembled from a total of 38 modules. Having in mind that repetition has a significant meaning for both coherence of the music as well as for the motif to be recognised, several modules (similar or the same) were used more than once.

[147] MIDI – (Musical Instrument Digital Interface) – an industry-standard protocol that enables computers, electronic instruments, drum machines, and other electronic music equipment to communicate and control one another.

The modules were grouped and put together in a particular order to form a three-part micro form: I, II, and III with a short, three-bar codetta. Sections I and III are in the same tempo of 120 BPM.[148] The middle section, II, is in a contrasting and slightly slower tempo of 100 BPM. The tempo markings were influenced by the tempo of improvisations from which modules were extracted. The intention behind this structure was that each part was supposed to reflect a different cinematic situation/mood: I – ambiguous, abstract; II – mysterious, darker, and serious; III – a chase sequence.

Section I (mm. 1-20) has an episodic character and features frequent time signature changes (e.g. 2/4, 5/4, 3/4, 6/4, 2/4, 4/4, 2/4, 3/8, 4/4, 2/4 etc.). See **Figure 1**.

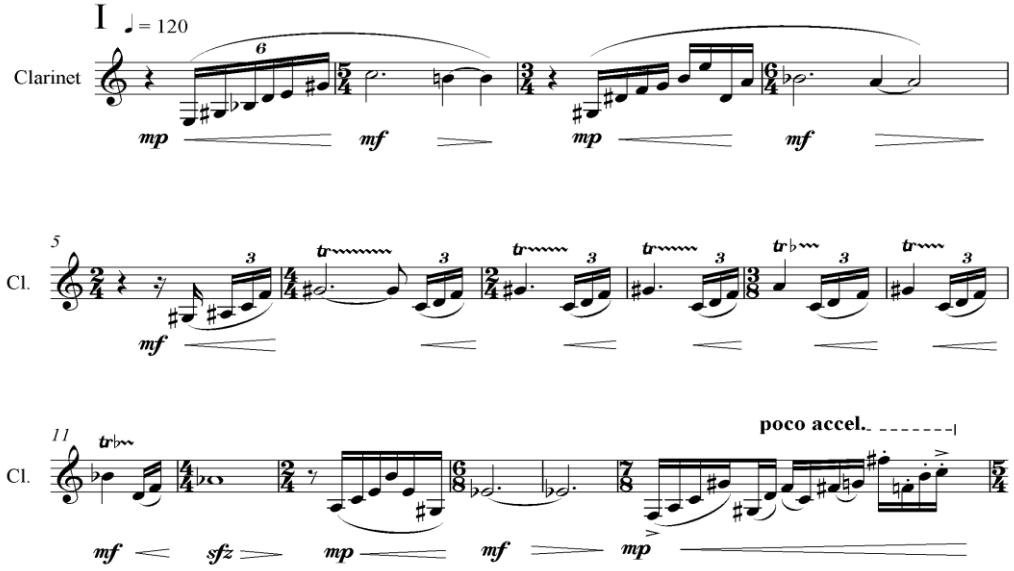

Figure 1: *Collection Basket* Section 1 (fragment (fg))

[148] BPM – beats per minute.

Similarly, section II (mm. 21-41) is varied metrically, but not to the degree of the previous one. Modules selected for this section are rhythmically simpler and consist of longer note values. The last section, III (mm. 42-59), has a consistent time signature of 4/4 through the whole segment. Apart from two interruptions of singular staccato notes, the entire section is also more continuous than the previous ones. See **Figure 2**.

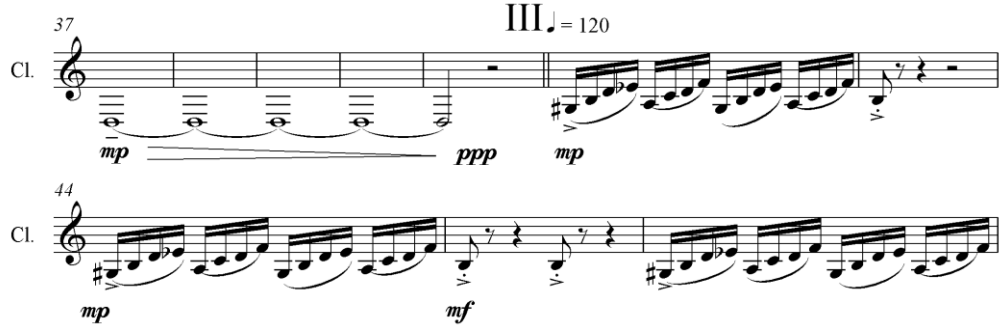

Figure 2: *Collection Basket*, beginning of Section III (fg)

After the second interruption, the melodic line rises steadily without further breaks to the climax in bar 55 (the highest pitch of the piece). Bars 57-59 form a short codetta with a motivic allusion to section I closing the composition. See **Figure 3**.

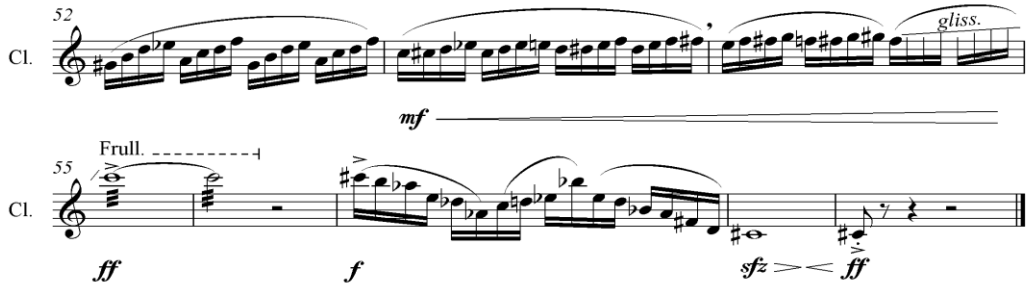

Figure 3: *Collection Basket*, the end of Section III (fg)

Throughout the piece, modules were frequently separated by rests in order to provide possible editorial points, see **Figure 1**.

After examinations of melodic and rhythmic characteristics, and the registral range of the piece, the clarinet (Bb) was chosen as an instrument suitable to perform the composition successfully. After the selection of the instrument (and addition of performance techniques characteristic for a clarinet) the composition was recorded as a continuous audio file in Logic Pro using a sampled clarinet (see **Figure 4**, and Volume II, DVD 2, Folder 01, clip 01-01).[149]

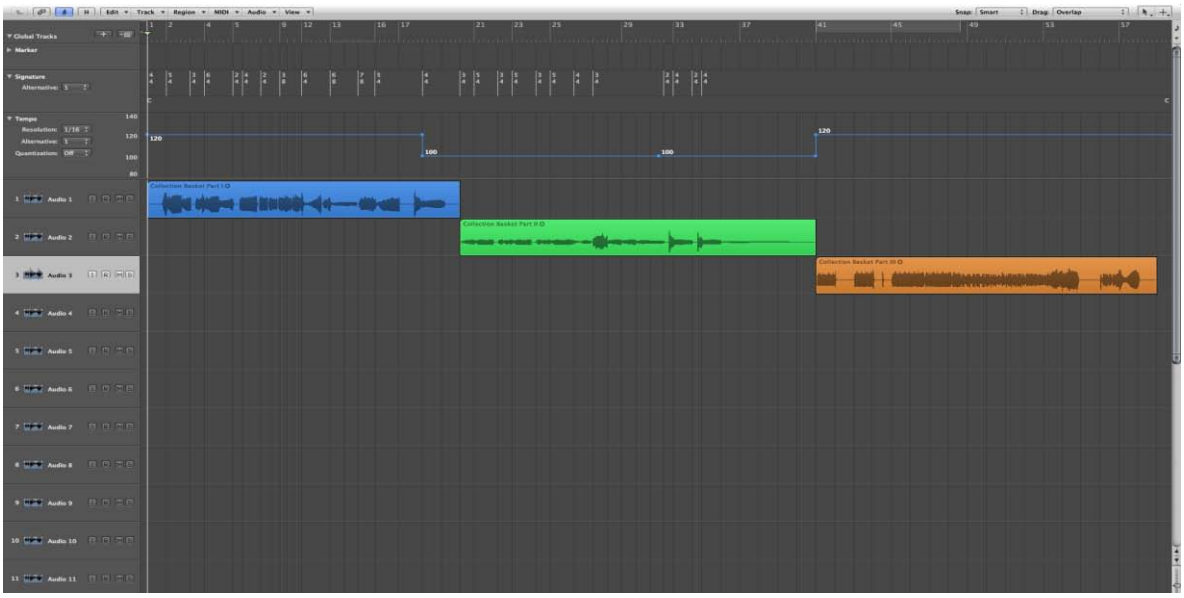

Figure 4: A Logic Pro screen of *Collection Basket*, primary form

4.2.1 Editing

After the piece had been assembled, several edits were made to test the flexibility of its modular structure, as well as to examine how the editing process influences the character and

[149] There are some differences between notated versions of pieces and audio mock-ups resulting from available articulations in the used sample libraries.

coherence of the composition. The first step was to rearrange the main sections of the composition. Thus, additional versions of the composition were created with the following order of the main sections: Edit 1, II (green), I (blue), III (orange), (**Figure 5,** also Volume II, DVD 2, Folder 01, clip 01-02); Edit 2, III, II, I (**Figure 6**, see Volume II, DVD 2, Folder 01, clip 01-03).[150]

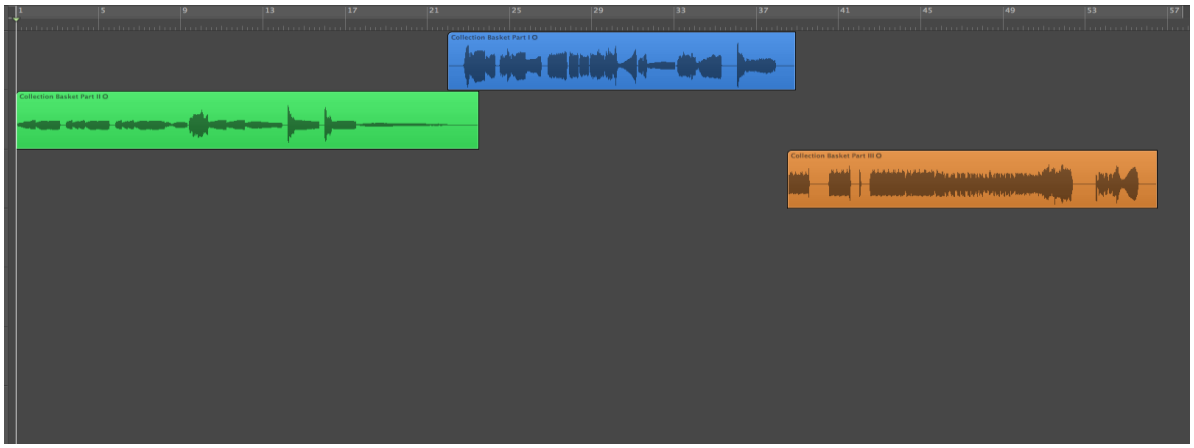

Figure 5: A Logic Pro screen of *Collection Basket* Edit 1.

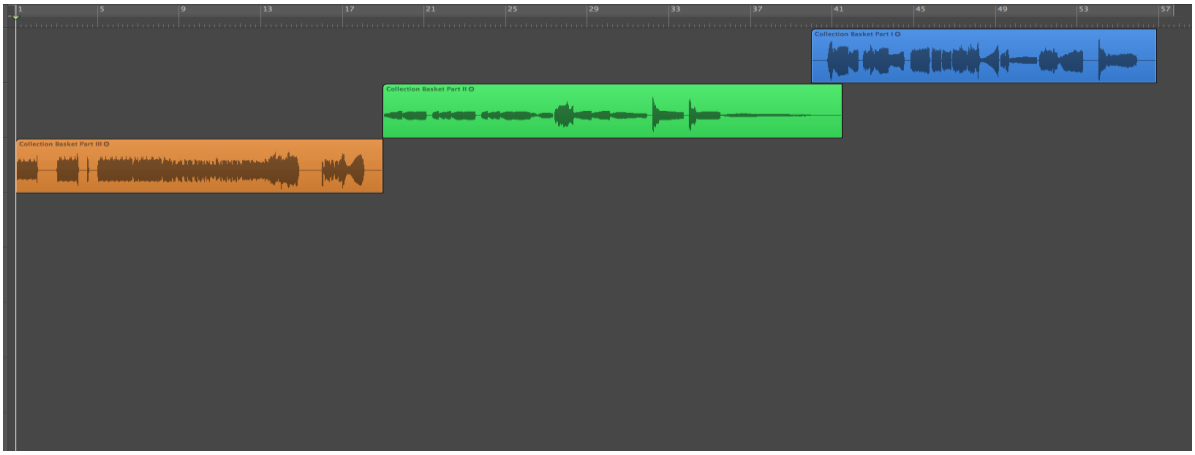

Figure 6: A Logic Pro screen of the *Collection Basket* Edit 2.

[150] The duration of audio clips in most cases is longer than the edit duration they exemplify in order to let the reverb effect fade out naturally.

The next steps were to test the flexibility of the composition, when edited to 15" and 30" time frames, and to examine how editing influences the flow of the music. The recorded sections of *Collection Basket* were divided into smaller slices containing one or two modules. See **Figure 7**.

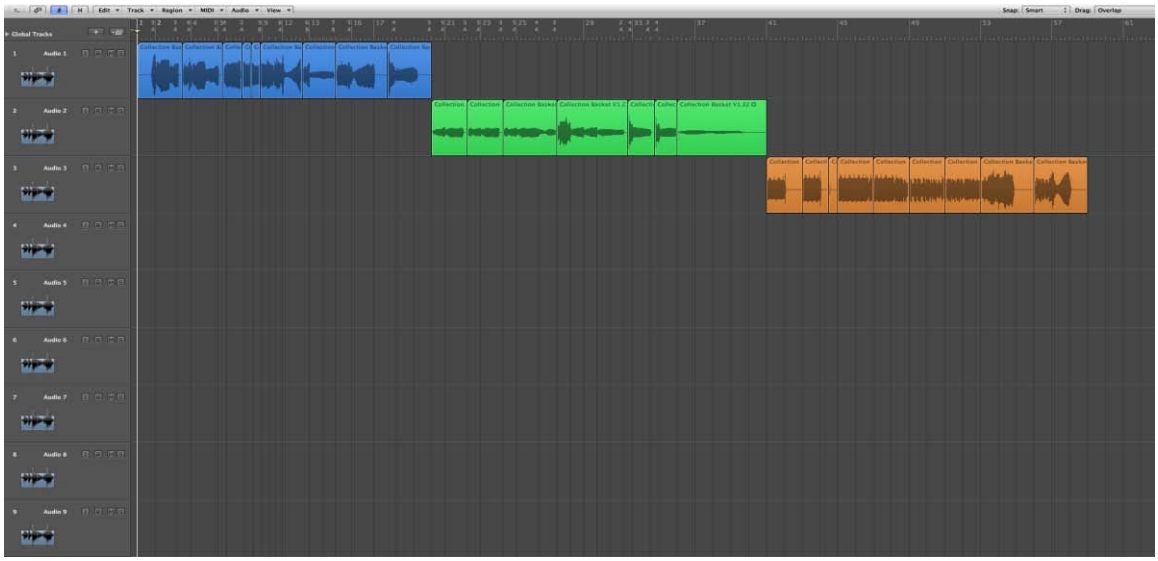

Figure 7: *Collection Basket* divided into smaller slices

Figure 8 shows that an empty region (of 15 seconds in duration) had been created to provide a ruler for the editing (i.e. the red region on the screen). Then, suitable modules were selected and put together to fill the 15 second space. The selection of modules was influenced by a desire to achieve a musical flow of the edited music. See **Figure 8**, and Volume II, DVD 2, Folder 01, clip 01-05 and clip 01-06).

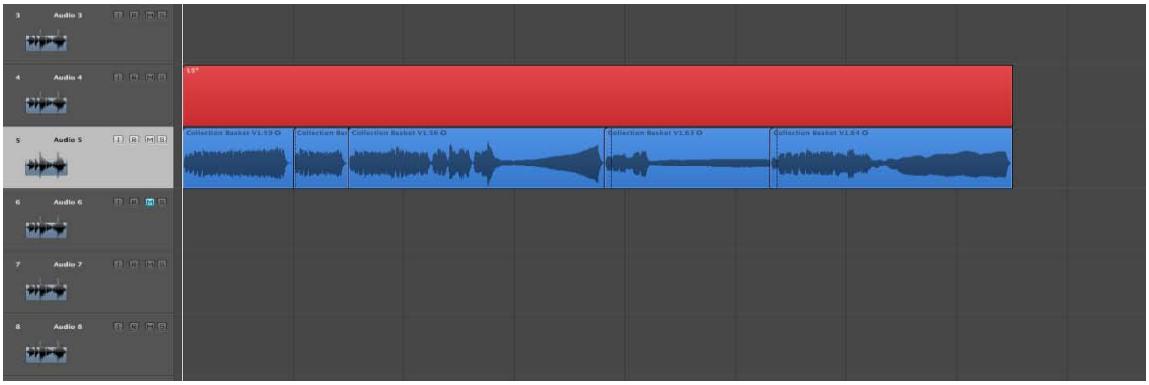

Figure 8: *Collection Basket*, a Logic Pro screen of Section I of the composition being edited to 15" duration

In the same fashion the edits of other main sections (II and III) of the composition were tested. See **Figure** 9, and Volume II, DVD 2, Folder 01, clips 01-07 and 01-08).

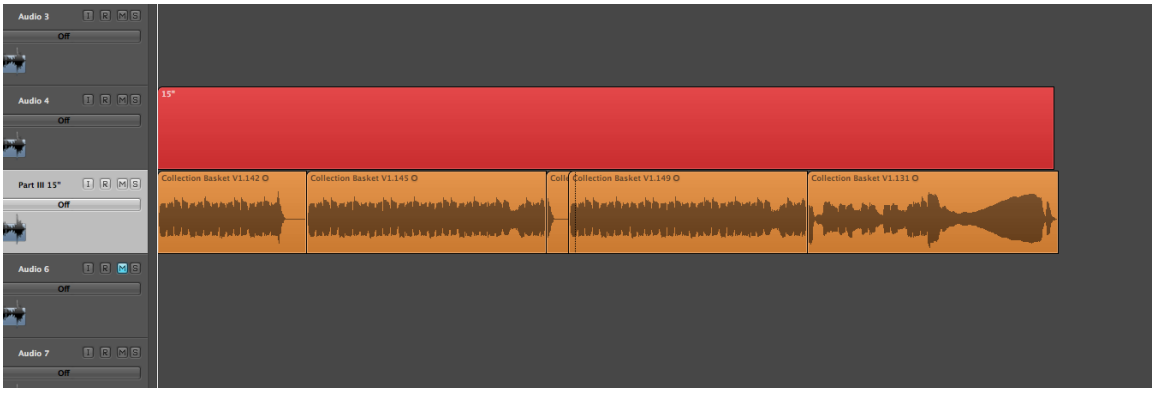

Figure 9: A Logic Pro screen of Section III of *Collection Basket* edited to 15" duration

During the next step, the edits were adjusted to the 30 second duration. The length of the ruler was doubled and the sections were adjusted accordingly to match it. See **Figure 10**, **Figure 11**, **Figure 12**, and Volume II, DVD 2, Folder 01, clips 01-09 to 01-11).

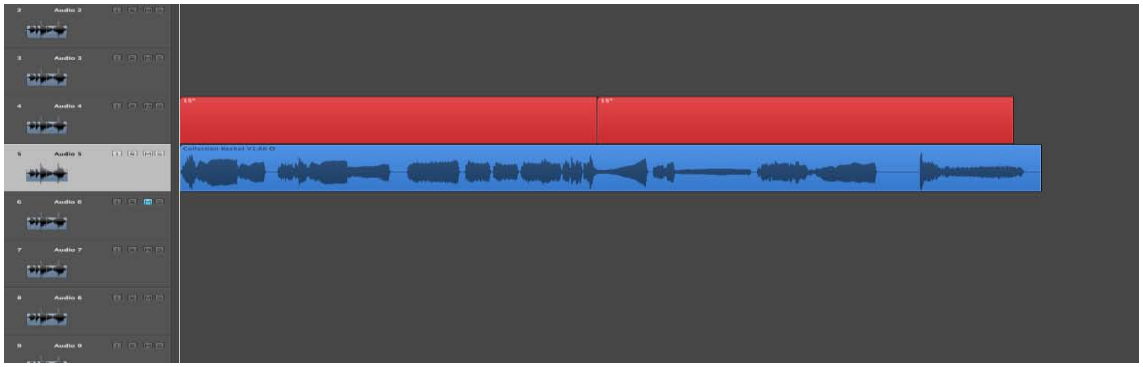

Figure 10: *Collection Basket*, Section I before adjustments

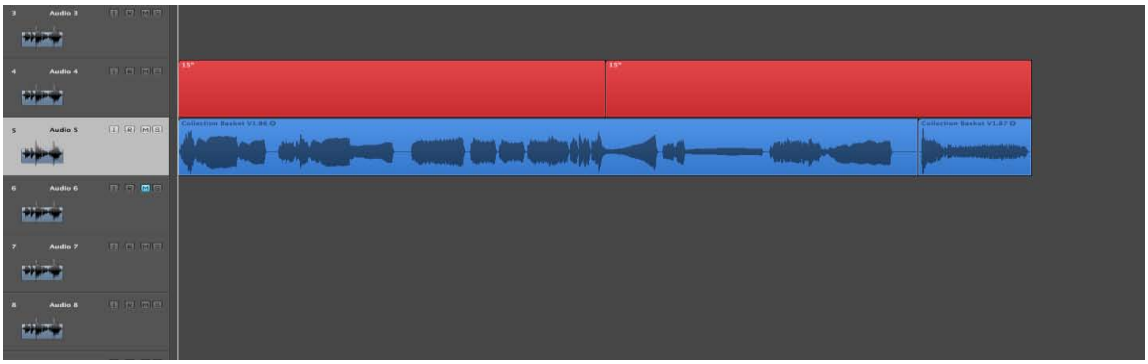

Figure 11: *Collection Basket*, section I after adjustments (Volume II, DVD 2, Folder 01, clip 01-09)

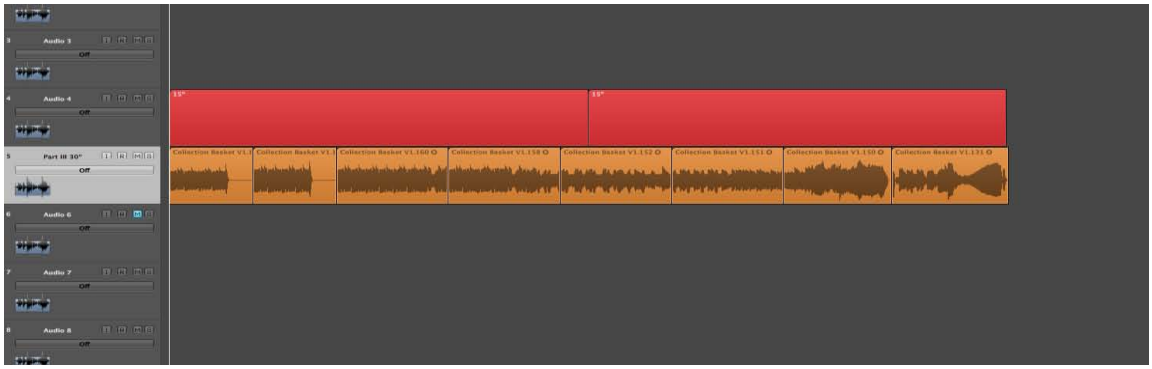

Figure 12: *Collection Basket*, section III after adjustments (Volume II, DVD 2, Folder 01, clip 01-11)

Then modules from different sections of *Collection Basket* were combined to test possibilities of obtaining acceptable musical flow in the 30" duration, **Figure 13 (**Volume II, DVD 2, Folder 01, clip 01-12).

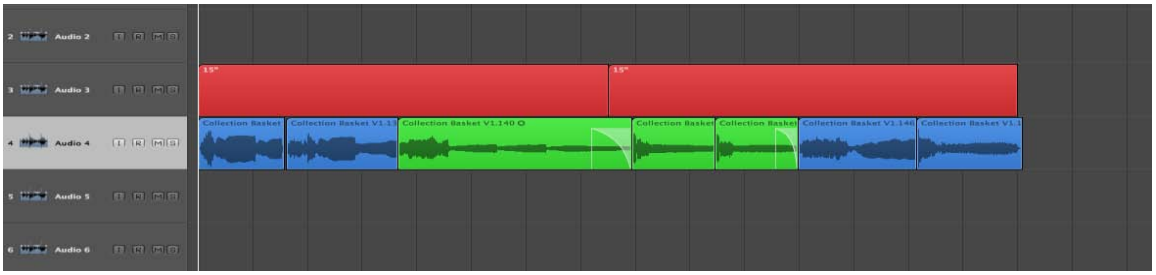

Figure 13: *Collection Basket*, a combination of modules from Section I and II adjusted to the 30 second duration

The final step was to compare results of the manual editing with an edit applying Logic Pro's digital algorithms (i.e. the flex time tool) to make adjustments regarding the duration of the music. During this test, the audio file of Part I of *Collection Basket* was compressed to fit the required duration. Figures 14 and 15 show the edited audio file, before and after compression. As can be observed, the actual length of the file remained unchanged and only the duration of the last note had been altered (see also Volume II, DVD 2, Folder 01, clip 01-13).

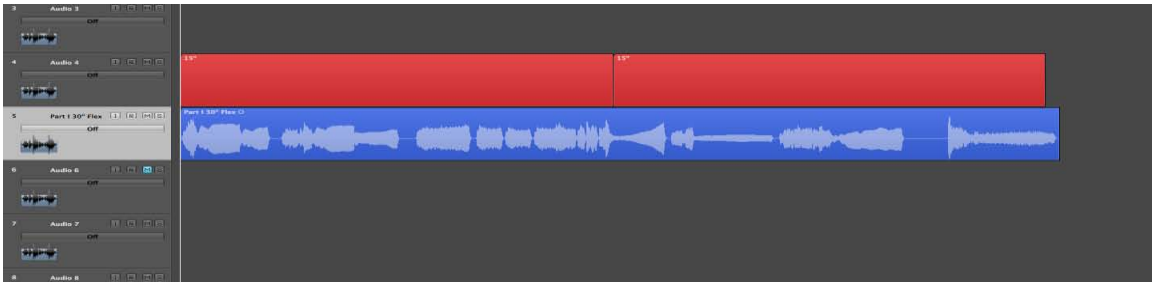

Figure 14: *Collection Basket*, section I, before the application of the flex time tool

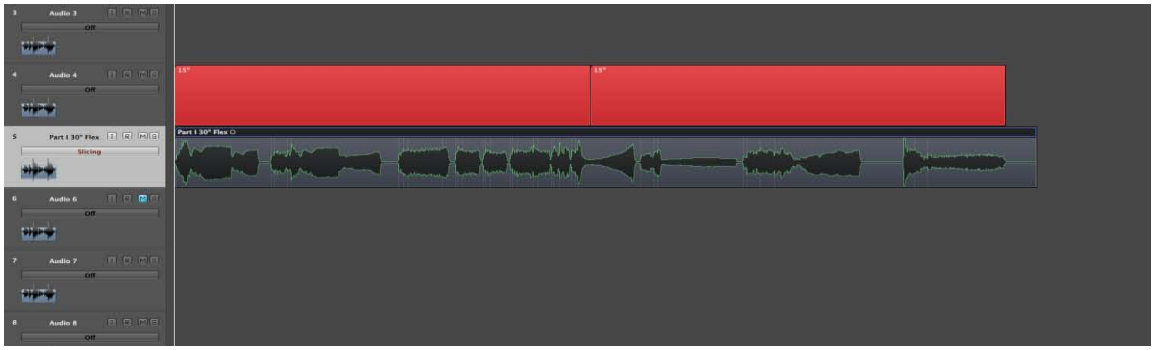

Figure 15: *Collection Basket*, section I, after the application of the flex time tool (Volume II, DVD 2, Folder 01, clip 01-13)

During the last stage of the experiment with the flexibility of music, the composition was transcribed for a different instrument to test how a modular composition would translate to it. In order to keep in the same range, without the need for transposition, the viola was chosen (see Volume II, Section I, *Collection Basket* Version 2 (v2), and Volume II, DVD 2, Folder 01, clip 01-14).

4.3 Outcomes

Collection Basket demonstrated that it is possible to construct a coherent non-linear piece of music having its own internal logic from a set of pre-composed and intentionally unrelated components (i.e. transitions between them were not pre-designed). As not all unrelated components would cohere, from the set of modules, the author selected those which were similar in character. The application of the repetition of selected modules reinforced the construction of the coherent flow of the piece. The planned development of the composition was also obtained. The lack of a defined tonal centre and the way modules were combined together (frequent short rests between modules) provided a certain amount of flexibility

during the editing of the piece. Other factors which contributed to achieving flexibility were variations of time signatures which provided diversified durations of particular modules. Thus, working with a combination of modules with different time signatures allowed for more precise fitting to the time frames without the necessity of adjusting individual modules.[151]

The editing process of *Collection Basket* showed that the modular structure provides flexibility on both the macro level (manipulation of the order of major sections I, II, III), and, the micro level (manipulation of single modules). The latter is especially important, because it allows for more precise duration adjustments. It is important to stress that the editorial flexibility of the piece depends on the stage at which the adjustments are applied (before or after recording as an audio file). The MIDI editing provides much more precise and comprehensive results, both in terms of the rhythmic structure of the modules and editing of the single pitches and their dynamics. Additionally, MIDI files can be edited both by music sequencers (e.g. Logic Pro, Cubase, Pro Tools) and music notation applications such as Sibelius or Finale. Digital audio editing allows for good results, but not to the same extent as with MIDI. More specifically, editing the tempo, pitch and duration of notes can be difficult, due to the degree the audio file can be stretched or compressed before its quality is compromised (i.e. audible pops and clicks appear). In the *Collection Basket* case study, the audio files were used to test the flexibility of the musical structure. Yet, during the main editing process of *Collection Basket* none of the sophisticated digital editing tools such as time stretching or pitch correction were used. The audio file was only cut to fit the desired

[151] In order to fit the music to the given time frame, many *Collection Basket* re-cuts were combined from modules that belong to different sections of the piece. As the tempo of sections I and III was set to 120 BPM and in section II, to 100 BPM, combinations of modules with different tempi could be considered a tempo manipulation.

durations. Later, however, one file (clip 01-13) was subjected to the time-stretching procedure in order to compare it with manual editing. In this instance, the adjustment was only cosmetic and thus, the procedure proved quicker than manual cutting, and no audible artifacts were produced.

The experiment showed that the modules can be easily detached from and combined with each other in different configurations. It became clear that the episodic character and clearly articulated rests of Sections I and II were more suited to editing. For example, it was possible to rearrange the order of modules in both sections, to achieve 15 and 30 second time frames, which are durations often used in the television and radio. As mentioned earlier, the varied time signatures in both Sections I and II provided subtle duration differences in modules, and these were helpful when combining them according to time requirements (see Volume II, DVD 2, Folder 01, clips: 01-05 to 01-13, and clips 01-15 to 01-23 with additional clips recorded on viola). In section III, which has a more continuous character, and where the melodic line develops in a particular direction, manipulation of modules was slightly more complicated. This highlighted the point that, if the development of the constructed melody line is essential, there is a need for a careful consideration of the structure of modules and potential editorial spots. Nevertheless, some edits were possible (see Volume II, DVD 2, Folder 01, clips 01-11, 01-21, 01-22).

A modular composition for a solo instrument such as *Collection Basket* can be highly flexible and facilitates editing. This is because each module can be subjected to further manipulation, for instance time stretching (used in this case study on a very limited scale), and pitch correction or the rests between modules can be extended. In addition, the strategic placement

of the pauses allows a composer to design the potential editorial spots so that a music editor or film editor will cut according to composer's predilections and liking. Designed editorial spots may help to avoid awkward transitions as well as maintain the control over coherence of the edited music.

4.4 Limitations

Despite the satisfactory outcome of the experiment, in terms of achieved flexibility, there is a need to note several limitations of the applied modular approach as well as experimental conditions. First of all, compositions constructed from non-linear modular components are inevitably going to have a distinctive character in comparison with music composed according to linear functional harmony principles. Secondly, editing processes on monophonic material for a solo instrument are typically easier than editing polyphonic textures. Thirdly, all modules were developed by one person in a relatively short period of time (the composition was a preliminary test for the method); thus even though the relations between modules were not intended some unconscious similarities were inevitable. This may explain the positive result of the experiment. Furthermore, the whole compositional process was restricted to the available recorded modular components. Thus, even though construction of a coherent piece from mainly unrelated modules was possible during this particular experiment, it is important to plan carefully possible relations between modules as well as their internal structure for easy assembly in future works.

To provide greater flexibility and variety in the modular musical discourse a number of variations of the basic modules should be created. Such variations would allow for fluent

progress of the musical thought, and avoidance of unnecessary repetitions of both the rhythmic patterns and the pitches. The problem can be easily observed in Section III of *Collection Basket* where an unchanged module from bar 42 is repeated twice in bars 44 and 46 (see **Figure 2)**. Therefore, the author decided to prepare a modified version of the composition to overcome the above shortcoming, *Collection Basket* v3 (see Volume II, Section 1). The piece was extended due to modifications of the existing modules as well as the creation of new ones. The tempo of the piece was also modified to achieve greater variety of agogics, see Volume II, DVD 2, Folder 01, clip 01-24.

Due to requirements of film narrative, musical motifs are frequently used in a different colouristic context (e.g. with varied instrumentation). Being mindful of the need for flexibility in film music one should not forget about colouristic variety. Consequently, during the development of modules the technical capabilities of particular instruments that can be used should be taken into consideration (assuming that the music will be realised by live performers on real instruments).[152] Thorough consideration of instruments at this stage would prevent difficulties and delays during a potential recording session. This important point became apparent when *Collection Basket* was transcribed for viola (*Collection Basket* v2). Carefully marked articulation and colouristic effects (which may be crucial for the film narrative) may not be available from the instrument for which the music is going to be transcribed. The same applies to slur markings and the breathing points in woodwind and

[152] "Virtual" orchestration is different in many ways from the traditional approach. There are a number of possible results that are achievable using a computer that are not feasible using a real orchestra and vice versa. This problem was addressed in the book *From score to screen: The new film scoring process*, by Sonny Kompanek (2004). Another sources are books that explore the issue of MIDI orchestration such as *Acoustic and MIDI Orchestration for the Contemporary Composer* (Pejrolo and DeRosa, 2007), and *Music Arranging and Orchestration* (Cavacas, 2003), or *Study of Orchestration* (Adler, 2002).

brass instruments. Of course, these problems do not apply to the situation when modules are written only for a specific instrument, or where the final product is generated electronically (by using sampled instruments).

4.5 Conclusion

Even though *Collection Basket* is a short and modest exercise piece, the case study brought to light several important observations. A significant result of the experiment was that it is feasible to apply to music the 3-step paradigm of creating a film: shooting, selection and montage. The main methodological ideas of developing a modular structure (sidestepping functional harmony; application of non-linear editing techniques) led to a solution that fulfilled the objectives of the case study. The experiment also indicated the potential restrictions and difficulties that should be considered applying a modular approach especially to film music. All these findings, in turn, were useful in refining the approach to the other compositions planned for the folio.

Chapter 5: Case study 2 - *Skippy's Adventure*

5.1 Rationale for the composition

Skippy's Adventure is intended to accompany an action-adventure movie with a light hearted mood.[153] It is an orchestral composition lasting 4 minutes, for: 2 flutes, 2 bassoons, 4 trumpets, 2 trombones, marimba, xylophone, piano, timpani, bass drum, snare drum, cymbals, violins, violas, cellos, and double basses. *Skippy's Adventure* focuses on the correlation of the horizontal (melodic) and vertical (chordal) planes in a modular composition. The accompanying scores can be found in Volume II, Section 2. Audio examples and Logic files can be found in Volume II, on DVD 2, Folder 02 and Folder 07-02.

Composers of concert music such as Aaron Copland and John Corigliano who occasionally wrote music for film, and film composers such as Leonard Rosenman and David Shire have demonstrated how flexible and adaptable non-functional music can be due to its non-linear features. It was also stressed earlier in the present work that the choice of musical means applied in a particular film production is influenced directly by the film project itself, the artistic vision of the film director, and the producer's expectations. In this context an important question arises: what can a composer do in a situation when non-tonal music with its inherent lack of linear attributes is needed to provide flexibility but the film director/producer or film requirements do not allow for its application?

Consequently, *Skippy's Adventure* attempts to answer the above question by testing the possibility of creating a non-tonal (non-linear) composition (i.e. not based on functional harmony and traditional voice leading rules) which would allow for creating syntactic

[153] *Skippy the Bush Kangaroo* (aka *Skippy*) is an Australian television series created by John McCallum (1966-1968).

progressions similar to these that are characteristic for tonal music, at the same time retaining a high degree of modules compatibility with each other on both horizontal and vertical levels.

Aaron Copland's approach to the composition of music influenced by neo-classical works of Stravinsky, and modular technique developed by Bernard Herrmann, provide a useful model for how to answer this question. However, a potential complication which may negatively impact the flexibility of the musical structure is the issue of implied harmony (i.e. notes on the strong beats, and arpeggiated chords), particularly when the compositional process starts from developing main themes. It was assumed by the author of this research project that the modular components can be fully interchangeable. Therefore, elements created to form larger units (i.e. building blocks) could be used freely in conjunction with elements created for other block-units. This inter-changeability concerns mainly the correlation of melodic modules and chord or chordal sequences, thus this issue also was tested during the present experiment.

5.2 Methodology

The author decided to compose an adventure cue that would refer to classic cartoon scores (e.g. Scott Bradley's cartoon music). Therefore, the character of the composition is light and teasing. The decision was also influenced by the fact that cartoon film scores have frequently used non-tonal means.[154] The examination was directed toward Aaron Copland's use of non-functional harmonies, as part of the assemblage method (McGinney, 2003, 2), application of octatonic mode but also motivic clarity and textural transparency. Copland's approach to

[154] For example, twelve-tone writing was utilised by Scott Bradley in several films who provided some of the earliest examples of the application of this method in film, e.g. *The Cat that Hated People* (1947) (Cooke, 2008, 298).

constructing the music from structural blocks consisting of melodic phrase fragments, ostinati and chord progressions, as well as Herrmann's approach for constructing music from motivic or rhythmic cells were used for the structure of *Skippy's Adventure*. These features were intended to provide formal flexibility for editing the music to match the picture. In terms of pitch organisation the focus was on the pandiatonicism of Stravinsky's compositions and more specifically towards application of an octatonic scale, often considered a significant component of Igor Stravinsky's vocabulary (Berger, 1963, 11-42).

After completing several tests, a particular octatonic collection was chosen: the alternation of semitone and tone, in jazz nomenclature described as a "diminished scale".[155] In practice, any chord may be followed by any other; however, as mentioned earlier (see section 2.1.3.2), harmonic succession in tonal music is guided by the root motion, as well as principles of voice leading. The tension and release (V^7-I), essential for the tonal system, is related to the central function of the tritone interval as part of a dominant seventh chord, and the way it resolves. The semitone is needed to create a leading tone relationship, which is an integral element of many cadences. All these regulations govern whether given note combinations sound tonal or not.

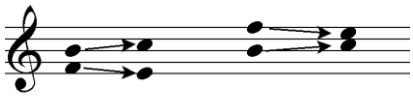

Figure 16: Tritone resolutions (augmented 4th and diminished 5th)

[155] There are several types of octatonic pitch collection among which the one constructed from alternating intervals of semitone and tone is the most commonly used.

Therefore, in order to simulate successfully characteristics of the tonal system, the possibility to create a similar chordal vocabulary and syntax as well as resolution of a leading tone are needed. The octatonic scale is a rich source of melodic and harmonic material. More specifically, it contains all intervals from minor 2nd to major 7th (i.e. four semitones, four tones, four major thirds, four minor thirds, four perfect fifths, and four tritones). The chosen octatonic scale offers twice as many half-step relations as the major scale; see **Figure 17** and **Figure 18**.

