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Optimality Theory and the Semiotic Triad: A New Approach for Songwriting, Sound Recording, and Artistic Analysis

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Optimality Theory and the Semiotic Triad: A New Approach for Songwriting, Sound Recording, and Artistic Analysis

By

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Committee in charge:

Professor Irmengard Rauch, Chair
Professor Thomas Shannon
Professor Winfried Kudszus
Professor Gary Holland

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Abstract

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Songwriters have always taken full advantage of the 'artistic license' offered them by their listeners. This dissertation investigates the freedoms and limitations of artistic license by examining language in the musical environment. This dissertation uses Optimality Theory as its method of analysis together with Peircean Semiotics. The OT analysis includes examples from both English and German and investigates the musical environment on syntactic, morphological, and phonological levels. The dissertation also explores the potential impact that songs can have on spoken language by considering the differences between modifications and innovations in songwriting. Additionally, I examine the roles iconicity and arbitrariness play in art and pop culture. As evolving principles of the Sign, iconicity and arbitrariness interact with one another in an overlapping manner, thus producing new innovations in art and language. These new innovations are then conventionalized, creating a new layer upon which more innovations take place. The fractal nature of this process adds credence to the reproductive nature of Peirce's Triad. Lastly, this dissertation applies Peirce's Triad to the art form of sound recording to shed light on that creative process and is then applied for an analysis of dissimilar musical genres to add further explication on the differing expectations of those musical genes.

To Jennifer, Allison, and Elizabeth

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Acknowledgements

When I decided to return to school with the modest goal of earning a BA in history, I never imagined my academic journey would end with me writing a dissertation. I could not have completed this project without the support and guidance of my committee, as well as other teachers I was lucky to have as a graduate student.
From my committee, I must first thank Gary Holland for his insightful feedback and constructive criticism. Though I didn't realize it at the time, it was actually when I was in Winfried Kudszus' German 207 class that the seeds for this dissertation were planted. As a result of his class, I discovered the following: Nietzsche's *Birth of Tragedy*, though not directly cited in the dissertation, is in many ways, the cornerstone of my entire theory. It is what made me realize that visual art and music have different sources of inspiration and that music is most likely mankind's earliest form of emotive communication. When I eventually discovered Peirce's Triad, I instantly noticed a connection between Firstness and Dionysian inspiration. Jakob von Uexküll's Umwelt was key for me realizing the realm in which music exists after it is conventionalized. Johann Georg Hamann was instrumental for how I see music connecting to the listener - proximity to the art. I also want to thank Professor Kudszus for encouraging an 'outside of the box' approach for interpretation and analysis of readings. I am grateful to Thomas Shannon for sharing his methodology, writing style comments, help with OT constraints, and sound life advice. And, of course, I want to thank my advisor, Irmengard Rauch. Simply put, without her unflinching support and keen understanding of me, I could have never written this dissertation. It was she who first saw value in my application of OT to the musical environment, advising me to go further with the idea. She was instrumental in instilling confidence when I doubted the significance of my dissertation and my ability to complete it.

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CHAPTER ONE
Introduction

The goal of this study is to shed light on the creative process, more specifically, on the songwriting process. The primary method used for this analysis is Optimality Theory (Prince & Smolensky 1993). This analysis also relies on Peircean Semiotics for the following: (1) support for the universality of a primary constraint, 'Faithfulness to a Musical Phrase' (F-MPH); (2) a clarification of the differences between innovation and modification, as well as iconicity and arbitrariness, and (3) an explanation of the triggers for, and evolution of, musical genres. This analysis differs from previous Optimality Theory (OT) studies conducted by Hayes & MacEachern (1998) and Kiparsky (2006) in that it is not constraint-based corpus analysis of metrics, though Löhken (1995) is referenced.

This analysis also differs from those previous studies in that it is not restricted to English folk music or other traditional/conventionalized art forms. It is limited primarily to Popular Music, i.e. subgenres of the supra-American Folk genre: Modal Jazz, Rhythm & Blues, Rock & Roll, and Standards of the mid to late 20th century. The analysis herein is not a narrow, linguistic study, arguing for or against the current research in the field. Rather, this interdisciplinary study is a theoretical analysis on the nature of the creative process, fusing a linguistic method (OT) with the philosophical theories of Charles Sanders Peirce, i.e. Semiotics.

The primary argument of chapter 2 is to show that artistic license is not limitless, and that a different hierarchical structure of constraints exists within the environment of music than does in spoken language. I will show that these constraints set the boundaries for artistic license. Unless stated otherwise, all of the constraints utilized in this dissertation are universals (Gussenhoven & Haike 1998:46). Though, it must be stated now that I am using OT in a very unorthodox manner – to analyze art. Therefore, constraints with little to no foundation in modern linguistics will be introduced to the reader. When I introduce new constraints, I will always specify whether the constraint is functioning as a faithfulness or markedness constraint, and I will always explain how it's influencing the output. That being said, I have made the utmost effort to use universal constraints when possible.

Central to the success of this dissertation is to show the universality of F-MPH by using semiotics, and specifically, Charles Sanders Peirce's Triad (stated in their simplest forms as Firstness, Secondness, Thirdness). This basic triad lays the foundation for the semiotic elements: sign, object, and interpretant, as well as Peirce's classes of signs. His triad can also be applied to the art of songwriting, and this paper will show that songwriting is a manifestation of Firstness, conditioned by Secondness, delimited by Thirdness. Additionally, it will be shown that each category contains subcategories, thus revealing the fractal nature of Peircean semiotics. Lastly, the dissertation promises to extend semiotics to the science of sound recording, where it will show that a fractal embeddedness of signs exists there as well.

