CREATIVE MUSIC PRODUCTION
PROFESSIONAL PROJECT
ABBY NAGLE GARNE

INVESTIGATING THE WAYS IN WHICH SOUND DESIGN CAN DRIVE THE NARRATIVE OF A FILM

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MENTOR: KARIMA DILLON EL-TOUKHY

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Abstract

This study explores the way in which sound design can drive the narrative of a film. Four different sound conditions were created and applied to the same piece of visual footage in order to isolate the effects that sound, void of dialogue and music, has on film. This project investigates methods by which sound design can affect an audience's narrative understanding, perception of emotional tone, and ability to identify sources of conflict and danger within a film.

The four sound conditions were designed as follows: Version A was designed to be set in a civil war, Version B was designed to be set in a zombie apocalypse, Version C was designed to be about a woman on the run from the law, and Version D was kept silent in order to act as a control during the investigation. Versions A and B were designed using identifiable sounds, whereas Version C was designed using more abstract and subtle sound cues. These versions were tested by presenting them to separate groups of participants and having them complete a survey after viewing the film. In total, 44 participants took part, with eleven responses being gathered for each version. Results were collected through both qualitative and quantitative methods.

The participants interpreted the same visuals differently depending on the soundscape presented to them. Those who watched versions A and B reported high levels of narrative clarity, whereas those who watched versions C and D reported low levels of narrative clarity. This shows that audiences can use sound sources to construct narratives when the sounds are identifiable. More abstract sounds result in less narrative clarity but are effective in portraying emotions and psychological states of characters. These results support the thesis argument that sound can influence narrative interpretations rather than just accompany an image.

Introduction

The purpose of this study is to investigate the ways in which sound design can drive the narrative of a film. Film historically originated as a solely visual medium. Cinema gradually started to use sound but treated it mainly as a synchronous addition to the film. In recent years, modern films have shown that sound can be used in more abstract ways. Despite the shift of sound design's role in cinema, the analysis of visual media still dominates research areas. Music and dialogue and their interaction with visual media have also been analysed in literature. However, this research project intends to investigate how sound alone, void of music and dialogue, can alter the narrative interpretation of a film.

To begin this research project, the theoretical framework for the study must be investigated. The works of Michel Chion proved extremely useful when deciding on the scope of the sound design. His concepts on causal listening, semantic listening, and reduced listening proved invaluable in this research project. Causal listening is the direct identification of the source of a sound and associating it with an object or action, such as gunfire or footsteps. Semantic listening refers to the interpretation of coded signals, typically through dialogue and recognisable sounds such as sirens and alarms. Finally, reduced listening focuses on traits of the sound itself, such as timbre, rhythm and texture, independent of the source or meaning. Chion's literature explores acousmatic sound and its role in shaping the world of the characters through offscreen sounds. This thesis also explores a publication by David Sonnenschein that talks about the importance of auditory hierarchy, which helped direct sound design choices for this project. Auditory hierarchy can guide the audience's attention and emotional response in a film by carefully placed sounds.

The literature review also analyses several films that use sound as a narrative device, including Denis Villeneuve's film *Sicario* and Lucrecia Martel's film *La Ciénaga*. The literature review explains how sound not only accompanies film footage but also actively shapes narrative interpretations. Many pre-existing studies focus on the influence that music has on film, rather than on Foley or sound design. For example, Claudia Bullerjahn and Markus Güldenring's study explores the effect of musical scoring on an audience's perception of a film. Their study was similar to the focus of this thesis in that dialogue remained limited. Bullerjahn and Güldenring investigated this by providing several groups with identical visuals, with the one

changing factor being the music. Their study highlights the gap in research surrounding empirical studies that investigate how sound design alone affects narrative interpretation.

This research project intends to explore how, by changing the soundscape of a scene, the narrative interpretation, perception of emotional tone, and ability to identify sources of conflict will change with it. To examine these elements, a short film was created with intentionally ambiguous visuals to allow sound to play the lead role in shaping the narrative. Four different soundscapes that suggested different narrative contexts were created to accompany the film. Version A's sound design was driven by a civil war; Version B was a zombie apocalypse soundscape; Version C was presenting the main character as a woman on the run from the law; and Version D was kept silent to act as a control in the research experiment. None of these four versions contained dialogue or music, ensuring that the effects of sound design and Foley could be isolated.

Participants in this experiment were divided into four groups, with each group assigned a different version of the film. After watching the film, participants were given a survey consisting of several Likert scale questions and three open-ended questions. The survey questioned participants' understanding of the narrative, perception of emotional tone, ability to identify the source of conflict within the film, and ability to predict what happened next. This approach was influenced by Bullerjahn and Güldenring's study, which demonstrated that an audience's perception of a film's genre and narrative can be influenced by altering the musical contents of the film without changing the visual content. By comparing the survey results of the four versions, this study will determine how different soundscapes and sound design choices can create different narrative interpretations of the same piece of footage. A final version of the film was created to showcase the most effective sound design methods discovered during this research project.

Literature Review

Thomas Edison was the first person to attempt synchronising picture with sound in 1894. He successfully invented a wax cylinder for recorded sound and developed the Kinetophone (Kohler). The first 'appearance' of a sound designer was in Alan Crosland's 1927 film *The Jazz Singer* (Zanna Sound). In the years 1928 to 1931, "practice and ideology dictated that sound and image be recorded simultaneously"; however, "A vocal minority of film artists nevertheless viewed this practice of synchronous 'naturalistic' sound recording as a threat to cinema" (Cook et al.). The first evidence of "postsynchronization" being used in a film was in the 1929 musical *Hallelujah*, directed by King Vidor. Vidor shot the film on location with a freely moving camera and recorded the soundtrack separately in the studio, "containing both naturalistic and impressionistic effects" (Cook et al.). The following year, G.W. Pabst's film *Westfront 1918* and Lewis Milestone's film *All Quiet on the Western Front* both used post-synchronous sounds in their battle scenes. Slowly, throughout the 1930s, multi-channel mixing and post-synchronous sounds became industry standard practice. It was during this time that Jack Foley also "pioneered" the creation of sound effects for specific onscreen actions, thus creating the role of Foley artists (Cook et al.). Post-synchronisation and Foley recordings enabled sound to be recorded and edited to not only accompany narrative, but also to shape an audience's interpretation of it. In 1979, Walter Murch was the first person to use the term "sound designer" in the credits of *Apocalypse Now* (Zanna Sound).