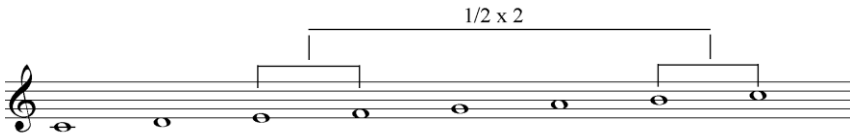

Figure 17: Half-step intervals in a major scale

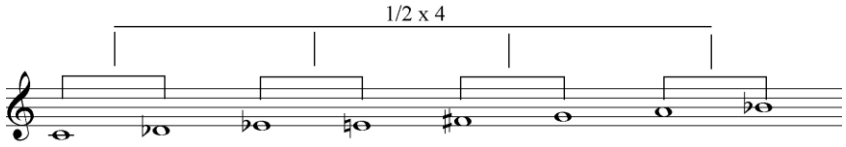

Figure 18: Half-step intervals in an octatonic scale

It is also possible to build all the chord types (except for the augmented triad and major 7th) from this type of octatonic scale. These features of an octatonic scale make it possible to create melodies that have a tonal character as well as harmonic progressions from one chord to another, similar to tonal harmony. Moreover, thanks to the quasi-symmetrical construction of the scale, establishing a single, unambiguous tonal centre is impossible.

Composers have commonly used an octatonic scale to expand traditional harmony. However, its application was only supplementary, for example, recent research indicates that an octatonic scale in Stravinsky's music was in fact the aggregation of non-diatonic minor scales as well as superimposition of elements belonging to other scales (Tymoczko, 2002, 68-102). The unique characteristic of an octatonic collection also appeals to film composers, for instance, it has been used by Danny Elfman in the main theme for *The Simpsons* show (however, a mode used by the composer may also be interpreted as a Lydian dominant), but also by others such as Alan Silvestri, Jerry Goldsmith and John Powell. Unlike these examples, where an octatonic collection has been used as a means to broaden the traditional vocabulary, the present author decided to limit the pitch material of *Skippy's Adventure* exclusively to an octatonic collection and determine what impact this limitation would have on editing capabilities.

The compositional process of *Skippy's Adventure* took several weeks (including preliminary tests of the different compositional techniques, various configurations of modular components and creation of the detailed mock-up), and applied the same three-step methodological procedure as used previously: composition of modules, selection of modules and constructing the final piece. The whole composition was built around two short, four-bar themes, see **Figures 19** and **20**: the first emphasises intervals of major and minor thirds; the second emphasises the semitones.

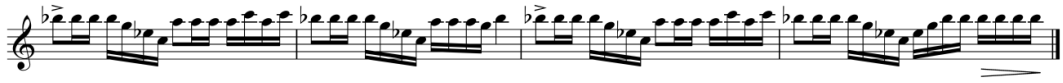

Figure 19: *Skippy's Adventure* theme I

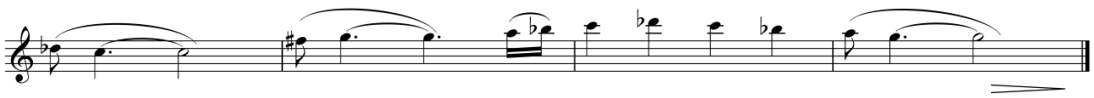

Figure 20: *Skippy's Adventure* theme II

After the themes were composed a number of modules containing short sequences, chords, and chord progressions were created. All modules were recorded as MIDI files in Logic Pro 8 software. Subsequently, modules were combined with each other and formed fifteen larger self-contained orchestral building blocks of different durations and textures. Frequently, singular modules were combined into more complex structures. Thus, the overall modular structure of *Skippy's Adventure* can be divided into three major structural levels: a) singular modules, b) more compound structures consisting of several modules, and c) major building modules of the composition which are pre-orchestrated blocks. See **Figure 21** and **22.**

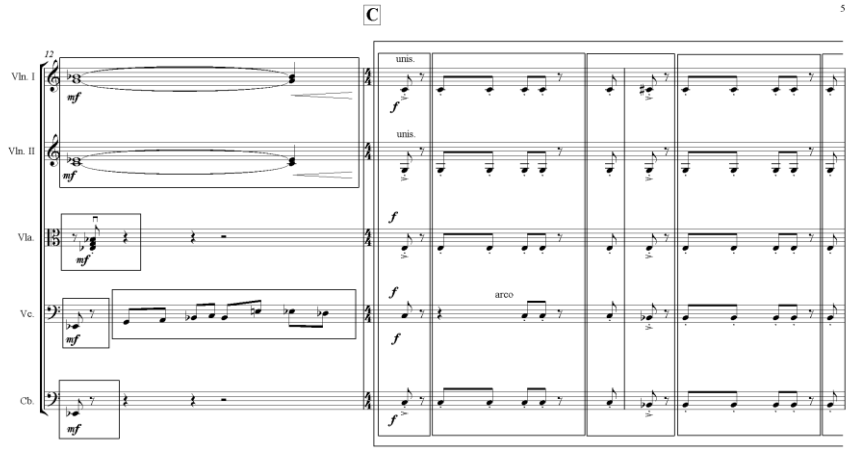

Figure 21: *Skippy's Adventure*, different types of modules for the string section

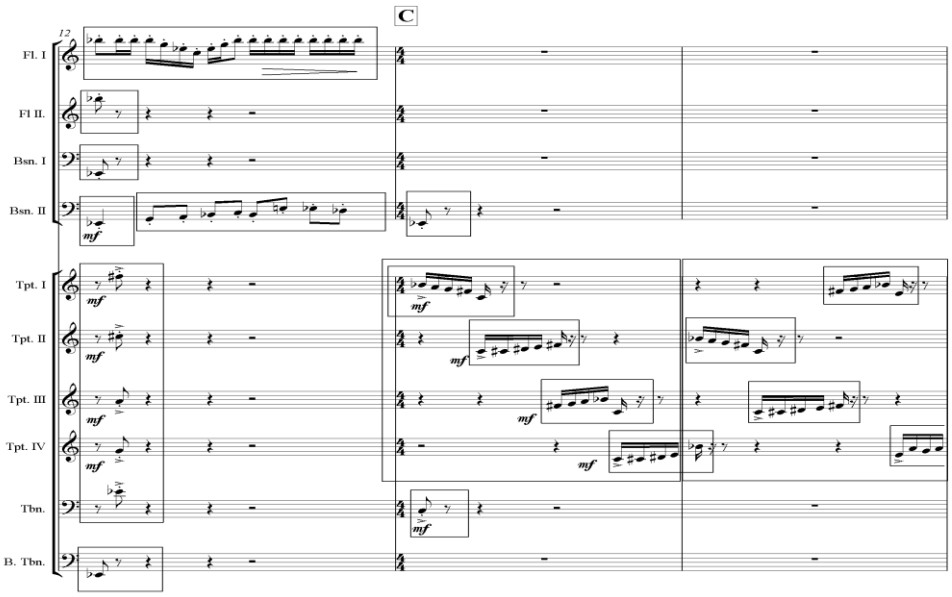

Figure 22: *Skippy's Adventure*, different types of modules of woodwind and brass sections

As a result of the manipulation of the order of orchestral modules, the formal structure of the composition was achieved (See **Figure 23** for the overview of the main building blocks of the composition and density of orchestration). In the figure, the colouration highlights the orchestral building modules (fifteen in total) from which the formal structure of the composition was constructed.

The linearity of a cause-consequence relationship between individual elements of any piece is, of course, characteristic for tonal music. The motion in a tonal piece is usually goal directed, moving towards a climax, a point of the greatest tension, and followed by resolution (Kramer, 1988, 25). Non-linear composition such as *Skippy's Adventure* lacks these relationships, which means that progression does not depend on what occurred earlier (this issue is discussed in section 2.1.3.2). There is also a lack of constant changes of tension. Thus, in this example, these missing elements, typical of tonal music, had to be simulated. The illusion of

progression and cause-consequence relationship was achieved in two ways. First, by application of different variations of modular components (orchestrated for the same instruments) placed one after another over the accompaniment of repeated chordal sequence, see Volume II, Section 2 (mm. 13-20). Second, by developing a fugato-module (MM 64-72), based on a short motif derived from the beginning of Theme I, that is developed polyphonically and drives the music forward. As observed by Lissa, fugato in film music is developmental and also has a dramaturgical meaning (1964, 294). This section was designed to serve as a transition from a static *pizzicato* section H (mm. 33-64) to the main musical material of the composition. Tension changes throughout the piece were achieved by variations in the texture of the music and by the superimposition of several contrapuntal lines, for instance in sections F (mm. 25-28) and K (mm. 77-80) or by breaking a steady eighth-note pattern by other division values in section H (mm. 58-61). Repetition of the material also played an important role in aiming for coherence of the piece. In order to place *Skippy's Adventure* in relation to the tonal idiom, the overall structure of the composition was organised so that it resembled a cyclic form in four stages: exposition, re-exposition, polarisation, and finalisation.

The composition was orchestrated for a sampled orchestra using the Quantum Leap Symphonic Orchestra library, whilst keeping in mind future translation for a real orchestra. After some minor adjustments the concert version of the piece was created (see Volume II, Section 2 and Volume II, DVD 2, Folder 02, clip 02-01). The preparation of an audio mock-up of the piece was also done in the modular fashion. First, all modular components (MIDI) such as themes, ostinati, sequences, as well as single chords and notes were recorded as audio files and then composition was assembled and mixed.

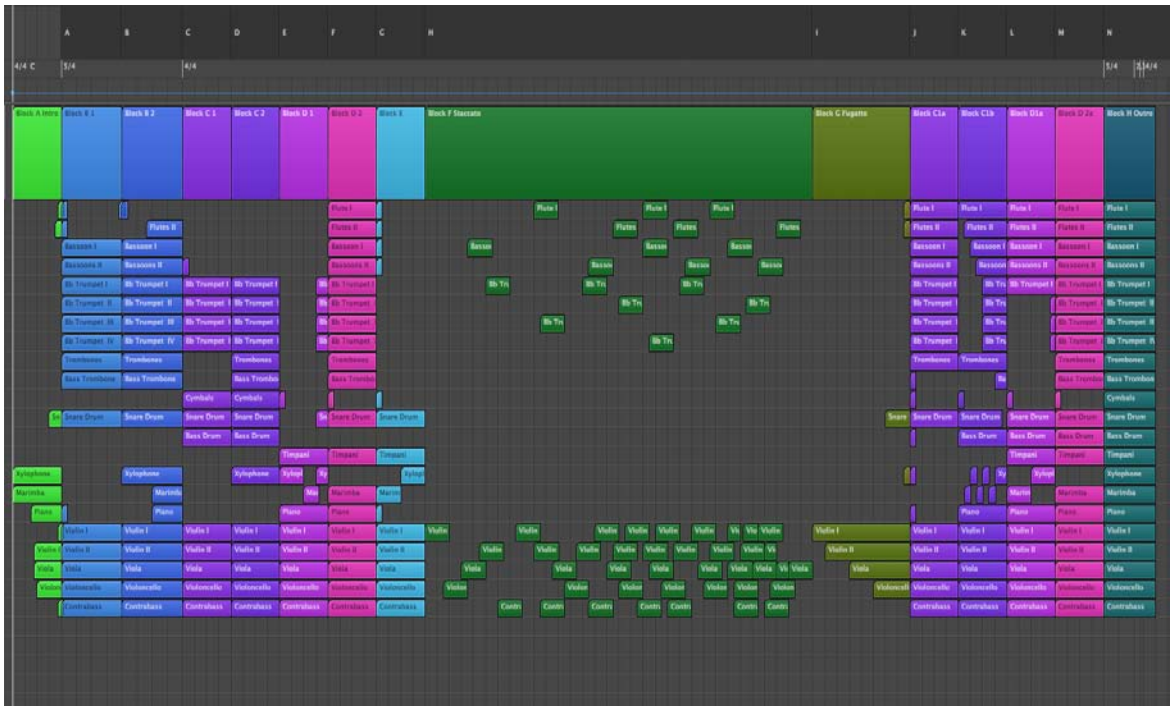

Figure 23: A screenshot of the Logic Pro arrange window of *Skippy's Adventure* modular structure and instrumentation (a Logic Pro file available in Volume II, DVD 2)

5.2.1 Editing

During the last stage of the experiment the flexibility of the composition was tested. For this case study a decision was made to approach this process differently than in the *Collection Basket* case. Manipulations of the order and combinations of modules were not done in Logic Pro (with MIDI and audio files) but in the Sibelius 6 score editor instead. The idea behind this experiment was to simulate the situation where *Skippy's Adventure*, as a hypothetical film cue, was to be prepared for a recording session with a real orchestra. Due to last-minute film editing changes, the music would have to be quickly adjusted on the spot in the recording studio.

The first step was a selection of time frames to which the music would be adjusted. Four different durations were chosen: 15", 20", 25", and 30". The assumption was that the tempo of the composition would not be modified; however, the time signatures were changed in several places for the clarity of the notation. For each cue, a different editing window was created in Sibelius with a marked hit point at the end of the music (**Figure 24**). Then, the second window with the full orchestration was opened and suitable modules were copied and pasted to the newly created arrangement, in order to fill the chosen time space. Rather than just trim the music, the assumption was that within selected time frames the orchestration and the arrangement of music should be varied (to simulate a situation in which each cue is independent, and may accompany a different scene with its own internal structure). This was done to create different variations of the modules testing their possible configurations and accuracy of the edit.

After the arrangements were established, the MIDI files of each cue were created and exported to Logic Pro, where audio examples were produced (see Volume II, Section 2, and Volume II, DVD 2, Folder 02, clips 02-02 to 02-05).

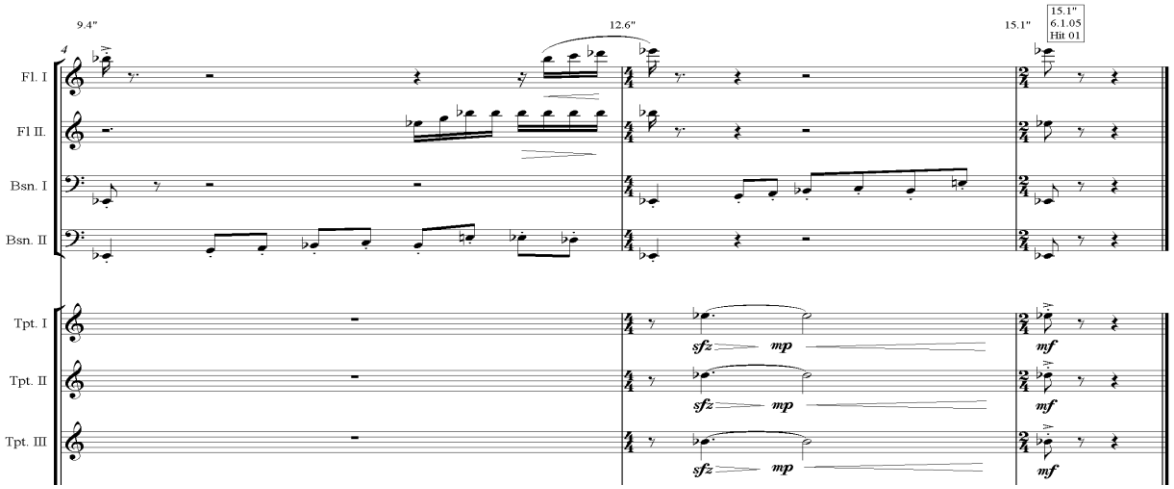

Figure 24: *Skippy's Adventure* 15" edit (fg)

5.3 Outcomes

The final form of *Skippy's Adventure* has demonstrated that it is possible to correlate successfully different horizontal and vertical modular components achieving a flexible modular composition which imitates tonal music with its emphasis on thematic material and chordal successions. The application of an octatonic scale proved essential for meeting the aims of this composition. As the only source of pitch material, this scale allowed both for writing short, distinctive motifs (particularly significant in film music), and obtaining more complex harmonic structures (i.e. interestingly sounding polychords and compound counterpoints). In addition, themes and modules used for a formation of major sections of the composition proved to be highly interchangeable. For example, the elements of the fugato module (MM 65-72), which was designed to serve as a linking unit between section H (*pizzicato*) and section J (MM 73-76), were superimposed without problems (in flutes, bassoons, xylophone and marimba) over the strings chordal progressions in section K, resulting in an interesting texturally effect. Due to the design of the modules used in the composition, manipulation of the order of modules did not influence significantly the logical flow of the composition (see Volume 2, Section 2, and Volume II, DVD 2, Folder 02, clips 02-02 to 02-05). Thus, it was possible quickly (preparation of each example took between 15 to 20 minutes) to rearrange the composition in order to fit it to the chosen durations and achieving a range of distinctive arrangements.

In the case of the 25 and 30 second durations, the edits were precise. As regards the 15 and 20 second durations, however, the trimmed music was either slightly too long (i.e. 164 milliseconds (ms)) or too short (i.e. 84 ms), respectively (see **Figure 21**). Nevertheless, these differences are slight (both are less than 0.2 a second which, is a precision standard in

synchronisation) and can easily be amended during a recording session by a conductor or afterwards by the application of a time-stretching tool without any/or with minimal audible artifacts (see Volume II, DVD 2, Folder 02, clip 02-06 and 02-07 for comparison). The former solution seems, however, to be more appropriate having in mind the scale of the adjustment. Alternatively, the duration of a 20 second edit could remain unchanged, as according to Rona, transitions in music are best executed on or slightly before a cut or hit (1999, 9). This can have positive implications for the effectiveness of film narrative, with the effect of drawing to the next scene. However, a musical accent of transition, occurring more than two or three frames after the synchronisation point will, almost certainly, be perceived by the audience as wrong (i.e. sounding too late). That is why the 15 second edit should be adjusted precisely to articulate the synchronisation point. Additionally, all the changes in the musical accompaniment should be executed in such a way that the sense of the unity of the cue is uncompromised.

5.4 Limitations

As long as a composer stays within the frames of the particular mode, transitions and various combinations of the modular material are achievable relatively easily. An octatonic scale in particular facilitates such a combination, mainly thanks to the lack of tonal centre. The application of one scale does not, of course, exclude the application of another one. In a film music context it may be a necessity dictated by the plot (i.e. folk or ethnic tunes). A combination or succession of different scales may be needed to highlight important elements of the film narrative. Nevertheless, the introduction of a new and different harmonic texture may impose some difficulties. This happens when one type of harmony leads to another, or

different harmonic fields are combined vertically. The issue becomes apparent in the modular approach where modules are composed first and the final form of the music is achieved later (according to the film's structure). Successful transition becomes even more important when a composer uses such a distinctive scale as an octatonic. Success in bringing the divergent musical material to the piece depends not only on the creative sensitivity of the composer, but also on the design of module and the ability to foresee their potential configurations. It means that there is a need to introduce and compose a special type of transitional modules that would contain a characteristic element of a new harmony and help with smooth morphing between different harmonic fields. Such transitional modules could also be used as a modulating device helping in overcoming the harmonic stasis of a single pitch collection.

5.5 Conclusion

In conclusion, the method of structuring a piece based on Aaron Copland's and Bernard Herrmann's experiences, in conjunction with the use of a single mode, certainly leads to flexibility. However, the fact that major building blocks of *Skippy's Adventure* were constructed from smaller modules (that can be exchanged between major building blocks), shows that such a process can provide a composer with many possible choices, both in terms of possible durations of the composition and the instrumental colour palette. The latter is especially achievable in the computer domain where transitional problems between different instruments do not impose problems. Moreover, an octatonic collection proves to be a valuable alternative to functional system providing illusions of traditional tonal language, and flexibility during the editing process.

Chapter 6: Case study 3 - *Oxygen*

6.1 Rationale for the music

Oxygen (Norris, 2008) is a 24-minute science fiction drama directed and written by Dave Norris from the Victorian College of the Arts (VCA), and produced by Deborah Kol (VCA). The supporting materials for this case study can be found in Volume II. DVD 1 contains *Oxygen* in the version in which it was released by the VCA. Additional materials (video clips and selected Logic files) can be found on DVD 2, Folder 03, and Folder 07-03.

Oxygen tells the story of Xavier, a maintenance technician, who lives in an enclosed world where citizens have given up their individual freedom and privacy in exchange for security and the supply of oxygen. This is necessary since, according to official propaganda, the outside air was contaminated with a deadly virus. It is a world where people accept that they cannot venture outside of their homes and no one can be sure if any other person or place physically exists other than on the video screens. Xavier's job is to deal with life threatening emergencies arising from dysfunctional carbon dioxide exchange equipment. One day, on his way home from an emergency call out, Xavier witnesses the brutal killing of an innocent man by the security agents. This undermines his belief in the government's official position on the state of the outer world, which he starts to believe is a device for controlling the society. While trying to fight against the government propaganda, Xavier is forced to leave the safety of his home and is exiled to the outer world. At the end of the story, Xavier discovers that his suspicions had been well founded and that the virus had been in fact an invention of the governors of his state. This realisation, as well as his euphoria at finding a new world, is short lived, as Xavier is killed by the omnipresent security agents.[156]

[156] The plot as well as some of *Oxygen's* scenes share remarkable similarities with the Polish comedy *Seksmisja* / *Sexmission* [trans.] (1984) by Juliusz Machulski.

The concept of the music for *Oxygen* was influenced by several important factors: the director's vision, the script, the product designer's vision, the genre, and the film set visit. The inspiration for *Oxygen* came from the director's perception of today's reality, where a person's role in the society originates from their service to maintaining order, and where social networks over the internet are an illusory replacement for human contact. In this film, the director sees the isolated unit in which the main character lives as a symbol of contemporary society's fear resulting from the "War on Terror", where people are constantly reminded that they should be afraid of something. The characters live in a world that imposes a physical and psychological jail around them.

The director's wish, with respect to music, was to blend orchestral sound with electronic textures. He frequently referred to scenes from Kubrick's *2001: A Space Odyssey* and *The Shining* which employed Ligeti's *Requiem*, Bartók's *Music For Strings, Percussion and Celeste*, Penderecki's *Polymorphia* among other compositions, yet during the first meeting with the author Jean Michel Jarre's album *Oxygen* had also been mentioned. The request was for both a traditional approach (i.e. use of melody) as well as a non-tonal, textural approach. The director's indication was to create music that would blend with sound effects providing a homogeneous sound entity. The second influence was the script, which gave ideas about the difficult circumstances of living in a totalitarian society, the nature of relations between characters, their psychological profiles, and a dramatic chain of events that leads to the death of the main character. The third influence was the art designer's vision which combined Sci-Fi futurism and 1930s design styles, more specifically Stalinist and Fascist architecture. The Sci-Fi genre *per se* could impose a particular stylistic musical approach. The final influence

was the visit to the set during shooting. It gave insights into the film's atmosphere and the appearance of characters.

All these factors contributed to the musical concept and to the realisation that a sonoristic musical style might be an effective vehicle for *Oxygen*. Consequently, the music incorporates various twentieth century avant-garde compositional techniques of the late 1950s and 1960s and electronic music. In general, the music is a combination of acoustic and electronic drones, rhythmic patterns, ostinati, and colouristic effects. This was supposed to facilitate blending the music with the film's sound effects. There is a significant emphasis on the rhythm section in the instrumentation (i.e. processed drum loops and different ethnic sampled percussion instruments), which was specifically requested by the director.

The music was intended to reflect not only psychological aspects of the plot but also action/ adventure elements as requested by the director. Most of the music for the film was created using the modular approach. The unfriendly environment and limitations to the characters' freedom (i.e. the rigour of their life in the desert city) were highlighted by various tension building drones (electronic and acoustic) and their combinations (to create dense and dissonant sonorities). In contrast, the feelings of the main character, Xavier, were to be scored with tonal music based on an associated theme. The theme was intended to reflect Xavier's psychological relations with his partner (Chloe), the environment, and his eventual deliverance from the repressive system.

6.2 Methodology

The compositional procedure was the same as in other case studies, following the three stage model (i.e. composition, selection, and arrangement of the modules into final pieces). The case study is an important part of the research project as all the author's methodological assumptions regarding a new approach of scoring for films were tested in a real life situation. The commission for the music for the film was obtained during a meeting on the 7th May 2008, at the VCA (Melbourne), where people interested in crewing on student productions had met with 3rd Year, Honours, Graduate Diploma and Master's student directors.

The author was invited to contribute to *Oxygen* in early stages of the project when the script of the drama had still been developed. Shortly after this, the first of several working meetings was organised. From the very beginning of this collaboration, the producer of the film insisted that all crew members contribute their ideas to the project. Before the first meeting, the author received a copy of the script to familiarise himself with the plot and characters of *Oxygen*. During this meeting, the director and the producer explained the most important aspects of the plot and presented their expectations regarding various aspects of the production. Even though this assembly had a rather informal character, it was crucial in ascertaining the coherent blend of visions of the director, producer, product designer and composer. In particular, during this meeting, the general style and function of music in the film as well as the application of the modular approach as part of the author's research were discussed. The director and the producer had also been briefed by the present author on possible advantages of modular compositions (such as the possibility of composing music before the film is shot and application of structural model for the scenes, reduction of the total cost of the music as well as time required for the completion of the music). This unconventional approach appealed

especially to the producer, who saw the potential of the music to inspire the rest of the crew throughout the production process, and thus the modular approach was applied. However, the idea of using music in pre-production was not utilised as the director chose not to change his usual practice. In order to explain the method of composing from modular components, two short examples of modular compositions were presented to the director and the producer. More detailed characteristics of the music in the particular scenes were developed with the director and producer during following meetings.

The compositional process for *Oxygen* started shortly after the two initial meetings, several months before the actual first cut of the movie was available. During the first stage of the compositional process, a number of modules of different structure, texture, and duration[157] as well as Xavier's theme had been composed (however, as noted above, the latter was later rejected by the director). During that time the author worked exclusively with a film script which over the period prior to film shooting went through many changes and modifications. These changes, however, did not contradict the approved profile and functions of the music.

Most modules were inspired by and created for the particular scenes outlined in the screenplay. The director's suggestions were also taken into consideration, mainly regarding the character of the music and (in a few cases) synchronisation with the story's events. During this stage, important decisions regarding the tempo of some modules (i.e. drum patterns, loops, sequences and ostinati) were also taken. It was especially important for the modules that were created as audio files, as their tempo was fixed and, according to the author's

[157] The author's requirement for drones was that all modules had to be at least one minute in duration (if possible).

intentions, was not supposed to be changed during the assembly procedure in order to test the flexibility of the method in its basic form.

Consequently, all modules were divided into two categories: 1) modules that were composed to particular scenes, reflecting requirements of the dramaturgical content; and 2) modules that were not composed to the specific scenes, but whose attributes were supposed to cover different general moods and situations. Modules were further divided into subcategories: a) modules with specific tempi, b) modules with free timing (improvised), and c) drones. Recorded modules were often subjected to additional sound processing (Logic Pro and third party plug-ins were used), and this modification forms another subcategory: d) processed modules. In *Oxygen*, modules from both categories formed one set of interchangeable compositional components. Often, modules which were composed to particular scenes had been combined with modules from the second category, providing a supplementation or replacement. Importantly, and as a part of the approach, the majority of modules were composed before the shooting of the film began.

On 24 August 2008 the present author visited the film set. The idea was to consider the reality of the film set and the appearance and performance of the actors. The trip proved to be very beneficial, especially in terms of the physical appearance of the main character Xavier. It turned out that the hired actor had a very different physical appearance from the description in the screenplay. This factor had an impact on the psychological profile of Xavier, which was altered by the director. The change influenced the music directly; it had to be adjusted to match a different personality. After the set visit, the author wrote additional modules that corresponded better with the transformed character.

Due to the fact that the musical concept involves a fusion of both acoustic and electronic instrumental elements, a large group of modules was composed for acoustic instruments; mainly for strings and various ethnic percussion instruments from different commercially available sample libraries. Approximately a week before the first cut of the film was available, the producer of the film organised a short recording session with four musicians (a string quartet), during which several improvisations were recorded (i.e. the musicians were asked to improvise to particular scenes from the film described by the author of this thesis and the film producer). During this session, the modules prepared for particular scenes were also recorded. The editing of the recorded material took two days and the individual modules were then prepared.

The final stage of the work on the music started when the author received the first cut of the film. From that day, two and a half weeks were given for the completion of the music. During the first week, music for the particular scenes was assembled and presented to the director. Throughout the second week, the director visited the composer's studio several times, and the most significant alterations to the music took place.

The music was composed and produced in Logic Pro 8 software.[158] The whole procedure was uncomplicated. Firstly, the digitalised video clip of the drama was imported into the software for synchronisation purposes. Then the "Detect cuts" function was used to spot scene changes. The function automatically detects scene changes (or edit points) in video clips. Next, the scenes that needed music were identified and markers (which enable a quick return to selected

[158] Modules for the string quartet were developed traditionally on paper to save time. The sonoristic effects prepared for the string quartet included clusters, unsynchronised glissandos, various evolving drones (either with specified pitches or with an indicated highest pitch possible), and free-time runs. Most of the timbral effect types were recorded separately to enable subsequent manipulation and creation of different sonoristic combinations.

points in the timeline) were established and edited precisely to mark their beginnings and endings. When the hit points within the selected scenes were located and marked with additional SMPTE[159]-locked markers the process of assembling individual cues began. The modules prepared for a particular scene were put together in appropriate places (each module was imported into a dedicated midi/audio track) and then adjusted in order to match the on-screen events including the hit points. There were only few scenes where the director was specific in terms of how music should interact with the image, and which places should be highlighted (such as the *Title sequence*). The majority of the musical decisions, however, were left to the composer's discretion. Of course, these choices were later on discussed with the director and adjustments applied accordingly. For assembling cues, the author decided to proceed chronologically from the first cue to the final one. This approach was supposed to help in maintaining control over the development of the music and its overall coherence.

Significantly, throughout the scoring there were no time calculations of any sort involved, apart from one exception which was directly related to the assumptions of the musical concept (e.g. cue #19 - *The first breath*). During that procedure no digital editing tools such as time-stretching and pitch correction were used. It was an intentional decision in order to investigate how precise the editing of music can be using conventional editing techniques only. Simultaneously, cues were mixed and exported in the correct requested format - stereo audio files (48 kHz 24 Bit).

The next section documents the scoring process for the individual cues. The description includes the scene portrayal, duration, SMPTE code (indicating the placement of the cues in

[159] SMPTE (Society of Motion Picture and Television) Time Code is an industry standard synchronisation signal.

the film timeline), director's comments and requests, and eventual changes made to the music during the production process.

6.2.1 Scoring for individual cues

The complete music for *Oxygen* comprises 20 individual cues with a total duration of 14 minutes and 49 seconds (see, Volume II DVD 2, Folder 03, individual *Oxygen* video clips).[160] The film material used for the preparation of below clips does not contain visual effects that can be seen in the final version of the production.[161] Therefore, the reader is invited to watch the final version of the film first.

Cue #01 (00:00:00) - *Title sequence*, duration: 26". [7 modules][162] See Volume II DVD 2, Folder 03, video clip 03-01.

The opening sequence of the drama introduces the atmosphere of the film and explains the air contamination, which is a reason why all citizens are closed indoors. The director wanted the music to highlight an importance of the core element of the plot: oxygen. Thus, the music hits the title when it appears on the screen (hit point 1) and ends when the screen changes to the next shot. The director specifically requested to use a glissando effect when letters appear on the screen. The structure of the cue is very simply constructed from several drone-modules put on top of each other. The transition to the next scene is accented by a single drum strike (hit point 2). There were few adjustments to the music in relation to coexistence with narration which explains air contamination. One of the drones was removed to provide a

[160] Music only mixes.
[161] PC users may find that there are some unwanted disruptions during playback of QuickTime, in which case please use clips prepared in an alternative format optimised for Windows Media Player. It is possible to watch clips in this format on Mac computers by installing Windows Media Components for QuickTime.
[162] The modules indicated in brackets can be built from a number of smaller modular components - sub modules.

needed space. During the dubbing session, the beginning section of the piece was edited without the composer's involvement.

Cue #02 (00:00:29) - *The City*, duration: 23". [8 modules] See Volume II DVD 2, Folder 03, video clip 03-02.

The scene shows a man dressed in an oxygen suit walking through endless empty streets of the desert city. The director asked for a sustained chord of female voices. He also indicated that the music should accent the change to a wide shot of the city highlighting its size. The cue was assembled from few drones, percussion instruments and a polychord (Dm + G no 3 5/7) of female voices. The latter was doubled with a string chord (dm add9) to thicken the harmonic texture and evoke the build-up of the city and contrast emptiness of the streets. After screening the sequence with music the director requested a change from female voices to a male choir with simpler harmony in order to better reflect the scene character (with male voices sounding more sinister). He also indicated that there should be a crescendo which leads to the next shot. Consequently, a sustained chord (Dm) of a male (sampled) choir was recorded. The crescendo articulation was also added. Moreover, the cue had been shortened, so that the end of it matched the view change from the sight of the city to the shot of the clean room. Initially, these two scenes were connected with music which faded out in the beginning of a new scene.

Cue #03 (00:03:16) – *Love scene*, duration: 19". [Traditional approach] See Volume II DVD 2, Folder 03, video clip 03-03.

The scene shows an intimate moment between Xavier and Chloe, his girlfriend. As mentioned before, the personal feelings of the main character of the drama were supposed to be

highlighted by a traditional approach based on the associated theme. According to the initial concept for the music this scene featured the first exposition of Xavier's theme, which was supposed to develop along with the development of Xavier's awareness of the nature of the situation and personal relations. The cue was orchestrated for a piano, strings, and a slowly evolving electronic pad sound. After some consideration the director asked for the "top element" (melody) from the arrangement to be removed. Additionally, he requested that all thematic material should be removed. This decision, of course, compromised the author's original concept (approved previously). Thus, it resulted in the need to introduce some changes to the two additional scenes. During the dubbing process the director indicated that he was not going to use music in this particular scene. Yet, in the final version of the film the un-thematic version of the piece was applied.

Cue #04 (00:03:44) – *Critical air supply failure*, duration: 1'28". [18 modules] See Volume II DVD 2, Folder 03, video clip 03-04.

The scene reveals the monotony of Xavier's job, and his automatic and indifferent approach to the life of his fellow citizens. The cue is built from a succession of fifteen slightly dissonant chord-modules and two drones (i.e. electronic and processed strings). The chords were recorded as MIDI files in a nonchalant fashion, in order to suggest the boredom and repetitiveness of the everyday duties. The drones were used to underline the message that appeared on the computer screen indicating "Critical Air Supply Failure" (hit point 1) and the life threatening situation faced by the Xavier's client. The tension was created by combining a low pitched electronic "bass" drone with a high pitched non-tonal drone consisting of string quartet *glissandi*. At the same time, the chord repeated six times emphasises Xavier's growing attention. The drones fade as soon as the call is over, and music once again highlights

monotony of Xavier's job. The cue was approved without any changes. **Figure 25** shows the structure of the cue.

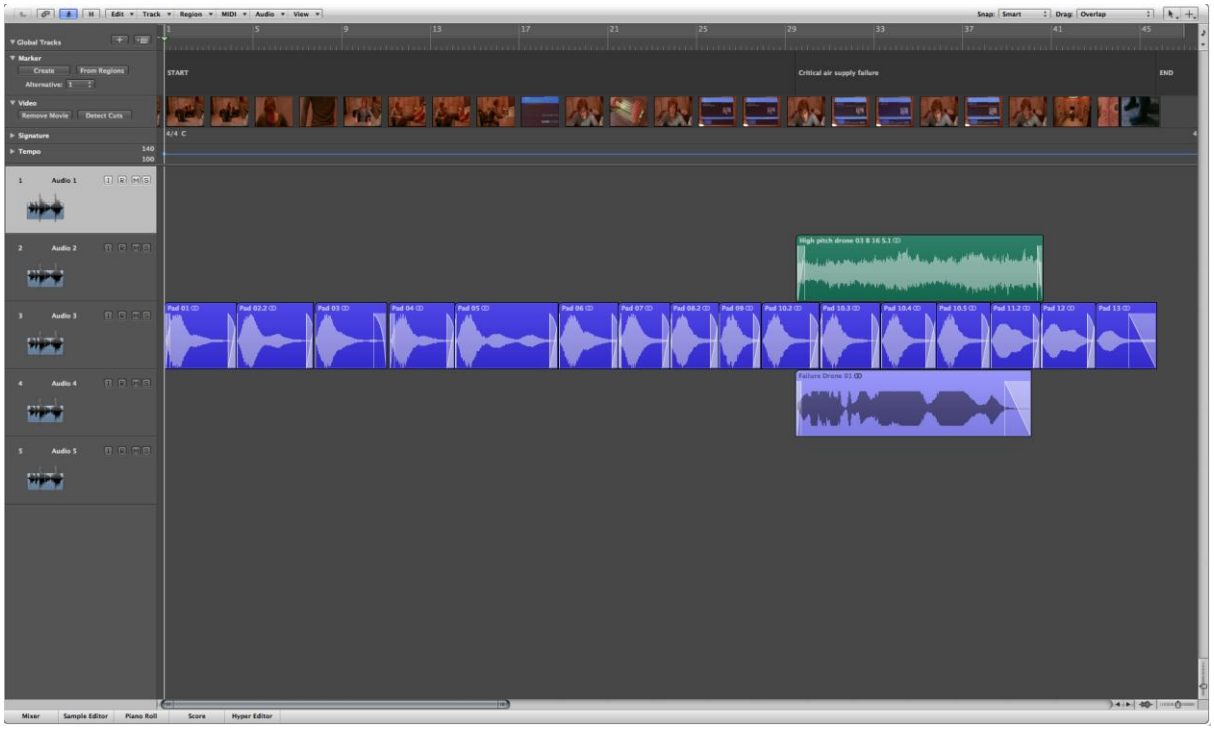

Figure 25: *Oxygen*, Cue #04 - *Critical air supply failure* (combination of audio and MIDI modules) – a Logic Pro file available (Volume II, DVD 2)

Cue #05 (00:05:13) – *Preparation and journey*, duration: 58" [8 modules] See Volume II DVD 2, Folder 03, video clip 03-05.

Xavier puts on the oxygen suit and walks outside his "domicile" [sic].[163] The second half of the sequence shows him walking to the client home to exchange a faulty component of the oxygen installation. The piece was put together from both MIDI (red) and audio (blue) files, and it is a relatively simple combination of drones, string modules, and drums playing

[163] The following section contains expressions used by the director of the film, which were incorporated into the descriptions of the cues by the author.

rhythmic ostinati**,** see **Figure 26**. The low drum (i.e. taiko drum) pattern was a central module around which the whole arrangement was built (the bottom blue file). The cue was accepted without any alterations.

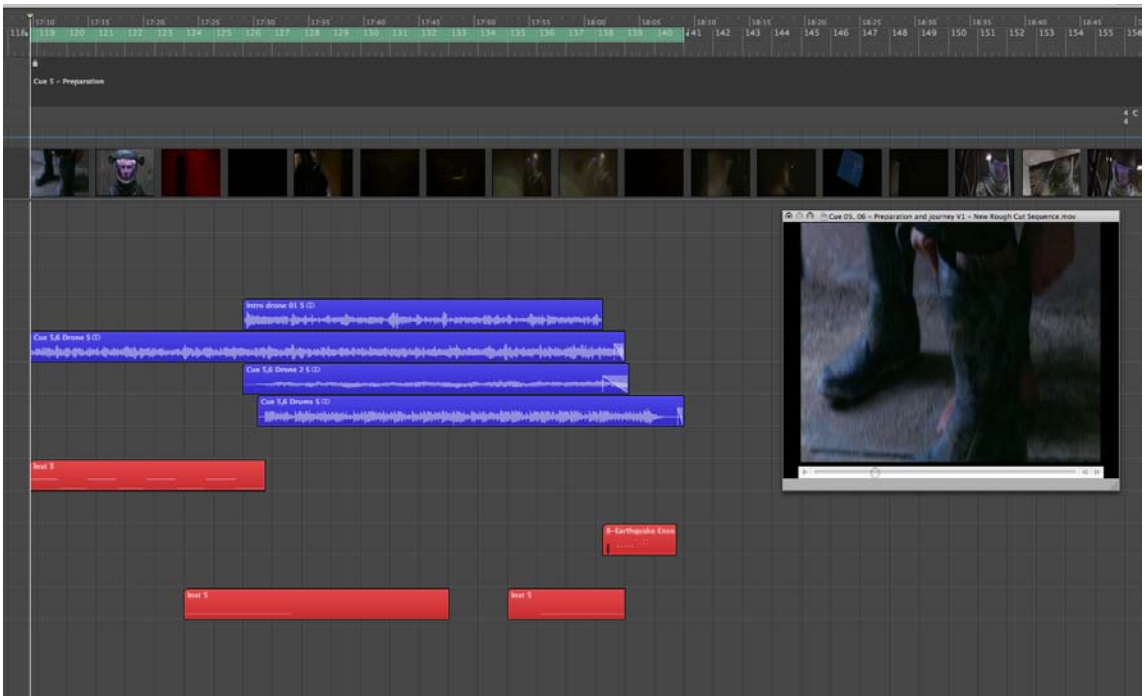

Figure 26: *Oxygen*, Cue #05 – *Preparation and journey*

Cue #06 (00:06:36) – *Repair*, duration: 44". [7 modules] See Volume II DVD 2, Folder 03, video clip 03-06.