In arguing for a predicable pattern in the creative process, this study claims that decisions made by songwriters are not as stochastic in nature as previously believed (Kiparsky 2006), and that the boundaries of 'artistic license' are conditioned by, on one

side, the freedom to create anything, and on the other, by the conventions of the genre.[1] The dynamism of these two opposing realities creates the realm in which the artist plies his/her craft, and the structure of OT is a well-suited method for quantifying this creative process. However, as stated above, the goal of the present study is not to further the research of metrics, poetic meter, or the prosodic structure of language, though, admittedly, these fields of linguistics are referenced (in chapter 2) to support the essential argumentation on which this dissertation rests. Lastly, though this study is a musical analysis, it is not a formal musical study – one in which the reader needs to have a knowledge of music theory. There are no compositional staffs, music notation, or chord charts in the analysis offered here.

This study is bold in its objective – to quantify the creative process methodologically through the use of OT, but also through applied semiotics. Chapter 2 primarily focuses on the use of OT when analyzing artistic freedoms. By using OT to analyze an idiomatic phrase (syntactically), a modified verb (morphologically), and a homophonous phrase (phonologically) in the context of songs, we gain insight into the limitations of artistic license. Once OT is established as a viable method for analysis, our attention turns to the importance of applied semiotics to this dissertation. Though a pragmatist, most of Charles Sanders Peirce's philosophy has remained in the theoretical abstract. However, by applying Peirce's triad of levels of consciousness, i.e., Firstness, Secondness, Thirdness, to the creative process, we can gain insight into why some instances of artistic license become innovations to the language, while most others simply remain modifications (chapter 3). Through the application of Peircean semiotics, we can understand better to what degree musical performances and recordings need to remain faithful to an original composition. By examining iconicity and arbitrariness (chapter 4), we investigate the point at which a performance of a known composition ceases to be like that composition, as well as when an exact replica of a performance ceases to be art. The degree of variance between iconicity and arbitrariness is explained in the context of the Icon and the Sign. Chapter 5 attempts to abandon the theoretical entirely and offers a pragmatic application of Peirce's triad to the art form of sound recording. And finally, chapter 6 fuses the pragmatism of chapter 5 with a return to OT for an explanation of musical genres, as well as the expectations of the genre-conditioned audience.

In addition to providing an analysis that quantifies the creative process for further academic research, it is hoped that this dissertation can be of use to the songwriter, recording engineer, and music producer. And that those artists will benefit from a study such as this by just being aware of the ubiquity of Peirce's triad, as well as how/why the optimal form of the language emerges in the musical environment.

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[1] The musical and lyrical patterns of modern genres are more random than those in traditional forms of music, enjoying a larger degree of freedom of expression. However, once a pattern is established in a song, it is often repeated. The expectations of the audience are the result of conventionalized traits in the genres. These conventions exert pressure on the composer and can increase or decrease the amount of repetition in a given song.

CHAPTER TWO
Applying Optimality Theory to the Musical Environment

Optimality Theory (OT) is a constraint-based approach. A tableau (Figure 2.1) is used like a mechanical structure. Hierarchically ordered constraints (upper horizontal row) process forms (far left vertical column) generated by the input (upper left corner). The optimal form emerges as the output when all the other generated forms are eliminated by violating higher ranked constraints. Simply put, demands are put on the input and its generated forms. Any form (generated by the input) that does not comply with the highest ranked constraint/s (by violating it/them) is rejected in favor of a form that does (by not violating it/them). This theory also holds that constraints are universal (Gussenhoven & Jacobs 1998:46). In order to utilize OT effectively, one must identify and define the determining constraints that produce the observed (and known) output. In addition, the input must be carefully selected. The combination of the input and ordering of the constraints is the essence of OT, and as Diana Archangeli states, "If we do not know what the input is, we do not know how to evaluate those constraints" (Archangeli 1998:200-207)**.** OT does not aim to predict outputs as much as it explains the process of language productivity. It is, therefore, well suited for an analysis that has the aim of shedding light, not only on language conventions, but also on the creative process.

Presented here is a basic example of how OT works:

Figure 2.1

Constraints

a) F-CO Faithfulness to Constituent Order (for English SVO)
b) *Fin-V Finite verb not allowed as first position element in indicative clause
c) *PostP Postpositions not allowed

Input: *He goes to school.*	*PostP	*Fin-V	F-CO
1. *He to school goes.*			**!
2. *To school goes he.*			**!
3. ☞ *To school he goes.*			*
4. *Goes he to school.*		*!	**
5. *He goes school to.*	*!		

* = violation of a constraint
! = fatal violation of a constraint
☞ = optimal form

A quick analysis of our example reveals that the generated form, *To school he goes* (3) emerges victorious, i.e. as the most optimal form, but why? First, let's assume that our input, the statement, *He goes to school,* is in response to a hypothetical question,

What does he do Monday through Friday? This helps to establish the context of our input, i.e. using the habitual form of the verb, *goes,* rather than the present progressive, *is going*. With our context clarified, we may now turn our attention to the generated forms. Observe, not all of the possible permutations (most of which are listed below) are generated in the tableau above. However, the five chosen forms are clearly representative of each possible type.