The majority of references explored in this literature review draw on Michel Chion's research on the relationship between sound and image. Chion considers sound to be 'added value' once projected on an image. He defines this 'added value' as the "expressive and informative value with which a sound enriches a given image so as to create the definite impression, in the immediate or remembered experience one has of it, that this information or expression 'naturally' comes from what is seen and is already contained in the image itself" (Chion 32). By this, Chion suggests that sound is already naturally part of the image. This raises the point that sound design has the possibility to go beyond what is contained in an image. Sara Pinheiro explores Michel Chion's discussions surrounding 'acousmatic' sounds and their relation to 'reduced listening,' one of Chion's three modes of listening. Acousmatic sound is defined as "a sound of which one does not see the source", whereas reduced listening tends to focus on "the sonic traits of the sound itself, regardless of its source" (Pinheiro 143). Pinheiro believes that sounds are more flexible than images, and that the sound designer can decide what to

include in the ‘auditory frame’. Sound does not have the same spatial boundaries as images in a frame. The sound designer has the ability to either enhance the narrative being presented in the frame or to create counterpoint.

Counterpoint is defined in Claudia Bullerjahn and Markus Güldenring’s study, *An Empirical Investigation of Effects of Film Music Using Qualitative Content Analysis*, as “the specific character of the music contradicts the specific content of the picture; thus the music conveys irony or comments on the content of the picture in another way”(Bullerjahn *et al.* 100). Bullerjahn and Güldenring also explain the techniques of paraphrasing and polarisation in relation to film music and motion pictures. Paraphrasing is defined as “the specific character of the music corresponds with the specific content of the picture; the effects are presumably additive” and polarisation is defined as “the specific character of the music moves the ambiguous or indefinite content of the picture toward the character of the music” (Bullerjahn *et al.* 100). While these three catagories specifically define the relationships between music and film, they can be expanded upon to explore the relationship between sound design and motion picture.

Karen Collins, David Sonnenschein, Sara Pinheiro, and Lidia Kniaź all explore the importance and significance of Michel Chion’s modes of listening: causal listening, semantic listening, and the aforementioned reduced listening. Chion defines causal listening as “The mode of listening that seeks indices that can inform the listener regarding the object, the phenomenon, or creature producing a given sound” (Chion 204). Causal listening can be used to reinforce a narrative that is already being pushed by the image. An example of causal listening is “good Foley work”, where “the sounds blend in with the action and therefore seem recorded at the same time as the image”(Pinheiro 6). The term ‘semantic listening’ actually came from Pierre Schaeffer, but Michel Chion prefers the term ‘codal listening’. Semantic listening refers to the interpretation of “a coded signal”, the most common of which in film is through dialogue and language (Chion 52). Finally, reduced listening is defined as “the listening mode that focuses on the traits of the sound independent of its cause and of its meaning” (Chion 52). Those who gain a mastery of sound as a medium have the ability to manipulate a sound to have its own “qualities of timbre and texture” and “its own personal vibration”(Chion 55). Sound can then be used to communicate emotion, tone or psychological state rather than literal meaning within a scene.

David Sonnenschein explores Michel Chion's concepts of listening modes and acousmatic sounds. Sonnenschein claims that "when we dive into the storytelling of the film, the sound tells us what is happening within or outside the character's world" (Sonnenschein 151). Sound can provide added value and influence an audience's narrative interpretation of a film. In Lidia Kniaź's study, she states that sound design can be used as a "narrative device which can propel the action, create interpretations of the visuals that otherwise would not emerge" and can "modulate the overtone of the whole film"(Kniaź 34). Kniaź's study provides a thorough analysis of the 2015 Denis Villeneuve film *Sicario*. Pinheiro, Sonnenschein and Kniaź all explore the concept of using sound design to create spatial relationships within visual media. In *Sicario*, the film's sound editor Alan Robert Murray uses directional sound effects to create a sense of space and enhance audience perception (Kniaź 40). Karen Collins also explores the importance of sonic spatial relationships within video games and how music and sound effects affect players' engagement with the narrative and characters (Collins 60).

Sound also has the ability to affect the perception of movement and speed within a film, thus influencing the narrative. According to Chion, there are three main ways to influence the speed perception of an image through sound:

> The first is *temporal animations of the image.* To varying degrees, sound can render theperception of time in the image as exact, detailed, immediate, concrete- or as vague, fluctuating, broad. Second, sound endows shots with *temporal linearization.* In the silent cinema, shots do not always indicate temporal succession- where what happens in shot B would necessarily follow what is shown in shot A. But synchronous sound does impose a sense of succession, which sometimes coexists with a sense of simultaneity, in what I call *temporal splitting.* Third, sound *vectorizes* or dramatizes shots, orienting them toward a future, a goal, and creation of a feeling of imminence and expectation. The shot is going somewhere, and is oriented in time (Chion 40).

In simpler terms, "temporal animation of the image" refers to sound's ability to influence how audiences experience time in what they see. It can make moments in a scene feel immediate and precise, or slow and unclear. By "linearization", Chion means that when sound is synchronised with visuals, it helps audiences understand the order in which things happen and gives the scene a sense of sequence and succession. When Chion says that "sound vectorizes

or dramatises shots" he means that sound can push scenes forward, making the audience expect that something will happen, creating tension and anticipation.