Xavier starts to replace a defective component. When the Personal Assistant (PA) informs him that the client's air supply is nearly 0%, the race against time begins. Finally, Xavier feels the pressure and seriousness of the situation. He makes it just on time. The director requested a "tempo music" [sic] (i.e. fast tempo) for the repair sequence. The music for this scene is combined from various percussive ostinati (a 4/4 and 7/4 time signature), and short electronic sound effects. There are two important hit points: 1) the music speeds up to highlight the

diminishing time when air supply is over (00:06:47), and Xavier's growing anxiety level to finish the replacement of the damaged component on time; 2) an accent with a low drum hit indicates the end of the repair. There were no adjustments.

Cue #07 (00:07:45) – *Chase sequence I*, duration: 1' 6". [36 modules] See Volume II DVD 2, Folder 03, video clip 03-07.

On his way back Xavier sees the naked man thrown out of his domicile by security agents. When agents notice Xavier the chase begins. The director asked for an ominous toned music for a "citizen beating" [sic], and chase music when a security agent chases Xavier through the streets. The music ends when Xavier escapes. This cue is one of the most compound in *Oxygen*. It was assembled from thirty six modules among which there are strings ostinati, drones, electronic effects, and various ethnic percussion patterns and hits. The overall structure of this particular cue is also complex. There are four major sections closely synchronised with on-screen events, see **Figure 27**.

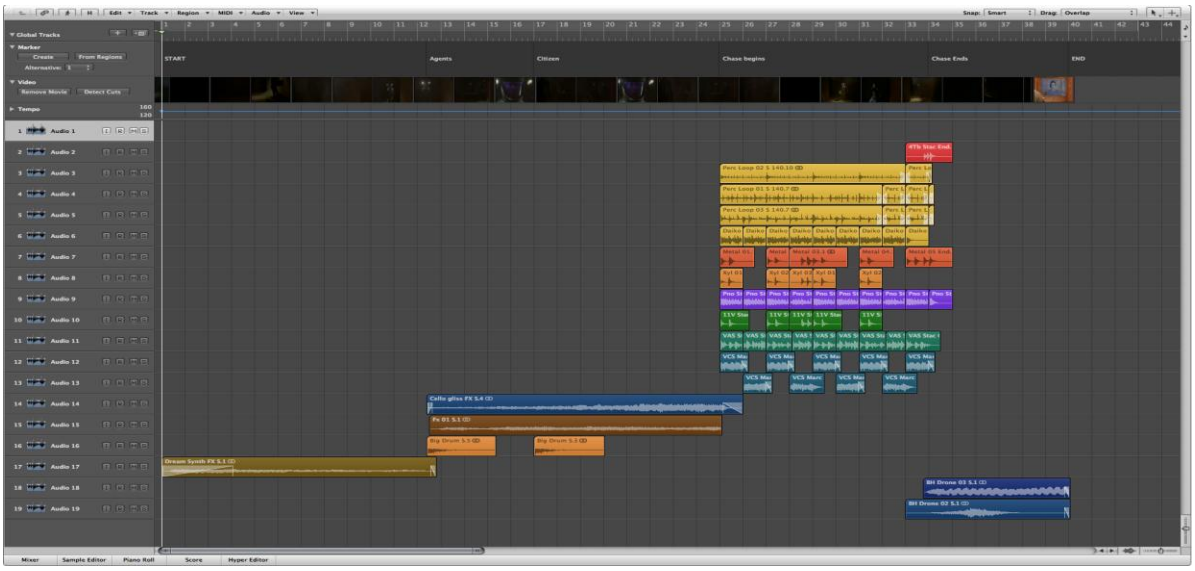

Figure 27: *Oxygen*, Cue #07– *Chase sequence I* – a Logic Pro file available (see Volume II, DVD 2)

The decision regarding the tempo of the music (140 BPM) had been taken at an early stage of the work when only the script was available. The assumption was to preserve this choice and to check whether the chosen tempo would provide an effective support for a sequence filmed and assembled many months later. The first (basic) version of the cue proved that this selection worked well. The producer of the film expressed astonishment at how dynamic the scene had become. This simple experiment may suggest that the range of tempos can, in fact, function well within a particular film sequence. Thus, the tempo of the music does not necessarily always have to be considered carefully before the commencement of the scoring.

As majority of the modules were recorded in the particular tempo to help with the assembly process, the author decided to set the tempo of the Logic Pro's arrangement to 140 BPM. Thanks to that, the grid view of the arrangement window facilitated editing of the modular components especially in the case of the percussion patterns (orange and yellow coloured audio files), see **Figure 28**.

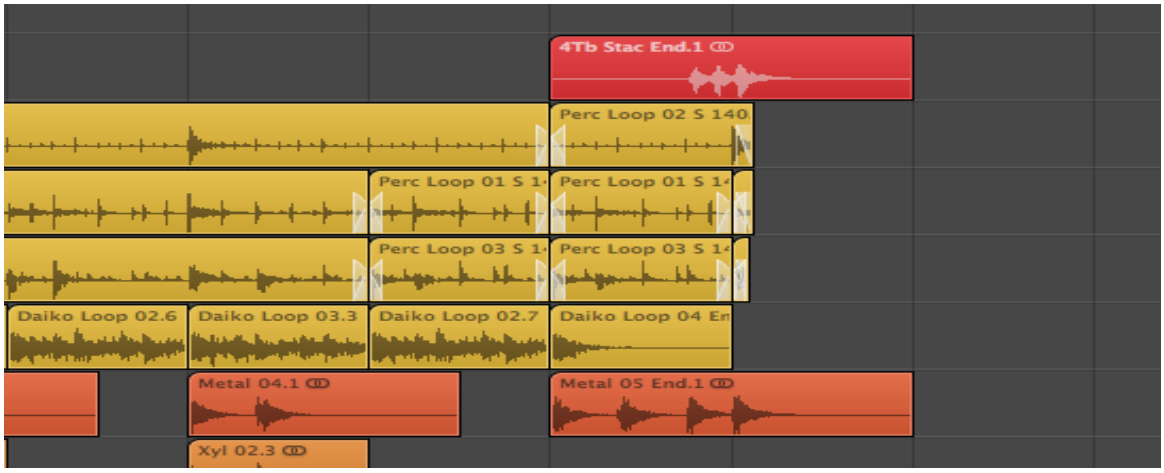

Figure 28: *Oxygen*, Cue #07 – *Chase sequence I* (editing to the grid) – a Logic Pro file available (see Volume II, DVD 2)

The cue had undergone a few changes during scoring. The initial idea for the music was built around ethnic percussion instruments and an electric guitar riff. After rehearsing the first version the director asked for the guitar riff to be removed. According to him, the music had too much of a "rock and roll" feeling. Thus, electric guitar was replaced with a string sequence based on an octatonic scale (it was not, however, a strict application of the pitch collection). The duration of the cue was also altered. The director preferred the music to start earlier than had been initially agreed. Thus, a drone module was added at the beginning of the piece, **Figure 27** (the purple colour file at the right bottom of the screen). Initially, the end of the chase music was linked with the end of the sequence. Yet, the director came up with the idea that the dialogue line from the next scene should overlap with the end of the chase sequence. Thus, the up-tempo chase music had to end earlier, providing a suitable space for the dialogue line.

Cue #08 (00:10:07) – *Dream sequence*, duration: 20". [13 modules] See Volume II DVD 2, Folder 03, video clip 03-08.

Xavier dreams about the traumatic event from his childhood when he was taken away from his parents by security agents. The director requested ominous music that ends when Xavier wakes up. The cue was constructed mainly from modules which were extracted from live recording of the string quartet, see **Figure 29**.

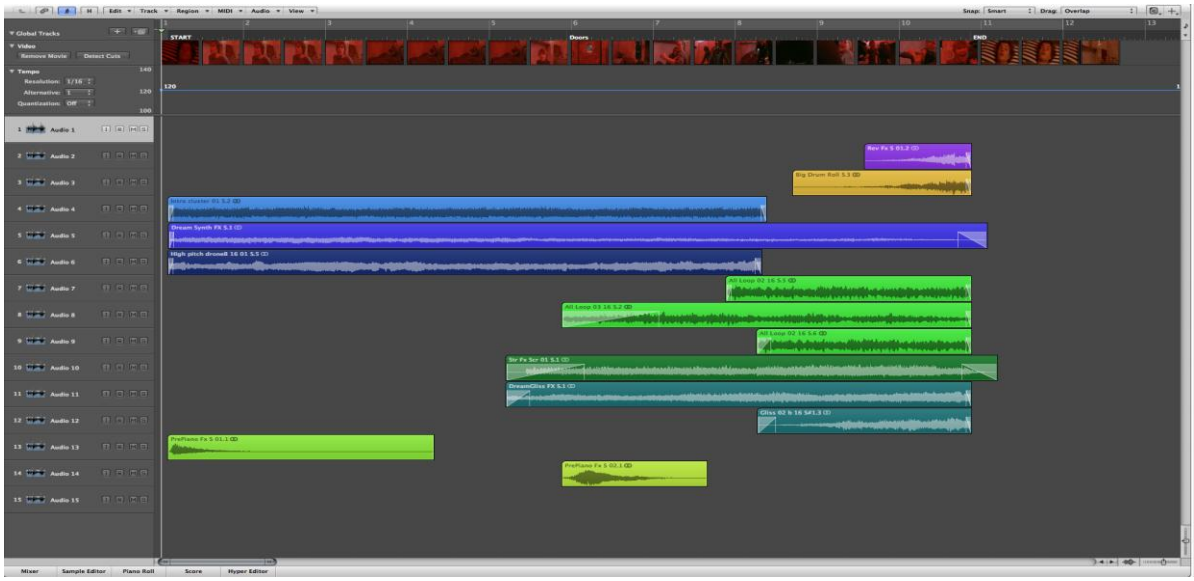

Figure 29: *Oxygen*, Cue #08 – *Dream sequence* – a Logic Pro file available (see Volume II, DVD 2)

In order to thicken the texture of the music some of the modules were layered (more than once) on top of each other (green colourised files), see **Figure 30**.[164]

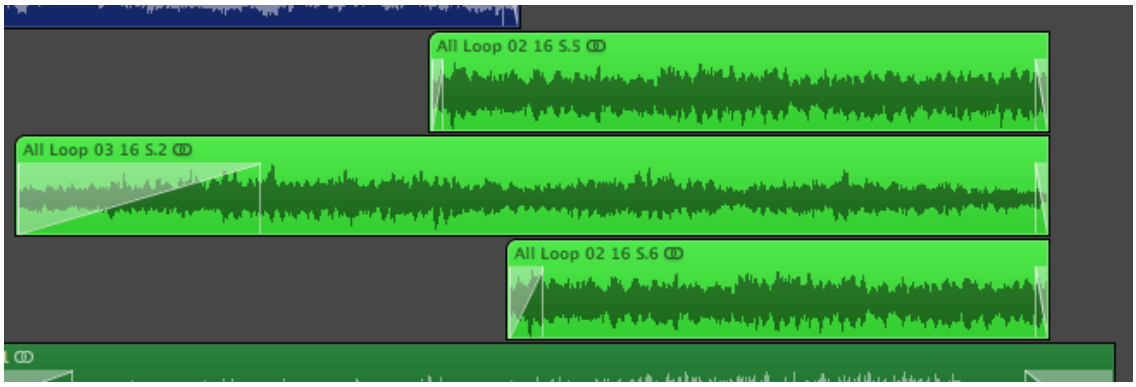

Figure 30: *Oxygen*, Cue #08 – *Dream sequence* (thickening of the texture of the music) – a Logic Pro file available (see Volume II, DVD 2)

[164] String modules used in this cue were prepared from multiplied recordings of four musicians to simulate a larger number of players.

The above cue is based on improvised performances and thus there is no particular tempo or tonal centre. Consequently, the assembly process of this cue, as well as all adjustments of the modules in order to fit the image, were easy to prepare and done very quickly. The music for the dream sequence was approved with no additional alterations.

Cue #09 (00:11:36) – *Hole*, duration: 57". [6 modules] See Volume II DVD 2, Folder 03, video clip 03-09.

One day, sitting in front of his computer console, Xavier discovers a tiny hole in the wall behind his desk. He realises that contaminated air is getting in through the hole. Terrified, he awaits death. The director indicated three important moments in the scene; reaction music when Xavier feels the breeze; when he discovers the truth and fixes the hole; and when he watches the clock awaiting the virus to kill him. The cue was constructed from several drones, percussion instruments hits, and prepared piano effects. One module (i.e. a processed brass aleatoric sequence) was removed from the arrangement due to the director's request of having more static musical accompaniment in this scene.

Cue #10 (00:13:15) - *Chloe's reaction and betrayal*, duration: 1' 34". [10 modules] See Volume II DVD 2, Folder 03, video clip 03-10.

Xavier contacts Chloe and tells her about the hole and his surprise that he should be dead but is not. However, Xavier underestimates the extent to which his lover's mind has been infiltrated. Chloe betrays him, calling for security. The contact and air supply are being cut off. The sequence has a compound structure, and, in line with the director's request, the music was supposed to highlight Chloe's negative reaction and the moment when she calls security. The cue comprises a number of low and high-pitched synthesizer drones, various string

modules, and prepared piano effects. There are several hit points accenting the development of the scene's action. There were minor adjustments of music to match the synchronisation points. One of the drones in the second part of the cue had been exchanged. Moreover, the initial version of the music comprised a number of short piano motifs based on a twelve-tone row (to emphasise the stressful situation and growing panic) and prepared piano samples. On the director's request, piano motifs had not been used to leave space for important sound effects in this scene. The director, however, asked to keep the last piano note that was synchronised with Xavier pressing the door's lock button.

Cue #11 (00:14:49) - *Chase sequence II a*, duration: 24". [12 modules] See Volume II DVD 2, Folder 03, video clip 03-11.

Xavier prepares for repairing his oxygen system when he notices the agents trying to get into his domicile [sic]. He rushes inside, blocks the door and looks around the room frantically. The director specifically wanted the tempo of the music to speed up when Xavier gets tools and starts fixing the problem. It was especially important as the second chase sequence was linked with a previous scene. Another key moment occurs when Xavier sees the agent's helmet though the door window (hit point 1). The music becomes scary and the tempo quickens. Finally, the director asked the author to emphasise the moment of crushing the door's lock (hit point 2) after which the chase music ends. Cue #11 is relatively complex, and is constructed from 12 different modules (e.g. drones, strings sequences, various drum patterns, prepared piano effects). Through the whole scene music is closely synchronised with the on-screen events. The original duration of the cue had been shortened to match the cut to the next shot.

Cue #12 (00:15:43) - *Chase sequence II b*, duration: 58". [12 modules] See Volume II DVD 2, Folder 03, video clip 03-12.

Xavier escapes from his domicile [sic] through the hole in the wall. The chase continues outside, through the streets of the city. The director's indications were that ominous music continues when agents' tools start up in the clean room. Then, Xavier looks at the escape hole for a moment. When he is outside the chase music starts again. It stops when Xavier stares into the void, as he decides whether to continue, and then he walks onwards. The modules used in this scene are mostly the same as those used in the previous sequence. In fact, music from both sequences should be considered as one piece divided in two (which is indicated by names of the cues). Similarly, music in this sequence is also closely synchronised with the on-screen events. Originally, both cues were a continuous piece. The director, however, decided to break the music in two by a shot containing sound effects of a sandstorm (i.e. when Xavier puts his head into a hole and examines the other side). There were also minor adjustments of the end section of the cue (reduction of the number of modules).

Cue #13 (00:16:45) – *Desert*, duration: 1' 18". [8 modules] See Volume II DVD 2, Folder 03, video clip 03-13.

Xavier wakes up at the desert and, to his astonishment, sees a clear blue sky. Looking in the direction of the city he recalls the events of the previous day – Chloe's betrayal, agents' chase. Finally, he spots a living plant. The director indicated that the music should highlight a moment when Xavier sees a sandstorm over the city. The female vocalise was used to emphasise that Xavier's current situation was directly caused by the closest person he had – Chloe. There were no changes in this cue.

Cue #14 (00:17:51) – *Desert walk*, duration: 2' 3". [5 modules] See Volume II DVD 2, Folder 03, video clip 03-14.

Xavier walks across the vast desert. Originally there was not supposed to be music in this sequence. Yet, the author suggested that the sequence would benefit from the application of music, particularly since the whole sequence is quite long and static. The cue was constructed from a slowly evolving synthesizer drone, an arpeggiated electronic sequence and a gentle brush toms drum pattern which referred to a drum pattern from Cue#05. The director agreed to use music in this scene, but requested to have the drums and synthesizer sequence removed from the arrangement.

Cue #15 (00:19:44) – *Forest*, duration: 13". [3 modules] See Volume II DVD 2, Folder 03, video clip 03-15.

Xavier reaches the end of the desert and for the first time in his life sees a forest. The director requested that the strings should accompany Xavier's shocked face as he stares ahead (crescendo), and the impact [sic] (i.e. accent) when he walks toward the trees. The cue was constructed from two superimposed string chords: Dm add9 and Dm7, and bass drum hit. There were no changes.

Cue #16 (00:20:24) – *Suffocation*, duration: 13". [3 modules] See Volume II DVD 2, Folder 03, video clip 03-16.

While walking through the forest Xavier starts suffocating due to the shrinking oxygen supply. Similarly to Cue #14 – *Desert walk* this scene was not supposed to contain music and it was only implemented after the author's suggestion. The music is a combination of two

modules: an electronic drone and aleatoric sequences of gong effects. There were no adjustments.

Cue #17 (00:20:46) – *Girl chase*, duration: 23". [13 modules] See Volume II DVD 2, Folder 03, video clip 03-17.

Xavier sees a girl who observes him and, to his astonishment, breathes the apparently contaminated air without any harm. The girl runs and Xavier starts to chase her. In line with the director's request the music starts when Xavier notices a little girl watching him. The chase music starts when Xavier tries to catch the girl. The chase music ends when she disappears. This cue consists of various modules (e.g. drones, string sequences, ethnic percussion patterns, electronic effects, processed acoustic instruments). The music closely corresponds with on-screen events. The cue was subjected to extensive re-instrumentation of the chase section. Originally the music intended to illustrate the girl and her close relationship with nature. Thus, an acoustic guitar riff, a didgeridoo drone, and ethnic drums were used. The director did not like the guitar, and the too "organic" sound of the cue. Consequently, the guitar was removed and replaced by strings, and the didgeridoo drone was heavily processed into a grooving rhythmic pattern. Several new modules were composed for this cue. The director had been encouraged by the author to take an active role in the work on this cue. One of the rhythmic patterns (i.e. low drum) was suggested by the director himself. The structure of the section remained unchanged. After approximately an hour of experimenting with different configurations of modules the final shape of the cue was achieved to the director's satisfaction.

Cue #18 (00:21:10) – *Suffocation II*, duration: 21". [3 modules] See Volume II DVD 2, Folder 03, video clip 03-18.

Xavier starts suffocating again. The air supply is exhausted. Xavier desperately tries to smash the protection glass of his helmet. The music stops when he succeeds (hit point 1). Originally there was no music in this scene. However, after discussion with the author the director decided to add music to emphasise the link with cue #16. The return of the music from cue #16, contrasting with a chase sequence (cue #17), also emphasises the shock at seeing a girl walking freely without the air support device and the fact that Xavier for a moment forgets about his shrinking air supply.

Cue #19 (00:21:40) – *The first breath*, duration: 24". See Volume II DVD 2, Folder 03, video clip 03-19.

After the successful attempt to break the glass of his helmet Xavier takes the first breath of real air. The director indicated that the music should be of discovery, as Xavier sees and hears a bird. Initially, in accordance with the author's original concept this scene was the second exposition of Xavier's theme. The cue was a traditional tonal composition orchestrated for piano and string quintet (see DVD II, Folder 07-03). However, as mentioned earlier, the director changed his mind in terms of the application of thematic material. In particular, he requested the melody to be removed, leaving only an accompaniment. The placement of the cue was also altered (the starting point was moved six seconds forward). When the low piano note highlights the shot change the bass drum was added to strengthen the emphasis. In order to match the new, shorter time frame, the tempo of the cue was increased. During the whole scoring process that was the only situation when the author had to calculate the tempo of the music.

Cue #20 (00:22:08) – *Xavier's death*, duration: 25". [5 modules] See Volume II DVD 2, Folder 03, video clip 03-20.

Shot by the agents, Xavier dies. The director indicated that the music should reflect regret and depression, although the audience is initially unsure why. Eventually the audience sees the agents walk away, leaving Xavier's body on the ground. According to the initial concept, it was a traditional tonal composition based on Xavier's theme. The theme was for the first time revealed in its full length. As part of the author's concept it was supposed to create an irony that the audience hears the full theme only when he dies. The boy's voice used for the theme was also supposed to create a somewhat metaphorical link to cue #8 *Dream sequence* when as a boy Xavier had been taken by the agents. The director, however, rejected this approach as he did not want to have any melodic material in *Oxygen*. Additionally, he insisted that music ought to double the on-screen action, especially highlighting the appearance of agents. Thus, the new music was constructed from available modules. One additional module (a quintal violin drone) was composed for this piece.

6.3 Outcomes

The music for *Oxygen* demonstrates that the modular approach can be successfully applied to the composition of film music, and provides a number of advantages in comparison to the traditional approach in scoring.

The modular approach proved to be a satisfactory solution for addressing the issue of fitting music to the picture; making adjustments to the music throughout the film editing; and speeding up the composition and orchestration processes. Notably, changes to the music were

scarce as there were only a few re-edits to the film material. Also, musical ideas for some cues were presented to the director during the film pre-production, thus many ideas were accepted very early. The adjustment of the music in terms of its duration resulted mainly from the lack of the spotting session, and the fact that the duration of particular cues had only been briefly explained by the director. Despite this, most changes were easy to accommodate, particularly in the cues constructed from drone-modules (e.g. #2, #10, #12, #14), where changes were only required with respect to lengthening or shortening of individual modules. Moreover, cues with a compound structure comprising drum and percussion pattern-modules and/or instrumental sequences had also been easy to edit, especially those with odd time signatures (e.g. #7 and #11).

Additional changes to the music were in relation to its coexistence with other soundtrack components (i.e. dialogue and effects). To the very last moments of the scoring process, the sound of the film was not ready. Thus, detailed information regarding the dialogue (e.g. the lines of Xavier's personal computer) and sound effects was not available to the author. During the second week of work (shortly before the deadline), when the director was frequently present at the composer's studio, the definite placement and the sound characteristics of the dialogue and the special effects had still not been clear even to the director. This was a result of the changes to the cast of the sound designer, which had only been finalised just before the completion of the project and thus, the author of this thesis was not offered the opportunity to co-operate with this person. Undoubtedly, this lack of co-operation has had an impact on the final product. Consequently, changes to the music (i.e. the duration and complexity) requested by the director (for instance in cues: #1, #7, #9, #10) were made assuming a future placement of effects and the dialogue. Thus, taking into account possible potential problems in the co-

existence of music with other film soundtrack components, in most cases, the author of the present work decided to limit the complexity of the music.

Throughout the project, the director was not very specific in terms of his decisions regarding music, with a usual explanation being: "it does not work". The possibility of quick and easy changes to the structure of the music gave the opportunity for the active involvement of the director into the creative process and helped with the exchange of ideas between the author and the director. For instance, cue #17 was re-orchestrated with the assistance of the director by exchanging existing modules and creating a set of new ones. The possibility of testing different arrangements of modules has undoubtedly provided a degree of control that pleased the director. He admitted that he felt safe and in control of the process of creating music for his film, which reportedly contrasted with his previous experiences. It is important to stress that quite often only one element of the arrangement (e.g. a choice of a particular instrument) is responsible for the rejection of the whole cue. The modular approach facilitates a quick identification of the "wrong" component in the musical structure and its immediate replacement (e.g. cues #1, #2, #7, #9, #14). As a consequence, all cues prepared for *Oxygen* found their place in the final product. This flexibility of the modular approach (adding or removing individual modules) may translate into more effective collaborative relationships between composers and directors. It may also facilitate collaborations between a composer, music editor, sound designer and film editor by providing them with music that can be easily adjusted to other soundtrack elements and film edit.

It is worth noting that the general tendency in the director's requests during scoring for *Oxygen* was to reduce the number of modules used in compositional cues. Interestingly,

compositions with an uncomplicated structure that were colouristically varied (i.e. comprising instruments from different families) were, in fact, destined for reduction of modules, in order to obtain more homogenous orchestration. On the other hand, compositions with more complicated structures (both rhythmically and harmonically), but orchestrated for homogenous ensembles, were more commonly accepted. The elimination of some modular components had, however, impacted on the unity of the music. Frequently, removed modules were deliberately used in certain cues in order to bind them together.

During the final stages of scoring the director decided to change the concept of the music, namely to abandon the contrasting tonal theme. This resulted in the need to introduce some changes to the original concept, for example in cue #19. As this particular one was a traditional linear composition, it could not have been subjected to the same methodological treatment as the modular cues. In order to match a new time frame, the tempo of the music had to be increased after some prior calculations. The decision to remove all melodic material from the music could have several potential explanations. The first is that the director simply did not like this particular melody. The second was, and this seems more likely, that he did not want to have any emotional charge (usually provided by a melodic material) associated with the music. Finally, the goal-directedness of melodic line usually tends to catch viewer's attention and thus can divert the audience from important elements of the image and this may have contributed to the director's decision. It should be emphasised that a film composer is obliged to accommodate the requests of the director even if these requests seem musically

counter-intuitive and contradict the carefully designed concept (Farrer, 2009; Oteri, 2005). Thus, these amendments were included.[165]

6.4 Limitations

Despite the fact that the overall experiment resulted in a number of significant observations, it is important to note the limitations of the *Oxygen* case study. The first limitation was the genre of the film. *Oxygen*, as a sci-fi film, belongs to the genre where non-tonality is commonly accepted. This, in turn, facilitates the application of the modular approach and fulfilment of the experiment's objectives. Thus, a question presents itself: can the modular approach suit other genres of film, for instance a comedy? Theoretically, the answer is yes as the success of the application of the method depends on the appropriate design of modules. The case study of *Skippy's Adventure* may serve as a potential answer. Nevertheless, in order to explore objectively the problem of the applicability of the method for various film genres, the method should be tested in films of different types (see also section 10.3.10).

The second limitation is related to the fact that *Oxygen* was a student film and as such its nature and the production process differed from real commercial projects. Unfortunately, this prevented the author from exploring some research questions. For example, it was impossible

[165] The author of this thesis has had experience in composing music for television, commercials and radio as well as in composition and arrangements of songs for other artists and for educational purposes. Up to this point, the author had worked only with experienced producers who were usually able to communicate their needs clearly and allowed for certain freedom regarding the music. The *Oxygen* undertaking was the author's first experience of working on a student production. It is widely known that young directors tend to be more difficult to work with due to lower confidence than more experienced ones (with some exceptions certainly) and this lack of confidence was at times present during the production of *Oxygen*. Thus, to support the director in achieving his desired outcome, the author decided to follow all the director's decisions regarding the musical score, offering suggestions for improvement only and not forcing his ideas.

to examine whether the modular approach helps in preserving coherence and logic of music edited without the composer's involvement [SRQ. 4]. These edits frequently take place during the last stages of film post-production, when music is already recorded and delivered. As a consequence of the last-minute changes, traditional music usually suffers from illogical cuts. In contrast, the delivery of music as stem or split mixes[166] (a common practice in film and TV) of modular components for the final dubbing session could give room for additional necessary rearrangements (both on the horizontal and vertical levels). It can be expected that this manipulation of modules may save music from abrupt, unmusical changes (as potential editing points can be designed by a composer). However, in *Oxygen* this option was eliminated due to the technical requirements of the Film School at the VCA, where the film was dubbed. In the *Oxygen* case, the music was supposed to be delivered as stereo audio clips only, which eliminated the initial aim of a multi-tracked session. Therefore, this requirement made answering the subsidiary research question 3 [SRQ.3] impossible.

The *Oxygen* case study showed that modular music fulfils its functions in terms of supporting the drama; it expresses the tension and general mood of the film. Although the director's expectations regarding the music were met, a question presents itself of whether the music was used to its full potential. The modular approach proved to be a good working method for this particular film, yet certain features of the method, apart from structural flexibility, had not been utilised. Further, in the author's view, the predominant use of drones desired by the director worked in few scenes only. Considering the film narrative perspective, there were situations where music could have been used in a more active and engaging way. For

[166] Stem/split mixes are premixed stereo audio files including all instruments of a certain type. Stem mixes provide an audio mix engineer with flexibility when balancing music with dialogue and sound effects.

instance, instead of just layering drones, modules could be associated with film characters as leitmotifs and then used within the musical structure to create dramatic tension. Additionally, transitions between traditional linear music and a non-linear structure of modular approach or even collisions of them could have resulted in interesting dramatic effects.[167]

Finally, a close co-operation between the composer, the sound designer and sound mixer is a crucial aspect of any film production.[168] Regrettably, in this case, due to organisational difficulties and delays during the production, the author did not have the opportunity to consult with the sound designer and the sound mixer. The lack of direct co-operation between the author and the sound designer resulted in some problems in the coexistence of the elements of the soundtrack, occurring due to the lack of exchange of ideas and sound files. The musical cues were sent over to the sound designer, yet the author was not provided with film sound files for assessment. Thus, following the director's suggestion only (it seems likely that the sound designer received similar instructions) the music often occupies similar frequencies as the sound design impacting the clarity of the soundtrack. Additionally, there are situations where music and sound design highlight the same on-screen event. For example, in Cue #10 - *Chloe's reaction and betrayal*, the sound of the door lock is doubled by the musical accent (piano) and sound design. The author suggested that if the naturalistic effect was the desired one the piano should be removed. Alternatively, the sound of the solitary low piano note (i.e. the prepared piano sample) if left as the only sound, could provide a more

[167] The author planned to include an interview with the director exploring various aspects of scoring for *Oxygen* from his perspective, however, this proved impossible due to reasons beyond the author's control.

[168] A close co-operation between a composer and sound designer is crucial especially when music and sound design must form a coherent entity. The successful application of this approach can be exemplified by *The Hurt Locker* (2008/2009) where a close co-operation between composers Marco Beltrami and Buck Sanders and sound designer Paul Ottosson resulted in a coherent effective soundtrack boosting film's psychological and emotional tone. However, excluding situations where a composer is also a sound designer for the project or a film director is particularly sensitive to the role of the film soundtrack, the practice of close cooperation between a composer and sound editor is rare.

metaphoric or abstract effect. The final mix of the soundtrack, however, compiles both sources. In effect, the final result of the sound mix is unsatisfactory, leaving room for improvement and further experiments. Had closer collaboration with the sound designer and sound engineer been possible, it is conceivable that these drawbacks could be overcome but also the film project could have a better integrated soundtrack which would potentially improve its overall reception.

6.5 *Oxygen* Promo Cut

Several months after the premiere of the *Oxygen* drama, the author was asked by the producer of the film to compose music for the newly created promo cut (i.e. trailer) of the drama. The producer's intention was to create a version of the film that could be used both as a show-real and a promotional material for the production. As the preview cuts of the film are compressed forms of the most interesting moments of the film, montage is extreme (i.e. quite often there is no logical flow of events as in the original film). Thus, this material was ideal for testing the flexibility of the modular approach for the composition of the film music.

The selection and order of sequences of the drama used for the promo version were supposed to mislead the audience regarding the development of the plot. The main aim of the promotional cut is to attract the audience (Zager, 2008, 181), and as part of the show reel, potential investors as well. The music originally composed for the drama was closely related to the story, and thus would not automatically provide the necessary support for the deliberately edited plot and meet the purpose of the promotional clip. After consideration the author decided that in order to emphasise the attractiveness of the film's promo cut for

commercial uses, new music had to be composed. In terms of the coherence of the musical flow, this also provided an opportunity to examine the possibilities of merging music composed in the traditional way with sections composed according to the modular method.

The *Oxygen* promo cut, in common with many film trailers, has a three-act formal structure where the last one features a powerful and dramatic end. During the meeting with the producer the author proposed that in order to strengthen the impact of the final sequence the ending of the second act should cut to black for few seconds. At the same time, in order to maintain a growing tension which gradually builds up in the second act, when the screen turns black, the music continues. The suggestion was approved and after reaching agreement regarding which film elements must be synchronised with the music, the scoring process had started.

The author decided that the compositional process would start from the composition of music for the major sections separately (i.e. each section was recorded in a dedicated Logic project window), and later the three major building blocks would be combined together into a continuous piece, as was done with the final form of *Skippy's Adventure*. The author's intention was to reduce the necessary time calculation to the minimum. In order to do it, the author decided that music composed in the traditional way should start in suitable spots, to provide necessary commentary to the scenes without the need for calculations. For the sequences that would require intense time calculations, in order to synchronise music with the plot, modular music was to be applied. Consequently, sections of modular music were to be used to attach all building blocks together. The next step was the selection of a suitable tempo for the whole composition. The preliminary tests indicated that 125 BPM would be

appropriate for the whole video sequence. From the beginning it was assumed that the tempo of the last section should rise until reaching the climax. Thus, some adjustments of the tempo were applied.

Act I introduces the environment and leads to the emotional climax which was highlighted with the full orchestral arrangement. The density of the second half of the sequence was supposed to contrast with a much more spatial beginning of the second act. The space between the beginning of the sequence and the orchestral section was filled with several modules created for the promo. **Figure 31** shows the Logic Pro arrange window for the first section of the *Oxygen* promo. As can be observed, the tempo had not been altered (see, the thin long blue line above the audio files).

Act II was divided into five subsections. The three traditional sections were "glued" together by short modular sections. For the convenience of assembling modules, in four places in the second half of the sequence, time signatures were applied. Thanks to this, the whole section fitted the grid. Similarly to the previous Act (I), the tempo remained unchanged, **Figure 32**.

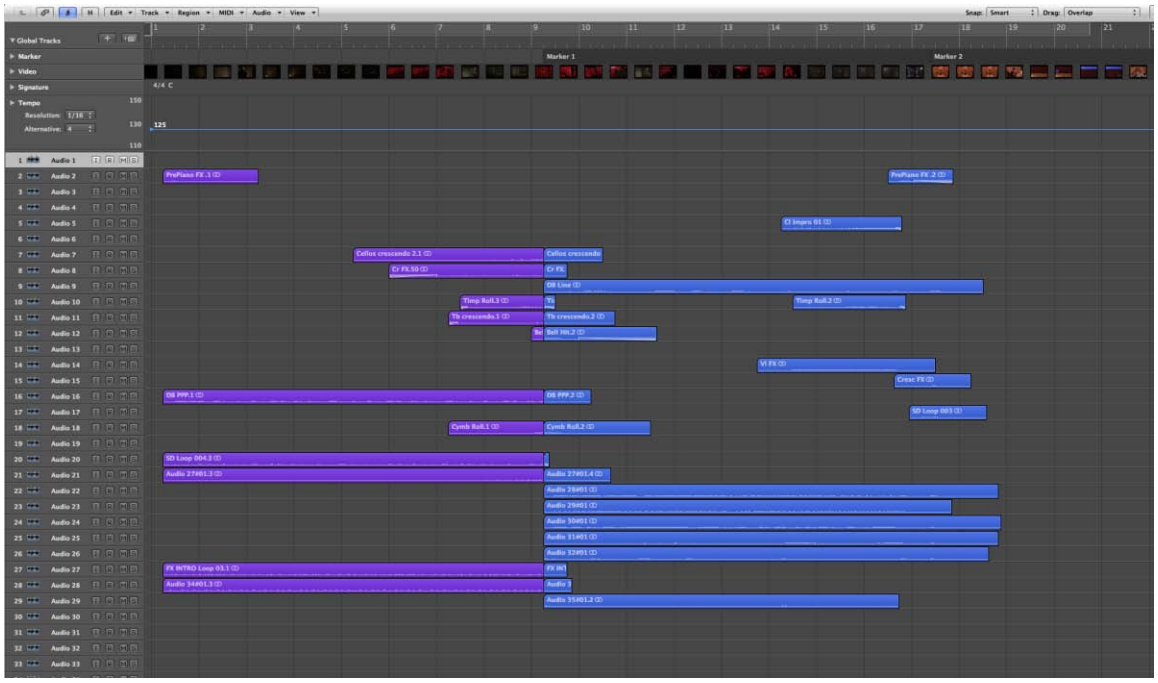

Figure 31: Section I of the *Oxygen* promo

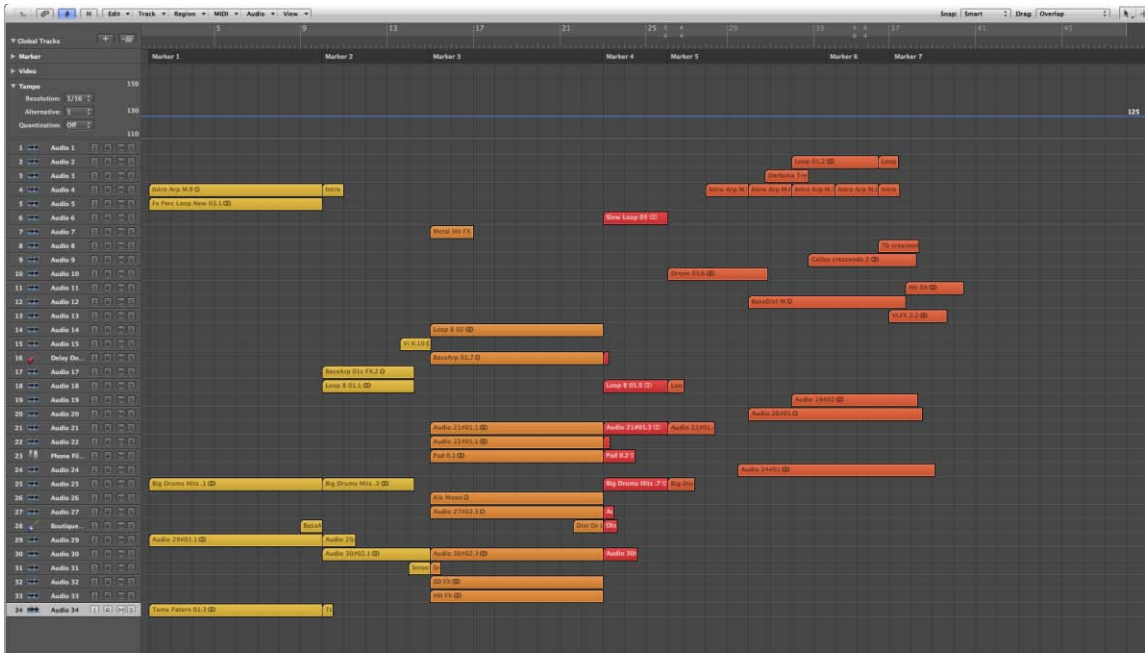

Figure 32: Act II of the *Oxygen* promo with five sub sections.