* = ungrammatical
? = questionable usage:

He goes to school.
**He to school goes.*
?To school he goes.
?To school goes he.
**Goes he to school.*
**Goes to school he.*
**He goes school to.*
**He school to goes.*
**School to he goes.*
**School to goes he.*
**Goes he school to.*
**Goes school to he.*

If we return to the tableau, the equally (indicated by the vertical broken line) undominated constraints, *PostP and *Fin-V, eliminate 8 out of 11 possible candidates listed above. The three remaining candidates all violate F-CO; three of them violate it twice, while the victor only violates it once. If we analyze the process further, we notice that the constraint, F-CO (Faithfulness to Constituent Order) only applies to an indicative clause in English, strictly SVO (subject before verb and object after verb). If we look closer at candidate (1), it violates SVO twice (as SOV), i.e. *He* (subject before object of the preposition) *to school* (before verb) *goes*. With candidate (2) we find a similar violation (as OVS), i.e. *To school* (object before verb) *goes* (verb before subject) *he*. However, with candidate (3), we encounter only one violation (as OSV), i.e. *To school* (object before subject) *he goes*, where the subject still precedes the verb. The fact that candidate (3) has the fewest violations and does not violate either of the undominated constraints makes it (by default) the victor.

A couple things are worth mentioning here: our object in this example is an object of the preposition [prepositional phrase PP]. Since the PP enjoys more word order freedom than an object of a transitive verb would, candidate (3) emerges the victor. Furthermore, while an example like the one given above helps to elucidate further the machinery of OT, none of these generated alternatives is as grammatically acceptable as the input. Since the main objective of OT is to understand why an output is produced, we need a context in which to justify our input. If we, for example, posit the question, Are there any other acceptable ways (syntactically in English) to mean, *He goes to school*, we would have our context, which in turn, helps to clarify why our input is already the optimal form. If our inquiry were to show how SVO works in English, we would probably use one of the other permutations as the input, which would undoubtedly

produce the optimal (SVO) form, *He goes to school*, as the output. However, since in this hypothetical example, our goal is to show how OT can be useful for shedding light on a process (in this dissertation, the songwriting process), the optimal form was chosen as the input to show how one might render, *He goes to school,* alternatively in the English language.

Before applying OT to the Musical Environment, we will need to familiarize ourselves with one of the primary constraints posited in this dissertation, 'Faithfulness to a Musical Phrase' (F-MPH), as it is exclusive to the musical environment and requires further explanation.

The constraint requires that a sequence of words, in any language, be faithful to the musical phrase in which it exists. A musical phrase is any sequence of notes in any rhythmic pattern that exhibits close repetition. The metrical pattern, time signature, tempo, and key are all irrelevant. The only requirement is that the phrase not be a single random event, and instead, mimic (in some way) its antecedent. Since the constraint also applies to melodies and musical chord progressions, it is not restricted to syllable counting (though metrical patterns are also often observed). This 'semiotic' nature of F-MPH is central to its comprehension, and its explication helps to elucidate further the potent nature of F-MPH.

For our first example, I will offer an idiomatic phrase for analysis. There is a well-known idiom in the English language; 'it's like trying to find a needle in a haystack'. Most native speakers of English are familiar with its meaning and resort to its usage when something is particularly hard to find. As is the case with most idioms, its meaning is derived from the cluster of words, rather than parsing or glossing each word individually. Admittedly, the idiom presented above is not very complex. That is to say, its literal meaning is not too far removed from its idiomatic connotation. However, what if one were to delete, randomly, certain words from the overall phrase? How far could one go in this process before the idiomatic effect is lost? Would 'it's like a needle in a haystack' work just as well as the standard rendering above? Certainly, the deletion of the verbal components, 'trying to find' is a subpar rendering of this idiom, but most native speakers of English would still be able to infer its meaning. What about 'it's like a needle haystack' or 'it's like a haystack needle' where the preposition 'in' is lost? Most native speakers would probably agree that the latter rendering is more acceptable than the former, but both are less effective renderings than the first or second versions offered above. Finally, there are renderings like, 'it's like a needle' or 'it's like a haystack', where all idiomatic efficacy is obliterated. Perhaps the more important question is, why would anyone who is a native speaker of English resort to any of these subpar renderings? What set of circumstances, or even more precisely, what kind of environment could foster any of these lesser renderings? The environment of music is one such place, and the use of OT will help to illuminate this mysterious and unique musical environment in which songwriters ply their craft. However, before I present an OT analysis of this idiom, we need to familiarize ourselves with Charles Sanders Peirce's Triad of Firstness, Secondness, and Thirdness, and the benefits his Triad provide.

Applying Peirce's Firstness, Secondness, Thirdness to Songwriting

In Charles Sanders Peirce's "On a New List of Categories" *Proceedings of the American Academy of Arts and Sciences* 7 (1868), pp. 287-298 (presented to the Academy May 14, 1867), Firstness described as being associated with chance and possibility, as well as a quality of feeling. When applied to music, Firstness can be seen as encompassing everything that transpires until the songwriting process begins. It governs inspiration, potentiality, and in a musical sense, melody. Temporally, it is a constant, because the potential to create is always present. However, once the creative process begins, Firstness shifts into Secondness, thus relegating Firstness to the past.

