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Towards a multi-level selection framework for understanding trends in popular music

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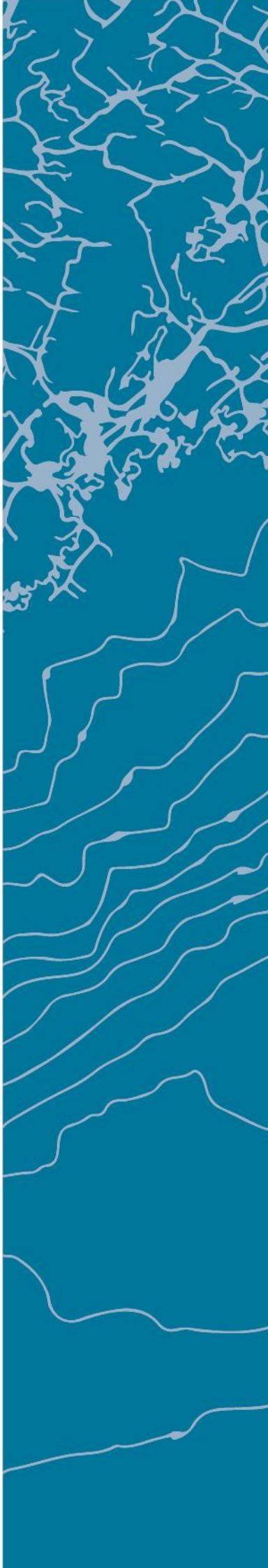

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Abstract

This thesis proposes a metaphysical Multi-Level Selection model for memetics which is intended to be utilized in research on trends in popular music markets. The goal is for this model to be the inter-weaved result, and expansion of Dawkins' (1989) work on memetics, Wilson & Wilson's (2008) work on Multi-Level Selection, and Pandora's Music Genome Project (see (Castelluccio, 2006)). However, much of this thesis is focused on the philosophical discourse associated in attempting to intermix these disciplines.

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List of abbreviations

AO	Analysis object e.g.; a trait, an individual or a group.
MLS	Multi-level selection
LST	Large-scale trait
SST	Small-scale trait
LIN	Local-innovation network (see (Dolbec, 2015))
AL	Analysis-Level
SL	Selection-level

Glossary of terms

Cultural transmission	Also referred to as cultural learning. Cultural transmission refers to the mechanism for which memes are proliferated. (cf. "meme")
Extramusical	"In relation to music" (Tagg, 2013) (cf. paramusical)
Holistic	A term that refers to the idea that an object is more than its discernable parts. For example; "a song".
Meme	An idea, behavior or style that spreads from person to person by means of cultural transmission. (cf. "cultural transmission)
Memetics	Referring to the scientific field of memes (cf. "memes)
(Musical-(Structural-))Traits	Sometimes just "traits"; a characteristic, usually associated to an individual compositional work of music. (Tagg, 2013)
Paramusical	"Literally 'alongside' the music, i.e. semiotically related to a particular musical discourse without being structurally intrinsic to that discourse." (Tagg, 2013)

Introduction

1.1 Introduction

In his 1976 book "The Selfish Gene", Richard Dawkins coined the term "meme" when explaining his theory on how cultural ideas follow the same laws of selection that Charles Darwin had hypothesized a century earlier. Dawkins suggested that ideas, songs, books, religions etc. would proliferate themselves based on their "fitness" to their environment (Dawkins, 1989), much like a biological species, with the exception that the mechanism for inheritance is significantly altered; memes are manifestations of thoughts, not biological entities. Which makes their link to the natural world difficult to scientifically examine (List., Grimm., Tresoldi., Kelk., & Iersel, 2013).

Some literature exists on the cultural transmission for memes showing how cultural traits are learned, transmitted and mutated (Bandura, 1971; Cavalli-Sforza & Feldman, 1981; Dawkins, 1989). And a handful of articles and publications exist on the topic of musical memetics, investigating how musical traits such as form or a specific melody might proliferate across multiple works (see (Jan, 2000, 2010)).

Attempts have been made to make a connection between musical traits and the social norms of their consumers (Bourdieu, 1984; Lomax, 1976), however some regard these attempts as either incomplete or insufficient (Middleton, 1990, p. 148; Savage, 2018).

1.2 Problem statement and research questions

In modern evolution science, some scientists have shifted away from the purely biological or genetic aspect, towards a return to the metaphysical approach that Darwin hypothesized before genetics became a recognized scientific field (see (Hayes, 2018)). David Sloan Wilson and Edward Osborne Wilson's theory on Multi-Level Selection is perhaps the most notable discovery in this regard. They theorized that evolution occurs at several distinct levels; genetic, individual and group level simultaneously (Wilson & Wilson, 2008).

After having done some research into Wilson & Wilson's theory and realizing how useful it could be, I began to inquire about a similar model for musical memetics, specifically one that focused on the evolution of popular music trends, at which point I discovered Pandora's Music Genome Project, which reduces individual songs into specific traits that are used in their recommendation system (Tagg, 2013, p. 247). Although I found Pandora's Music Genome Project to be an insightful resource into how such a model could be created, I found it to be limited and not suited for academic use (see (List. et al., 2013)).

My intent for this thesis is to extract the foundations of Pandora's Music Genome Project and out of that foundation build my own model that corresponds with Wilson & Wilsons theory. There is one major obstacle to this approach however, that is the theory-nature relationship, mentioned earlier. In evolution science this relationship can be observed in genetics which allows for a degree of clarity and certainty. In memetics however, ideas are generally what is being discussed, which are intrinsically unobservable. The lack of an observable theory-nature mechanism like genetics is likely to cause some unclarity, which stems from the inability to properly define idiosyncratic terms (a commonality in the philosophic academic disciplines). To exemplify; one of the found traits in Pandora's Music Genome Project is "Angry lyrics" (Castelluccio, 2006), which opens up a discussion on what is meant by "angry" and what is meant by "lyrics". The term is likely to be defined differently depending on who is being asked to define it, and the context in which the person is being asked to define it. The way Pandora deals with this issue is to rely on the collective intelligence of their musical analysts, meaning that, although the definition for the trait varies, common perceptions of what the trait is consisted of occurs as a result of the collective efforts of their musical analysists.

While attempting to create this model I have realized that any attempts to use it in specific scenarios will consistently be subjective and restricted since musical trait definitions will

always vary dependent on the perspective of the analyzer. However, the margin of error can be minimized if the analyzer is musically educated, and by increasing the number of analyzers.