The music in Act III consists of two sub-sections. The first one, fast, highlights the active character of the shots selected for this section, and the second underlines the ending. As mentioned earlier, the tempo of the music was speeded up, providing the build-up to the climax of the sequence. After that, the tempo of the whole clip was slowed down for the final shot, **Figure 33**.

When all three major sections of the music were ready, the music had been mixed and bounced as stereo files. Then, the new project in Logic Pro was created where three sections were combined into a continuous piece (see Volume II, DVD 2, Folder 03, video clip 03-21). It was agreed with the producer that the montage of the promo cut would be further adjusted to tighten the synchronisation with the music even further. However, the version of the clip presented in this thesis had not been subjected to any additional editing.

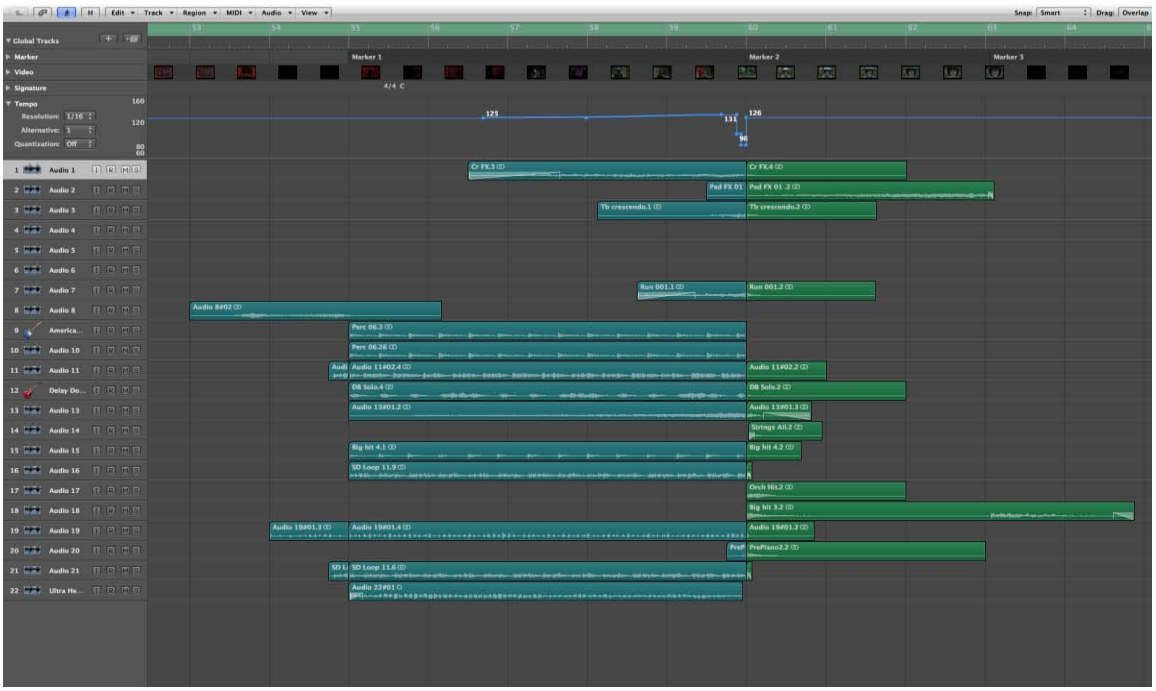

Figure 33: Act III, tempo manipulations of the sequence.

6.6 Conclusion

In summary, the modular approach allows for composition of music before a film is shot, reducing the time required for composition of music during post-production and assuring a greater comfort of work in situations where there is usually time pressure. In particular, modules provided flexibility in fitting and adjusting music to picture. Even though at the beginning of the project the director expressed his willingness to edit picture to music, thanks to the adjustability of the modular approach, this proved unnecessary. Moreover, the modular approach provided the director with the comfort of controlling the process of creating the music. This sense of control may have reduced anxiety and doubts regarding the musical dimension and tended to minimise last-minute changes. Surprisingly, the director's sense of control, resulting from the modular approach, helped the process of negotiation between the director and the composer. The opportunity to intervene in the compositional process seemed more important than the actual interventions themselves. The modular structure of the music seemed to appeal even to musically untrained people, perhaps because it shares patterns familiar from ubiquitous loop-based types of music.

Finally, the combination of traditional approach and modular method (during scoring for the *Oxygen* promo cut) brought satisfactory results. Sophisticated time calculations were unnecessary and, generally, the process of fitting music to the picture (including hit points) was uncomplicated. Furthermore, the application of the modular approach with traditionally structured music did not impose problems in relation to coherence of the music.

Chapter 7: Case study 4 - *Ostinatello*

7.1 Rationale for the composition

Ostinatello is a composition for two pianos, drum kit, and a percussion ensemble. The composition comprises five movements and is approximately 15' in duration. The piece touches on two different aspects related to contemporary film music: 1) rhythm, a dominant factor of action film music that highlights the dynamism of cinematic expression; and 2) use of minimalism in film music, and relations between image and music composed in this particular style, especially as regards editing capabilities. The author was specifically interested in the application and the dramaturgical role of the musical technique of ostinato.[169] The composition aimed to create a piece built mainly from ostinato-modules. Specifically, it focused on different types of melodic and rhythmic ostinati and their aggregations in the process of creating a cinematic expression. The accompanying scores can be found in Volume II, Section 3. Audio examples and Logic file can be found in Volume II, on DVD 2, Folder 04 and Folder 07-04.

In action-oriented films such as *Batman* (1998), *The Matrix* (1999), *Minority Report* (2002), there is a frequent demand for high levels of energy, pulse, and dynamism (Karlin and Wright, 2004, 279). As a consequence, the rhythmic component of the music often becomes

[169] Ostinato is a type of musical device which is commonly used in film music as a means of expression, for example the stairway chase sequence in *The Fugitive* (1993). The ability of ostinato to fulfil different dramaturgical needs is directly connected with the repetition itself as well as with the nature of repeated events (Schnapper, 2001, 784). For instance, repetition may evoke suffering and obsession and the unvaried repetition may lead to the loss of sense of time. Moreover, periodic repetition of a rhythmic motif can direct attention to a particular event. Also, intrusive repetition of a particular musical phrase in the high register can produce an atmosphere of suspense and psychological tension. This technique was used by Bernard Herrmann in *Vertigo* (1958), and Wojciech Kilar in *Struktura Kryształu* [trans. *The Structure of Crystals*] (1969), and also by other composers such as Roy Webb, Leonard Bernstein and Maurice Jarre. The technique of ostinato is also frequently utilised in commercials (Zager, 2008, 76). In addition, ostinato textures often point to future events, outcomes or possibilities in the film narrative. Finally, the ostinato that reappears throughout the individual sections or the whole composition may serve as a device that binds the musical structure together.

dominant. Moreover, fast montages in these types of films do not have the time-frame in which traditionally structured melodies can be established. Therefore, short motifs and ostinato figures tend to be used in these situations. By extension, particular rhythmic patterns can become thematic material (Karlin and Wright, 2004, 285); e.g. *The Player* (1992) or *Speed* (1994). Additionally, rhythm may play an important role in supporting a film narrative, for example it can direct and alter the attention of the listener in relation to the perception of musical events, highlighting important moments in the gradual unfolding of music. This feature is especially apparent when the auditory information and visual information are structurally similar, e.g. share temporal accent patterns (Cohen, 1988, 108-111; Cohen, 2001, 206). As the visual component of the motion picture is by its nature polysemic (Lexmann, 2006, 29), congruent elements (i.e. hit points) in the motion picture are more likely to enter the consciousness of the audience.

The minimalist style is used in film because it facilitates a successful merging of different characteristics of the traditional orchestral score, electronics and elements of pop music, which has always presented problems to composers who frequently had to combine various musical styles. Application of minimalist processes, based on extended repetition and simple motivic patterns, proved to be a practical solution to this problem (Cooke, 2008, 478). Reduction of musical means and the homogeneity of sound in minimalist compositions can often provide the appropriate density and texture for coexistence with other elements of the film soundtrack such as dialogue and layered sound effects.

Discrepancies exist in the approach to synchronising minimalistic music to film. Eaton claims that minimalism can be used in places that allow longer cues; e.g. under montages and

transitions and to fill any gaps in narrative, assisting with continuity of the film. However, this music is not as easily trimmed as conventional cues (Eaton, 2008, 38).[170] On the other hand, Cooke observes that minimalistic music can be composed quickly allowing for last minute alterations (2008, 478). A closer examination of Wojciech Kilar's music for *Bram Stoker's Dracula* (1992) seems to confirm the latter notion. Cues, such as *The Storm* and *Vampire Hunters*, exhibit characteristic for minimal music static harmony, use of repetition, regular rhythms and restricted pitch material that can easily be adjusted. In fact, there are scenes in the film which were illustrated by the music resulting from montage of different cues (i.e. manipulations of durations and superimpositions), for instance the beginning of cue *Storm*. Further, cue *Vampire Hunters* is frequently used in film trailers and adapted to condense montages (e.g. *The Mummy: Tomb of the Dragon Emperor* (2008)) proving that Cooke's observation regarding the possibility of adjustments of minimal compositions is a correct one. Thus, minimal technique may facilitate editing music for the picture.

Ostinatello aims to examine the issue and possibilities of editing a piece of music composed according to characteristics of minimalism: restricted pitch and rhythmic materials, neo-tonal language, diatonicism, use of repetition, drones, ostinati, steady pulse, static harmony, and long duration (Kostka, 2006, 303). *Ostinatello* also explored the question of how to expand the limited expressiveness of minimal music to improve its dramatic engagement and what means would facilitate it.

[170] Minimalist music in film can be effective in establishing the general mood for a scene. However, the slow rate of harmonic change in the minimalist style is not well suited for highlighting instant emotional shifts in the film narrative (Eaton, 2008, 38). This feature can perhaps be considered a disadvantage in comparison with conventional film music. On the other hand, the lack of precise correspondence between the visual component and music provides a distance from the subject, which is often sought by directors in order to increase objectivity in the perception of the film (Koehler, 2008).

7.2 Methodology

To maintain features of the minimalistic style, the focus during the process of creating *Ostinatello* was on a substantial reduction of musical means. Because of this, the lack of traditional melody, the application of the regular pulsation, the homogeneity of sound, the chords and the simple modes were priorities.

The compositional process began with the creation of several ostinato-modules for pianos, drum kit, and other percussion instruments (i.e. 4 toms, cymbals, wood sticks, and a shaker). The assumption was to create various types of ostinati including; 1) rhythmic ostinato (i.e. percussion); 2) rhythm ostinato on a single pitch; 3) rhythmic ostinato on non-repeating pitches; and 4) ostinato rhythm applied to chords.

Most modules were written in the standard way, planning possible configurations within the future movements in advance. The modules included both arpeggio-like sequences as well as chords. There were also modules developed through the improvisation process. This mainly concerned drum kit and percussion modules. In order to provide the necessary variation of patterns, as well as to create fills and breaks, originally created modules were also modified afterwards. All modules were recorded initially as MIDI files only in Logic Pro.

During the next stage, modules were selected and grouped into five sets that later on formed five major sections of the *Ostinatello* scheme: Part I, Part II, Part III, Part IV, and Part V. The first movement (in the tempo 60 BPM), which serves as an introduction, is separated from the rest of the movements. These are grouped in pairs (slow-fast tempi) played without any breaks:

Pair A) Part II (in the tempo 95 BPM) and Part III (in the tempo 135 BPM), and

Pair B) Part IV (in the tempo 65 BPM) and Part V (in the tempo 135 BPM).

Pairs A and B can be divided by a break; however, it is also possible to perform them without any break. All movements are in the 4/4 time signature, except for Part IV, which features a longer 12/8 metre. There are also minor variations of the metre in Part V (i.e. m. 330). The assumption was to keep the metrical structure of the whole composition as simple as possible, reducing it to the most common time signature of 4/4.

Each movement is intended to reflect a different hypothetical film situation. Part I establishes a mysterious mood with steadily growing tension. Part II has establishes a calm and slightly nostalgic mood. Part III has a fast tempo chase sequence taking into account numerous action turning points. Part IV has background generic music with a calm but ambiguous character, without any dramaturgical development. Part V has music with many hit points and a mysterious and energetic character that evokes a psychological tension.

Within the movements, piano modules were put together first, forming the structure of each part. The drum kit and percussion pattern-modules were added afterwards. There are, however, two exceptions. In Part IV, the whole structure of the part was based on a long (16 bar) drum kit pattern, and piano modules were added subsequently. In several places, drum modules were edited to match piano modules in order to highlight important parts of the movement. In the fifth and final movement, piano and percussion modules were combined simultaneously to equalise their dramaturgical engagement. When the formal structure of all parts was established the MIDI modules were recorded as audio files. Each part was

assembled in a dedicated Logic Pro arrange window. Then after each movement had been mixed, they were assembled into one continuous piece. See Volume II, Section 4, and Volume II, DVD 2, Folder 04, clip 04-01or clips 04-01-01 to 04-01-05 for individual parts.

7.2.1 Editing

Similarly to previous case studies, after assembly of the composition's final form, the music was subjected to various time-frame modifications (mainly to 15 and 30 seconds) in order to test the editing possibilities of the particular movement. During testing, only audio files were used. No time-stretching of modules was applied during adjustments. The first step was to create several edits to the 15 second time frame, and after that several 30 second edits were prepared. During the editing process, suitable modules were chosen and put against the 15 and 30 (i.e. 2 x 15") second measurement files (see the red regions in the figures), and adjusted to match the set length. Different configurations of modules were tested from simple, where a fragment of the composition was simply trimmed, to more complex configurations of modules coming from different sections of the tested part. Arrangements of suitable modules were prepared in two different ways. The first one was to edit the music so that the total length of the edit would fit the 15 or 30 second durations, **Figure 34** (see Volume II, DVD 2, Folder 04, clip 04-15).

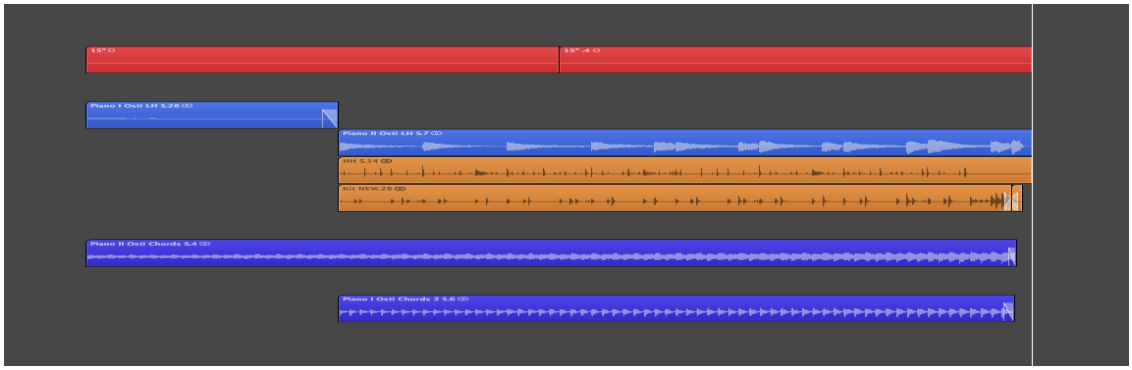

Figure 34: *Ostinatello*, modules from Part II edited to fit the 30 second time frame

The second approach was to prepare the edit so that the last note of the piece was synchronised with the end of the red ruler file, **Figure 35** (see Volume II, DVD 2, Folder 04, clip 04-16). In this case, the end of the edit is more natural and musical in comparison to the previous approach. However, the length of the music is slightly longer to allow the music to fade out.

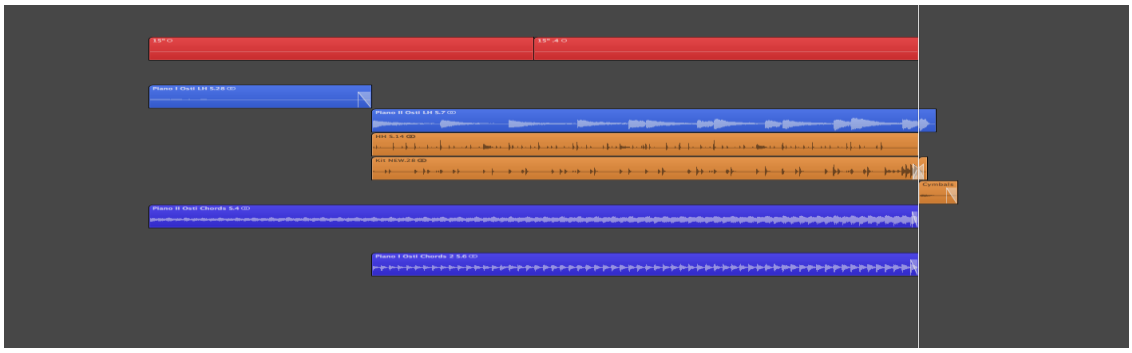

Figure 35: *Ostinatello*, modules from Part II edited to fit the 30 second time frame with the last notes synchronised with the end of the measurement file

During the testing process, the modules from different sections of *Ostinatello* movements were used to achieve a more complex arrangement. Finally, the last edit done to the 30 second

duration was to test whether it would be possible to achieve an arrangement which could fit the hypothetical film scene content highlighting potential hit points, see **Figure 36,** and Volume II, DVD 2, Folder 04, clip 04-17.

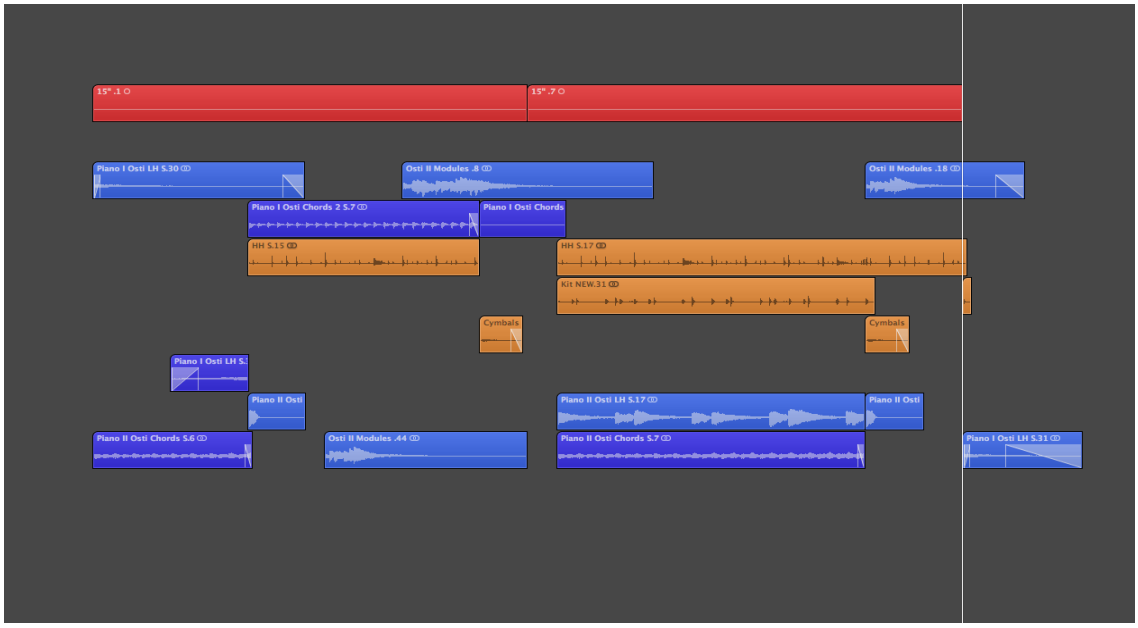

Figure 36: *Ostinatello*, a short 30 second cue assembled from modular components of *Ostinatello* Part II

Additional edits to different durations and featuring different configurations of modules can be found in Volume II, DVD 2, Folder 04, Audio clips 04-02 to 04-25.

The fast movements of *Ostinatello*, Part III and Part V were tested to selected fragments of the *Oxygen* movie promotional cut. The compressed nature of the promo cut offered excellent material for testing fast movements of the composition. The shorter fragment, 30 seconds, had been cut from the beginning of the promo and was used to test the flexibility of Part III of *Ostinatello*. For the test of Part V, a slightly longer 50" fragment had been chosen from the

end of the promo clip. Despite the fact that modules used for the assembly phase were not composed for these particular film clips, the author decided to attempt to illustrate them using unrelated modules. During the first step of this phase, a number of hit points were selected and marked. Next, the modules were selected and edited to fit the marked scene cuts and hit points, **Figures 37** and **38**. See also Volume II, DVD 2, Folder 04, video clips 04-18 and 04-26.

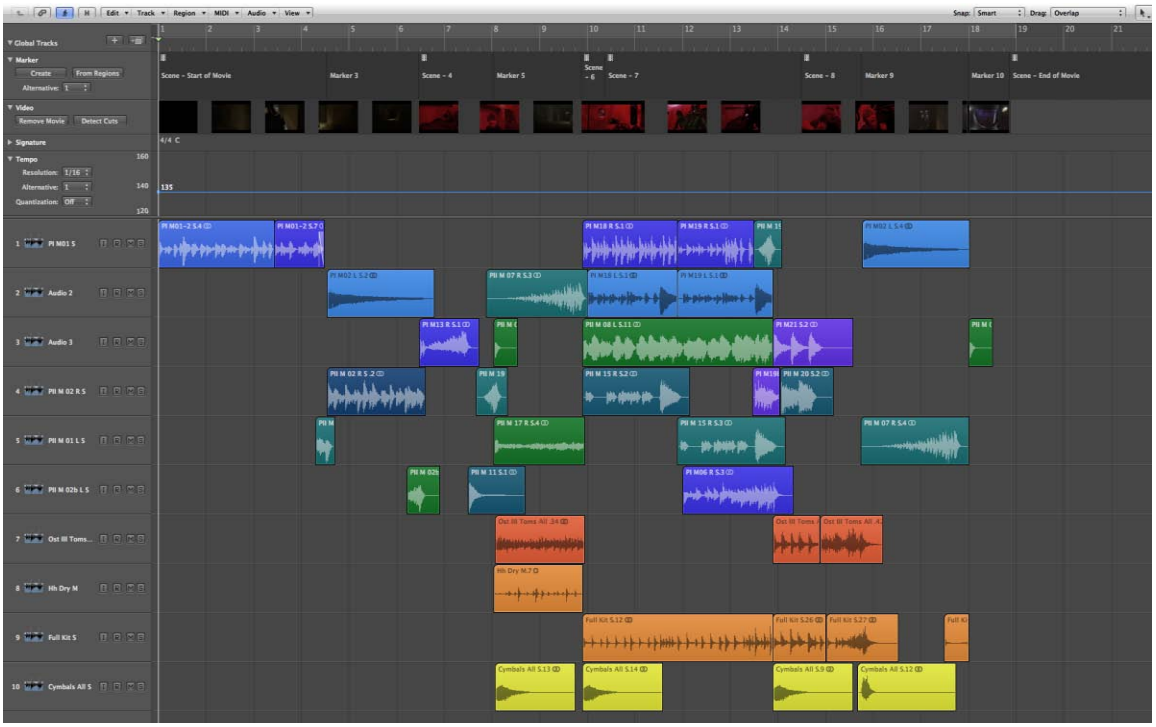

Figure 37: *Ostinatello*, modules of Part III of *Ostinatello* assembled for the test fragment of the *Oxygen* test clip 1

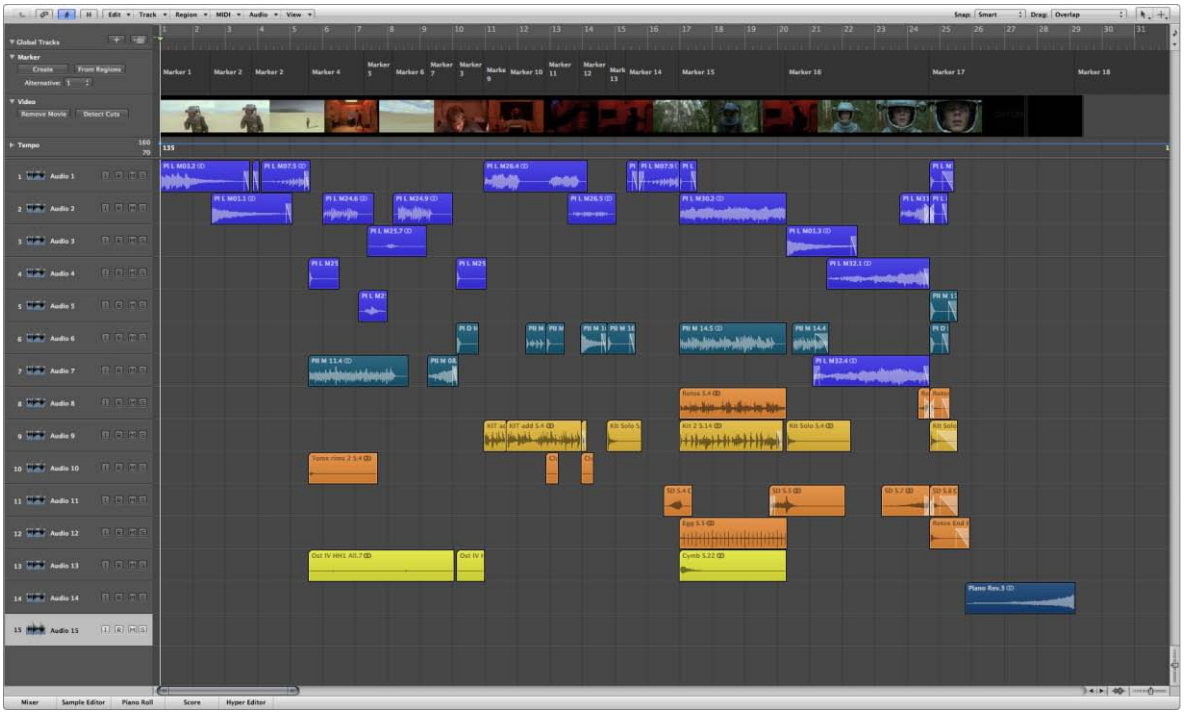

Figure 38: *Ostinatello*, modules of Part III of *Ostinatello* assembled for the test fragment of the *Oxygen* test clip 2 – a Logic Pro file available (see Volume II, DVD2)

7.3 Outcomes

As minimal music has, in fact, a modular structure, composing *Ostinatello* did not present problems in terms of maintaining the structural, minimalist idiom. Consequently, *Ostinatello* has demonstrated that minimal music built mainly from ostinato modules can be precisely synchronised with the visual component, and, as a result, provides dramaturgical support in a similar way to conventional film music. However, the degree of flexibility needed during the editing process depends directly on the planned structure and diversity of the design of prepared modules.

Part I of *Ostinatello* was constructed from one-bar modules only. The tempo of the movement was set to 60 BPM; thus, one quarter note equals one second. Thanks to this feature, it was easy to calculate the number of bars needed to fill a given time frame by simply adding or removing modules (i.e. bars). The simplicity of the musical structure of modules also allows for further arbitrary cuts within the bar, providing even more precision in fitting music to the given time frame. Additionally, it is possible to change the speed of accelerando, and extend or shorten the tremolando effect at the end of the part, **Figure 39**.

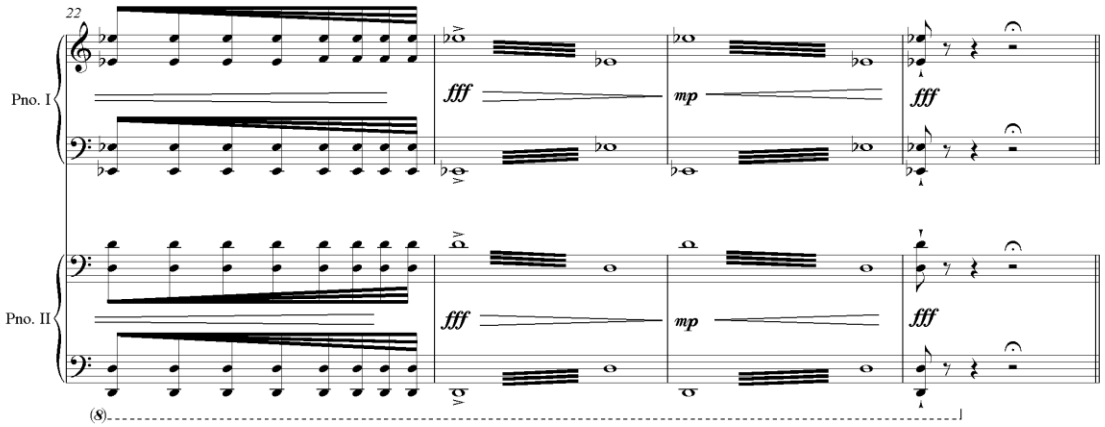

Figure 39: *Ostinatello* Part I (tremolando effect)

These features of Part I provide a great deal of flexibility needed to fit music to a hypothetical visual component (see Volume II, DVD 2, Folder 04, clips from 04-02 to 04-08). These clips present a number of edits of Part I to different time durations: 8'', 12", 15" (2x), 22", and 30" (2x).

Parts II and IV were composed to establish a certain mood to a hypothetical longer scene that would not require sudden changes in the character of the music, as well as to closely follow

the characteristics of minimalistic music. Part II was based on the four bar motivic ostinato (see **Figure 40)** repeated throughout the whole first half of movement.

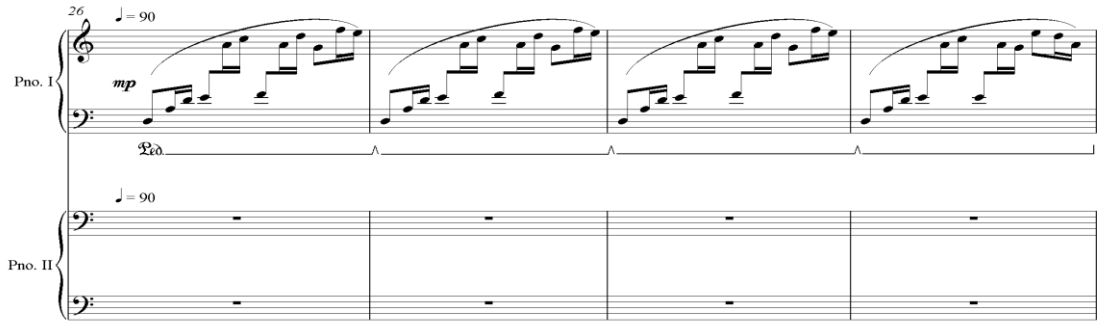

Figure 40: *Ostinatello* Part II, a motivic ostinato

Part IV, on the other hand, was based on a long (16 bar) drum pattern which dictated the modular construction of the piano parts. In both cases, the main aim was to test the possibilities of trimming typical minimalistic music. During the experiment, Part II was edited to both, 15" and 30" durations (see Volume II, DVD 2, Folder 04, clips from 04-09 to 04-17), showing that such edits are possible. Similarly, Part IV was easily edited to 15" and 30" time durations (see Volume II, DVD 2, Folder 04, clips from 04-19 to 04-25). In this case, several features that can facilitate potential edits were constructed. The first one includes the gaps between the modules as well as the fact that the duration of long notes can be trimmed (Piano I), **Figure 41**. The second feature is the structure of the drum kit module. Its long duration results in an impression of irregularity allowing for various cuts and duration modifications.

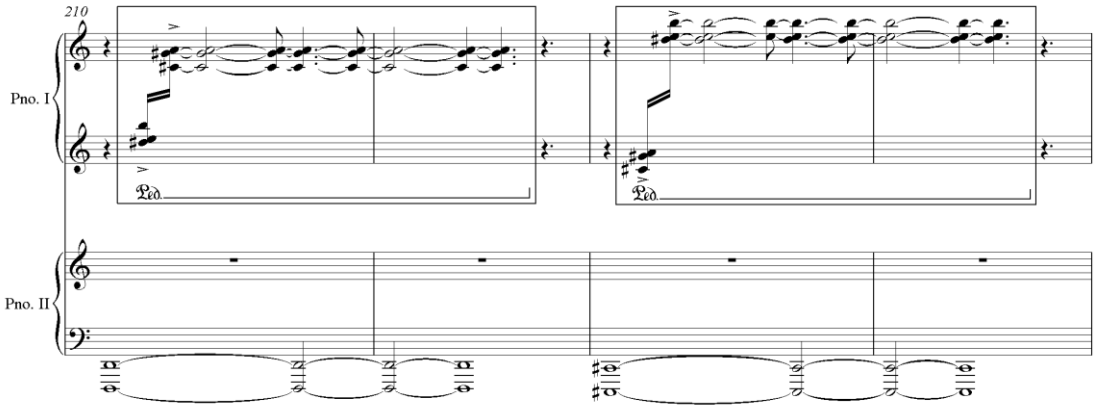

Figure 41: *Ostinatello* Part IV, gaps between modules

In terms of dramatic engagement into a (hypothetical) film plot, Parts II and IV are less active than traditional film music. Of course the interaction of music with film depends on a desired effect and functions music must fulfil. However, because it is possible to edit this type of music fairly precisely, the edited section of the composition can be followed by a section built from modules that reflect a needed on-screen emotion or dramaturgical situation. Sudden changes in the arrangement can be introduced; thus, it is possible for this type of music to be adjusted to follow on-screen action. These changes, however, have to be planned for in order to develop appropriate modules. Sudden transitions in the character of the music can be achieved by combining modules that are different in mood and texture and which come from different sections of the same composition or perhaps from a different composition (assuming that it is modular in structure). The following audio example (Volume II, DVD 2, Folder 04, clip 04-27) illustrates the combination of modules from Part I and Part II. The tremolando effect provides an abrupt transition which can be used for highlighting a turning point in the film's plot. Not only did the manipulation of modules fit the time durations, but it also gave

rise to the creation of more multi-layered musical structures, broadening the scope of possibilities for use in a film context (Volume II, DVD 2, Folder 04, clips 04-12 to 04-17).

Ostinatello's fast movements III and V were composed to provide a greater flexibility during the editing process, and to broaden the utility of minimal music in a film's dramaturgical context. This feature enabled relatively easy and quick adjustments of Part III and V to selected video clips used during the experiment. The transition from tonality to non-tonality in traditional film music is known to highlight various aspects of the film narrative (e.g. increasing anxiety and building suspense). This characteristic was a basis for the composition of movement III. The transition from diatonicism to chromaticism and the increase of harmonic density are crucial for the formal unfolding of movement III. This was done by gradually accumulating the modules leading to the climax, where clusters in both pianos were used (see **Figure 42**).

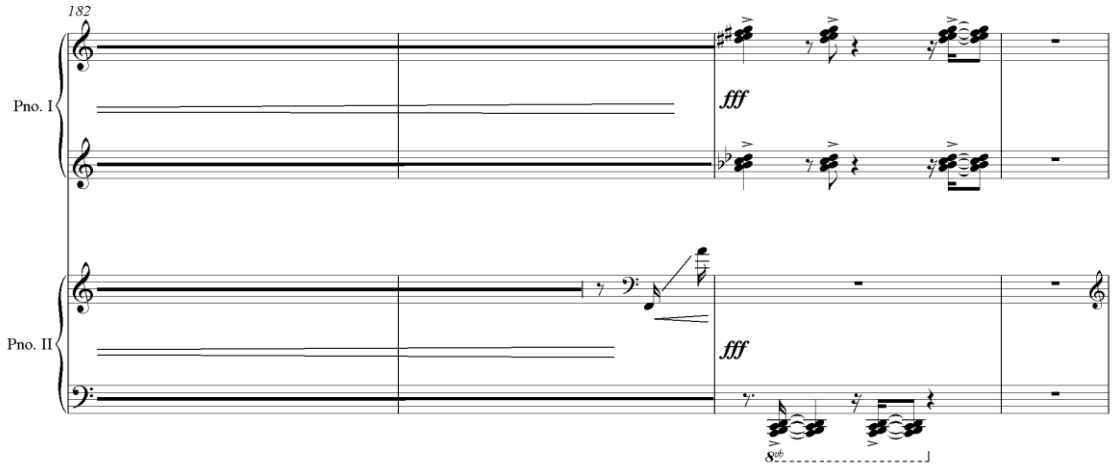

Figure 42: *Ostinatello* Part III, clusters

Part V is mostly non-tonal; however, the degree of chromatisicm of the beginning of the movement (right after the percussion is introduced) is less intense than the second half (see **Figures 43** and **44**). Moreover, the transition from the diatonicism of the first section of Part V to chromaticism is much more rapid than in Part III.

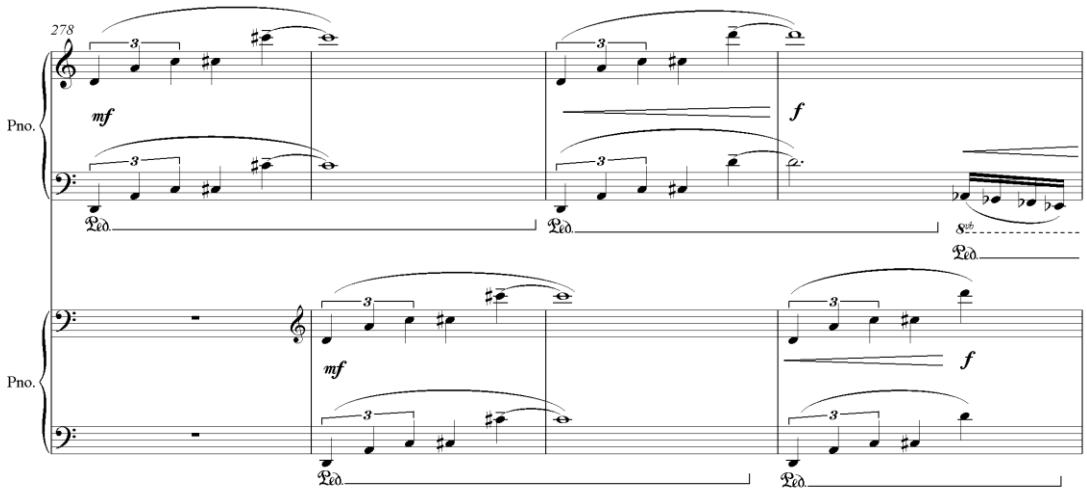

Figure 43: *Ostinatello*, section from the beginning of Part V

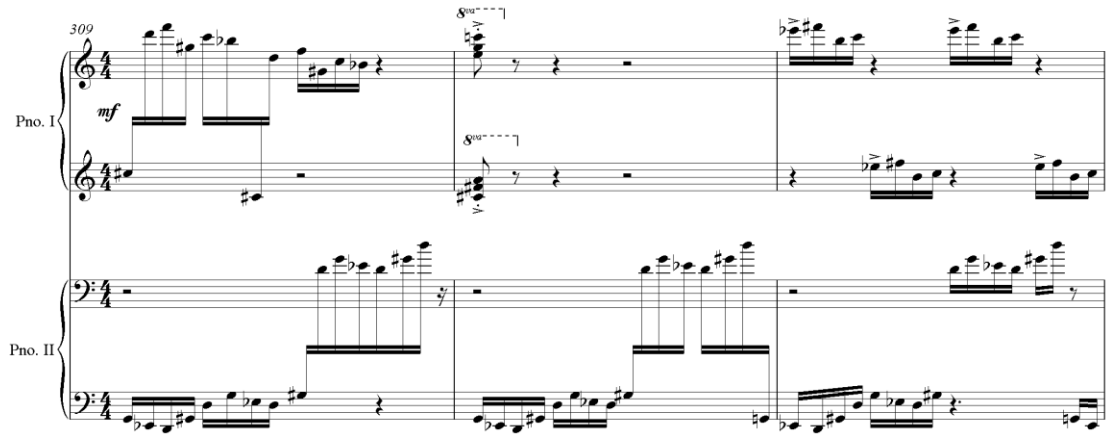

Figure 44: *Ostinatello*, section from the second half of Part V

The major feature of the second half of Part V is an episodic dialogue between the two pianos. In order to blur the clear-cut sections between modules, and obtain a more complex texture from relatively uncomplicated components a simple adaptation of Lutoslawski's chain technique was employed (see **Figure 45)**. The position of modules against each other was shifted in order to form overlapping layers.[171]

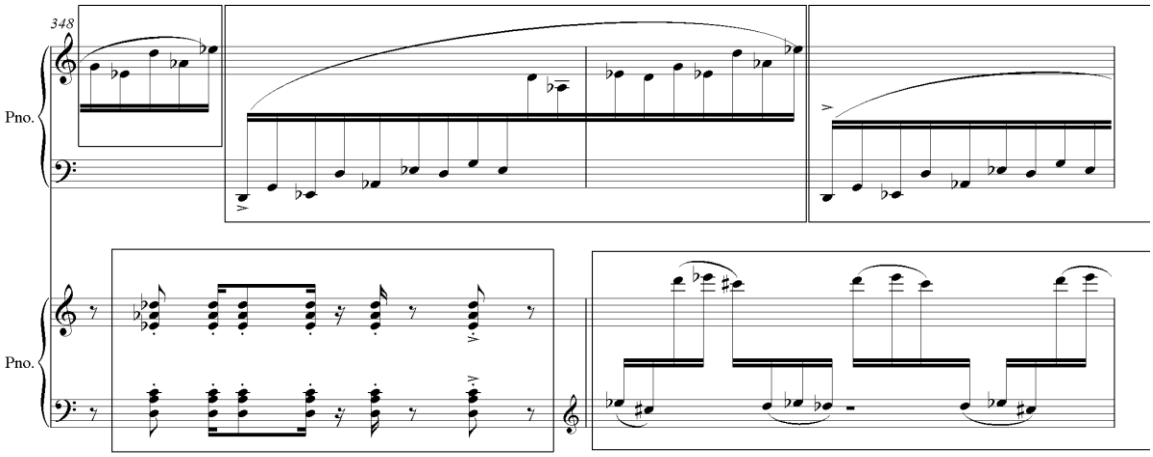

Figure 45: *Ostinatello* Part V, the adaptation of chain technique

As regards the flexibility of the musical structure of Parts III and V, tests showed that both the design of the modules and the way the modular components were used during the construction of the parts brought a high level of flexibility. Consequently, preparation of the cues for the selected film materials (*Oxygen* movie promo fragments) did not present any difficulties, and the whole process was quick. Thus, the scoring process of the shorter clip, from the moment of import of video clip to Logic Pro, took approximately 20-30 minutes.