Therefore, we can conclude that Firstness, as a potential, is a constant, until action is taken to realize its potential (Secondness), which fossilizes Firstness as a past event. Physically, Firstness is manifested as a blank piece of sheet music, a blank recording tape, or hard drive. Anything is possible in Firstness, e.g., any musical genre, tempo, time signature, or musical key. Firstness' reference is to a ground, i.e., a base/foundation: "Firstness is the mode of being of that which is such as it is, positively and without reference to anything else" ("A Letter to Lady Welby", CP 8.328, 1904). In art, this is analogous to a block of marble before the sculptor sets his chisel to it. For a songwriter, the entire universe of sound is the block of marble. Yet, once a series of notes or chords is selected, Firstness passes into Secondness, and much like the block of marble, the song begins to take shape.

Secondness governs brute force and actuality. It is the reaction to Firstness and resistance to further potentiality. In a musical sense, it governs arrangement and harmony, while physically it is manifested as the notes on a staff or the sounds captured on a recording device. Temporally, Secondness exists in the present. This is evident by the expression, 'a work in progress' often used by artists. But music is also limited by duration of pitch, and a song, by its beginning and end points. While anything is possible in Firstness, Secondness is constrained by the process of creation. For music, the closer the song gets to completion, the more limited it becomes in regard to melody, harmony, chord structure, and arrangement. Secondness' reference is to a correlate, i.e., the inspiration to create art: "Secondness is the mode of being of that which is such as it is, with respect to a second but regardless of any third" ("A Letter to Lady Welby", CP 8.328, 1904). This quote from Peirce may seem hard to visualize, but essentially, he is saying that Firstness and Secondness, at this point in the process, still exist in a vacuum, absent of interpretation.

Thirdness governs conventions, representation, and balance. Thirdness governs the finished work of art that exists in the future and is delimited by its own completion. For example, a Mozart concerto can be performed a week from now, but if the melody is not reproduced accurately enough, it ceases to be a Mozart. Thirdness' reference is to an interpretant: "Thirdness is the mode of being of that which is such as it is, in bringing a second and third into relation to each other" ("A Letter to Lady Welby", CP 8.328, 1904). In understanding this quote from Peirce and trying to connect it to music, one needs to visualize the space in which music is heard. The interpretant must be somewhere in order to interpret music because sound waves cannot exist in a vacuum. The listener can be listening to a recording in a room or listening to a live performance in a nightclub. Either way, the interpretant and his/her environment must be taken as a whole. While Firstness has the potential to be anything, Thirdness is the realized potential. Therefore, only the intensity of the finished product can be altered. This can be done via the listener's

proximity to the music (live performance) or by adjusting the amplitude (volume) of a sound recording.

Zooming in: Firstness, Secondness, Thirdness inside of Secondness

If we zoom in on the songwriting process, we find ourselves in the realm of Secondness. Yet, in the realm of Secondness, there exists another level of Firstness, Secondness, and Thirdness. On this level, the first melody, chord progression, or lyric represents Firstness. It does not matter which of these is chosen. A monophonic melody can be the foundation for a song just as easily as a chord progression can. A lyric can also be the foundation upon which a song is built. Even a beat, without melody or lyric, can lay the foundation. This genesis, being a linear phrase, also delimits the beginning and end points of the song. Firstness is represented by the horizontal axis upon which the song is built. Thus, the Firstness that exists in the Secondness of the songwriting process can be summarized as follows:

> Some instrument (including the human voice) produces a linear sequence of notes, chords, or words that define, on a horizontal axis, the beginning and end points of the song.

While Firstness lays the foundation, Secondness governs every additional layer added to the song, e.g., a melody added to a lyric, a harmony added to a melody, an arpeggio added to a chord progression. Secondness is represented by the vertical axis, i.e., the stacking of melodies and harmonies. While these melodies and harmonies enjoy some degree of freedom of movement, they are ultimately constrained by the foundational component of Firstness. For example, a chord progression played on an acoustic guitar represents Firstness. This chord progression determines the key, tempo, and time signature of the song. Let us assume a vocal melody follows. This melody has the freedom to be any melody, in any register, octave, or phrasing. However, it is still constrained by the key, tempo, and time signature of the chord progression played by the acoustic guitar. If the melody does not fit those basic criteria, the song will become dissonant. The more the melody strays, the more cacophonous it becomes, until it ceases to be musical. On the other hand, if the melody forces a change in the chord progression, in order to maintain harmony, then the vocal melody supplants the chord progression as being the foundational component, i.e., the vocal melody becomes Firstness and the chord progression played on the guitar, Secondness. Thus, the Secondness that exists in the Secondness of the songwriting process can be summarized as follows:

> Melodies, harmonies, and lyrics are stacked vertically upon the original linear sequence of notes, chords, or words. These parts are constrained by basic musical criteria such as: key, tempo, and time signature.

Thirdness governs balance and the blending of composed melodies and harmonies. It provides an environment in which the vertical and horizontal axes exist, and by doing so, provides depth and makes possible its own interpretation. Thirdness

delimits the end of the creative process. Thus, the Thirdness that exists in the Secondness of the songwriting process can be summarized as follows:

> Melodies, harmonies, and lyrics are balanced and blended sufficiently enough to warrant completion. The finished song is constrained by its own completion, and adjustments can only be made to the song as a whole.