Further, while some of the traits can be quite accurately detected such as traits associated with specific instruments, samples key signatures, etc. (e.g; use of the harp, use of the "amen" break or use of minor key signatures) Some large-scale traits are obscure and subjective, such as traits associated with feelings (e.g; angry lyrics, melancholic melody or "danceable"-beat). While some attempts have been made to identify a tendency for specific traits to be interlinked with traits that are associated with feelings (see (Hevner, 1935; Kolchinsky, Dhande, Park, & Ahn, 2017)), more research is required before an equitable relationship can be properly determined. Yet, when observing that consumers and reviewers often come to use the same expressions defining the feeling of specific songs and artists/bands one might theorize that the relationship is not entirely subjective (see chapter 3.1.4 *On collective intelligence*).

For the intents and purposes of this thesis however, my initial aim is not to apply the model in specific scenarios. Rather, my intention is to argue that it is plausible that (popular) musical selection follow Darwin's laws on natural selection and evolution, and that a memetic model can be constructed and utilized based on this knowledge. I will also, make a case for the utility of such a model.

The model has three distinct levels of analysis; (Musical-(Structural-))*Traits* (distinct musical or extramusical characteristics within an individual analysis object (AO)), *Individual* (a unit of musical experience, within which traits appear (in the case of popular music; a "song") and *Group* (a multitude of individual AOs forming a distinct musical category e.g; a trend or genre). And three distinct levels of selection; Selection of (Musical-(Structural-))*Traits* (selection between musical traits within an AO) *Individual* (selection between individuals within a group) and *Group* (selection between groups within a population). Although, there are two hierarchal levels of analysis and levels of selection, the model appears as one unit, not two separates.

There is also a sublevel; *Parameters of Musical and Paramusical Types of Expression* which is used to analyze the first level (i.e (Musical-(Structural-))*Traits)*.

1.3 Relevancy of the study

Trends and genres seem to appear and reappear continuously within popular music, yet there is no practical approach to conceptualize how these trends and genres are selected, or as to why some specific trends or genres are more qualified within popular music markets than others. Many musicologists seem satisfied with critiquing all of mass culture as subordinate art forms due to its apparent simplicity (see, for example (Adorno & Horkheimer, 1997; Baker, 2013)). While these musicologists have contributed with many considerable insights on mass culture, my suspicion is that there exists a pattern which popular musical trends and genres follow, and that with properly identifying these patterns lies the potential for true insight into human habitus (see chapter 6.1 *Cantometrics and structural homology*).

Then, there is the subject of popular musicology which seems to suffer due to the difficulty of properly defining idiosyncratic terms. My contention is that this problem is grounded in the fact that many of these terms are constantly being revised by its own actors, and therefore exists as a result of collective intelligence (see chapter 3.1.4 *Collective intelligence*) and thusly consensus on idiosyncratic terms are paradoxical. While I have taken some care not to use idiosyncratic terms in this thesis, preferring terms from existing MLS research whenever possible for reasons of adaptability between disciplines, sometimes clear examples are needed for the sake of clarity.

As for the relevancy of this thesis in popular music research, I believe it offers some unique perspective on the main perspectives of popular music (see (Drabløs, 2016; Middleton, 1990) by; [1] Helping to define what is meant by "popular", [2] Demonstrating how AOs in popular music proliferate, and [3] Assessing its relevance in connection with social groups.

As the last decade has seen a rapid incline in interest in MLS and memetic research, it seems inevitable that if the trend continues, someone will eventually attempt to interweave the two disciplines. Hopefully, this thesis will demonstrate one possible approach in that regard, and to stir excitement and interest for those who read it.

Methodological Approach

2.1 Methodological approach and research goals

For all intents and purposes, this thesis is entirely philosophical. My aspiration is to inter-weave multi-level selection theory with memetics and popular music theory in order to construct a metaphysical framework that will serve three unique functions;

[1] *Assist with categorization for Popular Music literature by providing useful labels.*

[2] *Test the validity of Popular Musicological hypotheses by evaluating them from an inter-disciplinary perspective.*

[3] *Provide a premise for further research.*

This thesis, however, is merely committed to the creation of a framework, which requires a solid foundation of philosophical argumentation to be considered academically viable, and to a simulation of the created MLS-model. Which will demonstrate how AO selection occurs at multiple levels.

The methodological approach being utilized will by qualitative, the data being collected will consist of pre-written literature within the relevant fields, which are: biology, ecology, economics, popular musicology and philosophy.

2.2 Structure

This document is structured in four parts; the first part is dedicated to the foundational consideration of the framework, which is predominantly a manner of adapting the mechanisms in Wilson & Wilsons model (see (Wilson & Wilson, 2008)) for musicological use, however, there are some epistemological obstacles to that approach which will also be discussed. The second part is dedicated to the construction and explanation of the framework, the third part to simulations and assessment of simulations of the constructed framework and the fourth part to speculations on further research that can be made by utilizing the framework.

Foundational Considerations

3.1 Epistemological concerns

To the best of my knowledge, there have been no previous attempts to construct a Multi-Level Selection model (MLS) that aims to create a hierarchy of traits, individuals and groups like I propose to do in this thesis. However there exists some research on musical memetics (see (Jan, 2000, 2010)) and some research on the functions and proliferation of musical trends (Dolbec, 2015; Lena & Peterson, 2008), the latter's of which I have found to be a commendable resource for my thesis.

Furthermore, since my intention is for this model to be weaved into the already existing academic field of popular musicology, much of the literature in this field will be useful and relevant for this thesis. The primary goal here is to construct an interdisciplinary model that weaves the memetic-evolutionary and popular musicology fields together, to uncover the hidden mechanisms that I believe to be driving popular music markets.

There are, however, some epistemological concerns to this approach. The first and most important to address is the concern that unlike most evolution science, there is no apparent observable mechanism that grounds the theorem to the natural world. Unlike genetics which are observable in laboratory conditions, memes are products of thoughts and ideas, and therefore not observable in the same sense. My contention is that despite the lack for such an empirical mechanism, there is still sufficient precedent for this type of research, grounded in intuitive, authoritarian and logical knowledge.

3.1.1 On the concept of traits

Philip Tagg uses the term musical-structural-traits to define the "genes" in Pandoras Music Genome Project (Tagg, 2013, p. 247). However, use of the words "genes" and "genome" implies a biological characteristic, which causes a misunderstanding since musical traits are not biological entities (List. et al., 2013). Likely the name was given to the project by Pandora as a marketing strategy and not to appear as an actual scientific theory. However, my contention is that Pandora's undeveloped approach could be used as a foundation upon which a tangible scientific methodology can be constructed.