[171] A structural procedure, that results in a composite form where the beginnings of sections or strands of the material overlap and interlock. The technique is characteristic for Lutoslawski's late style (e.g. *Chain 1* (1983), *Chain 2* (1984–5), *Chain 3* (1986), however, elements of the technique can be also found in earlier works, i.e. *Mi parti* (1976)), allowing for maintaining coherence and unity of the form.

Assembly of the music for the longer clip took around 40 minutes. The general outcome was satisfactory, especially that the music that illustrates video test pieces was not composed to accompany these particular clips. It must be noted, however, that in both cases, apart from highlighting selected by the author synchronisation (hit) points music unintentionally matched a number of additional (not selected) shot transitions. As Rona observed, synchronisation of the cue with a lot of hits and transitions becomes easier as the tempo of the music increases (1999, 10). This does concern both the structure of the scene with the hit points as well as the inner rhythms of the images. Thus, a composition such as *Ostinatello* could lend itself well for film, as musical rhythm in many instances would "synchronise" itself with on-screen events almost naturally. This feature also influences the editing of this type of composition. Consequently, as editing experiments showed, longer modules can help to maintain the coherence of the music.

7.4 Limitations

Despite the relatively uncomplicated process of creating a minimalistic piece such as *Ostinatello* a couple of important drawbacks need to be indicated. As mentioned in the Methodology section to this case study, minimal music is characterised by some distinctive features such as lack of traditional melody, the presence of regular pulsation and homogeneity of sound, etc. Thus, extensive modification of modules, both in terms of their placement against each other, as well as more extensive modifications of their melodic and rhythmic structure, may lead to breaking the minimalistic paradigm. This can be clearly observed in Part V where the initial minimal character is blurred or even decomposed by manipulation of

the modules in order to achieve increased expressiveness and harmonic variety, as well as flexibility (**Figures 46** and **47)**.

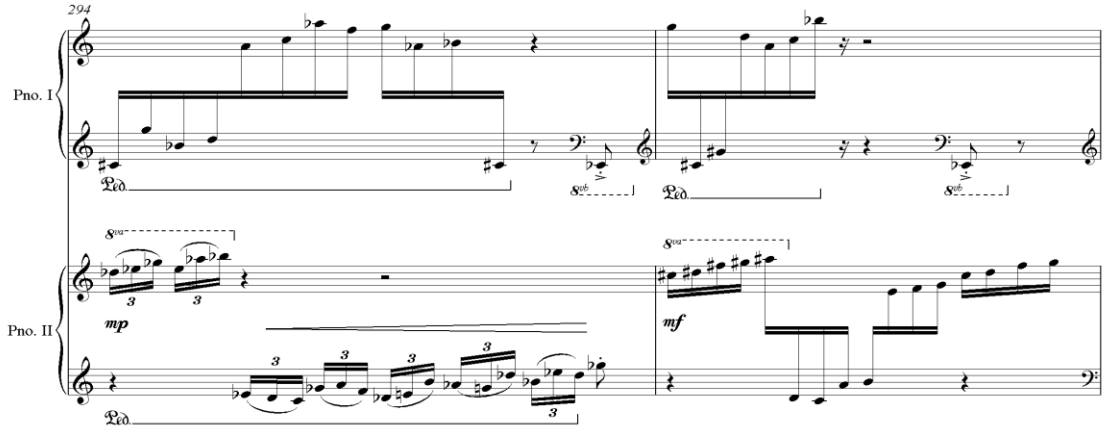

Figure 46: *Ostinatello* Part IV, beyond the minimalistic paradigm (example 1)

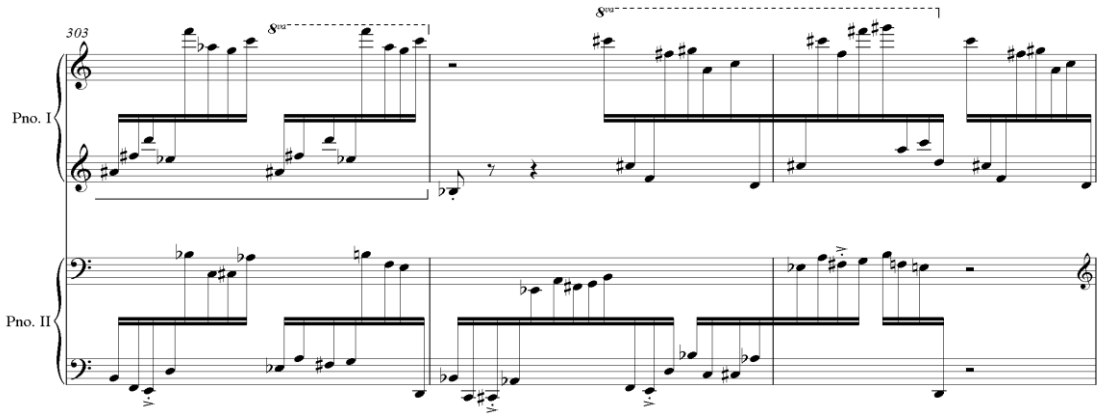

Figure 47: *Ostinatello* Part IV, beyond the minimalistic paradigm (example 2)

During the compositional process of *Ostinatello* the author approached the piano parts in such a way that each performer's hand, in many cases, was treated as an independent monophonic instrument (**Figure 48)**.

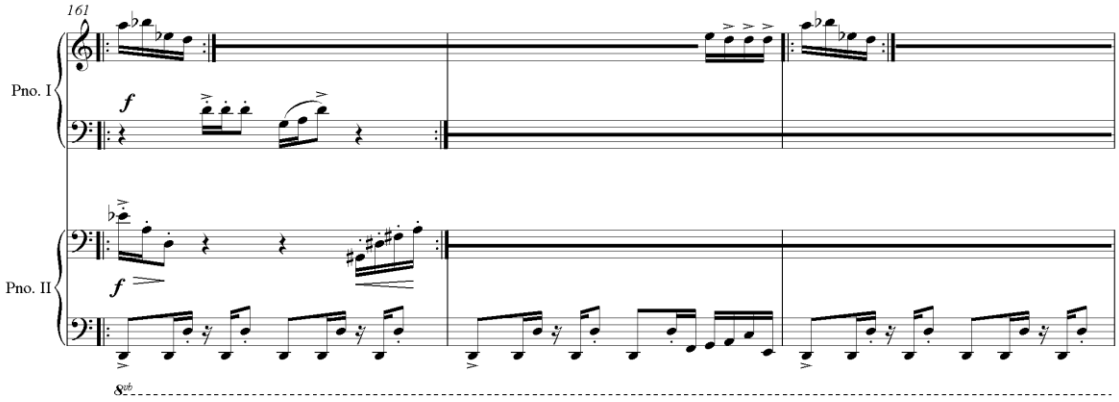

Figure 48: *Ostinatello* Part III, the example of independent lines

The character of these piano parts was influenced by electronic music and its extensive application of ostinato figures produced by arpeggiators.[172] This approach was mainly used in Part III where each piano realises a chain of ostinato sequences. Precision in execution of these sequences, as well as precise accentuation, is crucial for the character of this part. Here, the problem of whether the music will be realised by the computer or a performer reappears. The precision of a computer performance is almost impossible to achieve by a human being. Thus, Part III would cause a lot of performing difficulties even in the recording studio. Having this in mind, the author decided to review the whole movement, and also some sections of Part IV, to ensure that successful live performance of *Ostinatello* would be possible. The main issue was connected with preserving the character of the composition, yet providing spots where performers could rest. Thus, the bass part of the second piano in Part III was simplified. There were also modules in the piano parts (Part III) which were generated by using percussion rhythmic patterns. For instance, the opening module of Part III was, in

[172] Arpeggiator is a musical device that automatically performs a sequence of notes based on input notes or chords.

fact, a hi-hat pattern with very erratic accents. In order to simulate it on the piano, and to enable live performance, the module had to be arranged for both hands. Thus, instead of repeating one pitch the octave displacement was used, which is particularly effective with arpeggiated figures. This provides variety, but also helps to maintain the tempo and the unique character of the original module (see **Figure 49)**.

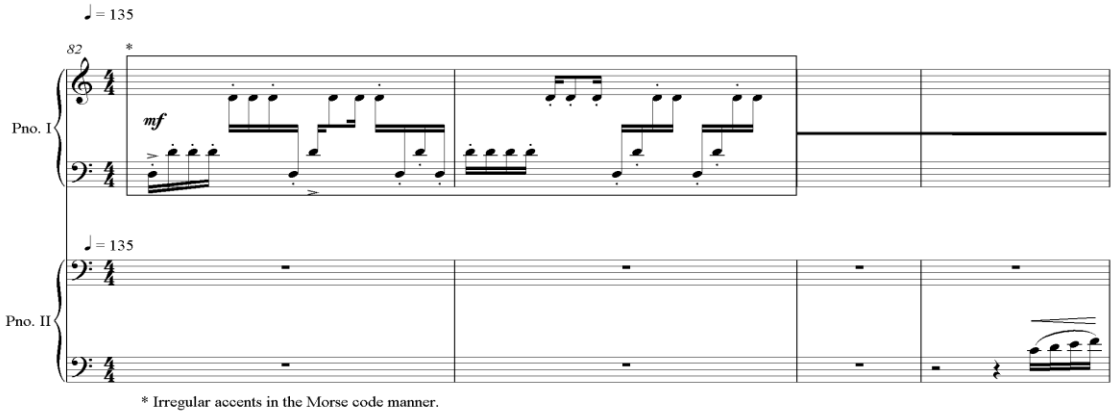

Figure 49: *Ostinatello*, Part III, the opening module

Rests were also introduced in all four hands to provide relaxing spots from monotonous repetitions of the ostinati (see **Figure 48**).

7.5 Conclusion

In summary, in accordance with Cooke (Cooke, 2008, 478) and as opposed to Eaton (Eaton, 2008, 38), film music rooted in the minimalist idiom such as *Ostinatello* was found to be able to provide both an overall commentary to the hypothetical scene and a more precise synchronisation with a film narrative (even in the situation when music was recorded before the film was shot). As Cooke notes, this music can be composed quickly, allowing for last

minute and precise changes. The experiment of adjusting Part III and Part V to the *Oxygen* promo cuts confirmed this observation. *Ostinatello* demonstrated that expressiveness of minimal music can be extended by different means, including irregular accentuation, unexpected pauses, and the use of dynamics and density of the music. The piece demonstrated that it is possible to enhance the tonal character of minimal music by transposition of the pitch material within ostinato-modules or by intentional juxtaposition of modules with a contrasting key. Despite providing all of these features, the music remains simple enough to fit into a dense feature film soundtrack.

Chapter 8: Case study 5 – *Cut the Moon in Half*

8.1 Rationale for the composition

Cut the Moon in Half is a composition that combines an orchestral sound with electronic elements. The piece is orchestrated for: 2 flutes, 2 oboes, 2 clarinets, 2 bassoons, 4 horns, 3 trumpets, 2 trombones, bass trombone, tuba, 5 percussionists (timpani, roto-toms, snare drum, bass drum, cymbals, tam-tam, triangle, wood block, xylophone, vibraphone, and chimes), piano, strings (ideally 14, 12, 10, 8, 6/4), and a sampler that supplies pre-recorded electronic music. The duration of the composition (Version 1 (v1)) is approximately 11'. The key features of *Cut the Moon in Half* are the treatment of orchestration and the possibilities provided by the modular approach for obtaining different colouristic combinations. The accompanying scores can be found in Volume II, Section 5. Audio examples and Logic Pro files can be found in Volume II, on DVD 2, Folder 05 and Folder 07-05.

Following current standards in the action/adventure genre, *Cut the Moon in Half* combines acoustic and electronic elements. The focus of the composition was on the application of contrasting compositional techniques and the textural and colouristic combinations they can offer. Avant-garde techniques of the 1960s and 1970s are commonly used in film music because of the diversity of their illustrative possibilities. During the compositional process of this piece, however, the techniques were reviewed and applied in light of their usefulness in achieving flexibility of the structure of the composition. In this work, the author reviewed accomplishments of such concert and film composers as Witold Lutoslawski, Krzysztof Penderecki, György Ligeti, John Corigliano, Elliot Goldenthal and Jerry Goldsmith.

The composition also addressed the problem of coherence in a piece constructed from modular components. The issue had already been investigated in *Collection Basket* and

Oxygen case studies, but this time it was done in a more expanded and defined orchestral form with an additional focus on instrumentation and the role of colour as a binding element of the music. The third problem examined in this piece was the possibility of building the dramaturgy of the piece without reference to conventions associated with tonal music.

8.2 Methodology

The structure and character of *Cut the Moon in Half* were inspired by the surrealistic film *Un Chien Andalou* (1929) by the Spanish director Luis Buñuel and by the artist Salvador Dali. The film lacks traditional narrative, it is a stream of extraordinary and irrational images designed originally to shock and provoke. Similarly, the form of *Cut the Moon in Half* was assembled from a series of loosely connected episodes. This approach was intended, in the broad sense, to reflect the construction of Luis Buñuel's images.

The composition was completed according to the three step methodological scheme as in previous pieces in the folio. *Cut the Moon in Half* Version 1 (v1) comprises nine major sections from I to IX. As v1 is available as an audio file only, the timings of the major sections of this piece are as follows:

I 0' 00" – 0' 41"

II 0' 41" – 2' 04"

III 2' 04" – 2' 17"

IV 2' 17" – 2' 55"

V 2' 55" – 3' 30"

VI 3' 30" – 4' 38"

VII 4’ 38” – 5’ 55”

VIII 5’ 55” – 9’ 00”

IX 9’ 00” – 10’ 41”.

Sections differ from each other in duration, tempo, metre, texture, application of different compositional techniques, and character (to illustrate different film situations). Particular sections have a continuous structure and form separate entities. Only section V has a more compound construction and consists of four smaller sub-sections. One of the ideas behind the creation of *Cut the Moon in Half* v1 was to construct a coherent piece built from components exclusively prepared for this composition, as well as modules that were written for previously composed pieces (in the folio in the ratio of approximately 60 to 40 percent).

The compositional process began with the selection of suitable modules from previously composed pieces, including the music for *Oxygen* as well as new material (modules for acoustic and electronic instruments). Due to the fact that the music for *Oxygen* used only a small number of the modules that had been prepared, the remaining ones were used extensively in *Cut the Moon in Half* v1. The assembly of the main sections was done so that each one is a blend of old and new modules, thus there is no section built purely from the former or the latter.

The thematic material for the whole composition had been based on modular components of *Collection Basket* which became a leitmotif (mm. 21-41) of the composition. Consequently, this leitmotif (melodic material from section II of *Collection Basket*) reappears three times during the composition, thus dividing it into three parts. Every appearance of the thematic

material is characterised by subtle differences in orchestration, and each time the melodic line is slightly shorter than the previous one (e.g. 33, 30, and 28 bars). The entire fast section (III) of *Collection Basket* with a slight augmentation (by repeats) was used for the coda of the *Cut the Moon in Half*.

Most sections of the composition were prepared without planning possible transitions to other sections beforehand. In the case of some sections, however, this development was planned and preserved in the final form (e.g. sections IV – V, VII – VIII). When all major sections were ready they were combined together into one continuous piece, see Volume II, DVD 2, Folder 05, clip 05-01.

The composition applies various compositional techniques such as: *musique concrète*, twelve-tone method, cluster technique, unconventional instrumental playing techniques (clusters, glissandi, quarter-tones, *sul ponticello*, tapping on the body of the instrument, snapping the strings against fingerboard), micropolyphony technique, aleatory technique, minimalism, application of extreme registers of instruments (i.e. highest pitches possible), combining layers of sound, non-metric notation, and free improvisation. *Cut the Moon in Half* v1 is mainly non-tonal, although, a steady tonal pitch on the note d natural can be distinguished.

As regards the application of electronics in the composition, no *purely* electronic section was used. All electronic components always appear as a blend with acoustic instruments. The electronic modules were divided into three groups: a) pure electronic, b) recordings of real performances, and c) processed acoustic sounds. The three categories comprise drones, solitary chords, arpeggios, loops, as well as prepared fragments of different performances of

string quartet (i.e. b and c categories as above). The presence of electronic modules in the piece plays a supportive role only. Their aim is to add additional colour (e.g. sections I, IV, VI), delude the audience (only in the concert hall situation) by mixing acoustic sounds with recordings of acoustic performances (e.g. section VII), and finally to provide a rhythmic base for the orchestra (e.g. section VIII). The character of the electronic modules used (i.e. pads, drum loops) refers directly to popular music. During the course of the composition, electronic modules are used in layers, from a single layer up to three layers.

8.2.1 Editing

In order to test the flexibility of the structure of *Cut the Moon in Half* v1, similarly to the previous case studies, the *Oxygen* promo cut of the film was utilised. This time, however, the full-length (i.e. 2' 7") video clip was used. As noted in the previous case study promotional cuts are usually a compressed version of the most interesting sequences from the film. Due to the time limitation, the montage is complex. This presented a perfect opportunity to test the adjustability of the modular approach with a complex piece such as *Cut the Moon in Half*. Additionally, during the experiment the author decided to test how digital editing tools (e.g. time stretching) influence the flexibility of the modular composition. In order to do so, all modular components of *Cut the Moon in Half* had to be recorded as audio files. Thus, the ones that were initially recorded as MIDI files were converted to audio. The idea behind this experiment was linked to the assumption that the promo cut was a hypothetical film project that required music. Thus, according to the author's approach, music was composed during the shooting of the imaginary film (i.e. the final form of *Cut the Moon in Half* served here as a suite of ideas for the film project) and then recorded with the "orchestra" during a hypothetical recording session before the final cut of the film (in this case the promo cut of

Oxygen) was delivered. All the modules were recorded independently (i.e. string modules, piano modules, electronics, etc.).

The next step of the experiment started when the hypothetical final cut had been delivered to the composer for scoring. The first step was to determine how the narration should be supported by music. In this regard the author decided to follow the dramaturgy of the music composed for the promo cut of *Oxygen* (i.e. Case study 3). The whole clip is divided into three major Acts: 1) "dramatic" – Xavier is taken by security agents, 2) "static" – shows Xavier's work and his journey which leads him to discovery of the truth, and 3) "chase" – a compilation of up-tempo sequences from the film. This structural scheme influenced the selection of modules which were grouped in three sets, corresponding to the film structure. The scoring process was similar to the *Oxygen* case study. The video clip had been imported to the Logic Pro software. The next step was a careful spotting of the clip and identification of the hit points that needed to be highlighted. Unlike in the original music for the *Oxygen* promotion cut the author decided to set a relatively large number of hit points, as that was crucial for the experiment. A total of 37 hit points were selected (much more than a two minute clip would require, causing a "mickey-mousing" effect in some sections); they were highlighted with markers and associated red-coloured audio files (i.e. a prepared-piano percussive effect), see **Figure 50.**

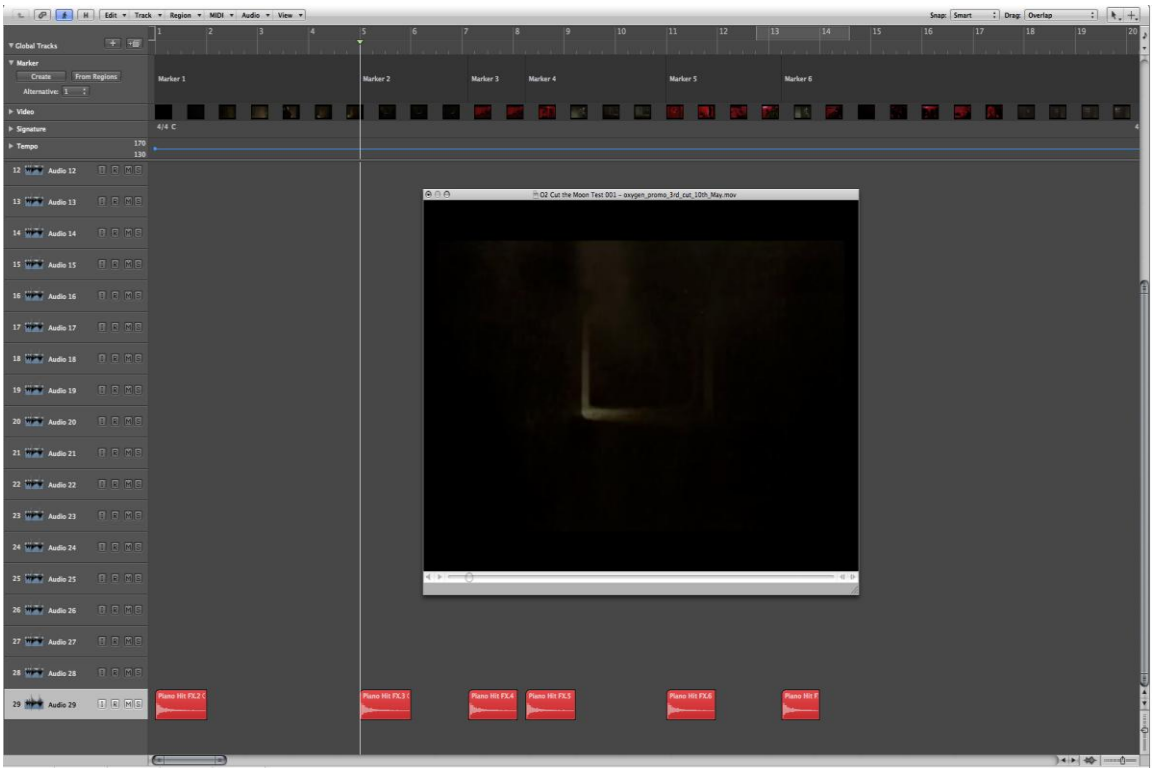

Figure 50: *Cut the Moon in Half*, the edit [173]

When all the hit points had been selected and marked, the assembly process of the music could start. The modules prepared for the main sections of the movie clip, one by one, were imported into dedicated audio tracks in a Logic's arrange window. As soon as all modular components were in place the process of adjustment could start. There were three main ways the modules were adjusted to match the marked hit points. The first and easiest procedure was simply to correct the length of a module. This concerned drones, sustained chords, and sequences. **Figures 51** and **52** show the process of adjusting the cello portamento module, from section I of the composition.

[173] The red-coloured files are supposed to help the reader to spot hit points on the illustrations.

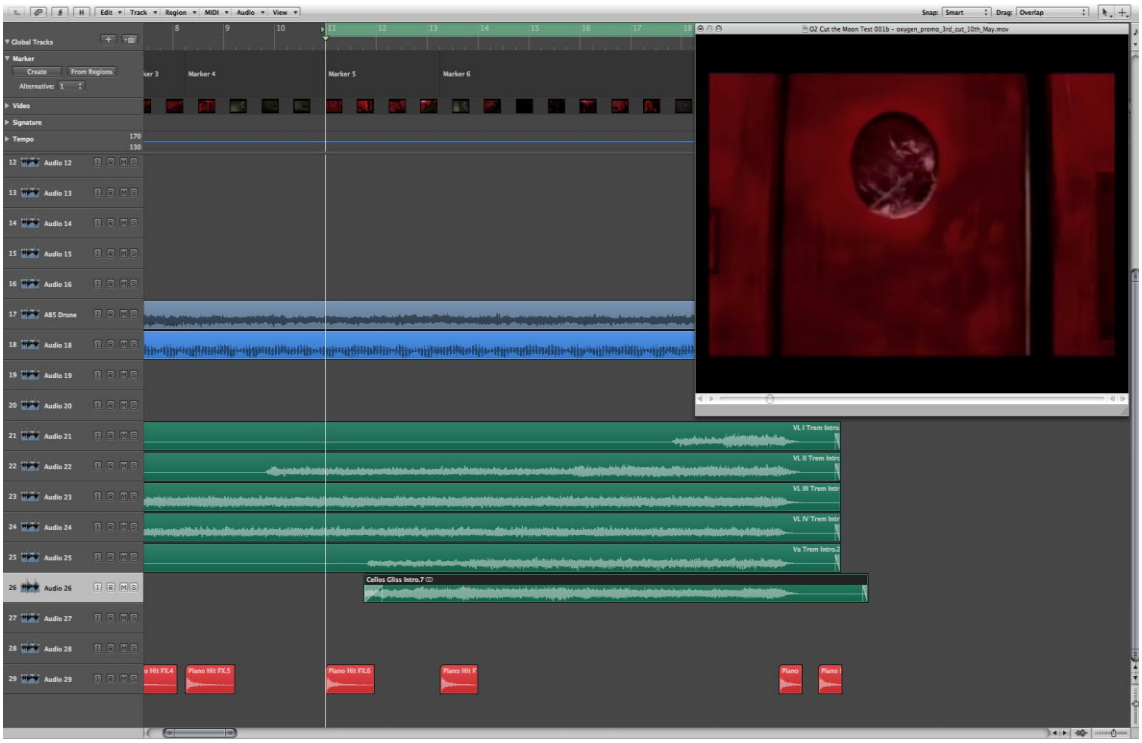

Figure 51: *Cut the Moon in Half*, adjustments to the cello portamento module

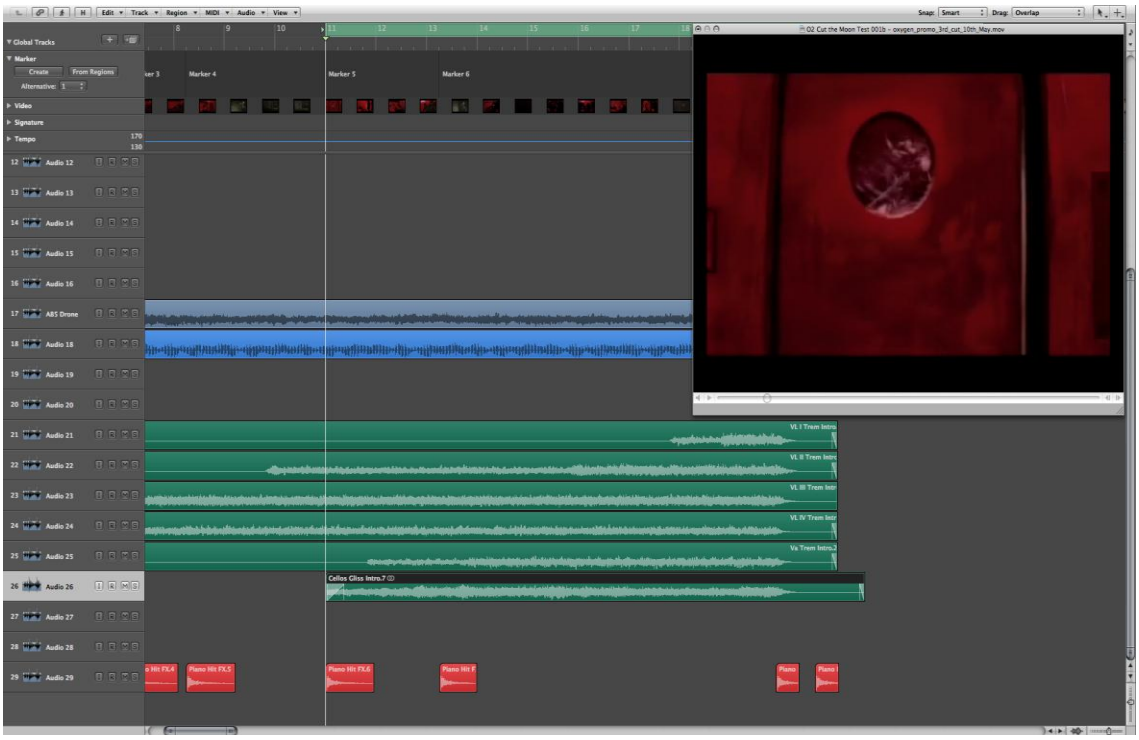

Figure 52: *Cut the Moon in Half*, after adjustments to the cello portamento module

In the second situation, when a recorded file was not long enough, a module was extended through montage (see **Figure 53**). A section of the module was cut off, and then copied in order to extend the overall length of the file. The crossfades were applied to mask any possible clicks and transitional discontinuities between edited sections of the file. Of course, this edit could have been done by applying the time-stretching algorithm (i.e. flex time tool), but it was part of the experiment to test different methods of editing.

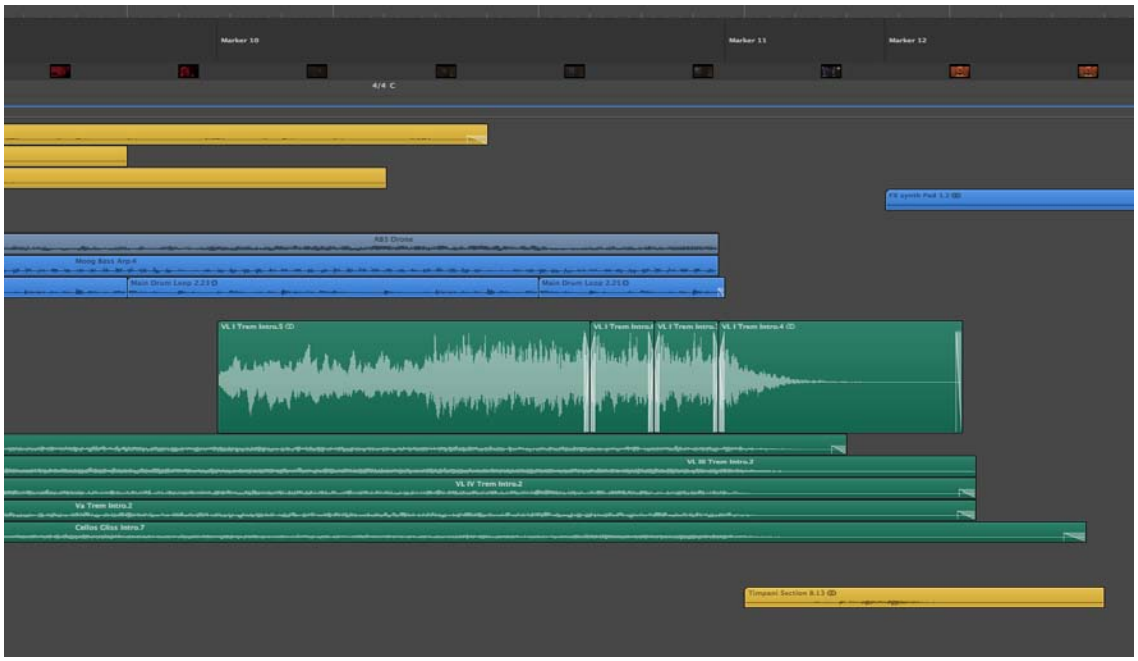

Figure 53: *Cut the Moon in Half*, extension of the string module

In fact, on many other occasions the Logic's time stretching algorithm was used. The flex tool was introduced in Logic Pro 9 (a major update to the Logic Pro 8 used during the composition of music for the *Oxygen* drama); this presented an opportunity to test the flexibility of the modular approach in conjunction with a new audio editing device. Time stretching editing allows for modification of the timing properties of audio files, thus reducing the need for

laborious standard editing procedures, for instance to change the duration of notes (i.e. shortening and lengthening). Consequently, after selecting the algorithm's appropriate mode (i.e. a rhythmic mode was applied, as it is the most universal one, and it provided good results), the flex time tool was applied both to change positions as well as durations of notes within edited modules.[174] **Figures 54** and **55** show the editing of a twelve-tone passage (xylophone, and woodwinds) to match on-screen events, at the beginning of the promo cut. Orange and green colour-coding are used to indicate expansion and contraction, respectively.

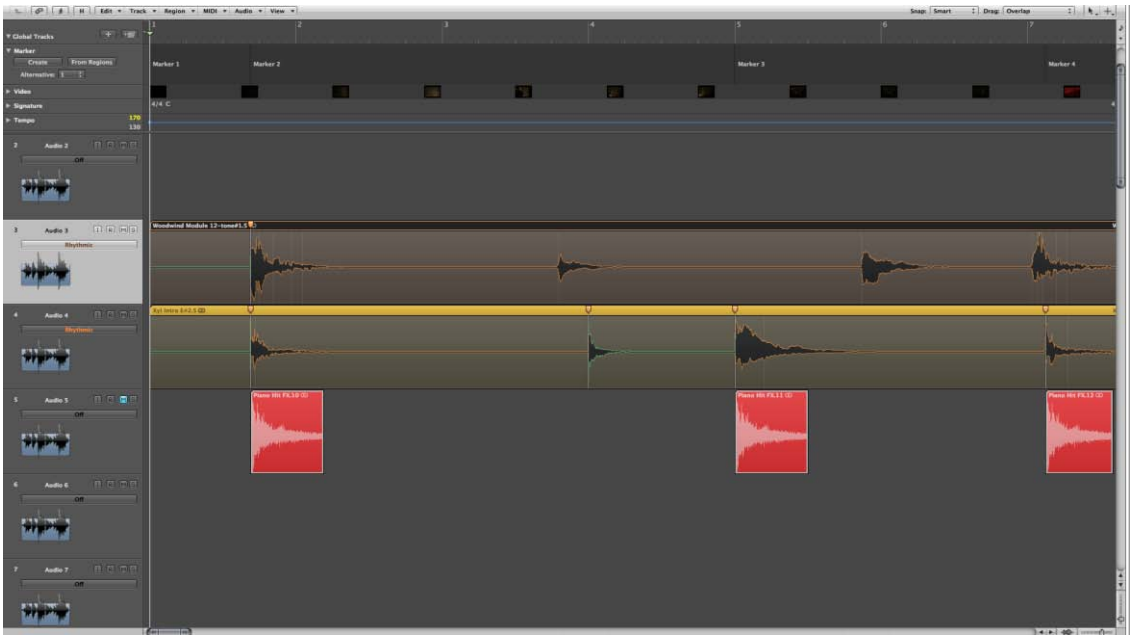

Figure 54: *Cut the Moon in Half*, adjustments to the positions of notes

[174] It must be stressed that there are limitations to digital editing and its extreme application may result in a drop in quality of the edited material (i.e. audible artefacts).

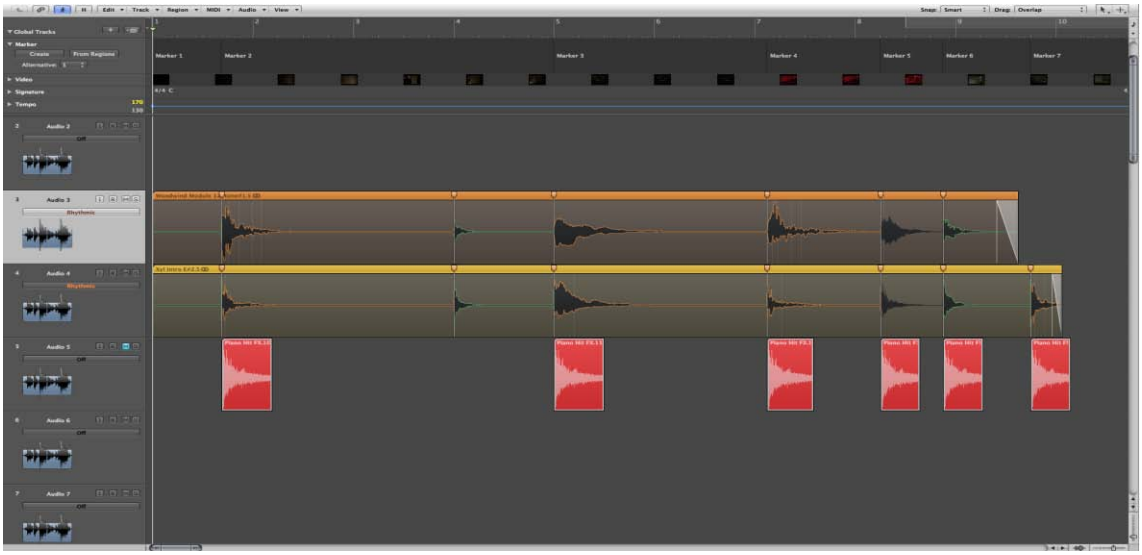

Figure 55: *Cut the Moon in Half*, edited modules matching all 6 selected hit points

In the above example, the editing process was easy and there were no audible artefacts in the audio quality. Predictably, the pointillistic texture facilitated easy cutting, and the same effect could have been achieved by means of traditional editing techniques. However, thanks to the flex time tool, adjustments were only a matter of moving notes into a desired position without a need to cut the audio file. In the very same fashion, the brass module (at the end of the first section) was edited. This time, however, it was a polyphonic material. After several attempts the author was able to achieve satisfactory results. Application of Logic's digital editing feature produced minor artefacts; but in the final mix they were unnoticeable.

When all the hit points were highlighted and the final form of the music was satisfying (to the author) the mixing stage commenced. The preparation of the music (i.e. assembly of modules and mixing) for the two minute clip took the author approximately three hours. **Figure 56** shows the final appearance of the arrangement of the piece (Volume II, DVD 2, Folder 05, video clip 05-02).