In Paul Ocone's paper, he analyses Naoko Yamada's 2018 animated film *Liz and the Blue Bird*. Ocone also explores how sound can drive the pace of a film's narrative. Throughout the film, the music and animation consist of a unified tempo. However, in moments of climax and tension, the walking speed of the characters "begins to deviate from the music", causing a sense of unease for the audience (Ocone 5). These variations of speed emphasise the conflict within the film. While Ocone's paper primarily analyses music and score over sound design, it emphasises sound's ability to hold tension and create movement within a narrative (Ocone 10). This supports Chion's literature surrounding temporal animation and temporal linearisation. However, it is important to note that scholars have criticised Chion's claims surrounding sound's influence on a film's temporal perception due to his literature often lacking direct references to other studies to support his claims. Pinheiro criticises Chion's book, stating that "He speaks from a position in which he rarely makes any reference to other studies (often saying "many scholars" or "some theorists")"(Pinheiro 142).

Lucrecia Martel's 2019 film *La Ciénaga* has been praised for its unique use of sound to carry the narrative. Dominique Russell published an in-depth review of the film and its use of sound design. In the review, Russell looks into published works by sound designer Randy Thom, who asks for films to be "designed for sound" so that they can be understood "aurally as well as visually" (Russell 1). According to Russell, Martel's films are not "suffused with loud music and bone-rattling effects, yet sound stands out in her films" (Russell 1). Her films are designed to be aurally and visually engaging. Martel's film style can be characterised by "limited point of view, carefully chosen locations, the use of close-ups and other means of […] starving the eye". In *La Ciénaga*, she manipulates noise to displace dialogue and score as a way of immersing the audience in the dysfunctional nature of the family while also excluding them at the same time. (Russell 2). Russell states, "Her use of sound is almost orchestral, as polyphonic as her narratives." (Russell 4). Chion also comments on Martel's film, analysing how she creates a "heavy atmosphere" through the sounds of "glasses against glasses, ice in the drinks, and tonal scrapings" to reflect the suffocating humidity the characters in the film experience (Chion 60). Martel also uses the absence of sound to convey messages. At the end of the film, a shot shows an unsupervised, uncoordinated child climbing up a ladder against a wall, then losing his footing and falling out of the frame. Russell writes: "The audience is not made to

watch (or listen to) the consequences of this loss in the characters' lives. Rather, they are made to feel it in their own body and breath" (Russell 7). While the visuals and the storyline in *La Ciénaga* are often banal and somewhat monotonous, the "sonic structure" of the film infuses scenes with an overall sense of foreboding and tension (Russell 7). Often, the sound design muffles out the dialogue of the film, as is Martel's intent. She believes that in many instances, the sound design carries more weight and meaning than the actual words of the characters themselves (Russell 9).

Sound can play a crucial role in shaping the narrative within a film. Sonnenschein explores the importance of "auditory hierarchy" in his book, explaining that the way in which sound catches the audience's attention can be used as a powerful narrative tool. He breaks auditory hierarchy is broken down into three levels:

> The immediate presence of something we are consciously listening to; the support sounds for the event or environment that are heard but do not command direct attention; and background sounds that we don't notice but that constitute the created reality and can influence our subconscious (Sonnenschein 195).

This concept of auditory hierarchy can be used to manipulate the perception of the audience within a scene and to focus their attention on certain auditory and visual elements in order to direct narrative interpretation. Worlds within a film can be shaped by sound ambience, and different sounds can be moved forward within a mix to draw the attention of an audience.

Both Martel and Villeneuve use sound to "reflect characters' personalities" (Kniaź 35). This use of sound reflects Sonnenschein's idea of "support sounds" to assist the narrative, even if the audience is not directly aware of it. In her film *La Ciénaga*, Martel also employs a range of sounds to convey the emotional states of the characters. The character of Luchi is almost always accompanied by the sound of a barking dog, despite the dog never being on screen during the film. Russell regards the barking dog as an aural motif, tied to "Luchi's nervous awareness" (Russell 2). Similarly, whenever the character of Mecha is on screen, telephones ring incessantly. "Her inability to deal with the phone, or to get servants to answer, point to her slipping grasp on the external demands made of her" (Russell 7).

Meanwhile, in Villeneuve's film *Sicario*, sound editor Alan Robert Murray wanted to keep the character of Kate "isolated in order to emphasize her loneliness" through a sparseness of sound in her scenes. With the character Alejandro, the sound palette was expanded as there are "more undertones into his scenes in order to play to the uncertainty of his character"(Kniaź 39). Both Kniaź and Russell show that sound can be used to reflect characters' emotions and personalities, thus assisting in shaping narrative within a film.

The literature examined demonstrates that sound design can have a significant role in driving narratives within film. The importance of sound design's role in driving and supporting narrative in film is highlighted by Sonnenschein: "At the heart of storytelling is the classic structure of goal-conflict-resolution. In its most contributive form, sound design supports this dramatic evolution by developing themes and rhythms that underscore this narrative structure." (Sonnenschein 198). This literature provided the theoretical framework needed to conduct this research project. It provided in-depth methods of sound design that were used to manipulate and influence narrative interpretations of the audience in this study. This literature also shows that sound is not just a supportive narrative tool, but also an essential element when it comes to communicating the meaning and emotional tone of a film to an audience.

Methodology

The first stage of the methodological process for this research project was to source a suitable film for the study. The film scene needed to have minimal dialogue and be ambiguous enough that the narrative could be shaped through soundscapes rather than by dialogue or visual cues. Initially, this research project was going to use a film by Fiona McDonald from part of her *Inhale Exhale* exhibition in the RHA Gallery in Dublin. The film consisted of no dialogue and is set in a bogland during the day. This film employed the use of wide, long-held shots and did not contain any changes of location or scenery. The original film is 37 minutes long, so for this research project, it was edited down to approximately 3 minutes. An initial soundscape was made for this shortened version of the film, but it was decided that the scene did not allow for many off-screen sounds, therefore limiting the ability to create counterpoint within the scenes. Due to the film being set in broad daylight, it was not very visually ambiguous. The wide shots of this film did not allow for intimate sounds that provide subtle narrative cues. This limited the scope for multiple narratives derived from the same footage.