Brøvig-Hanssen (2018) suggests the use of the terms opaque and transparent mediation to describe listener experience in regard to the aspects of musical sound. I propose that the terms may be expanded to be used to describe listener experience with any characteristic relating to a musical experience; i.e.; traits.
For the intents and purposes of this thesis, I will be utilizing Brøvig-Hanssen and Taggs' terms to support and explain my theory. However, I have made some changes to the way that they are used. Firstly, I will use (musical-(structural-))traits as a substitute for musical-structural-traits since my framework also recognizes extramusical traits. That is to say that traits need neither be musical and/or structural to be constituted as a musical experience within my framework. Secondly, I will be applying the terms opaque and transparent mediation directly unto traits instead of music-technological operations regarding, which will expand the terms to extramusical characteristics that aren't necessarily directly linked to sound. For example; gender of lead vocalist or name of bass player, are both considered traits within an individual AO.

My contention is that individual AOs (e.g.; a song) are consistent of a number of opaque or transparent (musical-(structural-))traits. However, this is purely a metaphysical claim that seems impossible to validate because that would require a total analysis of every possible trait within an AO, which would be impossible because traits become transparent dependent of perspective, different perspectives produce different transparent traits, and opaque traits might remain opaque for decades and centuries before they become transparent.

The Pandora Music Genome Projects brings some authoritarian credibility to this theory, since they have based their music recognition system on the same assumption, which some believe to be the most sophisticated music recognition system available.

Then there is also the field of memetics to consider which utilizes many of the same concepts that I am utilizing here, for example Dawkins specified "tunes" as the memetic object when he proposed his theory; "Examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches. Just as genes propagate themselves in the gene pool by leaping from body to body via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation." (Dawkins, 1989, p. 192), here Dawkins is comparing tunes to genes, which aligns with my traits theory, in that the tune of an individual AO (usually referring to the main recognizable melody of a song) is considered a (Musical-(Structural-))Trait.

3.1.2 On the Principle of Heredity'

The four main principles of evolution are; variance, heredity, selection and time. These principles should be present in memetics as well, I will clarify the principles of Inheritance and Selection in this chapter and the next. The remaining two principles I regard to be self-apparent and will not need further explanation.

Concerning the principle of heredity, the use of the word heredity is misleading where memetics is concerned since it implies a biological component. (Musical-(Structural-))Traits are phenotypical, and not genotypical (List. et al., 2013) the difference being that phenotypes are observed expressions of a gene (or meme), whereas genotypes are the mechanism (i.e. the gene) that code for those observed expressions, therein lies a homological predicament, since what is being observed is the expressions for a meme, not the mechanisms that code for the observed expressions (which would be equivalent to directly observing metaphysical objects (i.e. thoughts and aesthetic preferences)) . Thus, when traits are analyzed, there will always exist a degree of uncertainty whether an observed trait within an AO is actually "related" to the same observed trait within another AO.

My contention is that traits proliferate themselves through a process called cultural transmission, or cultural learning. Cultural transmission exists as a research field on its own,

however, I have selected one work in particular within this research field that has facilitated the theoretical foundation for this contention (see (Cavalli-Sforza & Feldman, 1981)).

While the theory can quite simply be explained as the presumption that cultural traits (i.e.; ideas, mannerisms, fashions, musical norms, etc.) are somehow transmitted from person to person. This allows for profound cultural traits that would be impossible to construct within a single lifetime being able to appear exceedingly quickly, since they are selected, rejected and adapted by several individuals within a group. This I suspect most would agree or at the very least not disagree with. The theory itself however is rather difficult to verify since there is no known mechanism that detects heredity in cultural traits.

Cultural transmission is also the mechanism which allows for variance in traits, either through innovation or copying-error (Cavalli-Sforza & Feldman, 1981).

3.1.3 On the Principle of Selection

Rational choice theory can be applied regarding selection; the assumption being that selection objects are in competition with each other, and that selection occurs a rational agent who is considering the circumstances and selecting the self-determined optimal choice of action. Though there are still numerous minutiae discourses that can be had about rational choice theory in music; narrowing the research down to minute details would be non-productive and unclear since selection occurs at a multitude of levels. I believe that a metaphysical explanation is better for the purposes of this thesis.

The main idea is that the listener will, in some sense "select" the music that he or she listens to according to their own aesthetic preferences at any given time (the act of selection includes numerous responses from the listener e.g.; going to concerts, buying or streaming a song or album, participating in subcultures or, simply not switching the channel on the radio when a song comes on are all acts of selection). (Musical-(Structural-))Traits within an individual AO will influence selection of individual AOs and, AOs within a group will influence selection of groups. And so, a hypothetical competition occurs at trait, individual and group level where the "winners" are the traits, individuals and groups that are the most selected.

These winners are then replicated either by having caused an aesthetic preference for certain traits or combination of traits in musicians producing individual AOs (songs) or/and by actors

who realize a potential for personal gain by replicating within a group (affiliation), until they become over-replicated and eventually fail (see Chapter 6.2 *Affiliation, groups as resources and the tragedy of the commons*).

How (aesthetic) preferences are formed is a subject open for discussion (the general assumption being that they are genetically inclined and socially formed, and that they are permittable to change). I did find some literature on this (see (Dietrich & List, 2013)). However, I suspect further research is required. For the purposes of this thesis though, a satisfying answer won't be necessary; assuming that rational choice theory is convincingly sufficient to build upon.

3.1.4 Collective intelligence

As mentioned earlier in the introduction for this thesis, I believe one of the chief obstacles in popular musicology lies in defining idiosyncratic terms. Some researchers have been overly tempted to define and categorize objects and social phenomena's that appear as a result of collective thinking, e.g.; markets, subcultures, genres, authenticity, etc. Therein lies the possibility for error in assessment since they're making assessments on collective objects and social phenomena from the perspective of an individual.

Others, might be inclined to disregard these terms entirely by claiming that everything is subjective and therefore not valid or well founded, save perhaps as market categorizations.

On this issue, I believe collective intelligence theory is a practical toolset to utilize, it states that; "(1) Simple aggregation of individual opinion is a poor substitute for reasoned opinion by collectives (i.e., deliberation) except in limited circumstances. (2) What constitutes an intelligent decision on complex matters requires approximations to the ideal of what is intelligent. There is no "gold standard" for intelligent decisions. (3) If collective deliberation is to be useful, then its outcomes must be improved decisions—in short, intelligent outcomes. (4) Deliberation can lead to more intelligent outcomes when opinion, knowledge, and judgment within a collective is diverse and this diversity is expressed." (Kenski, Jamieson, Cappella, Zhang, & Price, 2017).

To put it plainly; collective intelligence theory is the theory that human minds can collectively produce complex, self-regulating social structures that cannot be accurately defined by a

single individual. Social structures such as markets, or judicial systems are examples of these structures. I contend that musical genres/terms and traits are also products of a collective intelligence. So, while one might metaphysically explain these structures, accurately defining them seems impossible since the principles governing them are continually being revised by its own actors.