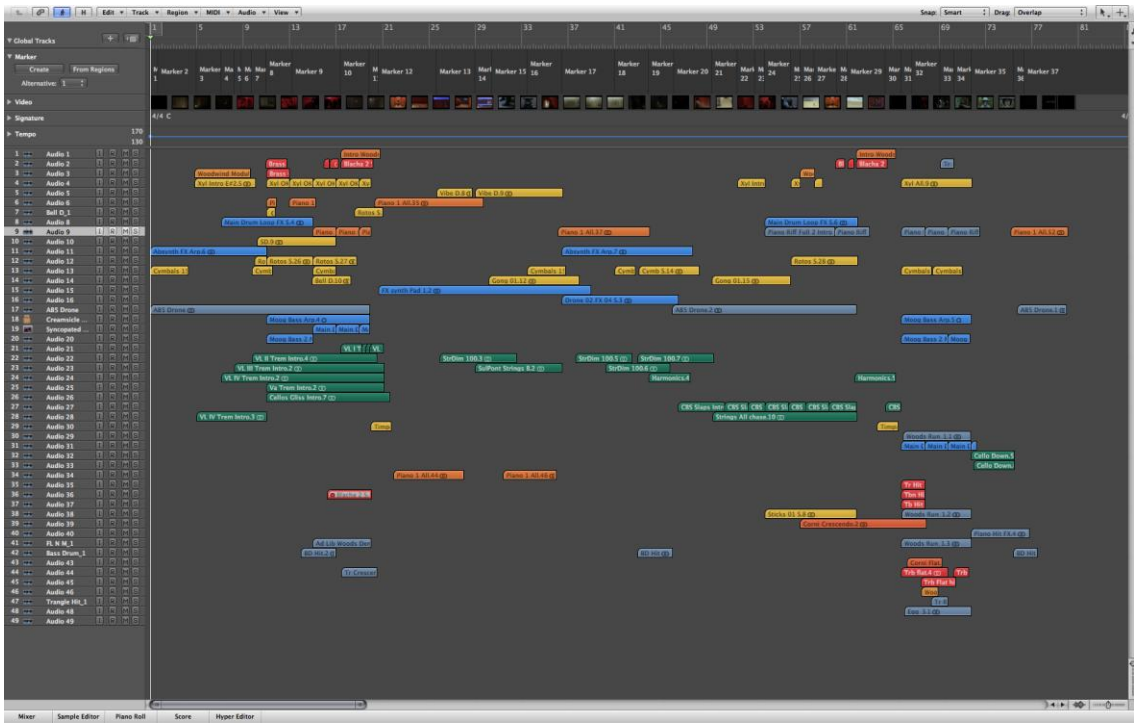

Figure 56: Final arrangement of modules for the *Oxygen* promo cut clip – a Logic Pro file available (see Volume II, DVD2, Folder 07-05)

8.3 Outcomes

Cut the Moon in Half brought satisfactory results regarding all three objectives indicated in the chapter's introduction: flexibility, coherence, and dramaturgy.

The flexibility of the composition was achieved on several levels both at the macro level (i.e. the form of the piece) and the micro level (i.e. the design of individual modules). The applied compositional techniques also increased the elasticity of the piece. The entire form of *Cut the Moon in Half* v1 was obtained from nine larger sections where particular sections could be removed or their order within the form could be altered. The individual sections can also be treated independently as standalone cues/units, or they can be combined with other sections.

Thanks to that, a range of possible durations of the composition can be achieved. Furthermore, the internal (modular) construction of the sections allows for additional modifications (i.e. rearrangements of the modules' order, and their placement especially on the horizontal plane). Thus, the duration of a particular section can be changed, bringing a more precise control over the time frame of the piece. Additionally, single modules can be subjected to modifications that can change their duration (i.e. cuts and repeats).

Flexibility of *Cut the Moon in Half* was also enlarged greatly by the application of the range of different compositional techniques. The first and the most basic of them was the technique of composing in one key. This strategy allows different elements and sections of the music to be combined easily. This technique is frequently used by video game composers. That is why, despite the overall non-tonality of *Cut the Moon in Half*, there is a steady tonal centre on d natural. Thus, the modules were chosen (i.e. from previous compositions), newly written and combined with each other to orbit around this particular pitch. For example, the woodwind module doubled by the xylophone module from section I is based on a twelve-tone row in which the first three pitches (d, f#, a) belong to a d major chord, **Figure 57**.

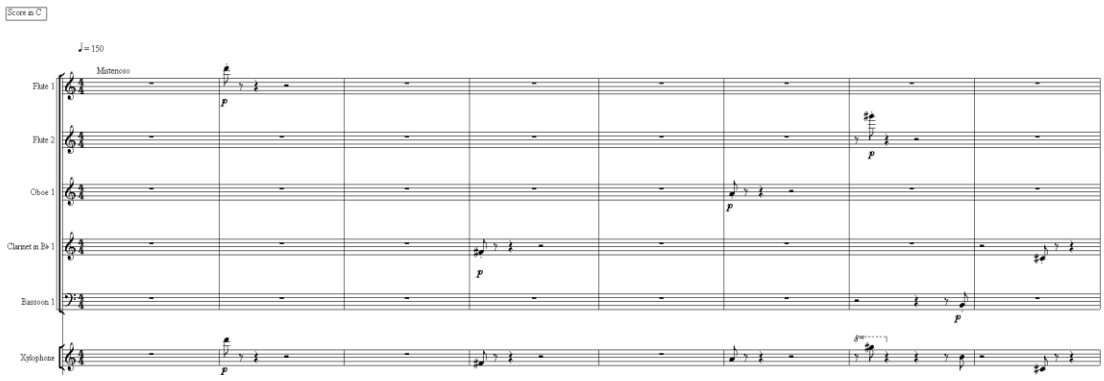

Figure 57: *Cut the Moon in Half*, twelve tone row (fragment)

On the other hand, the general non-tonal character of the piece permits mixing of modules from different sections, both on vertical and horizontal levels allowing for testing different colouristic and textural combinations.

The use of improvised elements and ad libitum fragments provides flexibility in terms of the duration of given sections of the composition (i.e. section VII). It is an especially convenient solution when the music is recorded with live musicians. The durations of these sections are dependent on the conductor's instructions, and can be adjusted easily as needed during a recording session, **Figure 58**.

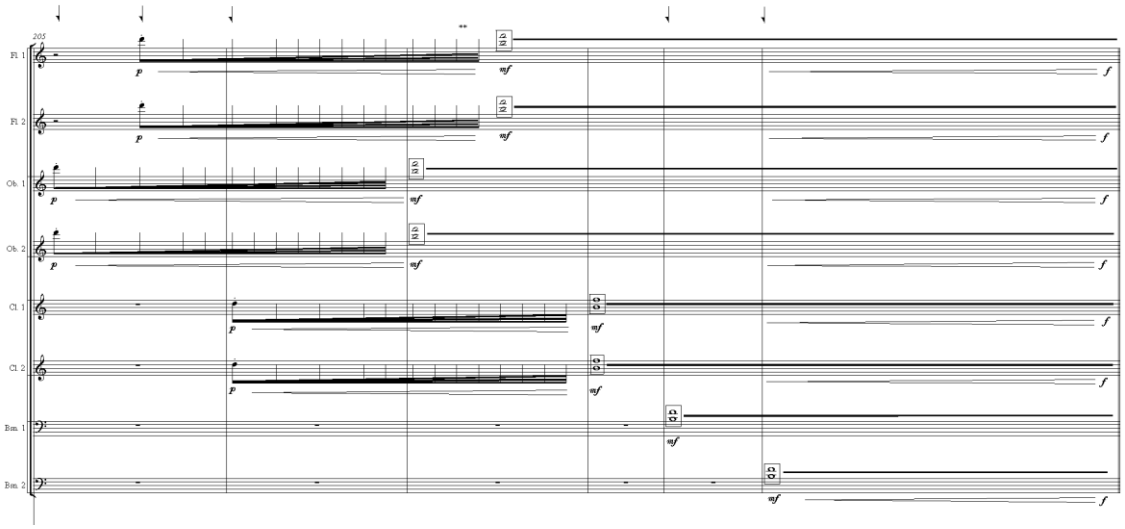

Figure 58: *Cut the Moon in Half*, a fragment of the section VII – woodwinds

Writing in the pointillistic manner, as was mentioned earlier, facilitates sudden cuts, and pauses between events within modules, allowing for their modifications. The twelve-tone row module from section I of *Cut the Moon in Half* can be cut into 12 one-note mini-modules.

These modules, for instance, can be reused to articulate certain pitches in other sections of the composition.

Next, in sections II, VI, and IX, adaptation of Ligeti's micro-polyphony technique provided a harmonically and rhythmically ambiguous sound bed upon which modules can be laid, regardless of their key and rhythmic structure. Consequently, modules can also be altered or shifted to match on-screen events (**Figure 59**).

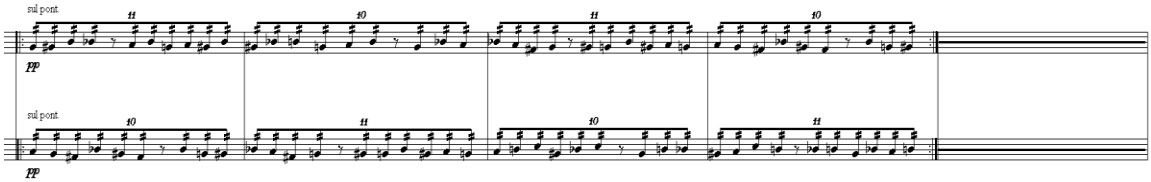

Figure 59: *Cut the Moon in Half*, micropolyphony technique used as a background for a melody line

Application of the modular approach had already provided flexibility to meet the requirements of the film scoring (i.e. mapping and highlighting hit points). However, the application of digital editing tools such as the Logic Pro's flex time tool provides the composer with even more control. This is significant, as it concerns the manipulation of audio files which, by their nature, are less elastic than MIDI files. Thus, the recorded material can be subjected to precise time related modifications (i.e. after the recording session), allowing for a needed flexibility during post-production. The test showed that it is feasible to compose music to the film material and, at the same time, precisely highlight all important on-screen events. Additionally, tools such as flex time tool not only allow for precise editing of audio,

but also are time efficient. Both features are highly important for film scoring practice. As a consequence, it was possible, in a relatively short period of time, to put together a complex arrangement (see **Figure 56**). It was already indicated in the Introduction chapter (section 1.3.3) that composing two to three minutes of music per day is considered to be an average and realistic amount in film. The modular approach allowed mapping and adjusting music to a film clip of 2' 7" in approximately three hours (however, this time did not include the preparation of modules). Thus, considering the eight hour working day it is hypothetically possible to produce approximately five minutes of music, which has a potential to improve productivity.

The modular structure of *Cut the Moon in Half* also provides elasticity in orchestration. As modules were written for specific instruments or groups of instruments (i.e. strings, woodwinds etc.), the process of manipulation of the modules allowed for experimentation with the timbre of a particular section. It was possible to achieve various degrees of homogeneity of the sound by combining modules orchestrated for the same instruments or the modules which varied in colour but featured a similar character and/or articulation (e.g. section IV). On the other hand, by combining modules dissimilar in colour and articulation (e.g. staccato vs. legato), the heterogeneity of the sound was increased (e.g. section VII), influencing the overall clarity of the given section. It must be stressed that typically a composer spends a considerable amount of time searching for appropriate sounds (including editing or even programming) for a score before the actual writing begins (Karlin and Wright, 2004, 374). The search may indeed be time consuming as contemporary composers have at their disposal literally thousands of available sounds to choose from. The modular approach

helps to organise and limit the choice to a number of sounds pre-selected during the modules development.

It is also possible to control the overall dynamic level of the given section either by adding or removing modules, or by modifying particular ones (i.e. by giving specific dispositions to performers regarding dynamic levels or modifications to the modules' content), or if they are already recorded, simply by changing the volume of the appropriate track. Modules have a rather simple rhythmic structure which should not impose problems during a recording session (e.g. film music often needs to be recorded while players are sight reading or playing after only one rehearsal). However, regardless of the simplicity of the modules, it is relatively easy to achieve a fairly complex rhythmic structure by combining modules with different rhythmic patterns if it is required (e.g. sections V, VII). Thus, diverse modules can help with a straightforward control of the dynamic levels (if the sound of the cue is too intense), colour, and the texture of the music (if there is a need to increase or decrease tension of the music). This feature can be especially useful when, for instance, a new cut of the scene is delivered during a recording with a whole orchestra, and the music needs to be adjusted at once on the spot. Yet, according to the author's methodology, all modules should be recorded separately. Then, modules are imported to the computer sequencing software, each to the dedicated audio track, which allows not only for full control over dynamic levels, but also provides additional colouristic possibilities through sound processing of single or multiple modules.

Coherence of the piece is one of the most significant issues for understanding the music. This problem is even more relevant when it comes to music constructed from modular components. In *Cut the Moon in Half*, the modular material came from several unrelated

compositions, and was combined with newly composed modules. The coherence of the composition was achieved on several levels. Firstly, the piece features a consistent episodic form, with a regular segmentation clearly confirming the overall nature of the composition's flow. Secondly, since the motifs and motivic associations are important for both the coherence and expression of music (Zbikowski, 1999, 5-42), sections were linked in various ways by the use of the same modular material. For example, by using leitmotif technique (e.g. appearing in sections II, VI, and IX) and by the use of modules from one section in another (e.g. modules from section I were used in sections II, IV, VII, VIII, and IX or modules from section II were utilised in sections VI, VII, and IX). Similarly, sections of the composition were also associated by recurring rhythmic patterns or rhythmic structures (e.g. the accelerando effect). The score was also unified by employing the same instrument in several sections (e.g. the piano in all sections apart from III and IV), colour (e.g. the use of electronics in sections, IV and VI, and IV and VII), or similar colouristic combinations (e.g. sections I and VII; and I and IX).

Regarding the third objective - dramaturgy, the composition showed that the modular approach can provide appropriate means for achieving it. This, in turn, may be utilised to support film narrative. Expectation and surprise, essential for dramatic unfolding of events through time, are achieved in music thanks to tension and motion (Kompanek, 2004, 32). These two aspects, most of the time, can be effectively achieved by non-tonal means. The use of a modular approach makes this task even more straightforward. Following experiences acquired during composition of *Ostinatello*, *Cut the Moon in Half* confirms that dramaturgical power is possible to achieve. Tension and motion were realised by various compositional means. For example, layering and juxtaposing modules allowed for creation of a high level of

tension (e.g. sections I, V, and VII) and motion (e.g. sections V, VIII, and IX). The fact that the modular structure of the music facilitates cuts in various places enables sudden changes in the mood of the music. Modules that apply contrasting compositional techniques can lead to attractive results in the dramaturgical development of the piece, as well as to new solutions in conjunction with the image.

8.4 Limitations

Cut the Moon in Half has brought satisfactory results in terms of all the objectives set by the author (i.e. flexibility, both structural and in terms of orchestration, coherence of the composition, and possibility of dramaturgical support for a film). Yet, there are several limitations which have to be noted. As in all previous case studies, a composer using the modular approach is forced (by its very nature) to work with the prepared pre-composed, pre-orchestrated, or pre-recorded material. Thus, there is a need to consider carefully all possible directions the score may evolve, so that the appropriate modules can be created. For instance, it may happen that there is a need for thematic development, and the available modules may not provide suitable material. When the assembly process of *Cut the Moon in Half* v1was finished, it turned out that modules used for the thematic material did not provide enough variety to allow for development of the theme. Even differences of orchestration during each exposition were not sufficient to make all three appearances of the theme distinctive. Clearly, it does not mean that during the scoring process additional modules cannot be created. However, it may prove problematic if, for instance, the modules were recorded during the session with musicians. It is possible that booking another session during the post-production process would not be possible, and there would be additional costs as well. Exact (i.e.

mechanical) repetition of the thematic material within film is not a rare occurrence. A good example is Jarre's *Lara's Theme* from *Doctor Zhivago* (1965) which was repeatedly used by the director David Lean throughout the film (more than the composer wished for).

Looking at the composition as a potential concert suite, this static repetition of the thematic idea would certainly not be enough to maintain the interest of the listener. Therefore, the author decided to refine some elements of the piece and prepare a concert suite, *Cut the Moon in Half* v2 (Volume II, Section 5, and Volume II, DVD 2 Folder 05, clip 05-03). The main focus was on thematic modules and on achieving distinctive variation during each exposition. The concert suite also presented an opportunity to show the thematic idea each time in a different light, by changing the orchestration. The first appearance of the theme in section II for solo viola remained unchanged (mm. 27-79). The second one (i.e. section VII, mm. 123-158) was orchestrated for a whole viola section. This exposition was also enriched by adding imitations in the violins. The whole fragment develops into a short culmination where strings play a rapid succession of short riffs (twice), triggered by the viola part (m. 137 and 142). The third and last exposition was re-written in order to increase its expressiveness with the full power of a string tutti. Similarly to the previous exposition, the section develops to a climax, this time scored for an orchestral tutti. The new version of the piece also features a longer end section, where the dissonance and energy generated in the climax (i.e. a twelve-tone chord) are gradually extinguished and resolved (mm. 411-415). In addition, the overall number of sections was extended from nine in Version 1 to eleven in Version 2. A total duration of the new version is approximately 12'.

The original version of *Cut the Moon in Half* v1was designed as film music which is recorded (i.e. acoustic elements) and produced in a studio, and not necessarily to be performed in a concert hall. Thus, in order to produce the concert version (v2) the author decided to make changes to the electronic elements of the score. The changes concerned mainly section VIII, which is based on an electronic drum loop and synthetic bass pattern created on the Moog synthesizer. In a studio situation, based on the author's experiences, synchronisation of all elements would not be problematic (i.e. recording with head sets for musicians and the click track). Yet, in a concert hall this could create some problems. In order to eliminate this obstacle the author excluded the drum loop and bass arpeggio, and replaced them with live musicians playing a drum kit and electric bass guitar. This, in turn, allowed for the introduction of new stylistic elements, (**Figure 59**) and shifting the character of section VIII from "industrial" to more "rock and roll" oriented.

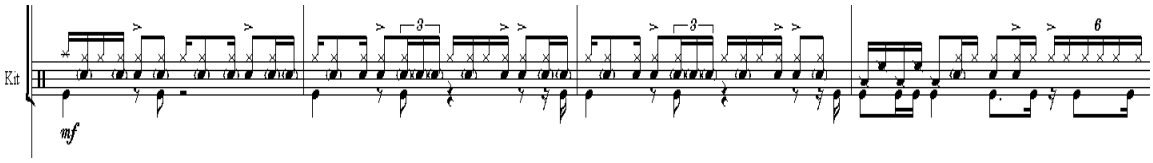

Figure 60: *Cut the Moon in Half* v2, drum pattern, section VIII

Later, the short third version (i.e. v3) was created (approx. 10' in duration). In v3, the long part IX was rearranged so that the section from letter H to N (mm. 206-304) was removed, and the segment from letter N was extended for additional 16 bars (see Volume II, Section 5, Volume II, DVD 2, clip 05-04). Thanks to this alteration the popular music elements were removed from the composition bringing it closer to the concert music realm.

8.5 Conclusion

In summary, a modular composition such as *Cut the Moon in Half* allows for quick alterations, and facilitates experimentation with colour as well as with the duration of the piece. In addition, the modular construction allows for quick and easy rearrangements (in the order and stratification of modules) to fit a new time frame, or dramaturgical situation. Composing from modular elements has a potential to speed-up the compositional process increasing the amount of the music that can be written during one working day. The modular approach also influences the process of orchestration which is significant for film scoring practice. It has already been indicated in the Introduction chapter (section 1.3.3) that a film composer works according to a demanding time schedule. Thus, orchestrations often have to be made by another person and not by the composer. However, this phase in the compositional process is, in fact, its integral element and ideally should not be performed by a different person. In the modular approach presented here the orchestration process starts at the design level of modules (i.e. they can be written for specific instruments or combinations). Thus, during the assembly process the composer deals with the already pre-orchestrated material. This "instant orchestration" saves a great deal of time, and permits the composer to orchestrate their own music even when working under the stressful conditions caused by tight deadlines.

Chapter 9: Interviews

9.1 Introduction

As the film making process (including music for film) is, in fact, a collaborative effort, and the research questions of the present work touch on some aspects of collaboration between the composer, film director and producer, to broaden the perspective of the current research project, the author decided to conduct and present interviews with directors and producers.[175] The interviews are meant to draw an enriched picture of the nature and problems related to the compositional process for media which a new modular approach can address.

The following section presents a condensed version of the three interviews conducted with people professionally involved in three different fields of the media: film, commercials, and radio drama. Of the whole collected material the author selected excerpts that were most relevant to the research questions. In particular, the interviews were designed to address the main research question [RQ.1] in relation to the need for creating a method that is practically suited to the needs of film / media scoring. The interview questions were formulated to address the problem of changes, and specifically the following reasons for changes: 1) alterations to the project as a consequence of the creative process; 2) application of computer technology in the editing process; 3) cooperation between a composer and a director or producer; 4) approach of the director towards the music creation process; and 5) understanding the problem of integration of the music into the narrative structure. The aims of the interviews were to include the perspectives of people working with media music on a daily basis, and to identify whether conclusions drawn from the case studies can find a practical application.

[175] Interviews are commonly used in the field of film music studies as a method of obtaining information based on participants' experiences.

All three participants were asked similar questions (Appendix 2), but these were customised to the characteristics of the given profession. The order and the number of questions were dictated by the dynamics of the interview.

9.2 Participants

Mario Andreacchio (MA), film producer/director with 25 years of experience.

Robi Watt (RW), director and producer of television commercials and documentaries, with 12 years of experience.

Christopher Williams (CW), director/producer/sound designer/composer of radio dramas for ABC Radio,[176] with 17 years of experience.

All participants gave their written consent (Appendix 4) and agreed to be named in this work.

9.3 Problems

9.3.1 Musical education

Working as part of productions that incorporate music with vision in film and television, or drama in theatre or radio, requires from the director and/or the producer at least a basic understanding of these components. The level of knowledge regarding music inevitably influences the degree of its successful integration within the given media, as well as the overall outcome. Yet, musical training among filmmakers and film producers is not common (Chanan, 1991, 32). Lack of musical training, in turn, influences how the ideas are

[176] Here the acronym ABC refers to the Australian Broadcasting Corporation.

communicated to the composer, and also the way music is utilised within the production's narrative structure. Unexpectedly, when asked about their musical education, all the interviewees demonstrated some degree of familiarity with music, usually resulting from studying music at school but also relating to actively playing an instrument:

> **MA:** Yes, I do have musical background. I play a classical guitar.

> **RW:** I learnt to play piano but it was during high school. So I did not start it at an early age. Our family were not particularly musical; but I had musical influences throughout secondary school.

> **CW:** I have a very patchy musical background. The earliest contact with music I had in primary school. I studied music in lower secondary school. I studied trumpet from the age of twelve to fourteen. When I came to Australia in 1973 I stopped having any musical input. There was no music given in my new school and I did not persist with studying trumpet [...]. When I went to University I undertook to study guitar with a tutor, but I lasted about three weeks [...]. At the age of thirty I bought a saxophone and worked with a private tutor. I took lessons in Sydney from 1991 to 1999 [...]. I was also reading about music theory to actually understand it better. So, I am mostly self-taught in this area.

9.3.2 Importance of music in media productions

Further to the question about their musical training, participants were asked about their views regarding the role of music in media projects. Given these participants' backgrounds, the author anticipated they may consider music an important element of their creative work and this was indeed confirmed by the participants agreeing on the music's fundamental role in media projects. Andreacchio reported on its impact on the believability of the film:

> **MA:** Music is incredibly important. It helps us to transfer our consciousness into a dreaming state. It gives the film rhythm, motion, pulse, and depth. This is music that makes it believable. People think that film making is about cameras. You go and make a film, and when there is a problem, you put in a bit of the music. The best filmmaking is not like that. [...] The only element that creates the strength in emotion of storytelling is the music. Because at each point the audience wants to be told: "How am I supposed to react to this?"

Williams, relating to his experience with radio drama, emphasised music's role in maintaining interest of the audience and directing their attention to the important parts of the plot:

> **CW:** When I was studying film I found that music is very important. To me as a theatre director music was essential. [...] In the radio drama the sound basically is your set design, lighting, costumes. These things tell you where you are, what's going on and about relationships between people. [...] Without music you would become impatient very quickly. Music drives the narrative of the drama. It helps to distinguish between moments of release and where the tension is needed. It helps to shape and maintain the tension and brings things to the climax at the end. Music marks key moments in the narrative. [...]

In the light of Williams' view, the role of music in radio drama seems unquestionable. The radio is a sound medium, and the radio drama can even be considered a musical composition in some circumstances. It is not the case in film, where the music is not always recognised as significant by film makers which may perhaps be explained by the general assumption that since film is a visual medium, the visual elements should be superior to other components of a production. This view is, however, contradicted by Andreacchio who criticises it as contributing to the audience's passivity in the reception of a film:

> **MA:** Unfortunately, many filmmakers forget about the importance of the music and the sound in film. The music is added on top of effects and dialogue but there is no real interaction. Consequently our perception is passive. We do not follow the story. We do not have the feeling that music is telling us – "sit, relax, and trust me".

Based on his own study Andreacchio further argues that the visuals are, in fact, inferior to the sound and he negatively appraises the preoccupation of the contemporary filmmakers with the visual aspect of a film:

> **MA:** The visual elements are actually secondary to the sound. One day I asked myself a question of how people are watching films. To answer that question I conducted an experiment with 200 participants. I showed the audience two film clips. The first one had good quality image and deteriorated sound. The second, deteriorated image and good quality sound. Participants anonymously had chosen the second one. The experiment shows clearly that sound is so

> important, and that it is indeed a half of the film. Film makers tend to focus on the visuals too much.

The critical view on the imbalance between the importance of image and music (and other soundtrack components) presented by Andreacchio distinguishes him quite acutely from his contemporaries demonstrating the uniqueness of his approach. Andreacchio understands the tendency to consider the visual aspect of the film as dominating in relation to the limited resources invested in the musical aspect of productions:

> **MA:** Unfortunately, because there is so much money spent on the visual aspect of film, everybody approaches the content from the visual point of view, and the sound becomes like an add-on. [...] You can spend $10 million on the film and $100,000 will be spent on the music, 1% and that small percentage probably has the greater impact on the film reception than any other component. [...]

The focus on the visual side of the project seems to be also apparent in the world of TV commercials as aptly described by Watt:

> **RW:** The music quite often is a poor brother for the pictures, unfortunately. I always stress to the agency (and clients) that sound is as important as pictures and we should give it as much emphasis as in films.

The view expressed by Watt may indeed reflect the industry practice in some instances, yet one can also observe that music is often cleverly used in commercials to support the advertisers' message and may, in fact, be considered as equal in importance to the image.

9.3.3 Choosing the composer

The interviewed directors highlighted the significance of hiring a suitable composer for the project. Both Andreacchio and Williams commented on the choice between hiring a particular

actor for a leading role versus choosing a composer, with the choice of the latter reportedly more critical for the reception of a film / media project:

> **MA:** More important. This is probably one of the most important decisions. If music is bad then the audience will not appreciate the performance of even the most famous actor. From the commercial point of view, an actor is more important. But from the point of view of the experience of the film, a composer is more important.

> **CW:** I can conceive circumstances where the choice of the composer is more important than the choice of an actor. Actor A can be similar to actor B, but the choice of the composer can lead to a radically different work. The power of music is so huge that it can create a much more significant difference. Music gives the sound print for the whole project.

The flexibility of writing in different musical styles, and a good understanding of drama are typically expected to be characteristics of a skilled composer. Yet, obviously, composers have individual styles and personalities, making some of them more suited to particular productions than others. Participants, when asked of the personal factors predisposing a composer for a particular project, listed the rich compositional palette and the fitness to the need of a particular project as crucial:

> **MA:** To me a composer has to have a sense of history, a strong command of different musical styles, and a sense of philosophy. So that we can jump from Gershwin to Bach, Shostakovich to Verdi, but also knowledge of how people will respond to the music and how it will operate within the structure of how I make films.

The ability to shift between different musical styles and understanding of the ways of how music successfully supports the film are emphasised as desirable by Andreacchio. But, specific requirements of the advertising industry translate into slightly different expectations regarding a suitable composer:

> **RW:** There are a few reasons why a particular composer gets chosen: the suitability to the target audience, good communication skills, ability to listen. I

> like to work with people who are open-minded. So, that you are not faced during the production with the situation – I will walk away if don't do it my way. But passion is also important. The speed is crucial, too; because you usually deal with extremely short deadlines.

And thus, the suitability to the target audience but also, and perhaps unsurprisingly given the short timelines, the ability to work quickly seem to be the key factors in composing for advertising. To facilitate the swift work, good communication skills and flexibility are particularly valued.

> **CW:** The works of the particular composer I have heard. This is important. What musical resources they tend to favour. The personal style of the composer is also very important. There are also very practical considerations like: does this person have a track record of fulfilling commissions? Does this person have a sympathy and empathy for the drama? - the common understanding of what the project needs? I also will be looking for whether, during the production, I will be able to communicate effectively with the composer. This means whether we will be able to deal with the issues that will come up.

However, it is worth acknowledging that the ability to work fast does not seem to be a necessary requirement for a composer in publicly funded radio. Usually a production schedule for completion of the radio project gives composers more time than in advertising or film.

9.3.4 Communication with the composer

The importance of effective communication between a director and a composer was of particular concern to the participants. As documented by other researchers, successful communication between these parties results in both the comfort of the cooperation and better final outcomes (Cavacas, 1993, 113) and thus the author considered this issue worth of more detailed inquiry. When asked about their communication with composers, the participants

expressed the opinion that the communication is one of the greatest challenges during collaborating on creative projects. As Williams observed:

> **CW:** The most basic trouble is talking about music.

The reason for these difficulties in communication may possibly be the lack of formal musical background, a common occurrence among directors as previously discussed, resulting in the communication based on an imprecise language:

> **RW:** Quite often it is very hard for some people to communicate what they don't like. Sometimes you hear some things you don't like, a particular instrument for instance not knowing its name, so it requires time to listen and talk to a composer to find out that the instrument you don't like is not trombone but a trumpet. Ok, I don't like it. For some people without any musical background it can be difficult.

Here, again, a sound musical background is reported as helpful in the process of communication with the composer:

> **CW:** That is what one composer said to me, that it is a relief to talk to a director who has some musical understanding. It is easier to understand the ideas and make them work together.

The role of the composer is to understand the intentions of the director and translate them into appropriate music. Yet, the lack of common language is the major obstacle in achieving this goal. A dangerous approach that a filmmaker can take is to communicate using musical terms. This often leads to confusion and misunderstandings. Watt categorically opposed such communication styles:

> **RW:** I am not pretending that I know everything and I don't try to be "smart" and to communicate using musical terms I think I know. So what I say is: ok, from that point it should be faster or the mood should change there.

The level of common understanding between a director and a composer may, however, also depend on how clearly a director or a producer can articulate their needs and expectations. Williams summarises it in the following way:

> **CW:** It is always dependent on the project. If there are specific needs then I will articulate them. Usually I would commission a composer based on a brief. I would say this is a style of play I am after, the ability of creating this atmosphere, this sort of mood, to suggest this kind of world and at the same time something that would bring the audience into this world, something that would drive the narrative, to underscore important moments in the drama. And that will bring the performance to a close.

This argument is supported by Watt who proposed that the best way to communicate the specific needs to the composer can be through examples:

> **RW:** I use film clips or existing music tracks to brief a style. Songs. I find this the quickest way to communicate. [...] I am usually preparing musical examples of what I am interested in.

This, however, may sometimes lead to situations in which producers are so set on specific examples that they are expecting the composer to practically copy the reference track. To Williams such a practice seemed inappropriate and he considered it to be a sign of the lack of respect for the composer:

> **CW:** This is totally alien to me. I think it is totally disrespectful to a composer. But I understand the impulse. I can have a specific example, for instance I can say – I need a piece with a dramatic tension like the one composed by Herrmann to such and such film. I want that effect. But it does not mean that I expect the composer to copy the music. No.

Watt, however, alluded to popular songs being frequently and intentionally used in commercials and described greater acceptance of deviations from originality in the advertising industry:

> **RW:** [...] There are composers that don't mind copying. It is a job, after all.

A possible way of improving communication with a composer is for directors to be involved in the compositional process. This practice is clearly reliant on personal preferences as observed by the participants. Andreacchio for example is not interested in partaking in the compositional process:

> **MA:** No. Life is too short. I prefer to leave it to people who know about music more than I do.

Williams, on the other hand, expressed the wish to be involved, yet at the same time did not perceive his position in such instances to be dominant, preferring an advisory role instead:

> **CW:** Yes. I do know, however, that composition is a very personal thing. And getting into this space may create some difficulties. My role there is to encourage and talk about the possible ways of approaching the problem. But I don't like to disturb the creative process.

Watt shared Williams' view on active involvement in the compositional process expressing a greater need to control the project through this means. Yet, even she reported that participation in this process may not always be possible due to tight time schedules, typical in commercials:

> **RW:** It is really up to you and how much you want to be involved. Some directors brief the composer and walk away. It is a little bit dangerous, I think. Sometimes during production you are coming up with a new idea. [...] I love music so I get involved with the music creation process. [...] But sometimes the schedule is so tight that when I am working with someone I trust I let them do the job.

It is a usual practice that composers prepare a number of versions of music to provide the director/producer with the opportunity to choose the best one. The presence in the composer's studio of the person who makes the decisions could potentially facilitate the work and actively influence the compositional process. Watt provided an analogy from her work with clients to better explain the importance of a discussion between a director and a composer:

> **RW:** Yes. I think so. It could potentially help them to realise that what they are asking does not work. For example, it is similar to lighting a set. Quite often you have to change it several times to show the client that ideas they had regarding it really would not work well. The good thing is that after some time they get bored and go for lunch. And this is great. Finally you can do your job (laughs).

This position is supported by Williams who reported that the presence of the director or the producer in the composer's studio may have mutually beneficial implications. Williams also acknowledges usefulness of providing guidance rather than instructions to a composer as a way to achieve better outcomes and use the composer's creative potential fully:

> **CW:** I don't talk to them about what they are going to be doing. I talk about a number of the pieces, duration, how it will be integrated into the drama structure. I may talk about musical styles. And also, when I came to Adelaide, I had an opportunity to sit in the composer's studio as a director while they had their arrangements set out and I could show which part of the music I like, which is let's say too busy, or maybe the tempo is too fast, this sort of thing. So, I could give a feedback to the composer to help the composition to evolve, and also to give some musical suggestions.

More specifically, an interactive collaboration reportedly has a potential to contribute to the quality of the final results. The filmmaker may have a strong concept in their mind, but Williams notes that it may be beneficial for the project when the composer's point of view is heard since the composer may provide a fresh perspective:

> **CW:** The composer could say that, if the scene was slightly longer by 3 or 5 seconds, the music could have space to develop, fit better to the narrative structure. I was after an interactive process.

But cooperating with the composer has also another advantage: it may provide the director with the sense of control over the music. The issue of control was explored by participants, with Andreacchio expressing his desire to control the function of music in his films rather than music *per se*:

> **MA:** Not over the music itself, but the functions it performs. This is what I am controlling.

Williams, on the other hand, did not report seeking control as a prerogative, clearly opting for the creative space for a music creator:

> **CW:** As a director... none. It is about giving the composer creative space in the production. I prefer negotiation. Plus, if ideas of the contributors would better serve the project I would consider and incorporate them. A composer can have a better solution to a dramatic problem. So I expect flexibility first, then the control.

Watt raised yet another important point, of the composer's ability to persuade the director to their views, linking with her previous comments on the ability to communicate effectively. Reading between the lines, it seems communication skills of a composer may sometimes be as important as their creativity:

> **RW:** Sometimes a composer must be convincing, sometimes brave and stick to his guns. Besides, music is a very subjective matter. It is possible to illustrate film in a few ways, equally acceptable ways.

But also their esteem and recognition as well as confidence allow them to have a greater input in productions:

> **RW:** The more experienced and respected you are the more likely you are to get your point of view across. But by the end of the day there is a team of people that you are answering to. I haven't seen a lot of people get sacked because they stood for what they believed in. It happens more often in the film industry.

The bargaining power resulting either from personal characteristics of composers or their position in the industry supports them in negotiations with directors. Participants commented on negotiations as an important part of their work and referred to them as an art in itself, with

not every composer, especially a young one, being able to find themselves comfortable in this situation. The issue of professional trust was raised by Watt in this context:

> **RW:** The director as a creator should be open-minded. After all we go to composers for their skills.

9.3.5 Music composition stage

The process of composing the music usually takes place during the film post-production when the rough cut of the film is available. Post-production, including the recording session, can take several weeks and is reportedly a very stressful period for a film director; after many months of active engagement into filmmaking, they have to wait for the outcomes of the composer's work. Watt has summarised it succinctly:

> **RW:** When you are making a film in particular, it is really a tiring process and you have to keep your energy level up for a very long time. So this is another reason to start your sound early. By the time you get to the end of post-production you are exhausted. And I think it is stressful because you are physically worn down by the whole production. Plus you are really attached to the project, you are emotional, you don't want to do anything wrong. I think that the best directors think about it [music] early.

That is exactly what Andreacchio reports he has been doing in his films. Consequently, the music composition stage in his view does not have to be a stressful experience:

> **MA:** No, because I have been living with it [music] through the whole production. In fact, for me it is one of the most rewarding experiences when you sit there and you have Bratislava State Radio Orchestra and you hear it in the full glory with images, it is incredible. So music is integral to the construction of the fabric of the film. It's not like that you are putting one piece here another there. It has to be a part of the whole.

He proposes that music can be a part of the production from an early stage, thus the stress related to the music composition stage could not only be minimised, but the process of

working on music may even become an enjoyable experience. However, what can be stressful for the director and the composer at this time are usually tight time schedules:

> **MA:** Usually the problem is time. Often you can lock the picture off until there will be a lot of approvals from investors etc. And it gets later and later. And then suddenly a composer has only two weeks to compose. On the last project I had eighteen minutes of music and the composer had only 4 or 5 weeks to score and the score was primarily orchestral.

Williams, who frequently shares the director's and composer's duties, confirms that for the composer the whole process can be stressful, especially when the work load is too intense:

> **CW:** There are stresses related to this [composition stage], though. Sometimes there are situations when you have to put together 20 minutes of music in two days.

9.3.6 Music in the dramaturgical structure of the project

Despite the stress resulting from tight time schedules, a composer needs to organise their time in the fashion that would allow for thorough mapping and fitting of music to the film structure according to the director's vision, usually a time consuming task. Participants perceived this part of work as crucial as the way music is integrated within the dramaturgical structure of the project may influence its reception by the audience. Unsurprisingly, the importance of synchronisation of music with visuals and its precision was raised by participants:

> **MA:** It depends on the function of music in the storytelling. In action scenes it has to be precisely to the frame.

As the composer's role is to enhance the director's vision and fulfil their expectations regarding both the function music performs in a particular scene as well as director's esthetical tastes, in situations when these expectations are not satisfied, changes may be introduced. In line with this, participants were asked about whether they edit music to visuals.

Andreacchio and Williams both acknowledge this practice as common in their work and understand its function in improving the perception of a given scene:

> **MA:** Yes. Often. So even when a composer prepared the music frame accurately I actually look at the shape of it in the context of the film and I cut the music if there is no right feel of the scene in the context of the whole film.

> **CW:** Very often. The most obvious situation is when a music piece is too long. Sometimes when the music is competitive with drama then music has to be edited and then placed in the sound field.

However, editing decisions may at times negatively influence the musical logic of a particular piece. Moving pieces of music from one scene to another, particularly if done without the composer's knowledge, may be destructive to the musical concept. Yet, when asked how often this kind of changes takes place, the participants considered them commonplace:

> **MA:** All the time... For instance, the opening piece of music in the *Paradise Found* was, in fact, for the ending credits. So when I saw the whole film, the opening did not work. It did not create enough trust for the film. So the ending was put in the beginning and the same piece repeated at the end.

What is more, the post-production process may in some situations result in drastic changes to the music. Often and understandably, these changes may originate from the specific structure of the drama and the need for supporting it. Nonetheless, music is frequently subjected to cuts and alterations as discussed by participants:

> **CW:** [...] I am responsible for unspeakable things I have done to other people's music to make it work. I mean editing, cutting, processing, layering it. Unfortunately musical logic and the dramatic logic quite often work in opposition. [...]

Problems with incorporating music in the dramatic structure are reportedly more frequent when library music is used. The use of pre-recorded pieces of music in the various types of productions in film, television, and radio usually results from a limited budget as observed by

Williams and Watt. With shrinking production budgets, particularly in mid- and low- budget films and in television productions, library music becomes an increasingly popular alternative to a custom made music. For some directors and producers this is, however, not a preferred option:

> **CW:** The thing is that this music has a very limited musical logic and no relation to the material it will be presented with. Moreover, it is in a way designed to pay a close attention to it. And because of that it is hard to incorporate it sometimes into a drama context. Besides, it takes a lot of time to go through the library to select something that would work. So, in a way, it is really depressing if you have to use them.

In radio, where there are no visuals, music is fitted to recorded performances. The manner in which music is integrated into a radio drama structure has changed over recent years as discussed by Williams:

> **CW:** No matter whether the music was delivered before the voice was recorded, or after, there was no attempt to shape or adapt the music to the recorded voice in my early work for the ABC.