The next film chosen for sound design was Nora Fingscheidt's film *The Outrun,* starring Saoirse Ronan. This film was better suited as there were more location changes within the film, and with it being set primarily during the night, the visuals were more ambiguous and open to interpretation. This film also employed a mix of wide and close shots, allowing for broad soundscapes that provide the ambience and setting of a scene, as well as more intimate sounds that provide subtle narrative cues. The film was edited down to four and a half minutes for this research project. Similar to the *Inhale Exhale* film, an initial soundscape was made for this version. The decision was made to create an original short film after this in order to experiment with the full array of proposed sound design techniques suggested in the literature review. It is important to note that the previous two films and soundscapes proved extremely useful in the decision-making process for the storyboard, style of shooting, and narrative direction of the original film.

Lucrecia Martel's film *La Ciénaga* also proved useful in the planning stages of the original film. Dominique Russell has described Martel's films as being "designed for sound" (Russell 1). The way Martel achieves this is through "limited point of view, carefully chosen locations, the use of close-ups and other means of […] starving the eye"(Russell 2). This is what drove the decision to have ambiguous scenes, close-up shots of the actor, and dark locations in the

original film for this project. During the filming process, scenes were shot while considering Chion's three listening modes and utilising Sonnenschein's concept of 'auditory hierarchy ' to use sound as a powerful narrative tool. Planning and shooting the film to be perceived aurally as well as visually made the sound design process during the later stages of this project go smoothly.

The choice to create different soundscapes but keep identical visuals across all versions came from Claudia Bullerjahn and Markus Güldenring's study, *An Empirical Investigation of Effects of Film Music Using Qualitative Content Analysis*. Bullerjahn and Güldenring's study consists of a 10-minute film named *The Joker*. The film is "ambiguous and gives the impression of an open-ended segment of a real feature film"(Bullerjahn *et al*. 102). Long shots are employed to allow the music to build effects, and "the dialogue is reduced to a minimum of trivial communication" (Bullerjahn *et al.* 103). This film description is similar to the framework seen previously in Lucrecia Martel's film *La Ciénaga*, where sound design was successful in replacing spoken dialogue when providing the audience with the narrative of the film (Russell 9). On pages 103-105 of Bullerjahn and Güldenring's study, a table is presented that includes shot number, running time, shot time, camera viewpoint, and scene description for each shot. This table assisted greatly in the preproduction stages of creating the original piece of footage for this thesis study.

In the first chapter of his book, David Sonnenschein states that "the written script should be the first 'listening' you will have of your soundtrack" and that the initial listening opportunity should not be wasted. Once the image has been viewed, one will never have an uninfluenced opinion of what the soundtrack could be again. (Sonnenschein 2). He defines several "voices" to look for during this initial listening period:

1) Sounds linked to people, objects, and actions on screen that are explicitly described.
2) Environments that can be fleshed out with sonic ambience
3) Key words in both scene description and dialogue that give clues to the emotions of the scene (both of the character and of the spectator)
4) moments of physical or dramatic transition (Sonnenschein 3).

Because this film was created for the purpose of this study, no initial listening period took place. However, the footage taken was designed to acknowledge the several 'voices' that

Sonnenschein encourages sound designers to listen to. Moments of visual tension within scenes were emphasised or minimised depending on the desired narrative, and environments were enhanced with different ambiences, also depending on the intended setting of each of the soundscapes. Sonnenschein provides detailed explanations on how to achieve various effects through sound for different situations, which proved to be a valuable resource during the production process of this research project.

The three narratives chosen for the soundscaped versions of the film were a civil war, a zombie apocalypse, and a woman on the run from the law. Version A's soundscape, the civil war, was inspired by Edward Berger's version of the film *All Quiet on the Western Front.* The sound designer for this 2022 film, Frank Kruse, said in an interview with Chris Koseluk that important aspects of conveying war in the film were "breathing and the close-up exhaustion" as well as screams and chose to "tackle the soundtrack from an emotional side" rather than being technically correct (Koseluk 1). There is a scene in Version A where all sound cuts out except for the protagonist's breath. This choice came directly from Kruse's method of emphasising the panic of the character, where "the background battle sounds get muffled and go away"(Koseluk 1). Version B, the zombie apocalypse, allowed for a mix of intimate sounds of fear, as well as overwhelming, loud zombie sounds. In the *Sound Bites: 28 Years Later* article written by Kevin Hilton, he speaks with Denise Yarde, the production sound mixer who worked on *28 Years Later.* Yarde explained the importance of balancing loud sounds that carry narrative, with more intimate sounds that carry emotion: "the screams and growls of the infected" were important, "but the breathing is important as well". Yarde also describes how sound "isn't utility but is integral" to the story (Hilton 51). This helped steer the version B soundscape towards a zombie apocalypse. The inspiration for version C's sound design, the woman on the run from the law, came primarily from the Villeneuve film *Sicario.* While the obvious soundscape choices, such as sirens and helicopters, were used, *Sicario*'s methods of revealing the mental state of the characters through sound design were also followed. All three sound designs were mixed using a ProTools post-production sound template from a previous internship with Pictor Productions.

Bullerjahn and Güldenring's study also served as a reference for the survey design of this research project. Their study tested 21 groups, each consisting of a diverse range of people from different age groups, educational levels, and backgrounds. The study included a total of 412 subjects, aged from 14 to 92 years (Bullerjahn et al. 107). These age ranges and sample

sizes were not possible to recreate for this research project due to ethical and logistical constraints; however, an effort was made to recreate other aspects of the testing conditions, such as sourcing participants of a diverse range of ages, genders and backgrounds and getting them to take the survey in a controlled environment.