Constructing the Model

4.1 Introduction to the model

This chapter will outline the four levels of analysis proposed in my thesis, the multi-level structure I am proposing here is based on previous works on multi-level structures found in other scientific fields, primarily within evolutionary science (For example (Waring et al., 2015; Wilson & Wilson, 2008)). Wilson & Wilson suggests that natural selection occurs at three levels of analysis; at genetic level; selection between genes within an individual, at individual level; selection between individuals within a group and at group level; selection between groups within a population (Wilson & Wilson, 2008). In this thesis I will follow the same approach that Wilson & Wilson have used to construct a similar MLS-Model that can be used for structuring the analysis and selection levels of popular music.
I have strived to follow the same set of principles, and the same set of terminologies that are usually found in MLS literature in order to have a common set of principles and terminologies that can be used interdisciplinary. However, some adjustments have been made to the model for it to be functional within the anthropological discipline, and the field of popular musicology. While, the overall methodology remains intact, any changes that I have made have been made for the model to be more precise within a cultural research discipline, and I will explain my reasoning for making them as they appear.

The hierarchy within the model can be traced down to the first level, that is; to either musical, or paramusical forms of expression. However, it should be noted that any attempts made to reduce a holistic unit into individual parts (for example trying to reduce a large-scale trait into smaller-scale traits) is likely to result in a collection of individual parts that might not fully convert back to that holistic unit. For example, (Hevner, 1935) investigates the correlation between perceived emotions in music such as; happy, sad, melancholic, dark, etc. and their tonal correspondence. Her research showed that compositions that were described as positive valance were likely to have a major key signature whereas compositions that were described as negative valance were likely to have a minor key signature. Although her intentions were not to map out all the musical and paramusical types of expressions that are associated with these emotions; one might ascertain that any attempts to do so is unlikely to be completely precise.

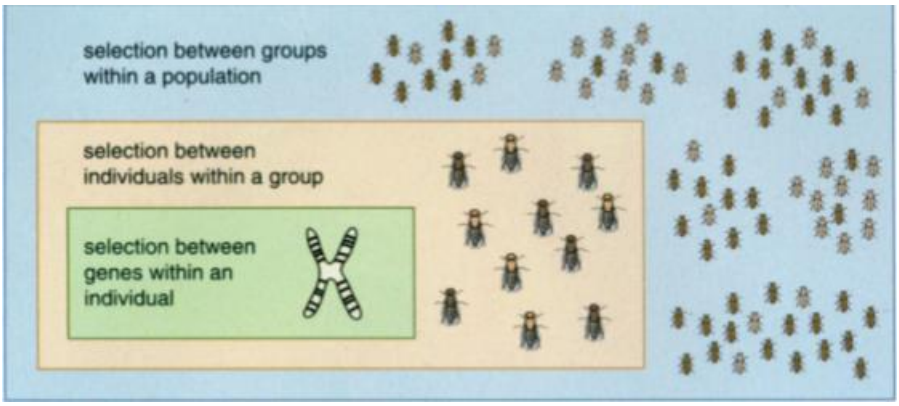

Figure 1 Shows the MLS-Model proposed by Wilson & Wilson (Wilson & Wilson, 2008)

4.2 Levels of analysis

4.2.1 Parameters of musical and paramusical types of expression

The first level of analysis for this multi-level model is the level of "Parameters of Musical and Paramusical Types of Expression". The first level is parallel the level that the genetic level would be analyzed. Wilson & Wilson did not feature this in their model, although its existence is implied since genes are analyzed as sequences of DNA and RNA. Presumably Wilson & Wilson did not include this level in their article because of its existence outside the selection hierarchy of all the other levels (or rather it is the mechanism that makes it all possible). The reason that I am including this level is that in the field of popular musicology its existence is not implied like it would be in the evolution sciences.

The parameters of musical expressions are organized in four inter-related categories: [1] *Time and space*; [2] *Timbre and Loudness*; [3] *Tone and tonality* and [4] *Totality* (Tagg, 2013, p. 271). Paramusical types of expression are forms of expression that are co-occurring alongside the music i.e; "*semiotically related to a particular musical discourse without being structurally intrinsic to that discourse*" (Tagg, 2013, p. 596). Theoretically these parameters could be further reduced into seconds, frequencies, decibels, etc. However, I would argue that doing so would be considered redundant for the intents and purposes of this thesis.

4.2.2 (Musical-(structural-))traits

The Oxford English dictionary defines "trait" as "A distinguishing quality or characteristic, [typically one belonging to a person.]" (Oxford English Dictionary, 2018). That is to say; any classifiable characteristic is considered a trait. Which, in the arts brands traits as highly subjective and are likely to change meaning dependent on who is asked to define the trait. This would also mean that the number of traits that could exist is virtually limitless, if everything is to be considered. However, despite traits being intrinsically subjective, common conceptions do often occur.

In 2008, after Coldplay released their single "Viva la Vida" many came to recognize the song as being "mellow" or "melancholic". In fact those characteristics are regularly used to

categorize much of Coldplay's aesthetic style (see reviews by BBC and EW (Jones, 2008); (Willman, 2008)). Musicologists are generally careful not to needlessly utilize phrases that are intrinsically subjective and contextual. Nevertheless, to say that much of Coldplay's music can be characterized as mellow or melancholic might be considered to be true, by virtue of collective intelligence.

Traits appear in varying scales; I suggest two distinct levels for traits; Large-Scale Traits (LST) and Small-Scale Traits (SST). Each level down increases the resolution of the analysis but lowers the scope of analysis. Each level up increases the scope of the analysis and decreases the resolution.

SSTs are isolated (musical-(structural-))traits that participate in varying degrees to a perceived LST, Individual, Group or Population, that can be directly analyzed by the parameters of musical and paramusical forms of expression. For example; minor or major key tonalities, use of a certain kind of rhythmic pattern, velocity of a specific instrument etc.

LSTs are traits that are composed of combinations of SSTs, for example; perceived perceptions for a given song e.g.; mellow, melancholic, happy, energetic, good, bad, relaxing etc. Or specific performance aesthetics e.g.; melodic electric bass, angry vocals, romantic strings, Latin-American drums etc.

Although LSTs are consisted of combinations of SSTs, not every SST that is involved in specific LSTs are required for the existence of that specific LST within an individual. For example; (Drabløs, 2016) suggests that the melodic electric bass is a specific performance aesthetic that occurs as the result of several; groove, melodic and attributed elements, though some appear more often than others, no single one in particular is the sole predictor for the LSTs existence within an individual AO.