With a summary of Peirce's Triad and how it applies to songwriting complete,we can turn our attention to an explanation of the primary constraint used for the following analysis.

Faithfulness to the Musical Phrase

As a 'free-floating' universal constraint, Faithfulness to the Musical Phrase (F-MPH) can be applied to any genre of music. The principal governing feature of F-MPH is conformity through brute force (a Secondness), a process by which the number of possibilities available to the songwriter diminishes, correlative to the completeness of the song. While F-MPH can be applied to any genre of music, its function is conditioned by the expectations of that genre, e.g. the expectations of rock & roll differ greatly from improvisational jazz.[2] Any song composed in either of these two musical genres would be limited by tempo, time signature, and musical key. However, jazz allows for more randomness than rock music does. In fact, free form, modal jazz is defined by the expectation of spontaneity, lack of conformity, and randomness (all aspects of Firstness). Conversely, rock & roll is defined by the expectation of simplicity and predictability, the simplicity being the result of diminishing possibilities, due to the *lack* of randomness (Secondness). Therefore, one can postulate that F-MPH would be a higher ranked constraint in an OT tableau for a rock & roll song than one for an improvisational, modal jazz song, shown here.

Figure 2.2

Constraints

a) F-MLT	faithfulness to a tempo, key, time signature
b) F-MPH	not a random event
c) Ident (spontaneity)	must remain spontaneous

Input: *Any linear series of: notes, chord progressions, or lyrics*	F-MLT	F-MPH	Ident (spontaneity)
1. *modal jazz*		*!	
2.☞ *rock & roll*			*
3. *non-musical*	*!	*	

[2] Here, I'm referring to 1st generation rock & roll of the early 1950s.

Input: *Any linear series of: notes, chord progressions, or lyrics*	F-MLT	Ident (spontaneity)	F-MPH
1. ☞ *modal jazz*			*
2. *rock & roll*		*!	
3. *non-musical*	*!	*	

* = violation of a constraint
! = fatal violation of a constraint
☞ = optimal form

These tableaux generally illustrate the difference in expectations for each respective genre of music. The generated form *non-musical* is added to represent the possibility of any series of sounds that does not conform to basic musical limitations. It also serves as a starting point for spontaneity and randomness. The generated form *rock & roll* must not be random (expectation of repetition) and is, therefore, not truly spontaneous. The generated form *modal jazz* lacks conformity (expectation of spontaneity) and allows for randomness (no expectation of repetition).

This oversimplification of two very well known musical genres is offered in the most general of terms, and in reality, the two constraints, F-MPH and Ident (spontaneity) are not always mutually exclusive. They would be better expressed in degrees of variation, rather than as absolutes. For example, there are subgenres of rock & roll that allow some randomness and of jazz that require some conformity. In fact, **degrees of variation in these constraints are precisely the means by which new genres of music come into being**. The OT figures are presented here merely to demonstrate that musical genres are defined by their expectations, and regardless of the expectation, the expectation itself assumes the existence of conventions (Thirdness). The circularity is inescapable, and the fractal nature of Peirce's triad is clearly visible, shown here:

Figure 2.3

Thirdness
(from a conventionalized genre)
↓
Firstness
(a new song comes into being due to degrees of variation in the constraints of the former genre)
→ Secondness
(song is conditioned by its own limitations)
→ Thirdness
(song is conventionalized)
↓
Firstness
(this song triggers the creation of more songs that constitute a new genre)

→ Secondness
(genre is limited by the constraints of those particular songs)
→ Thirdness
(genre is conventionalized)
↓
Firstness
(a new song comes into being due to degrees of variation in the constraints of the former genre)

This diagram shows the circular nature of the creative process. It is assumed that conventionalized expectations have always existed. These conventions delimit musical genres. However, much like languages—where variations in the ordering of constraints produce dialects, some of which, eventually becoming standardized languages—these variations in the constraints of the songs will often produce new genres of music. These new genres eventually conventionalize, producing more songs, until variations in the constraints of these genres produce new songs that eventually produce newer genres, ad infinitum. It must also be mentioned that many genres, though contributing to the birth of newer genres, have remained unchanged. This fixed nature is due to the proscriptive rules of traditionalists who preserve the conventions of these particular genres. For example, rhythm and blues (R&B), the nucleus of which, the Blues, dates as far back as the mid to late 19th century, was the forerunner to rock & roll. Shown here in Figure 2.4, the rearrangement of certain constraints in R&B (due to degrees of variation) produced the first generation of rock & roll. Nevertheless, rock & roll did not replace R&B; it was merely added to the many musical genres that already existed at that time. R&B has survived because traditionalists have strictly observed the conventions of that genre, even though others violated those same constraints (in degrees) eventually to create the genre of rock & roll.

Figure 2.4

a) F-SM Temp faithful to a slow-moderate tempo
b) F-MF Temp faithful to a moderate-fast tempo
c) F-MPH not a random event

Input: *Any linear series of: notes, chord progressions, or lyrics*	F-SM Temp	F-MPH	F-MF Temp
1. ☞*R&B*			*
2. *rock & roll*	*!		
3. *non-musical*		*!	

Input: *Any linear series of: notes, chord progressions, or lyrics*	F-MF Temp	F-MPH	F-SM Temp
1. *R&B*	*!		
2. ☞*rock & roll*			*
3. *non-musical*		*!	