The questionnaire in Bullerjahn and Güldenring's study consisted of four parts. Firstly, personal information (such as sex, age, education, profession, and current mood or disposition). Secondly, media competency (frequency and context surrounding the viewing of TV programmes, films, and digital media). The third part consisted of 'closed-category' questions regarding the film (mood scales and genre choices). The third section also included open-ended questions as a metric of testing the audience's perception of the plot and narrative. Finally, the fourth section consisted of a questionnaire about past musical experience (Bullerjahn et al. 107). This fourth section was distributed last so that the survey participants were unaware of the study's focus on musical perception, potentially creating biased answers and results. This method of distributing the fourth section after the viewing of the film was used in this research experiment to prevent the participants from being aware that the effect of sound design was the factor being tested in the survey.

John Creswell's book *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* proved useful in the process of designing the survey for this research project. This research project used sequential mixed methods to test the audience's narrative interpretation. This is where researchers seek "to elaborate on or expand on the findings of one method with another method" (Creswell 14). In the case of this research project, it involved a quantitative method in the form of Likert-scale questions followed by a qualitative method that consisted of three open-ended questions that asked for specifics on narrative understanding and genre perception. The Likert-scale response options were Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree.

This survey received forty-four responses, eleven responses for each version of the film. After the responses were gathered, they needed to be analysed. In Gail Sullivan and Anthony Artino's journal *Analysing and interpreting data from Likert-type scales*, they state that if "there is an adequate sample size (at least 5-10 observations per group) and if the data are normally distributed (or nearly normal), parametric tests can be used with Likert scale original data" (Sullivan *et al* 542). This journal also stated that researchers commonly "calculate a total score

or mean score" from survey results (Sullivan *et al* 542). The same mean calculations were made to measure average narrative comprehension scores across the four film versions, which can be seen in the analysis section below.

In the article written by Jessie Rouder and colleagues, they discuss methods for analysing open-ended questions. This article helped in the decision to use open-ended questions for this survey, as open-ended questions can "solicit a variety of responses that cannot be easily captured in one or more closed-ended questions" (Rouder *et al* 1). They recommend using a word cloud to exhibit common themes. This article was also the reasoning for applying the Gestalt Principles to the qualitative data collected in this survey, which consists of visually representing the data in the following ways: "Colour and shape", "Weight or size" and "Proximity and connection"(Rouder *et al* 4). This was useful in the analysis of the qualitative data from the survey as it allowed for the visualisation of key themes across each version.

Analysis

Participants in this investigation were shown the same visual film accompanied by different sound conditions labelled A, B, C, and D. Versions A, B, and C consisted of different soundscapes while Version D was presented as a silent film. After viewing the film, participants were given a survey that consisted of Likert scale questions that inquired about their understanding of the narrative, emotional tone, and perceived conflicts and dangers. This was followed by three open-ended questions that required descriptions about what the audience believed to be occurring in the film, what made them come to that conclusion, and a brief description of what they perceived the genre of the film to be. In order to test the effect of sound design and Foley alone on the perception of narrative, all four versions were void of music and dialogue. Forty-four people participated in the study, with eleven participants being assigned to each version to allow for unbiased results with reduced variance. Participants had varied levels of experience working and studying in the areas of film and sound, and were of different ages and genders.

In order to metrically analyse and measure the results from the Likert scale, each of the responses (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree) was assigned a number from 1 to 5, with Strongly Disagree being 1, and Strongly Agree being 5. From there, the mean rating of each response was calculated. The average overall narrative clarity score was also calculated. The questions of the survey were as follows:

-I clearly understood what was happening in the film.
-The emotional tone of the scene was clear.
-I have a strong feeling of what may happen next.
-The main character's emotional state was easy to understand.
-The source of danger/conflict was obvious.

These were followed by three open-ended questions, which were:

-Briefly describe what happens in this short film.
-What makes you think that?
-What genres would you use to describe this film?

Across all versions of the film, the majority of participants were able to develop a narrative interpretation despite the absence of dialogue and music. However, each version had differing levels of narrative clarity. Version A's soundscape was designed so that the film takes place in a civil war. Out of all the versions, Version A had the second-highest mean narrative clarity score among the participants. The participants in this version clearly perceived the danger and genre, and many of the responses referenced war, military conflict, pursuit, and danger. This version consisted of recognisable causal sounds such as gunfire, explosions, and military ambience. The participants were able to identify the source of a sound and derive meaning from it because the sound sources were familiar. Out of the eleven respondents who reacted to Version A, four interpreted the narrative from the audio cues, and seven interpreted the narrative from both visual and audio cues in the qualitative responses. The dominant themes in the responses to Version A were war, searching for safety, threat and danger. Out of the eleven participants in Version A, ten people used the word "war" at some stage during their qualitative responses.

Version B's soundscape was designed to be a zombie apocalypse. The participants in this version had a strong sense of tension and danger, and the sounds were successful in generating suspense. Version B also scored highly in terms of the participants' interpretation of narrative clarity and the source of conflict. The majority of participants for this version interpreted that the film was a horror film with lots of suspense and with a supernatural threat, such as zombies, ghosts, and monsters. The distant growls and movements and the low-frequency drones used to create tension helped to push this narrative of the zombie apocalypse. Sonnenchein's auditory hierarchy proved successful in directing the listeners' attention towards the threats. (e.g. foreground threat sounds, environmental ambience, subconscious tension from the low-frequency drones). Version B was the version in which the narrative was most driven by sound, with eight out of eleven respondents for this version crediting sound and noises alone for their narrative interpretation. Two respondents listed visual cues as being responsible for their narrative interpretation, while two respondents stated a combination of sound and visual cues was responsible for their narrative understanding. Out of the eleven respondents, ten used the word "horror" at some stage in their written response to the film, and six used the words "monster", "zombie", "ghost" or "alien".