Pandora's Music Genome Project is limited as to what is considered a "musical gene", selecting only characteristics that are "musical" such as; heavily distorted guitar sound or prevalent use of rhythmic percussion. The reason for this is that Pandora are mapping out the traits for songs and compositions, and like I mentioned earlier in this chapter; any attempts to reduce holistic units into individual parts are unlikely to be completely precise since the individual parts that make up the unit are often subjective constructs. Nevertheless,

Pandora's music analysts have accomplished creating a platform that is precise enough to be considered one of the best music recommending systems available (Tagg, 2013, p. 247).

4.2.3 Individual

The next level up in the hierarchy is the level of the individual. The individual is the level of analysis within which traits exist. In the case of today's popular music, the individual level of analysis is generally a song, although this model is applicable to other AOs also. Songs are compositions that encompass certain (Musical-(Structural-))Traits, both large scale and small scale.

Song are holistic units, which makes them problematic to reduce into individual parts (in this case traits). For example, a person listening to a song on the radio and then again at a concert later that night. Although his or her musical experience is distinctly different in the two scenarios, that is to say; the traits that are observable differ in the two scenarios. Yet, he or she has listened to the same song, Middleton touches upon this dilemma as well in his book "Studying Popular Music", he makes the point that although popular musical works are intimately connected with the technologies of mass distribution (radio or streaming, for example), the piece does not cease to be popular music if performed outside those domains, like by an amateur guitarist (Middleton, 1990, p. 128).

It should be mentioned that because of the high scope, low resolution analyses of the popular music consumers, AOs are sometimes misinterpreted. One of the more famous examples of this is Bruce Springsteen's "Born in the USA", which was perceived as a "feel good, patriotic song", whereas in truth the song confronts the emptiness of the American dream (Kot, 2014). I theorize that the reason for this apparent misunderstanding has to do with affiliation, in the case of Springsteen's song; usage of traits that affiliated with positive valance in other individual AOs (see chapter 6.2 *Affiliation, groups as resources and the tragedy of the commons*), giving the impression to a low resolution consumer that the song has a positive message.

4.2.4 Group

Groups are consistent of multiple individuals. In popular musicology this might relate to albums, playlists, genres or trends. I have decided to narrow this explanation to focus primarily on trends or styles as the analysis object for group level. Keep in mind however, that I intend for this model to be applicable to any music-memetic group.

There are numerous differing styles present in the mainstream simultaneously. And often individual AOs utilize several contemporary musical trends simultaneously. For example, at the time I am writing this thesis, after a hasty analysis of Spotify's "Todays Top Hits" playlist which features 50 unique songs and is followed by more than 23 million unique users (see page 39) for a list of songs included in the playlist as of 18.04.2019), I am able to distinguish three significant musical trends that seem to be performing well at this particular time, these are:

[1] A musical style where the vocals are overly pitch-corrected, or autotuned. This particular use of overly autotuned vocals is a trait that was picked up and made popular by a subgenre of the hip hop movement which was labeled trap. Although, the trait still has roots in this hip-hop movement in that many of the songs that utilize this trait within the playlist also utilize other traits belonging to that genre, many of the songs within the playlist utilize the trait outside the domain of trap.

[2] Hip-hop instrumentals that could be labeled as trap or as related to trap, most of the songs that utilize these instrumentals also utilize the "overly auto-tuned trait", but not as many of the song that utilize the "overly auto-tuned" trait also utilize the hip-hop instrumental trait.

[3] Quite a few of the songs within Spotify's playlist seem to include Latin-American instrumentals, rhythms or lyrics. Some of these songs include the other two significant traits that I mentioned as well.

Since there are some methodological flaws in the way I've analyzed this playlist, and by the fact that I used Spotify's playlist as a tool for analyzing contemporary trends. I'm not attempting to prove that these trends are in fact, popular, but rather to demonstrate that major musical labels like these can be quite easily distinguished.

Although, I would claim that the majority of the songs within Spotify's playlist utilize at least one of these traits at some point during their duration, certainly not all of them did so. However, I am confident that with proper analyzation that every song within this playlist, and indeed any other playlist that is consistent of pop-songs could be distinguished as being part of some greater, overarching trend.

4.3 Levels of selection

The following chapters will outline the three levels of selection within this MLS model. In chapter 3, I mentioned that the use of the word selection is somewhat ambiguous in memetics, since the term in linked with the everyday act of "choosing". Although that is in some sense what is transpiring. The term itself implies a very conscious action. Selection includes a multitude of responses from a listener including, but not limited to consciously choosing specific individual AOs to buy or listen to (see chapter 3.1.3 *On the principle of selection*).

4.3.1 Selection of (musical-(structural-))traits

At the level of (musical-(structural-))traits, the mechanism for selection is preference. Selection is occurring a rational agent who is composing a piece of music by selecting and/or innovating traits to and from the meme pool, albeit this process might transpire unconsciously. The idea here is not that a musician is selecting traits from a database and is in that sense constructing a piece of music like one would construct a jigsaw puzzle (although similar proceedings do transpire in popular music (see chapter 6.2 *Affiliation, groups as resources and tragedy of the commons*). Rather, the musician has either inadvertently or deliberately absorbed musical-structural norms through the process of cultural transmission (see (Cavalli-Sforza & Feldman, 1981), and chapter 3.1.3) and is deriving his or her piece of music from that compendium of learned norms and thereby selecting for the fittest traits in accordance to the musical-structural environment from his or her aesthetic preference.

The musical-structural environment refers to the landscape of (musical-(structural-))traits already existent within the composition, and the preferences of the people that are subject to them. For example, if this hypothetical musician has composed for himself a musical-structural landscape that could be categorized as upbeat, then this would limit the quantity of viable traits that could be utilized within this environment. Every trait within an individual AO operates as part of a holistic whole. If a specific trait within an individual AO were to be placed with disregard for the musical-structural environment, then this would compromise the fitness of the individual AO regardless of the individual fitness of that specific trait.

Traits within an individual AO must work holistically with each other by serving various functions, just like genes within an individual person must work holistically for the fitness of that individual person. In other words; preference for specific traits (i.e.; individual trait fitness) is not a predominator for individual AO (i.e.; individual song) fitness if the individual trait does not function as part of the holistic whole.

This does not imply that unique trait combinations are somehow not viable, for example the insertion of traits usually belonging to rock music into an operatic environment, i.e.; rock opera. I would ascertain that in the incident of rock opera, there would come to exist an opening within the operatic environment when the rock music style had become de-stigmatized that allowed for traits usually belonging to rock music to be inserted within the operatic environment thereby adding innovation to both categories and creating a new stigmatized category that would eventually prove to become a commercial success.