Since often a compositional process for radio dramas starts before the final version of the script is available, a composer may find themselves in a difficult situation, as at this point the duration of the pieces is not yet determined. Thus, particular approaches in order to integrate music with drama are applied. Williams refers to one of them which relies on sections of music that can be easily edited:

> **CW:** In briefs for the composers usually there is a suggestion that the music should be able to fade in and out. So, often composers start with ostinato or some sustained chord. So later I have the possibility to fit the musical pieces to the radio drama structure.

Another approach resembles the way music is composed to the film. In this case, as discussed by Williams, a composer may receive a recorded and pre-edited recording of performances which provide clues regarding places and durations of the music:

> **CW:** I usually organise a break in the post-production for, say, a couple of weeks, and I would send the edited recording of studio performances, so the composer could be sorting out where music starts and ends. The idea was to give a composer the opportunity to work more closely with the scenes they were trying to score for.

A common practice of editing music in order to integrate it with the dramaturgical structure of the project is sometimes reversed and visuals are edited to the music during post-production. This approach is used by Watt and reportedly useful:

> **RW:** Yes, I did it a few times. The reason was that music was driving the visuals. Again it is all about being flexible. If it works better that way, then why not.

The approach is however not commonly used, and usually music is being altered by means of editing or by careful planning and designing of the musical structure done by a composer. Thus, if the musical structure generates potential problems in integration with the dramaturgical structure of the project, perhaps music could apply principles of film editing, which was proposed by some composers and the present author (see sections 3.2 and 2.3). When asked about his opinion in this regard, Williams offered a different approach:

> **CW:** Well, I think that film montage should apply some musical principles. And my impression is that the best film directors think like that.

Andreacchio agrees that music could apply some principles of film editing, yet also proposes a similar idea to Williams, suggesting that the music structure should inform the film construction:

> **MA:** Yes. Definitely. However, for me it is the opposite, the film should apply the principles of the music structure.

When presented with the idea of having the music with a flexible structure which can be composed early on and then altered to fit the new cut during the post-production (when

changes to the montage appear), participants responded affirmatively. Andreacchio saw the benefits of such an approach in terms of providing more choices to him as a director at the beginning of the project:

> **MA:** It would be helpful at the beginning when you try to position the film. At this stage the more choices you have the better.

Watt confirmed the value of the suggested approach throughout the production rather than just at one stage:

> **RW:** This is a great idea. Because no matter how early you start composing, later there will be changes and you have to accommodate them. And the way to do them effortlessly would be very important. The changes are made to the very end and sometimes you are facing the situation when the budget does not allow for any more. So, I suppose it could help in this situation.

Williams acknowledged the importance of flexibility offered by such an approach:

> **CW:** This is a very important aspect. As I mentioned earlier it is a part of the composer's brief, especially when music is composed well in advance before the production or is not incorporated into the structure of the piece. So being flexible is very important. Working with the recorded medium, it is always very important.

However, a potential problem arising from too much flexibility was also identified. Andreacchio observed that too many choices may make the decision on music more difficult:

> **MA:** Too many options during production may complicate the process. Because the more options you have, the clearer you have to be why you don't use all the options you have. So if you create the situation that you will be able to offer the director a wide spectrum of choices, lot of them are not musically literate and don't have a philosophy on how to use the music within the film. You give them these options and then the answer will be "I don't know". More choices equal more problems with the decision.

9.3.7 Music at an early stage of the project

In line with the idea of a new compositional approach, the issue of considering music early arose. Undoubtedly, the decision regarding music and the functions it has to fulfil in the project will impact the overall outcome of the production. Participants were aware that this decision should not be taken lightly and the adequate time needs to be dedicated to the formulation of a concise and well thought through musical concept. Andreacchio reported planning the musical side of his productions as early as while reading a script and acknowledging the role of music in shaping the direction of the film:

> **MA:** Usually, I have musical ideas before the work on the screenplay begins. The music is putting the concept of the whole film into a space.... The composer must start as early as possible which means before the screenplay as well. [...] When I read the scripts, when I get a sense of what the film is about I start to think about music, for instance, maybe Shostakovich will be good for what I am reading. [...] music is integral to the construction of the fabric of the film. It's not like that you are putting one piece here another there. It has to be a part of the whole.

He was seconded by Watt and Williams both indicating the importance of an early start of composing music:

> **RW:** As early as possible... I try to brief music before we film. So the composer has as much time as possible. So when I am filming the composer starts to work.

> **CW:** From my perspective, the earlier the better. [...] If there is a project that has music embodied in its structure then music composition should start early.

And thus the script is often the first glimpse of the upcoming project for the composer. This is the first source of inspiration which may trigger the creative process before the screening of the film material. However, according to some authors (Karlin and Wright, 2004, 15) and in accordance with the present author's experience, working with the script may be deceptive as

hardly any script is shot the way it has been written. It is especially the case in commercials where for various reasons (i.e. limitations of the budget, client's wishes), alterations to the original concept are not a rarity. Watt emphasises flexibility in thinking required to tackle this issue effectively:

> **RW:** Quite often when the clients see the script they say it is fabulous, but then when you actually make it they say that is not what they really wanted. You have to change it. So as you know it is a process of making the most of what you've got. And this is where directing really comes in because you have to be able to recognise this point along the way that allows you to turn something into something else. If you hold on to what was written on the bit of paper at the beginning of the process you will kill yourself.

This is because the script is only a sketch, a suggestion of what the final product is going to be. Of course, if the composer works closely with the director this problem can be minimised. In this case, starting cooperation in the early stages of a production is clearly advantageous. If the script is still being developed, Williams highlights the value of early communication between the author and the composer which can support the dramaturgical integration of music into the project structure:

> **CW:** What I like to do if I am working with both the author and the composer is to get them in the same room before the work is even written so they can bounce the ideas from each other. In that case we start [working together] from the concept.

A difficulty with this approach, however, may be missing rhythm of images (or performance in the radio drama case). Yet, it certainly can be overcome if similarly to Andreacchio's approach, music is used as a starting point for the development of the project.

9.3.8 Music as a structural model

The music may also be used as an organising force in productions. This idea is not new, as some composers, and among them Stravinsky, were absolutely certain that in the task of achieving the real work of art, film structure should be based on the musical form (Dahl, 2003 [1946]). In other words, music can be composed first and then film adjusted to the music. Andreacchio's approach to filmmaking appears to be based on this very idea:

> **MA:** I adopted the approach that at the beginning I have a lot of music written before the film is shot. That is a part of my method to allow composers to start composing as early as possible. Then every scene in the film is shaped to the music. That music gives you a sense of timing, it gives you a sense of intensity, and it gives you a sense of relative positioning. [...] And when you look at the most successful pieces of the cinema, that's exactly what happens. [...] In one film, the music for the whole beginning sequence was composed before we shot the film. It starts as orchestral then goes to tribal, it goes to song and then it goes back to orchestral. And with these image sequences you would not write something like this. So if we started with the film and then you had to compose music for it, it would be different. So we still have accessibility but in the same time originality. Rather than, ok, music has to follow these images etc...

Like Williams before, Andreacchio refers to renowned films as examples of incorporating this method and producing memorable outcomes. However, the common practice of film making can be at odds with this observation. Although there are examples when music is composed before film is shot (e.g. *Once upon a time in America*, (1984)), as an intentional approach this practice is rare.[177] Typically, film is completed first, and then during the last stages of post-production, musical score is prepared. Andreacchio disagrees with this approach:

> **MA:** [...] So many films these days are just rubbish because the approach is made from a wrong angle.

[177] Excluding cases where music is embodied into the project structure as source music.

Nevertheless, music is used frequently by film makers during the montage process as a model for a development of the edited sequence. Andreacchio explains the rationale behind this practice as a way to verify the appropriateness of the edit and correct the rhythm of the film:

> **MA:** I quite often use Vivaldi's music to cut the film material. It works amazingly. If you really want to test whether the edit is actually working you get the section of Vivaldi that catches the mood of the scene you put it in and very quickly you can decide whether the scene is too long or you cut the scene too short. So I often use Vivaldi as a yard stick. It helps to develop the sense of direction, otherwise everybody will be bored. The rhythm of the film should be very musical and in fact people are expecting that.

Watts confirms that musical pulse is important for the development of the edit during montage:

> **RW:** We usually use guide tracks during the editing process. There is no point in editing without the beat. It is a waste of time. [...] You can't just put pictures together. Most editors wouldn't do it without the music. […] If I gave you visuals edited without the beat, it would be difficult to compose music for it.

A potential risk resulting from this approach can be identified, though. The guide track used during montage (in most cases the music is selected by the editor), is replaced with the original music composed for the project and the temporal structure of the film sequence modelled on the guide track may not be compatible with the commissioned music. For instance, the editor may use a rock song with a regular time signature as a reference whereas the original music may be in an odd meter. Or the tempo of the guide piece may be significantly different from the one of the commissioned music and as a consequence, musical rhythm may not necessarily fit the visual rhythm. Watt confirms that this may indeed happen:

> **RW:** Yes, it happens. But often they [clients] get used to the music and they don't like the new original music. Consequently the temp track stays.

Nevertheless, she offers a suggestion on how this problem may be overcome:

> **RW:** Thus, my approach is different. I try to brief the composer from the beginning and they come up with the guide track. Often the final result will be totally different but at least it is done by the one person.

Relevant in this context may be an observation made by Andreacchio regarding application of Vivaldi's music in the role of guide track:

> **MA:** [...] For the particular sequence I use Vivaldi that matches the mood and then I edit the scene. Amazingly you can put any other piece of music and it will work.

Yet, the application of music as a structural model for the production may also have another dimension. Music can provide the support for the performance of the actors as described by Williams:

> **CW:** Sometimes I have actors performing to pre-recorded music, which is of course commissioned. The music in this case has to be prepared earlier. What it does in this case is it allows actors to experiment and deepen the interpretation and the performance. And there is a kind of analogy. The music provides them with the support which performers in theatre get from the audience.

9.3.9 Music and other soundtrack elements

The placement of music as part of the sonic space of a production, and relations with dialogue and sound effects were also discussed with participants. Looking at the problem of the coexistence of music with other film soundtrack components from the storytelling perspective Andreacchio points out that the predominance of a particular soundtrack component may impact on the meaning of a particular sequence:

> **MA:** In terms of the story telling it becomes a very important feature. In the sound mix putting the music in the dominant position, for instance, will create a specific reception of the sequence. If the dialogue dominated and the music and effects were secondary, the meaning of the same sequence would be different. Thus putting the same elements but in a different way in terms of the dominance will tell a different story. And this ability to shape the story in this way is fascinating for me. [...] Moreover, by the appropriate mix with other

> soundtrack components we are creating this reality [...]. The best filmmaking recognises the importance of the sound in the story telling [...].

He then argues that the soundtrack has a crucial meaning for understanding of the film as it helps in interpreting the on-screen events for the audience:

> **MA:** The audience does not want to think about it. They need to know how to emotionally react to what they see. And this is where sound, the combination of music, dialogue and effects becomes a critical element in leading them through. It provides the milestones by which the audience is following the story.

In radio dramas, the missing visual element is, in fact, created in the audience's minds. Unlike in film where certain elements of the plot can be shown on the screen, in radio dramas the soundtrack provides all the supplementary information. Because radio is a sound medium, inter-relations of the soundtrack elements tend to have slightly different dynamics and roles. The balance and coherence of visuals and the sound need to be carefully considered as suggested by Williams:

> **CW:** Yes, in this sense that it does not steal your attention. That is what the underscore is. The voice, sound effects and music should have a sense of being a whole. Listening to it, you should not feel the lack of any of these elements. At the same time, any of these elements could be superior [at a given moment].

Referring to the BBC Radio tradition,[178] Williams points out how changing the balance between the dialogue, music and sound effects can influence the reception and the overall experience of the radio drama:

> **CW:** [...] There is a tradition grown up from the BBC, where there is a great reverence for literature: other audio sources, music, effects, were regarded as secondary. The text, the spoken words were at the top of the ladder. This can lead to a very theatrical sounding radio drama.

[178] Of course, this reverence for literature is not the exclusive property of the BBC. Broadcasters in other countries (English speaking, and non-English speaking) have due reverence for their great writers.

Thus, the adequate approach to the coexistence of the soundtrack elements can result in a more "cinematic" experience, which, as reported by Williams, is probably more attractive and understandable for the audience:

> **CW:** [...] When I came to ABC I wanted to try something different, more creative. I decided to draw on my film-making experience to create something cinematic. What I told myself was: it is not a performing art I am dealing with; I am dealing with the medium which is similar to film. I have tried to create very realistic soundscapes. I have used some of the editing techniques from film. I had been creating a kind of "cinema of the mind".

This interesting comment demonstrates an unusual approach to making radio dramas that includes a perspective coming from a visual medium and combining it with what is offered by a sound medium, in hope to achieve unique creative outcomes.

In commercials, on the other hand, directors typically operate within a very tight time frame, and the ability to communicate the message quickly and clearly is often more important than creativity resulting from unusual use of the soundtrack. However, even here in this very pragmatic context, there is a frequent lack of understanding of how soundtrack components should be positioned in order to achieve the sought response in the audience. As observed by Watts, the imbalance in the soundtrack may interfere with the main purpose of a commercial which is communicating a message:

> **RW:** Well, there have been a lot of discussions whether sound design gets in the way of the communication. Some sound designers in the industry tend to put everything into soundtrack – music, effects, and atmosphere. Then things get in the way and they need to be simplified because sound becomes too busy.

This issue becomes increasingly important in contemporary film. Soundtracks of some recent action films (e.g. *The Dark Knight Rises* (2012)) may seem overly busy with effects and loud. In many instances, this complexity forces the image and the sound to compete for the

viewer's attention which is in strong contrast to the creative and balanced approach to the soundtrack proposed by Williams. The phenomenon of the "over-business" of the sound elements could be described as the sound *horror vacui* where the powerful role of silence is nearly completely forgotten. Watts reminds about its importance:

> **RW:** In my opinion, the use of silence is very powerful. Sometimes something you don't say or hear is much more important than what you do.

Moreover, even though the fast montage is one of the ways of achieving dynamic film sequences, adding a loud and busy soundtrack does not necessary intensify this effect. In fact, it can even weaken the dramaturgical impact of a particular scene. An example can be a situation when the sound effects are doubled with musical accents (for example by orchestral tutti). Watt observes that some viewers bombarded with the intense stimuli may not be able to follow the story outline and may not find the experience of watching the film enjoyable:

> **RW:** [...] Overall mix of the audio in current films. It is too loud, too noisy and too busy, with too many sound effects. And quite often it is not a pleasant experience. Action films especially are quite overdone, *Salt* [2010] for instance.

An alternative view on how to approach the problem of coexistence of different, often competing, elements of the film soundtracks, and how to communicate with the audience clearly, is provided by Williams:

> **CW:** [...] Most people are additive in their approach. They keep on adding things until they are happy with the result. [One of the composers I worked with], used an approach that was subtractive. First, he put everything he could possibly think of into a mix and then removed elements to the point that there were only the necessary components left.

Although the "less is more" policy seems to be the way to overcoming problems related to the integration of the film soundtrack components, Watt points out that this tendency may be related to the target group the product is directed at:

> **RW:** [...] It also depends on the audience. When you consider the teenagers with their gaming, videos, music clips, etc., they expect it.

9.3.10 Digital technology

Technology not only changed the way the audience views films but also how the films (and other media productions) are created. The importance of this change was raised by all the participants, which is particularly noteworthy as all of them had experience with both analogue and digital technology. Watt praises the flexibility resulting from the ease of editing in the digital domain:

> **RW:** The computer technology has constantly changed and very fast. And the change from linear to non linear was amazing. It gives you the flexibility to easily see different ways to edit something. In old days all the planning was done on paper, the storyboard, and that was it. There was no what if..., in six different ways. You could not do it.

Andreacchio points out to the possibility of testing ideas and solutions prior to shooting which may minimise the risk of error:

> **MA:** It [digital technology] allows me to construct the film in the storyboard form to test the whole rhythm of the drama of the film in pre-production, before I start the film. So we storyboard the film, shoot and edit it, put the music, dialogue and test the rhythm of the film.

This may potentially have an implication for the budget which can be reduced as a consequence of more judicious planning of a production. But the technological change has also brought improvement in the accuracy of editing which can have an important effect on

the reception of the work. Williams comments that the changes can now be easily done without compromising the source material:

> **CW:** Alongside the non-linear editing which opens up the area of editing which was not possible with a tape, not being destructive, is very important. You can save the result and always return to the earlier stage if something is not right. It is easier to layer things than with an analogue tape. The accuracy of the editing is also far more precise. It gives you a control over the timing of the text. Delaying something slightly can change the subtext of the drama. In other words it was incredibly liberating. [...] Plus there are no annoying noises in the places the material was spliced in. Of course, the sound of the tape is much more pleasing but you have to remember about the accumulated noise, which sometimes is an obstacle in pursuing certain things.

However, Watt also indicates disadvantages to the introduction of new technology and the resulting ability to make an indefinite number of changes.

> **RW:** And the question is whether you are making the change because you can or is it really going to make things better. It is tricky. Politically, I have to keep my mind open. But quite often by the time they (clients) request it, they are out of money. Sometimes the answer is: yes, I can do it but you have to bring more money. And often if they are stubborn, they will stick to their wishes.

9.3.11 Changes

Digital technology has also contributed to the increase in the number of changes during film (and other media) editing. These changes can also be dictated by creative decisions made in order to achieve the best product possible, as observed by Andreacchio:

> **MA:** Well. I finished the last film two months ago and now I am just making the edit changes. This is driving everybody nuts. Sometimes, people such as investors or distributors are coming up with terrific ideas on how to improve it. There are also bad ones and then, I obviously say no. For me, to make the film better is much more important than my ego. I don't have a problem with that. During shooting, on the set, I am not anxious to say "Ok I don't know what to do? Any ideas?"

Watt emphasised the seemingly endless time dedicated to introducing changes:

> **RW:** All the time. And it can go on and on and on. Just when you think it is finished there is another change.

While Williams noted the importance of knowing when to stop introducing changes:

> **CW:** There are changes right up to the end of the production. How many? Constant. And you keep changing it to improve it until you cannot think how to make it any better. So when whatever you do makes it worse it means that you need to stop (laughs). Every creative person has to know when to stop, when changing something will bring nothing and diminish the work. I saw plays overwritten many times.

Thanks to computer technology, editing becomes faster and allows for creating a number of versions of the scene quickly. Watt reported the following experiences with the number of edits:

> **RW:** Sometimes around six edits. Sometimes more. Depends on the editor you are working with. But always more than one. Sometimes there are subtle differences, sometimes quite substantial.

This number may also depend on the creative approach and on how well the project was defined during the pre-production. When asked about whether he creates different versions of the scenes Andreacchio denied:

> **MA:** No. Not really. It is more like that each scene is like a building block. So I think whether it should or not be there, because you can cut the scene well very early.

The whole philosophy of project editing in radio drama may, in Williams' opinion, be opposite to the mainstream approach in the film industry, and the application of the technological facilities slightly different than standard:

> **CW:** I tend to work towards limiting a choice. I am about making choices and committing to things and refining these choices as time goes on. So I don't generate and keep many versions of the same thing. What I do, however, is save many versions of the project at different stages. So I can always return to a previous stage. But it is a linear process and not generating alternatives.

While, based on her work on commercials, Watt reports that making the decision to stop introducing more changes can at times be very difficult:

> **RW:** As a director you have to know really when enough is enough. A good example is working with children. The client is pushing you; they want another try and another. But after the fifth take you can see that the poor kid is not going to improve the performance or even deteriorates. So you have to recognise where the limit is. When the performance does deteriorate it makes the client (the agency) realise that take No. 2 was really great.

However, the question of the necessity of these changes is also raised by Watt. She observes that clients and investors who are paying for the project may insist on making changes with the arguable assumption that the change always means improvement:

> **RW:** It depends on the stage of the final cut. There is a director's cut which is my own version. Working with editor, composer and producer, we go and present it to the agency which acts on behalf of the client. And they may want to change some things. And then it will go to the client. And they also may want some things to change. With the film it would be producer, director, executive producer and then the broadcaster. And because the broadcaster puts money in it, they can ask for changes. And of course you have to go along with the flow including changes to the music.

Sometimes there are also other reasons behind this practice than simply improving the product. Watt explains:

> **RW:** If people you are working with are inexperienced or insecure or afraid of the boss, they will be pushing until you tell them that you can't do it anymore. The experienced people will recognise a good take straight away. Sometimes I was happy with an early take but the client will not necessarily trust you and you have to prove yourself. This, however, creates a tension because the time and money are being wasted. So, inexperienced people are dangerous.

Clearly, the lack of experience may contribute to problems during production. In addition, although, rationally, generating a number of different versions of takes may be helpful in facilitating the decision regarding the best possible result, it is not necessarily the case:

> **RW:** A funny thing is that during the presentation everybody has a different opinion which is the best. And the discussion takes hours to decide.

9.3.12 The studio

The introduction of digital technology has also influenced the work environment for many composers. In this regard a noteworthy inside perspective of working in a private studio environment brings the interview with Williams who, apart from being a director and the producer of radio dramas, frequently creates sound design and music to his productions. His approach to the application of digital technology, however, is slightly different from the industry standards. One could describe it as "retro-digital":

> **CW:** In terms of the technology, I use digital and analogue hardware technology. This set up suits my needs in terms of the sound and functionality. It is really a hands-on craft approach. I like to have controls in my hands instead of the computer mouse. I like to work in different parts of the studio instead of being fixed to the screen. I am stuck in the past in a way! When I started, the outboard technology was too expensive to accumulate. That's changed, and currently I am using discarded technology. It can be fussy, but I am able to come up with really good results. The time you spend is crucial. [...] More recently I have enhanced capacity to work with both multi-sampled instruments and loop based sequencing.

This particular studio set-up can provide a composer with enormous possibilities, yet Williams indicates the difference between his studio and the commercial ones:

> **CW:** This is not a viable approach in the commercial studio. It is not so easy to rework the material with this equipment because it is not software-based. It would not be possible, if a producer would request the music to be shortened by four bars, now! But of course, I am lucky to be the producer.

The software applications existing on the market are designed to provide a composer with great flexibility especially in the sound palette. Since skilful programming takes time, software developers provide an easy and quick solution: there are hundreds of pre-

programmed sounds available at composer's fingertips instantly. This is where, according to Williams, a potential danger of compromising the originality of the work exists:

> **CW:** I have a concern with the software for sound design. You are buying of the shelf product. It may be quite a flexible product, but if it is the same product everybody else is using in this industry, then you're in danger of coming up with the same solution. That is why I wanted my own facility, which would have its stamp and at the same time would be best for my needs.

Thus, the working process may look as follows:

> **CW:** Working in my studio, I often use the edited voice tracks. I am playing them back when I am creating the sounds that I need. So I always hear them in the context. This is very important for me. The music is often textural, the tempo is not that important because I follow the dynamic of the drama. So I am interested in the qualities of the sound, whether it is sweet, nasty or edgy.

Williams is also convinced that working in one's own studio allows for exploration and creativity due to its unlimited availability. Yet, at the same time the available possibilities may jeopardise composer's efforts as the process of experimenting or improving things may never stop, a comment linking with previous observations of Watt and Andreacchio regarding the abundance of options offered to contemporary creators:

> **CW:** The stress comes for me when I am overwhelmed by the possibilities. [...] My studio offers quite a vast spectrum of possibilities and choosing between competing possibilities could take six months! (laughs)

Thus, in order not to get lost in often overwhelming possibilities provided by technology, Williams recommends setting strict boundaries:

> **CW:** [...] When I spend more than two hours experimenting with the sound, then I do a conscious intervention – Ok, that's enough. No more.

And thus if such boundaries are in place, working in a private studio which is designed to complement the needs and a working style of the owner may potentially contribute to a

shorter time needed for the completion of the project. Yet, Williams also stresses the shortcoming of working in the isolation:

> **CW:** The whole process is probably slightly faster. However, working alone has one serious disadvantage. I don't get a feedback in terms of the results, whether the sound is ok etc. In the studio a sound engineer often would take a role of the producer. They will tell you "that sounds terrible", "fix this" or "that's not edited properly" or "that's not the best performance". So it is very important to have this kind of relationship that you can rely on, expertise of other people. Your perspective sharpens. Two heads are always better than one, especially when you are dealing with aesthetic issues and logical issues at the same time. This is really exhausting on your own.

This comment seems particularly relevant to the work on media projects which is by and large team-based, demonstrating the importance of combining perspectives and reinforcing the issue of communication expressed by all the participant throughout the interviews.

9.4 Outcomes

This analysis has focused on the role of music in the process of making films, commercials and radio dramas and relates to the main research question [RQ.1] regarding the need for and application of the method which would allow for easy redrafting of music during post-production. The interviews were conducted with three experienced media creators, who all albeit (haphazardly) had some musical education and, consequently, some insight into the role of music in moving picture and radio, the way it is integrated within the production structure, and the role of the composer.

In particular, these interviewees perceived music as a vital component of the media production. Despite the well known saying that "sound makes fifty percent of a film", the

main focus of the majority of contemporary filmmakers is unsurprisingly on the visual aspect of the production. In contrast, these interview participants stressed that not only is the sound an important component of film- or commercial making, but it may be perceived as equal to the visual side, in relation to its influence on the story telling and the audience's perception of the production.

Consequently, it seems unsurprising that the interviewees think that hiring a good composer is equally important to engaging an excellent leading actor. In some cases, as reported by the participants, it may even be more important, since the commentary added by music created by a particular composer may change the perception of the production in a more pronounced way than employing a different actor. The participants agreed that the task of a media composer is to bring the product to a higher level of artistic quality. Moreover, all observed the value of the cooperation with a composer, based on dialogue, guidance and mutual trust in each other's expertise. The need for an adequate amount of time for a composer to deliver good quality music was also discussed.

The interviewees indicated that composition should start in the early stages of production, or even possibly at pre-production, in order to influence the development of the project, and to allow for better integration of music in the dramaturgical structure of the work. This enables actual incorporation of a composer into a creative process, and not just limiting their role to supplying a musical illustration. Additionally, early engagement of the composer in the creative project may lead to more time for preparing a suitable musical concept. The application of music at early stages of the project can also be used as a model for the temporal

structure of a scene. Consequently, as indicated by the participants, this may facilitate the perception of the scene by the viewer.

Since music is not the only element of the soundtrack, as it has to function with dialogue and sound effects, the participants reported that the balance of these three elements is crucial for perception by the audience in terms of esthetical aspects and the ability to follow the unfolding plot. The interviewees also stated that the logic of the (tonal) musical structure can not only be difficult to integrate into the production, but it may also work against the logic of the drama. This clearly shows that media music should be constructed in the fashion which will correspond with the needs of the dramaturgical logic. The modular approach developed as part of this project addresses this issue: the departure from the tonal system allows for non-linear approach to the structure of the music providing the needed flexibility but also allowing for constructing a musical flow in congruence with the project dramaturgy developments in a way that may articulate these developments in a more accurate manner.

In relation to developments in technology, the interviewees agreed that non-linear computer editing has changed the way films and dramas are produced. Technology has been found helpful in editing of music, but the fact that music has its own logic and structure at times becomes a serious problem during synchronisation with the picture. Thus, having in mind that changes are an inevitable part of the filmmaking routine, participants confirmed that the application of music with a flexible structure (in film, television and radio making) would be very useful through the various stages of the production. This very aspect is directly addressed by the newly developed approach which demonstrates its suitability in the media projects.

9.5 Limitations

The process of scoring for film, television and other media may at times be complicated by the lack of musical education of filmmakers. In fact, the lack of understanding of the basic nature of musical construction (factors regulating the flow of the musical logic), may lead to difficulties during the process of integrating music with the dramaturgical structure of the project. The lack of understanding (that music cannot be edited in the same way as film) is a potential barrier to successful cooperation and satisfactory outcomes, and the lack of the ability to communicate clearly (about the director's or producer's expectations) may impose another obstacle. Consequently, this may result in frequent changes regarding musical accompaniment, forcing the composer to multiply the number of different versions.

All three interviewees received some form of musical education and they had experience of playing a musical instrument. Even though the level of musical education varied in each case, all three exhibited at least a basic understanding of the musical terminology. So, a limitation of this analysis is that the interviewees were not typical directors. Nevertheless, the collected data are a useful source of information on the current practice of filmmaking, including experiences and perceptions of experienced professionals working with composers.

9.6 Conclusion

The knowledge obtained from the interviews broadens the perspective of this research project. The interviews confirm the need to identify an alternative method of composing for film, television and radio that would address the practical issues raised by the participants (e.g. speed of work and being flexible, application of music at early stages of the project, the

directors' wish to be involved in a compositional process, integration of music with other soundtrack elements), and thus provide support for the present research and the development of the modular approach. As noticed in Limitations (9.5), all the interviewees reported to have musical backgrounds, and their approach to music in media is exceptionally mindful and well thought through. However, it was noted that this awareness did not remove the problems related to fitting and adjusting music to the montage. Moreover, even though all participants agreed that the composer should be involved in the production as early as possible, this did not seem to minimise changes which appear during production and post production (at least in the experience of these three media creators). Changes are still being made from the very beginning of the project to the very last stages. Finally, a musical background does not always translate into smooth communication with a composer, and talking about the music was in some cases still described as difficult.

Chapter 10: Outcomes

10.1 Introduction

This thesis has attempted to examine the development of a compositional method that would address the need for flexibility, in order to complement film editing during the post-production process. In particular, this research has focused on application of modular structures, which facilitate the synchronisation and redrafting of music during the film editing process. Although modularity has been utilised in existing film scoring practice, the present work is the first research study that has sought to articulate and draw attention to the modular approach to film music composition by gathering and refining previous experiences, and by developing the technique further in the digital era.

10.2 Contribution to knowledge

The thesis makes an original contribution to knowledge by demonstrating that it is possible to develop a compositional method practically suited to the needs of the film industry and its current techniques of digital, non-linear film editing (see Research question [RQ. 1], section 2.1.1) thus supporting the project's hypothesis. The development and application of a modular technique, deliberate side-stepping of functional harmony (along with traditional voice leading rules), and use of computer technology (allowing for non-linear editing, where individual modules can be layered, mixed and modified), proved to be suitable approaches for accommodating changes resulting from film editing. To make this method better suited for film, during a scoring process, a new three-step compositional approach was applied. This compositional approach follows the process of film making (e.g. shooting/composition of individual modules; selection of shots/selection of suitable modules; montage/arrangement of modules into the final piece of the music) and determines the way music is mapped and

adjusted to match on-screen events (as illustrated by the *Oxygen*, *Ostinatello* and *Cut The Moon In Half* case studies).

The issues of mapping and adjusting a musical score to visual components during the post-production process had not hitherto been fully addressed by composers or researchers in film music studies, especially with regard to developing a new compositional strategy.[179] Moreover, while studies on aesthetic and theoretical considerations in the field of film music are already well established, the compositional practices for film have not yet been fully explored through empirical research. In this project, merging film music theory with scoring practice during the investigation process has shown that a cross-disciplinary approach can provide the composer-researcher not only with a means of identifying and understanding the nature of the problem, but also with a means of devising an appropriate strategy to address it. This approach seems to be especially suitable for such a complex issue as compositional practice for film, where, apart from the purely technical aspects of scoring, there are also social and psychological considerations (i.e. cooperation with a film director, producer, and negotiations regarding both financial as well as artistic issues). In this sense the research project has filled a gap in the field of film music studies by improving understanding of specific practical issues related to scoring practice.

10.3 Contribution to practice

This thesis also makes an original contribution to practice. The issue of synchronisation and the application of digital non-linear film editing techniques influencing this process, identified

[179] Experiments with algorithmic (automatic) generation of music for film are not considered here.

in the theoretical part of the research project, were addressed by the development of a new compositional strategy for film (and other media) tested in case studies. The need for such a method was confirmed in the interviews (see Chapter 9, section 9.3.6 directly, but also sections 9.3.4, 9.3.7, 9.3.11, 9.3.12 indirectly). The following sections discuss the most significant aspects of the developed method, present a personal perspective of the author as well as list potential limitations of the method's application.

10.3.1 Modular approach and cooperation between composer and filmmaker

One of the most important practical implications of the use of modular approach in film is that it may facilitate negotiations between the composer and the director/producer. Specifically, the modular approach can provide the director with a possibility of active participation in the creative process (see, Subsidiary Question 5 [SRQ. 5], section 2.1.2). It is advantageous because the modular approach, which is similar to the ubiquitous loop-based technique, is easy to appreciate and appeals to non specialists (at times, the director or producer). The modules can be colourised in ways that help to group the material and distinguish between elements of the piece, such as rhythmic or thematic components. The structure of the music is clearly displayed on the computer screen, thus providing an overview of the created or edited piece of music (i.e. cue). This facility allows the director/producer to refer to the musical material as "modules", "elements", "components" indicating the colour at the same time. This, in turn, may eliminate an inappropriate use of musical terms, or confusion regarding the names of particular instruments, all of which can be misleading or even distressing for a composer. The interview chapter clearly shows that talking about music is difficult even if the director or producer has a musical background (See Chapter 9, section 9.3.4). Thus, the inclusion of the director/producer into the compositional process, and ability to quickly

implement their suggestions or discuss unclear terms on the spot may result in a better understanding of the common goals. This, in turn, may reduce the director/producer's anxiety and doubts regarding the music and minimise last-minute changes.

10.3.2 Modular approach and non-linear editing of music

Until now, film/media composers have been disadvantaged, in comparison to filmmakers, with regard to the use of digital technology. In film, the computer technology of non-linear editing allows for an effortless manipulation of the edited visual material and can generate numerous versions of edited sequences easily. This has significant implications for a composer's work, as was discussed broadly in the Introduction chapter (section 1.3.4). Despite the ubiquitous presence of computer technology in film scoring practice, the compositional approach, in the majority of cases, remains linear. In certain circumstances traditionally structured linear music may complicate application of non-linear editing processes. The method of composition for film (but also other media) proposed in this thesis offers composers an opportunity to make full use of the non-linear editing facilities and in this way matching the workflow of the filmmakers. It is particularly relevant to practice as many filmmakers believe that editing of music should be as easy and immediate as digital editing of film material (FilmMusic, 2011). Moreover, non-linear music which is being created thanks to the presented here modular approach, not only responds to the expectation regarding editing, but may also better serve the whole compositional practice for film and other media which, these days, seldom proceeds in a linear fashion.

10.3.3 Modular approach and fully-functional film / media music

The method presented here and tested in case studies enables the creation of film/media music that can be expressive and coherent despite its flexibility resulting from modular structure. Within the film context it can: provide a sense of narrative continuity and unity; underline the attributes of film characters (including psychological features); and create an overall emotional tone or mood for particular scenes as well as for a whole film. Music composed in the modular way can be considered fully functional film music, and offers a viable alternative to traditional (linear) tonal film music. Significantly, the modular approach presented here can also potentially address the problem of how to integrate music with the dramaturgy of the film. Ideas of musical logic can sometimes work against the dramatic logic, as indicated in interviews (see, Chapter 9, section 9.3.6). In such circumstances, musical components such as melody and functional harmony may divert attention from important aspects of the drama. By deliberately avoiding functional harmony and traditional principles of melodic development, and by assembling music in accordance with film's dramaturgical events, the modular approach provides effective support for drama. Thus, the inner structure of individual scenes can be better complemented thanks to the modular structure of music.

10.3.4 Modular approach and the speed of the scoring process

Ability to work fast is an essential characteristic of a composer working for film and other media in order to cope with usual time restraints. This skill has been indicated as crucial by interviewees (sections 9.3.3, 9.3.5). Time required for a completion of the commission depends on how quickly a composer is able to write the music and how flexible it is, allowing for additional adjustments. As demonstrated by case studies, the modular approach can successfully address both of these issues. Consequently, the time needed for development and

finalisation of the musical score can be reduced (see Subsidiary Question 1 [SRQ. 1], section 2.1.2).

The most significant features of the method are: the manner in which the structure of music is established during the assembly process; and structural flexibility, provided by the modular construction of music. In conjunction with computer technology, these features allow for adding, removing or rearranging modules, and impact on the duration, structure and development of the composition in accordance with film narrative (see Subsidiary Question 6 [SRQ. 6], section 2.1.2). Due to the fact that adjustments to the structure of the pieces can be made, both at the macro (i.e. the form of the music) and micro (i.e. the structure of individual modules) levels, the overall control over the composition's temporal structure can be precise. Individual modules can be subjected to various types of editing techniques, including digital editing processes, such as time-stretching, which means that control over the duration of the music can be even more accurate. This can eliminate the need for time-consuming calculations and creation of comprehensive tempo maps required for fitting music to the temporal structure of the project (see Subsidiary Question 2 [SRQ. 2], section 2.1.2), because modular components for the particular sequences can be simply assembled and adjusted. This also means that the need for rescoring is minimised, because a finished piece can be disassembled easily and fitted to freshly edited film sequences (see Subsidiary Question 1 [SRQ. 1], section 2.1.2). Furthermore, thanks to the modular approach (i.e. work with pre-prepared components), the mock-up of the score that is created in the composer's studio, and then presented to the director/producer, becomes the actual, final score, mixed and ready for dubbing.

In addition, the flexibility of the modular approach influences the process of orchestration, especially when music is written for various types of acoustic instrumental ensembles. Due to demanding time schedules, orchestrations are usually made by a person other than the composer, and this can affect the integrity of the compositional process. In the method developed during this research the orchestration process on the modules started at their design level. After that, prepared modules were recorded. Thus, during the assembly of the piece the composer works with pre-orchestrated and pre-recorded material. This "instant orchestration" permits a composer to retain control over the entire compositional process. Additionally, manipulations of the configuration of modules on the vertical plane allow for experiments with the colouristic palette of the composition, its texture, and dynamics. Maintaining control over these three parameters is vital for fitting music to other components of a dense film soundtrack (i.e. dialogue and sound effects) influencing a clarity of film's storytelling.

10.3.5 Modular approach and project management

As part of the new method of composing, the complete scoring process (i.e. three major steps described in section 2.3) takes place entirely within the computer domain (once the structure of modules is established). Composition, editing and arranging of modular components are done in the Digital Audio Workstation, such as Logic Pro or any other software which enables manipulation and editing of MIDI and audio data to the digitalised video image. Due to the modular structure and computer technology the final form of the piece can easily be rearranged (i.e. its development, duration, texture), thus the composer can commence work earlier than would normally be the case. This has obvious advantages for a composer. Starting early means that most of the composing can be done well before the project reaches the post-

production phase (assuming that the composer is hired early). Practical implications of early involvement of the composer were indicated by all three interviewees (see section 9.3.7).

The compositional process may start during the film's pre-production stage, from development of individual modules (i.e. singular, simple structures as well as more complex self-contained formations). The different strategies to development of the modular components can be employed. For instance, modules can be developed through improvisation, where possible connections with other modules are not planned beforehand or designed with carefully planned possible connections (when a more coherent flow of music is a needed or desired outcome). The decision regarding the choice of appropriate strategy for development of modules is directly related to the film project and the role the musical accompaniment plays in it.

Consequently, during the post-production, a composer would assemble the already developed and recorded modular components. The advantages of greater freedom and comfort (in situations where usually there is an intense pressure of time) are apparent (see Appendix 5 which describes the filmmaking process). Extra time available during post-production may be utilised for additional composing and recording should the need arise. Early commencement allows also for careful development of a suitable concept and experimentations with different approaches that can be demonstrated to (as demo tracks) and discussed with the director and the producer. The modules that are a result of the general reflection coming from the script and/or preliminary consultations with the director and producer can help to determine general artistic direction regarding the music (i.e. testing different compositional techniques, and colouristic possibilities) and functions it has to fulfil. The filmmakers can familiarise

themselves with the musical ideas so that, during post-production, they are not confronted by unexpected musical outcomes. Such situations often arise when the director or the producer has not been able to communicate their needs clearly. Even though communicative functions of temporary tracks can be very helpful for the composer in understanding the director's expectations, the fact that composers are often forced to emulate them may diminish originality of the music. Involvement of originally composed music during pre-production can minimise use of temporary scores.