Version C's soundscape was designed to be about a woman on the run from the law. However, this version had the most ambiguous interpretation of all the versions, with a low average

of narrative clarity from participants and low understanding of the source of danger and conflict. The sense of what happens next was also low amongst participants in this version of the film. This sound design had the more subtle sound cues in contrast with the war and horror sounds in versions A and B. This ambiguity could be a result of inadequate sound design, or because of the focus on reduced listening that communicates emotion rather than a direct narrative. In contrast with Version A and Version B, the participants scarcely relied on audio alone to gain their narrative understanding, with only two participants mentioning audio alone in their qualitative responses. Five participants credited both audio and visual cues to gain an understanding of the plot. Three participants mentioned the visual cues alone to decipher the meaning of the plot, and one respondent was unclear and did not address any cues. Five participants described the genre of this version as "mystery" while others said varying genres such as "horror", "spooky", "experimental", "noir", "avant guard", "scary", "contemplative", "action suspense", "thriller", "drama", "suspense", "scary", "detective police" and "detective".

Version D was in the form of a silent film. This acted as a control in the study and resulted in the weakest narrative comprehension within the audience. The clarity amongst participants on the source of conflict was also very low. Without sound, the audience could only rely on visual cues, which increased the ambiguity of the film. Out of the eleven respondents to Version D, all of them relied solely on the visual cues to gain an understanding of the plot. Despite the absence of sound in Version D, some respondents interpreted the same plot as participants of other versions. Some participants of Version D hinted at war and refuge being points of the narrative, whereas another participant interpreted the flashing lights scene as aliens.

Participants were asked in the survey if they had any experience working or studying in the areas of film, sound, or music. The data from the survey results suggest that having prior experience has only a marginal effect on participants' interpretation of the film, regardless of what version they were presented with. The analysis of responses across age groups 18-24, 25-34, 35-44, 45-54, and over 55 suggests that age only had a limited effect on the participants' interpretation of the film. Participants aged 45-54 reported slightly higher narrative clarity, but the differences between age groups were relatively small.

In order to metrically compare levels of narrative clarity between the versions of this film, the Likert-scale responses were assigned numbers in order to calculate a mean score for each

question and each version. ‘Strongly Disagree’ was assigned 1, ‘Disagree’ was assigned 2, ‘Neutral’ was assigned 3, ‘Agree’ was assigned 4, and ‘Strongly Agree’ was assigned 5. These scores were added together for each Likert scale question for each version, then divided by the number of participants per group. Results were calculated in order to compare results across versions. The average overall narrative clarity score was also calculated by adding together the means across each version and dividing it by the number of Likert-scale questions (5). The results of the Likert scale questions and mean calculations of the results are below:

Version A Likert scale responses:

	I clearly understood what was happening in the film	The emotional tone of the scene was clear	I have a strong feeling of what may happen next	The main character's emotional state was easy to understand	The source of danger/conflict was obvious
Strongly Disagree					
Disagree			2		
Neutral	1	1	2	1	
Agree	3	6	5	7	2
Strongly Agree	7	4	2	3	9

Version B Likert scale responses:

	I clearly understood what was happening in the film	The emotional tone of the scene was clear	I have a strong feeling of what may happen next	The main character's emotional state was easy to understand	The source of danger/conflict was obvious
Strongly Disagree					
Disagree			1	1	
Neutral	4			1	2
Agree	2	4	4	4	3
Strongly Agree	5	7	6	5	6

Version C Likert scale responses:

	I clearly understood what was happening in the film	The emotional tone of the scene was clear	I have a strong feeling of what may happen next	The main character's emotional state was easy to understand	The source of danger/conflict was obvious
Strongly Disagree	2		3		1
Disagree	2	1	5	2	2
Neutral	5	3			2
Agree	2	5	3	7	5
Strongly Agree		2		2	1

Version D Likert scale responses:

	I clearly understood what was happening in the film	The emotional tone of the scene was clear	I have a strong feeling of what may happen next	The main character's emotional state was easy to understand	The source of danger/conflict was obvious
Strongly Disagree	1		2		4
Disagree	3		5		1
Neutral	1	2	2	3	1
Agree	6	6	2	7	5
Strongly Agree		3		1	

Mean average of Likert scale responses:

	Version A	Version B	Version C	Version D
I clearly understood what was happening in the film	4.55	4.09	2.82	3.09
The emotional tone of the scene was clear	4.27	4.64	3.73	4.09
I have a strong feeling of what may happen next	3.64	4.36	2.27	2.36
The main character's emotional state was easy to understand	4.18	4.18	3.82	3.82
The source of danger/conflict was obvious	4.82	4.36	3.27	2.64

Overall mean of comprehension of the film:

	Version A	Version B	Version C	Version D
Overall average comprehension of the film	4.29	4.33	3.18	3.2

Discussion

This research project explores the ways in which sound design can drive a narrative in a film. The audience's interpretations of narrative, emotional tone, and source of danger and conflict were examined by presenting identical visual footage accompanied by four different soundscapes. The methodology for this method came from Claudia Bullerjahn and Markus Güldenring's study, previously mentioned in the methodology section of this thesis. Their study demonstrated that by altering the musical context of a short film, they could significantly change the audience's interpretation of the narrative and genre. Bullerjahn and Güldenring's study provided the framework needed to test how audiences respond to identical visual footage when paired with different sound conditions.

The theoretical foundation for this research question also draws heavily from Michel Chion. Chion argues that sound provides "added value" to visual media and helps to provide narrative and emotional meaning that may not be presented in the image alone (Chion 32). A similar theory is supported by Bullerjahn and Güldenring, by which they define the method of polarisation as "the specific character of the music moves the ambiguous or indefinite content of the picture toward the character of the music" (Bullerjahn *et al.* 100). The results of this research study support both of these literatures. Across the four versions of the film presented in this study, the presence and manipulation of sound design significantly affected the audience's interpretation of narrative events, emotional tone, genre, and the source of conflict within an ambiguous piece of footage, proving that sound design is not only an additional attachment to an image but a central component of storytelling.