4.3.2 Selection of individual AOs

In the same sense that traits are selected by means of the selection for the individual AO that they exist within, so too are individual AOs selected by the means of the group that they exist within (i.e.; selection of an individual within a group). (Salganik, Dodds, & Watts, 2006) showed that individual quality (that is an individual (person) selecting songs without knowledge of the choices of others) is a poor predictor for market success, and that the market success of songs are almost impossible to predict in artificial cultural markets when the selection of other individuals becomes a factor, they showed that songs with low individual quality would rarely perform well and that song with high individual quality would rarely perform poorly (Salganik et al., 2006).

My conceptualization is that their study shows the importance of considering the social aspects of a market before making predictions, that is to consider the environment of the product within a market before making any predictions to it. Which Salganik, Dodds & Watts did not consider in their study. To measure the fitness of an entity, first the environment of that entity must be considered. I speculate that, predictions can in fact be made when the environment is first carefully considered.

Accordingly, as I explained in the previous chapter, it would be futile to analyze trait fitness without first considering its musical-structural landscape and preference for it. So too, would it be futile to analyze individual AO fitness without considering its environment as well.

The environments for individual AOs are the multitude of individuals AOs within the group that the individual AO is being considered within, and the preferences for combinations for traits of the people that are being subjected to them.

4.3.3 Selection of groups

Within the population of popular music there are a multitude of trends existing at any given time. These trends are in direct or indirect competition between each other for selection.

Trends are the development of specific traits within multiple individuals, for example usage of a specific musical sample (i.e.; short audio clip) or a particular way to utilize a musical instrument (i.e; a style). Trends can be placed in one of three distinct market categories: LIN (Local Innovation Network), Niche and Mainstream (Dolbec, 2015).

LIN, short for Local Innovation Network are a small group of actors or contributors (producers and consumers) often geographically centered in a few locations, the role for this market category is to innovate new (musical(-structural))-styles (Dolbec, 2015). If the style that is produced by this market category proves to be "fit" enough for selection and replication, then LINs move up to a more diverse, geographically expanded, and longer lasting level called "niche"(Dolbec, 2015). It should be noted however that there is no apparent boundaries for these three market levels, rather there exists a tipping point where trends either move up or down market levels.

Niches are specialized markets targeted by smaller marked actors. Consumers within this marked category are often mainstream opposed (Hietanen & Rokka, 2015), the role of niche markets are to bridge LINs and Mainstream markets (Dolbec, 2015).

If niche styles are fit enough, then they might move up to the highest market level which is the mainstream; Dolbec explains this process: "[…] stylistic innovations are developed by and/or for a niche group (for motives of differentiation) and as a result become valuable to

mainstream ones (for motives of affiliation). As the new style becomes popular, it is adopted by mass market companies and becomes a convergent design" (Dolbec, 2015).

The mainstream market is the top market level for traits. The most successful traits make it to this level, where traits that make it to this level enters a cycle that I theorize can be explained by (Lloyd, 1833)'s theory on the tragedy of the commons (see chapter 6.2 *Affiliation, groups as resources and the tragedy of the commons)*

Usually in the exchange between niche and mainstream, some niche actors and producers (the producers of a product, not necessarily music producers) are elevated to be mainstream level actors despite their countercultural attitudes (Hietanen & Rokka, 2015). Also, since the mainstream cultural market is commercially oriented, risk is typically minimized (Adorno & Horkheimer, 1997) and as a result "their distinguishing genre characteristics [are] purposely obscured or muted in the interest of gaining wider appeal" (Lena & Peterson, 2008).

	Level		
	Local	**Niche**	**Mainstream**
Role in the cultural innovation process	Innovation	Bridge (and end market)	Diffusion and categorization
Logic of production	Distinction	Distinction/Commerce	Commerce
Logic of consumption	Participation	Distinction	Affiliation
Main territorialization process	Geographic; Anonymity	Stigma and/or community	Institutionalized
Market orientation	Product	Community	Market
Main actors	Prosumers	Entrepreneurs	Established actors Peripheral (focal) market actors Niche entrepreneurs turned institutional entrepreneurs
Audience	Local members	Niche members	Mainstream audience
Duration	Short	Long	Cyclical
Diffusion	Local	Trans-global	Global
Geography	Local night, local club, record stores, homes	Virtual (*dubstepforum*); transnational (pockets); *linked trans-global places*	Established actors/firms/festivals/main industry conferences
Media	Word of mouth; Local (e.g., pirate radio)	Specialized (EM magazines, EM blogs, EM communities)	Mainstream
Relationship with other levels	Protected from mainstream markets		Removed from local & niche markets

Table 1 shows the characteristics of the three market levels (Dolbec, 2015)

As it is important to consider the environment for traits and individual AOs, so too is it important to consider the environment for which groups exist within, which at group level refers to the multitude of groups and subcultures that exist within the population of popular music.

Simulations

These two preceding chapters and its subchapters have been dedicated to the construction of an analysis hierarchy and a selection hierarchy that exists within the MLS-model. This chapter will be dedicated to simulations of the MLS-model. These simulations will demonstrate; [1] how mew trends emerge within the population of popular music, and [2] how selection for traits and trends occurs across multiple levels.

The two hierarchies can be visualized as such:

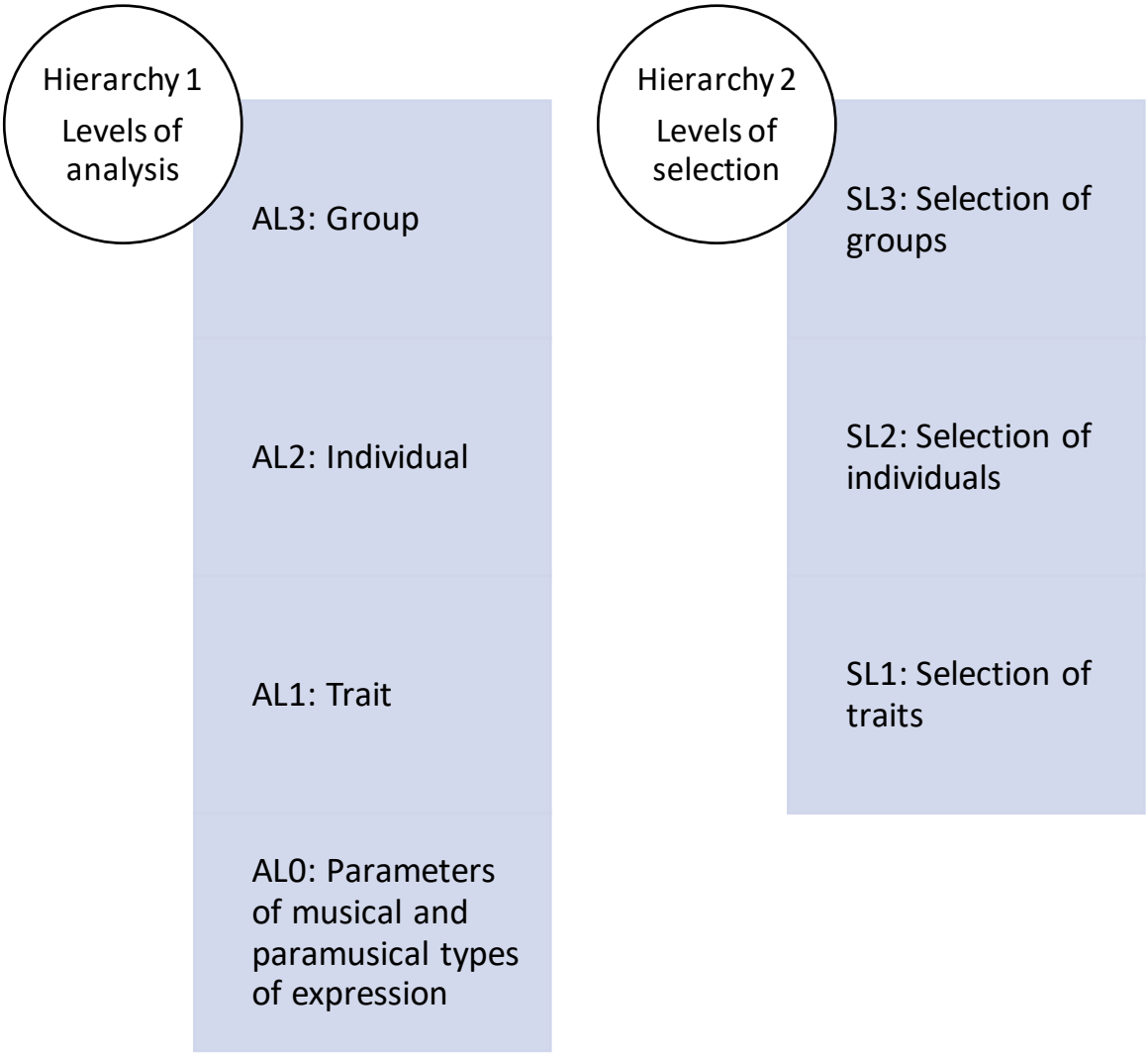

Figure 2 Visualization of the two hierarchies within the MLS-Model

While the MLS-Model can be visualized as such:

Figure 3 Visualization of the MLS-Model

(Drabløs, 2016) details the stylistic elements that define the large-scale-trait melodic electronic bass, and then detects the presence of these stylistic elements in the mainstream over a period of 31 years by analyzing songs included in Billboards' hot 100 rankings during that period. However as (Dolbec, 2015) explains, these stylistic elements likely existed at LIN and Niche market levels prior to its occurrence in the mainstream.

For the first simulation, I will conceive a hypothetical trait e.g.; a new performance aesthetic associated to a particular musical instrument being discovered at trait level and then explain how this newfound trait might proliferate across multiple selection levels, thereby demonstrating how variance is occurring within popular music.

Firstly, this new performance aesthetic (i.e.; trait) will usually originate within a small, secluded community of prosumers whose members are passionate about musical innovation (i.e.; a Local-Innovation Network) (Dolbec, 2015). This community might exist within an already existing metagenre, genre, subgenre and/or style (see (Shuker, 2008)). Oftentimes the new performance aesthetic is developed as a consequence of new technological or ideological progress within the community, as the result of extensive experimentation. (Brøvig-Hanssen & Danielsen, 2016) mentions that as new technological devices appear, they

are often subject to radical experimentation. However, I would argue that this rings true for new ideological progress also, such as new compositional norms (e.g.; minimalism or serialism).

As the new trait at AL1 originates, it is subject to selection at SL1. If the new trait proves to be qualified enough for selection at SL1, then it might move up a level in the hierarchy.

As the trait is selected at SL1, it then exists as part of a holistic unit (i.e.; within AL2). Thus, although AL1 fitness contributes to selection at SL2 (some more than others, e.g.; a cool guitar sound might contribute to selection at SL2 more than a cool hi-hat sound would). AL2 fitness is measured in accordance to *its* environment (see chapter 4.3.2 *Selection of individual AOs*). Therefore, while AL1 fitness *is* a reliable predictor for SL1 selection and does contribute (in varying degrees) to AL2 fitness. It *is not* a reliable predictor for SL2 selection.

When the individual AO at AL2 is selected at SL2, the traits within it are subject to replication. The more qualified the AO is (in accordance to its environment) the more of its traits will be replicated. Some traits will be replicated more than others in accordance to their AL1 fitness. These replications are susceptible to mutation either by means of innovation, or copying error (see (Cavalli-Sforza & Feldman, 1981)). Depending on the scale of the new trait, it might be absorbed into the market category within which it already exists, or pivot and develop into an entirely new market category within the larger context (e.g.; metagenre or subgenre).

At AL3, the hypothesized trait at AL1 exists within an individual AO at AL2 within a group at AL3. For the purposes of this simulation it would be productive to resolve on a specific group; e.g.; a subgenre or musical style, which can be categorized as a market category composed of several similar individual AOs (i.e.; individual AOs sharing many of the same, or similar traits). As the AL2 AO is subject to selection at SL2, the subgenre within which it exists will either benefit or disbenefit as a result of the proliferation of new traits within it, often dependent on complexity (see (Percino, Klimek, & Thurner, 2014)).

In the same sense that AL1 quality contributes to SL2, so too does AL2 quality contribute to AL3 selection. However, likewise as with AL1 and AL2, AL3 is subject to selection in accordance with its fitness to *its* environment (see chapter 4.3.3 *Selection of groups).*

Hierarchy A to hierarchy B simulation demonstrates how isolated AO fitness is not a reliable predictor for selection at corresponding levels and upwards in the corresponding hierarchy, and how a newfound musical trait might proliferate throughout a population.

Assessment of simulations and conclusion

5.1 Results

The intent for this simulation has been to demonstrate how the MLS-model might be utilized to detect how (musical-(structural))traits might proliferate across and up selection hierarchies and throughout a population.

This simulation has showed that isolated AO quality is not a reliable predictor for selection at any of its following selection levels, since every AL has its own environment within which it is subject to selection.

5.2 Conclusion

The goals for this thesis were to provide and review the necessary epistemological and philosophical theory for constructing a MLS model for use on popular music market theory. In that respect, this thesis has been a success However, while the main goals were achieved, what remains to be seen is whether the framework is usable for researchers in a practical sense. That is, whether it could become a useful philosophical tool for researchers who are analyzing cultural market trends.