Another issue that modular approach can successfully address is management of possibilities created by technology which, at times, may overwhelm the composer. As observed by Hans Zimmer (see section 2.1.3.3) and Christopher Williams (see section 9.3.12), making a decision regarding which one of the many competing possibilities is preferred, (e.g. selecting an appropriate instrumental colour from the rich palette available thanks to software instruments, with hundreds or even thousands of sounds to choose from), can take a lot of time and in fact make the working process harder. Yet, in the modular approach the composer prepares modules early on, including making the choice of particular instruments that will be used. This, in turn, creates boundaries that limit the choice during the post-production and facilitates the compositional process.

10.3.6 Modular approach and "recycling" of musical modules

Designed interchangeability of modular components allows them to be reused both in other pieces (i.e. other than they were initially created for) and even other projects. Film and other media projects usually result in large amounts of recorded material that do not find their way into the final product. Thus, often gigabytes of data are not utilised and the time spent creating

the material wasted. In modular approach, recorded and unused material from different projects may still be utilised in future commissions. Not only would the combination of unused material from other projects with newly created elements be economical, but could also allow for greater freedom of experimentation. Also, assuming the worst case scenario, where the whole concept of the music is suddenly dropped during the last stages of the project, pre-prepared music does not necessarily need to be thrown away. On the contrary, modular components can, in some situations, be salvaged and reused, thus reducing the need for starting the compositional process from the beginning. In some cases, this feature may save the score or even composer's credit. Even if the composer is not able (due to other arrangements) to implement alterations resulting from sudden changes to the concept, the necessary adjustments or even creation of new cues could be done by someone else, for instance, by the composer's assistant or music editor, using the modules composed by the original creator.

10.3.7 Modular approach and composer's creativity

The modular approach, presented here, which facilitates adding, removing and rearranging of modules; provides a composer with an opportunity to experiment with an arrangement of the music that can bring unexpected but often satisfactory results; and boosts the composer's creativity (this is precisely how the formal structure of *Cut The Moon In Half* was achieved). The modular approach allows for different compositional techniques to be combined. Such combinations are frequently needed in a film for narrative illustration purposes. Consequently, this particular feature of the modular approach (i.e. composing from pre-composed components) may be a tool for solving writer's block, especially when pressure of time is intense. Possibility of easy rearrangement of music addressed by one of the subsidiary

research questions [SRQ.6] can also be useful at the beginning of the film project and support the development of the artistic direction not only of the film, which was indicated in interviews (section 9.3.6), but also of the musical score.

10.3.8 Modular approach and sound design

Working with pre-prepared modular material (both audio and midi, within the Digital Audio Workstation domain), allows for additional sound design (i.e. signal processing of the modular components). Consequently, the composer is able to create variations of existing modules or to develop completely new ones. Not only can the processed modules be used as featured music (which is their primary function), but they may also serve as elements of the film's sound design, helping to create the overall soundscape. In this way, a musical score and a sound design may be integrated on a more sophisticated level, enhancing the role of the soundtrack. Additionally, the modular structure of the music which can be easily recombined allows for adjustments in terms of accommodating other sonic elements of the film. The problem of coexistence of all film soundtrack elements and the role of the soundtrack in effective storytelling had been also recognised as an important issue by interviewees (section 9.3.9). Modular structure, built from interchangeable modular components (supported by departure from the linearity of the tonal system), in conjunction with computer technology allows the music to be assembled in the same fashion as the sound editor assembles other soundtrack elements (i.e. dialogue and sound effects). Consequently, it is assumed that the modular approach can facilitate cooperation between the composer of the score and the sound designer during post-production through creation and exchange of audio files.

10.3.9 Modular approach and project's costs

The modular method can also reduce the cost of music production, which is especially relevant to low budget undertakings. Modules can be recorded during one recording session only (particular groups of instruments, and soloists can be recorded separately, instead of recording a full orchestra or other large instrumental ensembles) and combined into finished compositions. Thanks to the use of modules, some effects that are typically achievable only with a large number of musicians (and are thus more expensive and difficult to execute) can be accomplished easily and economically in the composer's own studio (i.e. by layering several modules on top of each other).[180] The cost-effectiveness issue becomes even more relevant in light of the general shape of today's economy and growing expectations regarding lower costs of music production.

10.3.10 Modular approach's suitability for various film genres

The question of the suitability of the modular approach to different genres of films has been briefly raised in the *Oxygen* case study (see section 8.4). It has been indicated that the application of the modular method is directly related to the appropriate design of modular components. "Appropriate" means that the modular components in their structure and overall character reflect specific attributes linked to a certain genre of music. Since the outcome of the compositional process (using the approach presented in the thesis) is a piece of music with a modular structure, it is possible to adapt an industry model and procedure for developing modular products (in this case, music calibrated for a specific genre). Such a method consists of five steps, and is called Modular Function Deployment (MFD) (Ericsson and Erixon, 1999,

[180] Assuming that this procedure does not interfere with Musicians' Unions regulations, which can be the case in some countries.

29-41). To demonstrate the procedure the two case studies, *Skippy's Adventure* and *Oxygen* can serve as examples.

The first step of the MFD is to define customer's requirements. In the case of film music, it means the director's or the producer's needs regarding the function of musical accompaniment in the particular project and overall stylistic approach (whether the music is to be generic or unusual for the particular genre). In *Skippy's Adventure* there was a need for music that would fit a hypothetical cartoon movie (a free allusion to old MGM cartoons). It was supposed to be an orchestral piece, light and humorous in character (yet without use of sound effects incorporated into the score), but it was also supposed to suggest a kangaroo's skips. *Oxygen*, on the other hand, required serious music that could emphasise both psychological and action elements of the plot. The director of the film was very specific as regards the style of the music, pointing to compositions used in Stanley Kubrick's films (i.e. *2001: A Space Odyssey* (1968) and *The Shining* (1980)). The music was also supposed to blend with sound effects to formulate a homogenous entity. An additional requirement (of the present author) was that the composed music had to be flexible in structure, so it could be subjected to various modifications.

The second step of the MFD is to select the technical solutions that would allow the demands to be fulfilled. For *Skippy's Adventure* an octatonic scale provided a suitable solution, allowing for monophonic and polyphonic textures, compound chord structures, and the necessary structural flexibility (see Case Study 2). In the orchestration of the piece a prominent role was given to xylophone and marimba, instruments frequently associated with cartoon music. *Staccato* articulations were chosen for their humorous effect and to suggest

skips of a kangaroo. In *Oxygen*, in order to meet the director's expectations, a sonoristic musical style of Penderecki's and Ligeti's compositions used by Kubrick in the indicated films had been used as a reference for the music (see Case Study 3). As the music was supposed to be combined with the film's sound design the formal structure and the orchestrations had to be kept simple. It was decided that the tension and seriousness of the on-screen events could be highlighted by the use of dissonant sonorities, both acoustic and electronic. Various percussive instruments and short percussive loops were used to amplify the action elements. A combination of mainly non-tonal music (i.e. no functional harmonic progressions and traditional voice leading rules) and simplicity of musical structure provided sufficient flexibility for musical cues.

The third step of the MFD is to generate modules. The modules developed for *Skippy's Adventure* were divided into several groups: main themes; ostinati; short sequences; chords and chord progressions. As mentioned earlier, an octatonic mode gave the pitch material for the modules and provided a high degree of interchangeability of modular components. Apart from two modules (which were four bars in length) the rest were short (one to two bars in length). All modules were constructed so as to provide editing points for intercutting and further modifications. The overall character of the developed modules was light-hearted, with relatively simple rhythmic and melodic structures. The modules were constructed so as to allow for combining them as compound structures (i.e. building blocks of the composition). In *Oxygen* there are several major types of modules: drones; modules with specific tempi; improvised modules (free timing); and hits. The drone is a commonly used device in film music to illustrate moments of tension. A range of low-, mid- and high-pitch drones were created. Additionally, drones which are free from temporal limitations of bars, harmonic

rhythm and pulse (Mera, 2006, 139), provided freedom in terms of duration. Modules with specific tempi were usually short (i.e. one to two bars), to allow for editing and modifications. Occasionally, longer drum loop modules, ostinati and sequences were used (i.e. up to four bars). This group of modules was mainly associated with action elements of the plot. Improvised modules were created to emphasise tension and its intensification. Low drum sounds were often used to evoke feelings of danger. Finally, various percussive hits were created to highlight some elements of the film narrative.

During the fourth step of the MFD, the module concept has to be evaluated. *Skippy's Adventure* involved creation of several four- and eight-bar building blocks (constructed from smaller modular components) and subjection of them to a number of modifications (i.e. rearrangements). It allowed the author to determine which modules would be used for construction of main sections of the composition, as well as to check possible transitions between them. The evaluation was mainly concerned at this stage with the issue of adjustability of the musical structure. To evaluate the modular concept of *Oxygen* a number of short examples were created and presented to the director of the film. In terms of the character, mood, structure (i.e. complexity of the arrangements), and synchronisation of music with visuals, the director had the final say. All the director's suggestions and wishes were applied.

The fifth and final step of the MFD concerns the optimisation of modules. After initial tests, in both cases, it became clear that some modifications needed to be done. These changes mainly concerned: variations of modules, so as to extend their variety; fixing potential transitional points between modules; and, in some instances, modifications of texture, tempo,

and time signature. The application of the discussed procedure demonstrates what considerations regarding the construction of modules have to be undertaken in order to secure their suitability for the specific genre and narrative needs of the project. Thus, applying the MFD strategies allows for the construction of modular music suited for any genre

The author's method presented for this research project comprised three major steps: 1) creation of modules, 2) selection of suitable modules, and 3) assembly of modules into the final pieces of music. All five steps of the MFD are the element of the first stage of the modular approach (i.e. creation of modules). During this stage a composer must define what style and genre of music is required for a particular project as it will influence the design of the modules. Consideration needs to be given to the degree of flexibility required. Consequently, if it has to be a score-based music, with high flexibility, then the modular structure can be the answer. If the degree of flexibility is not crucial then a more traditional approach may work; or a mixture of modular and traditional could be applied (e.g. action sequences can be scored using a modular structure). When it comes to sound-based (rather than score-based) music the temporal constraints (and consequently fitting the music to the temporal structure of the project) will not be problematic; neither will the genre of the music.

10.4 Personal perspective

The author's main objective for this thesis was to develop a method that would simplify various stages of composition for film and television (but also other media), by addressing the issue of mapping music to the project structure and subsequent often time consuming adjustments of music to fit the re-edited material. However, apart from addressing its main

and subsidiary research questions the thesis also provided opportunities for personal reflections.

For the author, the most interesting aspect of working with modular components was the possibility of quick experimentations with various configurations of modules. There were situations where a chosen set of modules did not bring interesting results, yet most of the time various configurations resulted in musically appealing effects that could help in maintaining the author's interest and excitement in the developing structure. This feature of the modular compositional process is particularly valuable since the results would have probably never occurred when working in a traditional way. Consequently, it was possible for the author to work quickly, developing interesting musical structures, which at the same time remained flexible.

Acknowledging the attractiveness of the method, it should also be emphasised that many of the early experiments with the modular method were unsatisfactory. For example, the prepared modules did not fit together well enough to form an acceptable musical flow or the achieved structure only partially addressed the author's expectations. Work with the limited number of pre-produced modules was somewhat restrictive at the beginning of the process. Often it was obvious to the author that the developing flow could have been more musically interesting if certain modules had been constructed differently. Nevertheless, in time, this limitation helped to focus the author's attention on how to construct modules to provide their greater variety (achieved by internal transformations or combinations with other modules) and how to work efficiently with what is available. It must be stressed, however, that with a growing library of modules the possible choices also increase, which may certainly provide a

composer with a richer palette of modules, but may also impact on the time needed for the selection of modules suitable for a particular project.

As mentioned before, modular compositions lend themselves well for editing. In contemporary media-related projects an enormous amount of time is often dedicated to editing, and although technology facilitates editing by allowing for a greater flexibility in treating audio materials, it consumes a lot of the time that could be dedicated to composition. On the other hand, the use of pre-recorded material designed with the interchangeability of modules and ease of editing in mind seemed to deliver answers to the author's questions and brought back the balance between editing and musical composition.

However, it should also be acknowledged that the compositional methodology used in this research project, though it was convenient and effective for the author, may not satisfy the needs of other composers. The method may be restrictive, may not suit the particular style of composing, and may be particularly unsuitable if linearity of the music is a compositional goal.

10.5 Limitations

Some issues could not be addressed by this thesis. For example, the author was unable to examine whether or not the modular approach helps to preserve the coherence and logic of music edited without the composer's involvement (see, Subsidiary Question 4 [SRQ. 4], section 2.1.2). This problem was directly connected to the nature of the *Oxygen* film project and resulted from technical requirements of the Film School at the Victorian College of the

Arts, where the film was dubbed. Similarly, it was impossible to determine whether the modular approach could allow a film and/or music editor to work independently from the composer (i.e. to edit, manipulate, or create additional variations of the cues). See Subsidiary Question 3 [SRQ. 3] (section 2.1.2). These two questions seem worth answering as changes to the music are often implemented by directors (which was confirmed by interviewees, see section 9.3.6) and due to the growing role of music editors in shaping the final form of the film's soundtrack, especially that these individuals rarely receive a formal training similar to the one composers or performers get (Sadoff, 2006, 168).[181]

The modular method offers not only a new approach but also a new philosophy for creating and integrating music with image within the dramaturgical structure of the film. A synthesis of different approaches which proved to be useful in addressing the problem of synchronisation seems logical. Yet, in conjunction with the introduction of a three-step paradigm (of creation, selection and assembly of modular components), as well as early commencement of the compositional process, it is radically dissimilar to the prevailing mainstream practice. Thus, as a new approach, it may generate some concerns, and its application may be limited (the application may be more likely in small budget and/or independent projects). Moreover, the way the musical structure is achieved and the need for flexibility influence the character of the music, which may not appeal to everyone. The linearity of the music built from modular components can be significantly diminished in comparison with the traditional approach. It is, however, possible to simulate pseudo-linear attributes of modular music to compensate for the discontinuous character of the musical

[181] In low budget films, TV and radio editing of music is often done by a sound engineer, film editor, director, or even by a producer.

structure (as exemplified by case studies). However, as indicated by Collins, no matter how music is organised, for the listener it will appear as linear as it exists in a time-span (2008, 77). Thus, the lack of linearity may not necessarily be perceived as a limitation by some audiences.

The method also implies a certain way of approaching the compositional process. The modular approach requires detailed planning at a preliminary stage. First of all, a composer has to consider carefully the amount of flexibility needed for the particular project, and to balance this need for flexibility against stylistic and functional requirements for the musical accompaniment. Secondly, if the final outcome is recorded by real musicians, it is also necessary to determine whether developed module/modules could be played by a particular instrument (considering its range, articulation, technique) as well as the degree of interchangeability between various instruments. Thirdly, the development of the piece needs to be taken into account while creating modules. It is likely that there may be a need to create a certain number of versions of the modules in order to cover foreseeable eventualities. Working exclusively with audio files requires careful consideration of the tempi. Even though digital manipulation of the audio material can provide satisfactory results in adjusting the tempo of recorded material, it must be stressed that there are limitations to this process which may influence the quality or character of the audio material. It must also be noted that in some cases (i.e. a recording session) traditional linear tonal music can be more easily and adequately (i.e. more musically) adjusted than the application of digital processes and editing techniques, especially, when required adjustments are not extensive.

Finally, the presented approach is in the early stage of its development and it has been tested on a limited scale. Despite the promising results achieved during this research project, it is hard to determine to what degree the modular approach can be used, and whether it may suit all genres of films/projects. At this stage it is justifiable to say that the modular approach could be used efficiently in action and psychological films. However, the application of the MFD strategy (discussed in section 10.3.10) demonstrates that a proper construction of modules (i.e. in accordance with the needs of a particular project and its genre) can provide building materials suitable for a range of film genres. Furthermore, while the thesis has explored the technical aspects of composing for film (specifically focusing on synchronisation), the aesthetic aspect of the modular approach has not been the focus of this work.

10.6 Future research

This thesis opens the avenue for further research into the application of the modular composition method. The method should ideally be tested in a real life film production (as opposed to the student's project) to confirm its usefulness and to answer the subsidiary questions that were unanswerable (i.e. [SRQ. 3] and [SRQ. 4], section 2.1.2). Specifically, the question of whether the modular approach helps to preserve the logic and coherence of music edited without the composer's involvement seems to be of particular interest [SRQ. 4]. Future research should also explore aesthetic aspects of the modular approach. It could be interesting to compare differences in the audience's perception and interpretation of the film between the traditional scoring approach and the modular approach. Aesthetic considerations should also

focus on the application of modular approach as a rich artistic and creative source of solutions available to a composer in the task of supporting film narrative.

The development of the film plot frequently dictates application of various genres of music in the film. Often, a stylistically diverse cue or contrasting cues are required in the same scene. Transitions from one musical style to another, at times, may impose difficulties. Therefore, it would be also interesting to research whether the flexible structure of the music could help to address the issue of sudden changes from one musical style to another within the film sequence. Perhaps modular technique could provide a solution for swift and flawless shifts between different musical genres, becoming a "modulation tool", a feature indicated by Andreacchio as essential for successful scoring (see section 9.3.3).

The fact that the modular approach is based in the computer domain means that future explorations could focus on the interface with dedicated computer software. The method may lead to the development of a large number of modular components for each project, which can be stored on the hard drive. Moreover, the modules created for a particular commission can be reused in other projects. In time, composers could develop a diverse and useful library of modular components ready to be used. Yet, as indicated in section 10.4, the workflow would depend on how quickly suitable modules can be identified and successfully applied. Each library requires a detailed search strategy in order to secure quick and easy access for the users. And this creates the space for further research towards creating a dedicated software application which could not only solve this particular problem but could also provide other benefits. For example, the computer application, possibly a hybrid system (i.e. Expert system and Self-learning system), could serve as a highly sophisticated search engine providing a

composer with easy access to the daily-growing library of modules, as well as an arranging tool grouping and mapping modules to the time structure of the project. The application of such dedicated software, in conjunction with the modular approach, could also provide a significant advantage over experiments with algorithmic generation of film music. The advantage rests in the fact that, in the modular approach, the musical material is composed by a human composer, so the software would serve only as an assistant "who" sorts and proposes possible configurations (arrangements) of modules as a starting point for a new piece. Due to the possibility of applying an Artificial Neural Network, the system could be trained in the accuracy of choices, slowly becoming a skilled composer's assistant.[182]

The non-linear structure of the modular approach, especially in conjunction with the dedicated software application, could certainly find its application in video games scoring. However, there is a significant difference between composing for film, where editing dictates how the music will change, and writing music for games. In the latter, the way music interlocks with the story is controlled by the player (i.e. user of the game) in the real time. This difference, influences approaches and techniques used by composers in these two genres. Nevertheless, the modular approach presented in this thesis shares some techniques with dynamic music composition, such as use and manipulation of pre-composed segments of music. Thus, further research in this area is utterly justified. Perhaps, some observations resulting from this research project can be implemented to already existing solutions.

[182] Some aspects of the application of Expert system and Self-learning system during the compositional process are currently being investigated by Robert Wolf at the Elder Conservatorium of Music, the University of Adelaide.

10.7 Summary

This work has provided significant contributions to knowledge and practice of film and/or media music composition. In particular, it showed that it is possible to develop a compositional technique practically suited to the needs of the film industry and its current techniques of digital (non-linear) film editing. Practically, this method may: facilitate cooperation between a composer and a filmmaker; facilitate non-linear editing of music; enable composing fully functional film/media music; speed up the scoring process; improve project's work management; facilitate "recycling" of music; boost composer's creativity; facilitate integration of music with a sound design and reduce project's costs. Thanks to these benefits, a composer can devote more time, care and attention to the process of creating the music rather than merely to the technical aspects of adjusting music to film. This, in turn, may result in better developed and more unique music that more accurately addresses the needs of the film.

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Alien (Ridley Scott, 1979)

Alien 3 (David Fincher, 1992)

Alien: Resurrection (Jean-Pierre Jeunet, 1997)

Aliens (James Cameron, 1986)

Altered States (Ken Russell, 1980)

American Beauty (Sam Mendes, 1999)

Amores perros (Alejandro González Iñárritu, 2000)

Apocalypse Now (Francis Ford Coppola, 1979)

Armageddon (Michael Bay, 1998)

Assault Precinct 13 (Jean-François Richet, 2005)

Avatar (James Cameron, 2009)

Back Street (John M. Stahl, 1932)

Bad Boys (Michael Bay, 1995)

Barton Fink (Ethan Coen, Joel Coen, 1991)

Basic Instinct (Paul Verhoeven, 1992)

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Batman Begins (Christopher Nolan, 2005)

Batman Forever (Joel Schumacher, 1995)

Batman Returns (Tim Burton, 1992)

Battleship Potemkin (Sergei Eisenstein,1925)

Behind Enemy Lines (John Moore, 2001)

Big Lebowski,The (Ethan Coen, Joel Coen, 1998)

Birds, The (Alfred Hitchcock, 1963)

Birth of a Nation, The (D.W. Griffith, 1915)

Black Hawk Down (Ridley Scott, 2002)

Black Rain (Ridley Scott, 1989)

Blade (Bob Rafelson, 1987)

Blade Runner (Ridley Scott, 1982)

Body of Lies (Ridley Scott, 2008)

Bounty, The (Roger Donaldson, 1984)

Bourne Identity, The (Doug Liman, 2002)

Bourne Supremacy, The (Paul Greengrass, 2004)

Bourne Ultimatum, The (Paul Greengrass, 2007)

Bram Stoker's Dracula (Francis Ford Coppola, 1992)

Breathless (Jean-Luc Godard, 1960)

Bullitt (Peter Yates, 1968)

Casino Royale (Martin Campbell, 2006)

Cat That Hated People, The (Tex Avery, 1948)

Cell, The (Tarsem Singh, 2000)

Chinatown (Roman Polanski, 1974)

Chronicles of Riddick, The (David Twohy, 2004)

Citizen Kane (Orson Welles, 1941)

Close Encounters of the Third Kind (Steven Spielberg, 1977)

Cobweb (Vicente Minnelli, 1955)

Coma (Michael Crichton, 1978)

Conversation, The (Francis Ford Coppola, 1974)

Craft, The (Andrew Fleming, 1996)

Crimes and Misdemeanours (Woody Allen, 1989)

Człowiek na torze (Andrzej Munk, 1957)

Dark City (Alex Proyas, 1998)

Dark Knight Rises, The (Christopher Nolan, 2012)

Dark Knight, The (Christopher Nolan, 2008)

Das Boot (Wolfgang Peterson, 1981)

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Day The Earth Stood Still, The (Scott Derrickson, 2008)

Déjà Vu (Tony Scott, 2006)

Descent, The (Neil Marshall, 2006)

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District 13 (Pierre Morel, 2004)

Do widzenia do jutra (Janusz Morgenstern, 1960)

Donnie Darko (Richard Kelly, 2001)

Dracula (Tod Browning, 1931)

Dune (David Lynch, 1984)

East of Eden (Elia Kazan, 1955)

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Enemy of the State (Tony Scott, 1998)

Entr'acte (René Clair, 1924)

Event Horizon (Paul W. S. Anderson, 1998)

eXistenZ (David Cronenberg, 1999)

Exorcist, *The* (William Friedkin, 1973)

Face/Off (John Woo, 1997)

Fahrenheit 451 (François Truffaut, 1966)

Fallen Angel (Otto Preminger, 1945)

Fantastic Four (Tim Story, 2005)

Fantastic Voyage (Richard Fischer, 1966)

Fast and Furious (Justin Lin, 2009)

Fatal Hour, The (D.W. Griffith, 1908)

Fifth Element, The (Luc Besson, 1997)

Final Fantasy - The Spirits Within (Motonori Sakakibara, Hironobu Sakaguchi, 2002)

Fly, The (David Cronenberg, 1986)

Forbidden Planet (Fred M. Wilcox, 1956)

Forever Amber (Otto Ludwig Preminger, 1947)

Fountain, *The* (Darren Aronofsky, 2006)

Frankenstein (James Whale, 1931)

Gladiator (Ridley Scott, 2000)

Goldfinger (Guy Hamilton, 1964)

Great Train Robbery, The (Edwin S. Porter, 1903)

Gunfight (Lamont Johnson, 1971)

Hamburger Hill (John Irvin, 1987)

Hard Boiled (John Woo, 1992)

High Noon (Fred Zinnemann, 1952)

Hostel (Eli Roth, 2005)

I, Robot (Alex Proyas, 2004)

In Dreams (Neil Jordan, 1999)

In the Mood for Love (Wong Kar-wai, 2000)

Inception (Christopher Nolan, 2010)

Independence Day (Ronald Emmerich, 1996)

Informer, The (John Ford, 1935)

Inside Man (Spike Lee, 2006)

Intolerance (D.W. Griffith, 1916)

Jaws (Steven Spielberg, 1975)

Jaws 2 (Jeannot Szwarc, 1978)

JFK (Oliver Stone, 1991)

Jumper (Doug Liman, 2008)

Jurassic Park (Steven Spielberg, 1993)

Katastrofa w Gibraltarze (Bohdan Poręba, 1984)

King Kong, The (Merian C. Cooper, Ernest B. Schoedsack, 1933)

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Kingdom of Heaven (Ridley Scott, 2005)

Koyaanisqatsi (Godfrey Reggio,1982)

La Commare Secca (Bernardo Bertolucci, 1962)

La Ronde (Maximillian Ophüls, 1950)

La Strada (Federico Fellini, 1954)

Laura (Otto Preminger, 1944)

Léon (Luc Besson, 1994)

Lethal Weapon (Richard Donner, 1987)

Life of an American Fireman, *The* (Edwin S. Porter, 1903)

Live Free or Die Hard (Len Wiseman, 2007)

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Lost Highway (David Lynch, 1997)

M (Fritz Lang, 1931)

Matrix Reloaded, The (Andy Wachowski, Lana Wachowski, 2003)

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Matrix, The (Andy Wachowski, Lana Wachowski, 1999)

Memento (Christopher Nolan, 2000)

Michael Clayton (Anthony Joseph Gilroy, 2007)

Michael Collins (Neil Jordan, 1996)

Milcząca Gwiazda/Der Schweigende Stern (Kurt Maetzig, 1959)

Minority Report (Steven Spielberg, 2002)

Mulholland Dr. (David Lynch, 2001)

Mummy, The (Karl Freud, 1932)

Naked Lunch (David Cronenberg, 1991)

Naqoyqatsi (Godfrey Reggio, 2003)

National Lampoon's Animal House (John David Landis, 1978)

Natural Born Killers (Oliver Stone, 1994)

Nest, The (Florent Emilio Siri, 2002)

Ninth Gate, The (Roman Polanski, 2000)

North by Northwest (Alfred Hitchcock, 1959)

Notatki Krakowskie (Zbigniew Bochenek, 1961)

O Brother, Where Art Thou? (Ethan Coen, Joel Coen, 2000)

October (Sergei Eisenstein, 1928)

Of Mice and Men (Lewis Milestone, 1939)

Omen, The (Richard Donner, 1976)

On the Beach (Stanley Kramer, 1959)

On The Waterfront (Elia Kazan, 1945)

Oxygen (David Norris, 2008)

Paycheck (John Woo, 2003)

Pianist, The (Roman Polanski, 2002)

Piano, The (1993, Jane Campion)

Platoon (Oliver Stone, 1986)

Plow That Broke the Plains, The (Pare Lorentz Resettlement, 1936)

Possession (Andrzej Żuławski, 1981)

Powaqqatsi (Godfrey Reggio, 1988)

Prestige, The (Christopher Nolan, 2007)

Psycho (Alfred Hitchcock, 1960)

Psycho II (Richard Franklin, 1983)

Pulp Fiction (Quentin Tarantino, 1994)

Quantum of Solace (Marc Forster, 2008)

Raiders of the Lost Ark (Steven Spielberg, 1981)

Raising Arizona (Ethan Coen, Joel Coen, 1987)

Ran (Akira Kurosawa, 1985)

Rashomon (Akira Kurosawa,1951)

Rear Window (Alfred Hitchcock, 1954)

Recruit, The (Roger Donaldson, 2003)

Red Pony, The (Lewis Milestone, 1949)

Red Violin, The (Francois Girard, 1999)

Rescue Daw (Werner Herzog, 2007)

Rogue (Greg Mclean, 2008)

Rope (Alfred Hitchcock, 1948)

Rules of the Game, The (Jean Renoir, 1939)

Run Lola Run (Tom Tykwer, 1998)

Russian Ark (Alexander Sokurov, 2002)

Saving Private Ryan (Steven Spielberg, 1998)

Schindler's List (Steven Spielberg, 1993)

Sea of Love (Harold Becker, 1989)

Secret of the Sahara, The (Alberto Negrin, 1988)

Seven (David Fincher, 1995)

Shining, The (Stanley Kubrick, 1980)

Shiri (Kang Je-gyu, 1999)

Shoot the Piano Player (Francois Truffaut, 1962)

Signs (Night Shyamalan, 2002)

Silence of the Lambs, *The* (Jonathan Demme, 1991)

Sin City (Frank Miller, Robert Rodriguez, 2005)

Sixth Sense, The (Night Shyamalan, 1999)

Sleepy Hollow (Tim Burton, 1999)

Social Network, *The* (David Fincher, 2011)

Solaris (Andrei Tarkovsky, 1972)

Solaris (Steven Soderbergh, 2002)

Spartacus (Stanley Kubrick, 1960)

Species (Roger Donaldson, 1995)

Sphere (Barry Levinson, 1998)

Spider-Man (Sam Raimi, 2002)

Spider-Man 2 (Sam Raimi, 2004)

Spider-Man 3 (Sam Raimi, 2007)

Stalker (Andrei Tarkovsky, 1979)

Star Trek: Insurrection (Jonathan Frakes, 1998)

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Star Trek (J. J. Abrams, 2009)

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Strike (Sergei Eisenstein, 1925)

Sunshine (Danny Boyle, 2008)

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Terminator Salvation (Joseph McGinty Nichol, 2009)

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There Will Be Blood (Paul Thomas Anderson, 2008)

Thin Red Line, The (Terence Malick, 1999)

Thing, *The* (John Carpenter, 1982)

Thing, The (Matthijs van Heijningen Jr., 2011)

Three Colors: Red (Krzysztof Kieślowski,1994)

THX 1138 (George Lucas, 1971)

Transporter 2 (Louis Leterrier, 2005)

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Trouble with Harry The (Alfred Hitchcock, 1955)

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Vertical Limit (Martin Campbell, 2000)

Vertigo (Alfred Hitchcock, 1958)

Wanted (Timur Bekmambetov, 2008)

War of the Worlds (Byron Haskin, 1953)

War of the Worlds (Steven Spielberg, 2005)

Watchmen (Zack Snyder, 2009)

Weekend (Jean-Luc Godard, 1967)

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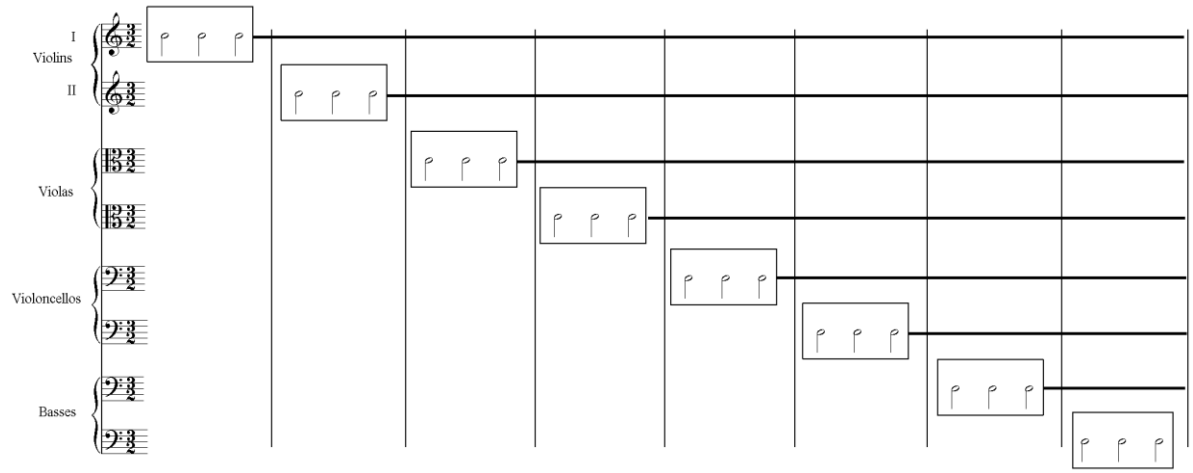
Appendices

Appendix 1: Modular construction of cue # 17, *The Murder* from *Psycho*

The first eight bars of cue # 17, *The Murder*. To present a clearer overview of the modular structure of this cue, notation was simplified and the actual pitches (two pairs of semitones Eb-E and F-Gb) were removed.



Appendix 2: Interview questions

1. Have you got a musical background and if yes what sort of background?
2. Is the degree in Psychology helpful in you work also regarding application of music?
3. What are your music fascinations/favourite concert hall and film composers?
4. You have directed many films and worked with many composers. How important in your opinion is music in film?
5. Is music in film really a necessary evil for the film director?
6. Do you think film music has to follow the old clichés (i.e. violin in the love scene) to be understood by a viewer?
7. What is the most significant element of the music (i.e. melody, rhythm, harmony, or colour) in film? What influence do these elements have on the reception of the film?
8. Should music in film remain "unheard" – not stand out?
9. The style and the genre of music are directly related to a film project. However, have you got any preferences in terms of music being symphonic/electronic? Or does it not matter as long as music fulfils its functions?
10. Is there anything that annoys you about film music?
11. Have you got a system on how to use music in your films?
12. When do you usually start thinking about the music for an upcoming project? (as early as during work on a screen play or later?)
13. Is the music composition stage (last in the production chain) a stressful experience for the director, producer after so many months of hard work and money spent?
14. Is the choice of the composer for the project equally important as hiring an actor?

15. What factors influence your decision regarding a suitable composer for the upcoming film project?
16. What is better from your perspective: when a composer starts their work during the screenplay stage or later during post production?
17. What do you think about the idea of having the music that is flexible and can be altered easily whenever the need comes?
18. Would that be helpful during film making process?
19. What is difficult in cooperation with a composer?
20. How did you handle your very first film project (in terms of music)?
21. How did your cooperation with the composer go?
22. In your experience, what is the best way of the communication between the director and the composer: verbal communication, musical examples, involvement into compositional process?
23. Do what you have been told to or you are out! What is the degree of freedom in the composer's input in your projects?
24. How specific are you in your requests regarding music?
25. Have you ever changed your mind about the scene (structure, montage, duration) because you were not sure about the music?
26. What degree of control would you like to have over the process of music composition?
27. Would you like to be involved in it?
28. If you could, would you like to be able to co-compose music for your film?
29. Would that possibility provide you with the feeling of control?
30. How important is a perfect synchronisation of music and image?
31. Last-minute changes to the montage? How many, how often? Why?

32. Have you ever wished to be more flexible in terms of music structure during the post-production?
33. Have the technology (non linear editing) changed the way you make films? How?
34. Do you usually create a number of versions of a scene during the montage process?
35. Have you ever had to cut the music to fit altered film sequence? (how often)
36. Have you ever used a piece of music composed for a particular scene in a different one?
37. What do you think about the idea that the film music should apply principles of film montage? (structure)
38. Has film music got a right to exist outside the film? In fact its role and the meaning can only be understood/considered in conjunction with an image.
39. Have you ever directed a commercial? If ye, how that was different from the feature film directing?

Appendix 3: Participant Information Sheet

My name is Bartlomiej (Bart) Walus. I am undertaking research as part of my Doctor of Philosophy degree in the Elder Conservatorium of Music, Faculty of Humanities and Social Sciences at the University of Adelaide.

The research I am conducting aims to develop a method of composing film music with a flexible (modular) structure, which would more easily facilitate adjustments of music after changes resulting from film editing. The outcome of this research will be a new improved approach to film scoring that represents the alternative to the current film industry practice. The important aspect of the method is that it also addresses cooperation with a film director, music and film editor and finally, a film producer. Thus, your point of view will help to contribute to research regarding the collaborative aspect of the film composer's work. It is also likely that original ideas developed through this investigation may be of some interest to you on the practical level.

The study is completely confidential, so nothing that you say will be reported in a way that will identify you or your remarks about any person or organisation, unless you agree to be identified. If you do not wish to be identified, no personal or identifying information about you will be included in my thesis, and I will use a nickname to attach to your interview notes.

The interview should take only 40-60 minutes and will be more like a conversation than a formal interview. I would like to tape our conversation if that is okay with you. If you do not wish to be identified, your real name would not be connected with the tape. The tape would be erased as soon as I have finished using it to make notes of our conversation. If you would prefer not to be tape-recorded, I am happy just to take notes. If you wish to check a copy of my notes before I use them in my study, then please indicate this on the attached Consent Form.

If you decide to participate in the study you are free to change your mind and withdraw at any time before the study has been completed. Also, you are not obliged to answer questions or to discuss any issues that you do not wish to discuss. You are free to withdraw your interview material up until the time that I have finished all the interviews. You do not have to give me any reason if you do decide to withdraw from the study

Please don't hesitate to contact me if you want more information about the study. If you have any concerns that you do not wish to discuss with me directly, please contact Professor Charles Bodman Rae, who is the supervisor of the PhD program for which I am conducting this study.

CONTACT DETAILS

Mr Bart Walus Student, PhD candidate Elder Conservatorium of Music, University of Adelaide Ph. [redacted] E-mail: [redacted]	Professor Charles Bodman Rae Supervisor Elder Conservatorium of Music, University of Adelaide Ph. [redacted] E-mail: [redacted]

Appendix 4: Consent

CONSENT FORM FOR A PARTICIPANT IN A RESEARCH PROJECT

I **(print your name)** .....…… consent to take part in the study titled: A New Modular Approach to the Composition of Film Music.

I acknowledge that I have read the attached Information Sheet that describes the aims and purpose of this study. I confirm that I have had the study, so far as it affects me, fully explained to my satisfaction by the researcher, Bart Walus. My consent to be interviewed for the purpose of the study by Bart Walus is freely given.

I understand that I can request that my name not be connected with any information that I provide and that, if I do not wish to be identified, Bart Walus will create a pseudonym to identify me.

I do/do not **(circle one)** wish to be identified.

I also understand that, if I do not wish the interview to be tape-recorded, Bart Walus will only take notes of the interview.

I do/do not **(circle one)** wish to be tape-recorded.

I understand that my participation is completely voluntary and that:
• I am free to withdraw the information that I provide at any time during the information gathering stage of the study
• I do not have to give reasons for withdrawing the information that I provide
• I am under no obligation during the interview to divulge information or to discuss issues if I do not wish to do so.

I understand that I can request to check the transcript of the interview before it is used in the study.

I do/do not **(circle one)** wish to check the transcript of the interview.

I understand that I will be provided with information about the results of the study if I wish.

I do/do not wish **(circle one)** to be provided with information about the results of the study.

If you answered in the affirmative to either of the above questions, please provide your contact details.

.....……. Street.....……...City

Postcode ……..…….……... (H) ……...……...

(W) Phone.....

I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

Signature (Participant) .....……. **Date** .....

WITNESS

I, Bartlomiej (Bart) Walus, have described to **(name of participant)**

……

the nature of the interview to be carried out. In my opinion she/he understood the explanation.

Signature (Interviewer) .....…….. **Date** .....

Appendix 5: Film production stages

Stage 1. **Development**: finding the story, preparing the synopsis, developing the dramatic structure, writing the screenplay, negotiating a deal with a film studio and a distributor.

Stage 2. Pre-production: planning the design of the video, creating storyboard, budget planning, shooting schedule, hiring the crew (director, assistant director, casting director, DoP, DoA, sound mixer, art director, costume designer, storyboard artist, choreographer).

Stage 3. Production: film is created and shot.

Stage 4. Post-production: film is assembled by a film editor, music composed*, all components are put together, distribution.

*** Music preparation:**

1. Reading the script (not always in current film productions)
2. Screening the film
3. Discussions and decisions (style, functions etc.)
4. The concept
5. Timing/mapping
6. Composition process
7. Orchestration
8. Recording sessions
9. The final mix