Version A was sound designed to be set in a civil war. It included highly recognisable sounds such as gunfire, explosions, and military ambiences, inspired by those heard in Edward Berger's 2022 film, *All Quiet on the Western Front*. These sounds are universally associated with war and violence, allowing the audience to interpret the narrative context from them easily. Despite the visuals being ambiguous, the presence of these identifiable sounds directed the audience towards the civil war interpretation. Out of the eleven participants who watched Version A, ten people mentioned the word "war" at some stage in their survey response. By following Pinheiro's belief that the sound designer chooses what to include in the 'auditory frame', counterpoint was created wherein a narrative was pushed that did not necessarily occur on screen. Counterpoint is defined as when "the specific character of the music contradicts the

specific content of the picture"(Bullerjahn *et al.* 100); however, in the context of this research project, it was sound design that contradicted the visual imagery, rather than music. The sound design in Version A could also be classified as acousmatic sound, "a sound of which one does not see the source"(Pinheiro 143).

In the survey responses reacting to Version A, seven of the eleven respondents credited their understanding of the narrative to a combination of both audio and visual cues. For example, respondant 1 described the plot of the film as a "girl is living in a war filled world, where she tries to escape to a safer place" and states why: "With the girl moving only through night it hinted to me that she didn't want to be seen and that accompanied by gun shots and artillery being shot it almost had a battle ground effect." While Michel Chion believes 'added value "is already contained in the image itself" (Chion 32), these gunshots and war ambiences occur offscreen and therefore cannot be classified as such. Similarly, causal listening is defined by Chion as "the mode of listening that seeks indices that can inform the listener regarding the object, the phenomenon, or creature producing a given sound" (Chion 204). One of the downfalls of Chion's literature is that he fails to define sounds that are clearly recognisable but offscreen. In the case of this study, the gunfire and explosions are designed to be causal, with a clear source and narrative intent. Despite the soundscape of Version A creating counterpoint against the visual footage, all eleven participants credited the sound design to some degree for assisting in their narrative comprehension of the film.

Sonnenschein's descriptions of "auditory hierarchy" assisted the narrative process greatly, particularly with Version B, the zombie apocalypse. He describes how sound catches the audience's attention and can be used as a powerful narrative tool. The zombie sound design relied on "the immediate presence of something we are consciously listening to"(Sonnenschein 195) in the form of growls and snarls. Chion's concept of 'causal' or 'codal' listening was also used in Version B's sound design to great effect. The causal listening cues in Version B helped to create a world for the character and give the film a sense of realism to increase suspense. The footstep and breath sounds, when isolated, created moments of suspense to help keep the film in the genre of horror. This is an example of using causal sound cues, as well as Sonnenschein's theory of 'auditory hierarchy', being used to create tension. The most common forms of codal listening in film are through dialogue and language; however, in Version B, the codal listening cues were presented to the audience in the form of alarms and sirens, indicating that zombies had overrun the sanctuary in the film. Version B also relied

heavily on Sonnenschein's auditory hierarchy to build suspense through atmospheric sounds. Sonnenschein states that there are "background sounds that we don't notice, but that constitute the created reality and can influence our subconscious" (Sonnenschein 195). Respondent 6 in the survey credited the "low growling" and the "squelchy sounds" for giving them the impression of a scary creature. This is an example of both causal and acousmatic sounds being used to carry narrative information to the viewer. The success of this approach in communicating narrative is reflected in the survey results, with Version B receiving the highest average score of narrative understanding among participants.

In contrast to Versions A and B, participants of Version C reported significantly lower levels of narrative clarity and had the lowest overall mean score of narrative clarity. In Version C, the sound design is intended to tell the story that the main character is on the run from the law. However, the participants of Version C produced a wide range of narrative interpretations. This may be a result of poor sound design, but it could also be an indicator that reduced listening cues can result in poorer narrative clarity. Chion defines reduced listening as "the listening mode that focuses on the traits of the sound independent of its cause and of its meaning"(Chion 52). Version C was sound designed to explore Chion's belief that sound can have "its own personal vibration" in such a way that it relied more heavily on subtle environmental sound cues rather than clearly identifiable narrative sounds (Chion 55).

Participants seemed to have interpreted the sounds of Version C both in terms of their emotional and atmospheric qualities, as well as using them to determine a specific narrative. The sound design attempted to convey the protagonist's mental state through underwater sounds and the sound of the incoming train, and real-world sounds from the police sirens and helicopter sounds. This was to mirror Lucrecia Martel's techniques of reflecting her characters' mental states through unconventional methods, such as the sounds of phones ringing and Luchi's barking dog (Russell 2), while also trying to create a tangible storyline. The results of Version C could indicate that sound can influence not only the interpretation of a narrative but also can be used to alter the levels of narrative ambiguity experienced by an audience.

Version D, the silent version of the film, served as a control condition within this research study and had very low levels of overall narrative clarity. It proved that the creation of a visually ambiguous film was successful, as many participants of Vesrion D struggled to develop any

narrative understanding of the film in the absence of sound. In Lidia Kniaź's study, she states that sound is a "narrative device which can propel the action, create interpretations of the visuals that otherwise would not emerge" (Kniaź 3). Without sound acting as an extra narrative device, the participants in Version D were left to interpret meaning from an ambiguous film without guidance, resulting in a wider variation of perceived narratives. Version D also had some of the lowest scores in terms of participants feeling they knew what would happen next due to the absence of sound. This supports Chion's argument that "sound vectorizes or dramatises shots, orienting them toward a future, a goal, and creation of a feeling of imminence and expectation"(Chion 40). Without sound, the participants were not pushed towards any narrative conclusions.