Further speculation

6.1 Cantometrics and structural homology

(Bourdieu, 1984) and (Lomax, 1976) suggests a relationship between social class structure and aesthetic preference. This theory is accepted by some researchers and rejected by others (see (Middleton, 1990; Savage, 2018)). Although the relationship between social class structure and aesthetic preference is not specifically being discussed within this thesis, it does imply a correlation between aesthetic preference and habitus, which I regard to be the fundamental goal of musicology, and indeed any anthropological research discipline. That is, to authoritatively identify a relationship between a given object and what our[1] relationship to it reveals about ourselves.

Although Bourdieu and Lomax' attempts to identify a structural homology has been met with diverse evaluation, I would argue that the claim that there is a relation between aesthetic preference and habitus, which is to say that the aesthetic preference is caused by some habitual mechanism and that this habitual mechanism might explain behavioral tendencies, is a logical assumption. The real difficulty lies in accurately identifying it.

Specifically, for this motive I maintain that the metaphysical model that is the subject of this thesis, could be a reliable tool to be utilized.

The relationship (assuming of course that mapping out a homological relation between aesthetic preference and habitus is practically feasible) must be mapped out by taking a multi-level approach by separating specific trait preference individual AO preference, and group preference, and then review habitus accordingly. For example; one might attempt to detect a common habitus in specific subcultures, but since subcultures exist at group level, where each individuals' pretext(s) for taking part in that subculture is idiosyncratic. Then, what will likely be found is a minute majority of similar idiosyncratic pretexts, which may or may not be anecdotal. While, attempts to map out tendencies within groups might be contextually useful, the approach leaves it up to discussion as to why the specific habitus became a tendency within the group.

[1] Our and ourselves here refers to "us" as human beings.

The Music Genome Project operates under the assumption that if a listener shows favor towards specific traits, then it is likely that he or she will like individual songs that utilize those specific traits, or similar traits. Which is an assumption that has proven practical enough to build a credible recommendation system. The subject here is whether other habitual assumptions can be made from knowledge of that specific aesthetic preference. For example; a common speculation in musicological discourse is that there is a correlation connecting preference for shorter song lengths and short consumer attention span (although the quantitative data supporting that theory is rather ambivalent (see(Léveillé Gauvin, 2018))), these are the types of one to one relations that could contribute to the overall anthropological discourse.

6.2 Affiliation, groups as resources and the tragedy of the commons

(Ward, Goodman, & Irwin, 2014) suggests that listener familiarity with an individual AO is a reliable predictor for selection and (Dolbec, 2015) suggests that mass market actors utilize affiliation as a market strategy to boost sales. My contention is that since popular music selection occurs at multiple levels simultaneously, individual AOs (i.e.; songs) might be top down constructed to be evaluated as part of a specific group thereby exploiting that group's fitness within the population as assurance for its individual selection.

Although these are not the only instances of affiliation, for example an artist might deliberately affiliate his composition with other compositions in order to convey a message (e.g.; a social critique as was the case with Springsteen's "Born In The USA"), or affiliation might occur accidentally.

Regardless, affiliation becomes a viable strategy for market success as the relevant group's fitness inevitably becomes a resource for mainstream actors to exploit. Although demand for repetition of pleasant stimuli is one of the driving forces for musical enjoyment (Schönberg, 1983; Ward et al., 2014), so too exists there a demand for novelty (Schönberg, 1983). Thus, as the exploitation of a (musical) group's fitness is rapidly exploited by means of affiliation (increasing the supply for repetition of pleasant stimuli), its supply of novelty and change decreases comparatively to that of another (musical) groups within the cultural population,

inevitably allowing for this new (musical) group to outcompete the first one, as the musical style interlinked with the first (musical) group becomes de-stigmatized for lack of innovation.

As there is much incentive for mainstream actors to exploit a group's fitness for individual gain, and since there is little to no regulation on the exploitation of specific group associated musical styles by mainstream actors (to be clear; I am not suggesting that there should be), over-exploitation of specific group associated musical styles seems inevitable (see (Lloyd, 1833)).

List of music examples

Below is a complete listing of the songs included in Spotify's "Today's Top Hits" as of 18.04.2019.

Direct link to a snapshot of the playlist can be found here:

https://open.spotify.com/user/1178571878/playlist/6bltInR1Nor18PmiVZV0zu?si=08E7Vxk7QWWXyDrj4Z6hiQ

Artist	Song title
Alan Walker, Sabrina Carpenter, Farruko	On My Way
Alec Benjamin	Let Me Down Slowly
Arianna Grande, Victoria Monét	MONOPOLY
Ava Max	So Am I
Avicii, Aloe Blacc	SOS
Bazzi	Paradise
benny blanco, Selena Gomez, J Balvin	I Cant Get Enough
Billie Eilish	Bad Guy
Billie Eilish	all the good girls go to hell
BLACKPINK	Kill This Love
A Boogie With da Hoodie, 6ix9ine	Swervin
BTS, Halsley	Boy With Luv
The Chainsmokers, 5 Seconds of Summer	Who Do You Love

The Chainsmokers	Kill You Slowly
Daddy Yankee, Snow	Con Calma
Daya	Insomnia
Dennis Lloyd	Never Go Back
Dominic Fike	3 Nights
Ellie Goulding	Sixteen
Fletcher	Undrunk
Gaullin	Moonlight
Jonas Blue, Theresa Rex	What I Like About You
Jonas Brothers	Cool
Jonas Brothers	Sucker
Juice WRLD	Hear Me Calling
Khalid	Talk
Khalid, John Mayer	Outta My Head
Khalid	My Bad
Kiana Ledé	EX
Lauv, Troye Sivan	I'm so tired…
Lil Nas X, Billy Ray Cyrus	Old Town Road - Remix
Mabel	Don't Call Me Up
Maluma	HP
Marren Morris	The Bones

Marshmello, CHVRCHES	Here With Me
Martin Jensen, James Arthur	Nobody
Nav, The Weeknd	Price On My Head
Nipsey Hussle, Roddy Ricch, Hit-Boy	Racks In The Middle
Ozuna	Baila Baila Baila
P!nk	Walk Me Home
Panic! At The Disco	Hey Look Ma, I Made It
Post Malone	Wow,
ROSALÍA, J Balvin, El Guincho	Con Altura
Sam Smith, Normani	Dancing With A Stranger
ScHoolboy Q, Travis Scott	CHopstix
Sia, Diplo, Labrinth, LSD	No New Friends
Tom Walker	Just You And I
Twenty One Pilots	Chlorine
Why Don't We, Macklemore	I Don't Belong In This Club
Zara Larsson	Don't Worry Bout Me

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