* = violation of a constraint
! = fatal violation of a constraint
☞ = optimal form

These tableaux show that one of the primary differences between R&B and rock & roll is tempo change, i.e. rock & roll is generally played at a faster tempo than R&B is. However, this rearrangement of tempo constraints came about gradually. One can imagine that, before the genre of rock & roll existed, there were faster R&B songs written, but still considered part of the R&B genre (an intermediate period). Eventually, however, the feature, 'faster tempo', became distinctive, giving birth to a new genre of music, rock & roll. Observe, the input for the tableaux has been described as *any linear series of: notes, chord progressions, or lyrics* (Fig 2.4). Also observe that the input (as well as the generated forms of music) is a Firstness. The constraints (including F-MPH) and their ordering are a Secondness, as they represent the brute force that produces the output. The output (of course) is a Thirdness. By viewing the mechanism of OT through the binoculars of Semiotics, we can gain a deeper insight into the creative process.

In summary, Peirce's semiotics can be used to shed light, not only on the songwriting process, but also on how genres of music come into existence. With every modification to an already existing (and conventionalized) form of music, a new triad of Firstness, Secondness, and Thirdness also comes into existence, forming a fractal-like circularity. Additionally, Optimality Theory can be seen as a systematic method that conveys Peirce's triad, which can be used to disambiguate musical genres, as well as to show how conventions gradually drift, eventually giving rise to new musical genres. Lastly, I have shown that the constraint F-MPH is a Secondness functioning inside of a Secondness, acting as a primary conditioner of the brute force needed to forge the output.

Applying Optimality Theory to Syntax in the Musical Environment

With the application of Peirce's Triad to songwriting, and how it is fused with Optimality Theory, explained, it is now possible to return to the idiom referenced above at the beginning of this chapter.

The constraints needed for a syntactic analysis of an idiom in the musical environment are given here:

a) F-MPH Faithfulness to a musical phrase
b) IDO-INT Idiomatic integrity must be maintained
c) F-CO Faithfulness to constituent order (for English SVO)

d) MAX-IO No Deletion

The input for this analysis is the idiomatic phrase:

(Something) *is like trying to find a needle in a haystack*

While it is assumed that multiple renderings of this idiom are generally produced, this paper assumes the rendering above to be the most commonly produced by native speakers of English. The generated forms are considered subpar usages of this idiom. The musical environment in which this idiom occurs is the 1973 hit song, "Living for the City", written and performed by Stevie Wonder. The lyrical context is as follows:

Her brother's smart, he's got more sense than many
His patience's long, but soon he won't have any
To find a job, ***is like a haystack needle***
'Cause where he lives, they don't use colored people

Figure 2.5

Input: *is like trying to find a needle in a haystack*	F-MPH	IDO-INT	F-CO	MAX-IO
1. *is like a needle in a haystack*	*!			***
2.☞ *is like a haystack needle*				******
3. *is like a needle haystack*		*!		*****
4. *is like a needle*	*!	*		******
5. *is like a haystack*	*!	*		******

* = violation of a constraint
! = fatal violation of a constraint
☞ = optimal form

This analysis demonstrates the process by which a songwriter chooses the optimal form of any idiomatic phrase. Ideally, the input and output forms are identical, and in many instances, that is the case. However, this tableau shows that language in the musical environment exhibits more freedom than spoken language. As long as the selected output does not violate F-MPH (in this instance, the musical phrase is conditioned by the amount of syllables in each line) and IDO-INT, it is potentially optimal. F-CO can be violated, as long as it does not violate IDO-INT in the process. It may also violate MAX-IO. In the generated forms above, candidates (1), (4), and (5) fatally violate Faithfulness

to a Musical Phrase. Candidates (4) and (5) also violate IDO-INT. Candidate (3) fits the musical phrase, but its idiomatic effectiveness is compromised because, with the deletion of the preposition *in* and indefinite article *a*, the former sequence of noun + noun, *needle (in a) haystack*, is transformed into an adjective + noun or compound noun. This transformation obliterates the original meaning, denoting a type of haystack, as opposed to a type of needle. The victor, candidate (2), shows deletion of the verbal elements, *trying to find*, the preposition, *in*, and the indefinite article *a*. However, it properly reorders the nouns, *needle haystack*, which is necessary to preserve idiomatic integrity, i.e. describing a type of needle. It is also worth mentioning that the rhyme scheme is preserved via the proper assonance between *needle* and *people*. In summary, *is like a haystack needle* is acceptable in this environment because it does not violate the most important constraints. It is also the **only** variant of this idiom that will fit this particular musical phrase and preserves assonance in the process. Our analysis now turns to the morphological level, and with it, a different language.

Morphology and Syllable Structure

The constraints needed for the analysis of morphology in the musical environment are given below:

a) F-MPH Faithfulness to a musical phrase
b) IDO-INT Idiomatic integrity must be maintained
c) F-CO Faithfulness to constituent order (for English SVO)
d) MAX-IO No Deletion

The main differences here with the constraints are apocope replacing ellipsis, and, since this analysis is for German, a modification of the constraint for constituent order. German has more freedom with word order than English does, and this freedom is reflected in the F-CO constraint, i.e. V2 (finite verb must be the second constituent) for main clauses and SOV (subject, object, verbal components) for subordinate clauses. Once again, time signature, tempo, and musical key are all irrelevant factors in F-MPH.