As a result of this survey, it was decided to create a final soundscape based on the responses. This was to implement all of the effective narrative tools revealed from the investigation. Instead of pushing a narrative on the scene, the narrative was based on the narrative interpretations given by participants of Version D, attempting to apply Bullerjahn and Güldenring's concept of 'paraphrasing' to a sound design context. They define paraphrasing as "the specific character of the music corresponds with the specific content of the picture; the effects are presumably additive" (Bullerjahn *et al.* 100). This was to see how sound could enhance a narrative already perceived from the silent piece of footage. This final version was not tested through audience participation; however, it was designed using all the sound design techniques that have been proven by this study to be successful in driving the narrative in a film. The one technique excluded from this final version was a heavy reliance on acousmatic sounds. Due to Version D being perceived solely by visuals, it would be incorrect to expand beyond the visual frame for the final version. However, Lucrecia Martel's technique of drowning out dialogue with atmospheric ambience was used in this final version, with dialogue from a phone call being drowned out by voices of children and church bells from the past, in an attempt to give the impression that the phone call was of a nostalgic nature.

It is also important to note the limitations of this research experiment. Firstly, each sound scape was not mixed to be -27 LUFS integrated as per industry standard (Nikolic). This was realised after the surveying process, and it was too late to retest the project using the correct LUFS. This could have been avoided if the 7.1.4 post-production sound template provided by Kieran Lynch in IADT had been used in the early stages of this project, which already includes channel routing to a Youlean Loudness Meter.

As aforementioned, participants were asked in the survey if they have any experience working or studying in the areas of film, sound, or music. In order to make an accurate analysis of the effect of a participant's experience on their ability to perceive a narrative, a larger sample size and further investigation are needed. Similarly, further research and much larger sample sizes will be needed to gain more accurate and reliable results on the effect of age on narrative understanding. This experiment would also benefit from being applied to several different visual scenes to test the limitations of the theory that sound drives narrative within a film. The literature aforementioned, and this study itself, examine the effects of sound and music on primarily dark subject material, both in narrative and visuals. *La Ciénaga*, *Sicario*, *All Quiet on the Western Front*, and *28 Years Later* all deal with relatively dark subject material, as do the three versions of the film in this study. It would be of benefit to see the effects of sound design across various genres, such as comedy films, romcoms, and more, and see if the same results emerge. There is also scope for further research on the narrative effects of sound design choices when applied to films of different cinematography styles.

There is also the opportunity for further research in comparing the narrative effect sound has on film when listened to in a binaural setting or a 7.1.4 Dolby Atmos setting. During this study, eleven participants watched the film in a 7.1.4 setting, while thirty-three participants watched the film binaurally through headphones. The sample size of this research project was too small to measure any significant differences in narrative understanding between those who listened binaurally and those who listened in the 7.1.4 Dolby Atmos format. The sound design choices influenced the narrative interpretation more significantly than the playback format. There is scope for further research wherein soundscapes are specifically designed to be interpreted through binaural or 7.1.4 playback environments.

Conclusion

This research project aimed to investigate the ways in which sound design can drive the narrative in a film. This study set out to research the methods by which sound design, void of music and dialogue, shapes narrative understanding, emotional tone, and perceived sources of conflict. To investigate this research question, four separate groups of participants were given identical visuals that were paired with four different sonic conditions. This was to isolate the narrative functions of sound design and test those functions through both quantitative and qualitative analysis. The results of this investigation demonstrate that sound design can have a significant role in the narrative interpretation of a film.

The results from this investigation show that sound design can impact how audiences perceive visual media. Versions A and B, which consisted of the most recognisable sound cues, resulted in the highest levels of narrative clarity among participants. These results indicate that causal sound cues, such as zombie noises, gunfire, and explosions, enable the audience to identify narrative contexts, genres, and sources of danger within a scene. Version C employed the use of more abstract sounds and reduced listening cues, which resulted in more ambiguity and a wider range of narrative interpretations. These techniques were successful in conveying the character's emotional state, but were less effective in pushing narrative information to the audience. Version D, the silent version, reinforced these results by producing some of the lowest levels of narrative comprehension across all of the Likert scale questions.

The results from this research study support Michel Chion's concept that sound can serve as 'added value' to a scene. Sound does not just enhance what is already being presented by the visuals, it can also act as a primary driver of narrative content and is an essential part of the storytelling process. Additionally, David Sonnenschein's concept of 'auditory hierarchy' proved to be an effective method of shaping an audience's perception of a scene. Foreground sounds can be used to create moments of intimacy, shock, or alarm, while background sounds contribute to the shaping of the characters' world and can create suspense and tension. This study reinforces this literature by proving that sound can be manipulated to direct the audience's narrative interpretations.

The limitations of this research study must be acknowledged. The research project consisted of only forty-four participants, which restricts the accuracy of the results, particularly when

analysing the effects of age and previous industry experience on narrative comprehension. As well as this, the previous literature examined in this study, as well as the research project itself, consists of the same kind of aesthetic, which is one that is dark and tension-driven. It is unknown whether these results of the study are applicable to films of different genres and aesthetics. The effects of spatial audio and binaural listening on narrative understanding were also insignificant within this study due to the small sample size, leaving scope for further research.

Future research could address these limitations by expanding the sample size and including a wider range of film scenes from films of multiple genres, cinematography styles, and narrative content. Particularly, with regard to films that do not consist of ambiguous visuals and that are not reliant on tension. Further research would also be beneficial on the effects of listening conditions on the narrative interpretation of a film. This could include the comparisons between Dolby Atmos monitoring, binaural monitoring, and stereo monitoring. There is also scope for further research in the effect of sound design working in tandem with music on the narrative interpretation of a film. This could help to bridge the gap between music-focused studies, such as Bullerjahn and Güldenring's study, and existing sound design research done by the likes of Chion and Sonnenschein.

In conclusion, this research project has demonstrated that sound plays a significant role in shaping narrative interpretations, as well as influencing an audience's perception of emotional tone, sources of danger and conflict, and genre. This study has proven that sound is not just an additive to a visual piece of media, but is essential in the storytelling process of cinema. The findings of this study have shown that when the piece of visual media is ambiguous, sound design can take responsibility in guiding the audience towards narrative conclusions. This research project reinforces the importance of designing films to be perceived aurally as well as visually because sound is an integral part of cinematic storytelling.

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