The input for this analysis is the phrase:

*Ich **wäre** dazu bereit* 'I would be ready for that'

However, the target word in this analysis is *wäre* (shown in bold), which exhibits apocope, manifested as *wär'*. The musical environment in which this phrase occurs is the 2011 hit song "Küssen Kann Man Nicht Alleine ", performed by the Max Raabe Orchestra. The lyrical context is as follows:

Allein ist das unmöglich,	*Alone that is impossible,*
ich weiss genau - das geht nicht.	*I know for sure - that is not possible,*
Versuche enden kläglich -	*attempts end miserably -*
das ist nur vertane Zeit.	*it is just a waste of time.*
Ich müsste mal agieren	*I would have to act*
und endlich kapieren:	*and finally understand:*

da hilft kein Meditieren -	*that meditation won't help -*
küssen kann man nur zu zweit.	*you can only kiss as a pair.*
*- Ich **wär'** dazu bereit.*	*- I would be ready for that.*

Figure 2.6

Input: *Ich wäre dazu bereit*	F-MPH	IDO-INT	F-CO	MAX-IO
1. *Ich wäre zubereit*		*!		*
2. *Ich wäre da bereit*		*!		*
3.☞*Ich wär' dazu bereit*				*
4. *Ich wäre bereit*	*!			*
5. *Ich wäre dazu*	*!	*		*

This analysis shows that even in a different language (German), the undominated F-MPH and IDO-INT constraints still decide the optimal form in a musical environment. F-CO is not violated by any of the generated forms, and MAX-IO is the lowest ranked constraint. In the generated forms above, candidates (4) and (5) fatally violate faithfulness to a musical phrase, (5) also violates IDO-INT. Candidates (1) and (2) fit the musical phrase, but in both cases, idiomatic effectiveness is compromised. Candidate (1) has an ill-formed word, and candidate (2), 'I would be ready there', fails because the input meaning has drifted too much. The meaning of candidate (1) has also changed, 'I would be prepared' (with the incorrectly formed *zubereit*), which offers a different connotation than what the songwriter obviously intended. Additionally, candidate (1) shows apocope (deletion of *–et* from the participle *zubereitet*). Candidate (3) emerges victorious, despite the apocope of the bound morpheme *-e* (that marks first person, singular, of *wäre*) because that apocope is required for the word to fit the musical phrase. However, its victory is the result of more than just satisfying these listed constraints, and therefore, requires further explication.

Syllable Structure

The syllable structure of German is strong weak. This trochee structure forms a foot, which is the unmarked form. A syllable is comprised of a maximum of the sounds CCVCC (where C stands for a consonant and V for a nucleus vowel) and a minimum of CV, plus extrasyllabicity, but the latter is irrelevant to the discussion. No more than two C can exist to the right or left of V. If the vowel is long or a diphthong, it takes up a C slot (Wiese 1996:37-43). With two of these syllable structures per foot, and keeping in mind that stress is always on the first stem of the syllable, one final rule in German remains. This rule states that the head of a foot cannot contain schwa [ə] (Löhken 1995:77-93).

If we return to the top two candidates above, (1) and (3), we notice that both candidates fit the musical phrase. However, in the musical environment, the two constraints that express the unmarked nature of the German foot (syllabic trochee) are more potent than they are in the spoken environment.

These constraints,

FOOT-MIN (feet may be no smaller than two syllables)
FOOT-MAX (feet may be no larger than two syllables)
in addition to,

ALIGN-L (every stem begins at the left edge of a foot)
RHYTHMTYPE=TROCHEE (feet are trochees, i.e., a weak syllable following a strong accented one)
*H/ə (The head of a foot does not contain schwa)

make up the environment of spoken German (Löhken 1995:77-93).

However, while FOOT-MIN is often violated (to accommodate degenerate feet) in spoken German, the musical environment places a higher value on this constraint. The result is a 'fusion of words' in order to preserve FOOT-MIN. The examples below illustrate the difference between the spoken and musical environments.

Figure 2.7

Spoken Environment
( ) = a metrical foot

Input:*(Ich.∅)(wär.e) (da.zu) (be.reit)*	*H/ə	ALIGN-L	FOOT-MAX	RHYTHMTYPE =TROCHEE	*FOOT-MIN
1. ☞ *(Ich) (wär.e) (da.zu) (be.reit)*				*	*
2. *(Ich) (wär) (da.zu) (be.reit)*				*!*	**
3. *(Ich) (wär.e) (zu) (be.reit)*				*!*	**

Candidate (1) emerges victorious despite the fact that it violates two constraints because candidates (2) and (3) violate the same constraints twice each. With candidate (1) *ich* is the culprit of the violation, with candidate (2) *ich* and *wär*, and with candidate (3) *ich* and *zu*.

Figure 2.8

Musical Environment

Input: *(Ich.∅)(wär.e) (da.zu) (be.reit)*	F-MPH	*FOOT-MIN	RHYTHM =TROCHEE	FOOT-MAX	ALIGN-L	*H/ə
1. *(Ich.wär.e) (da.zu) (be.reit)*	*!		*	*		
2. ☞ *(Ich.wär) (da.zu)*						

(be.reit)						
3. *(Ich.wär)(e.zu) (be.reit)*						*!

In the musical environment, which exhibits word fusion, candidate (2) emerges victorious, as it does not violate a single constraint. Candidate (1) is eliminated due to its violations of F-MPH and FOOT-MAX (the fusion of *ich* and *wäre* produces a ternary foot), while candidate (3), replacing *da* with the schwa from *wäre*, violates *H/ə due to the fusion of *-e* and *zu*. It should be noted, however, that violation of *H/ə would be acceptable in the musical environment, if no other candidate existed. That is to say, F-MPH is still undominated, and in certain situations, not violating F-MPH is all that is required for a phrase to be optimal. If candidate (3) were to fuse *ich* and *wäre*, like candidate (1), it would still be fatal, due to the violations of FOOT-MAX and FOOT-MIN. However, that manifestation would be highly unusual due to the gravitational force of word fusion that exists in the musical environment. With a satisfactory explanation of the musical environment on the morphological level, the analysis now turns to the phonological level.

Phonology

The musical environment treats the phonological level differently than the previous two levels already discussed. While it is well known that words in songs are often pronounced differently, stretched and skewed, in order to help felicitate rhyme and proper assonance, this practice does not distinguish itself markedly enough from the spoken environment. Syllable structure and prosody have already been discussed above, and that is where one finds answers to alternate pronunciations (metrically). For example, an American speaker of English might choose to pronounce *secretary* the British way, in order to remain faithful to a musical phrase. However, the musical environment offers nothing unique in the way of constraints that can tackle the problem of phonetic similarity. Simply put, the same problems of ambiguity that exist in the spoken environment (due to words sounding alike), also exist in the musical one. In fact, songwriters often rely on such ambiguities to create puns and irony. So while the problem of phonetic similarity can be used effectively in the musical environment when one so desires, conversely, there is no way for songwriters to remedy the problem of unwanted ambiguity. If we return to our example from above, *ich wär' dazu bereit,* we find that ambiguity exists, due to the lack of contrast between /eː/ and /ɛː/ (Wiese 1996:17). With the deletion of schwa in *wäre*, the modified *wär'* is perceived as fusing with *da-*, from *dazu*. These segments wind up sounding very similar to the first person singular form of the auxiliary verb, *werde*. This kind of ambiguity is not the desired kind mentioned above (where the artists uses ambiguity to create euphemisms, double entendre, or irony). With this undesirable kind of ambiguity, the listeners are forced to resolve the confusion on their own. But the process by which the confusion is resolved is no different from the one shown above (in Fig. 2.6). In other words, the same constraints from the morphological tableau are used.

Figure 2.9

Input: *Ich wär' dazu bereit*	F-MPH	IDO-INT	F-CO	MAX-IO
1. *Ich werde zubereit*		*!		*
2. *Ich werde zubereiten*	*!	*		*

Candidate (2) fails because it violates F-MPH. But candidate (1) fails only because *ich werde zubereit(en)* 'I will prepare' is not what the songwriter intends to say. There is nothing at the songwriter's disposal in the musical environment to help assuage this ambiguity. Here, he is simply dealing with the limitations of the language. In fact, between the two environments (musical and spoken), the musical one is even more restrictive than the spoken one. Here, due to the speed at which he must pronounce the phrase, he does not enjoy the luxury of hypercorrection in *wär'* (with either /ɐː/ or /ɛː/) and the /aː/ in ***da****zu*, with a potentially perceived /ə/ in the *–de* of *wer****de***, i.e. the word cluster, *wär' da(zu)* winds up sounding like *werde zu.* Additionally, the meaning of candidate (1) does not drift so far from his intending meaning, which only feeds the ambiguity further. It should come as no surprise that instances such as these benefit greatly from the songwriter providing a lyric sheet.

Conclusion

This chapter has investigated the freedoms and limitations of 'artistic license' by examining language in the musical environment. Just as a hierarchy of constraints exists within all languages, they also exist in the musical environment. These constraints set the boundaries that are the source of the freedoms and limitations songwriters utilize while plying their craft. The use of Optimality Theory clearly demonstrates that more freedom exists at the syntactic and morphological levels than does at the phonological level. It was also shown that the phonological level, in many ways, is more restrictive in the musical environment than it is in the spoken one. This chapter has also shown how triads exist within triads, forming a fractal-like circularity in regards to the formation of musical genres. Additionally, semiotics can be applied to Optimality Theory, which can be used to disambiguate musical genres, as well as showing how conventions gradually drift, giving rise to new musical genres. Lastly, in this chapter, I have shown that the constraint, F-MPH is a Secondness inside of a Secondness, acting as a primary conditioner of the brute force needed to forge the optimal output.

CHAPTER THREE
Modification vs. Innovation

The analysis above primarily focuses on the artist's ability to modify existing metaphors, idioms, and ambiguous phonotactics. For example, Stevie Wonder modifies the syntactic structure of the common English idiom:

S is like trying to find a needle in a haystack > S is like a haystack needle
(where the value *S* = something).

As was shown, the driving force behind this syntactic modification is the inviolable OT constraint, Faithfulness to a Musical Phrase (F-MPH). As was also explained above, F-MPH is the result of the inescapable natural force of the Peircean Triad. F-MPH is also the dominant constraint in the analysis of Max Raabe's "Küssen Kann Man Nicht Alleine", forcing the deletion of /ə/ in the German verb *wäre* (1st person singular subjunctive II).

In each example provided above, the artist is modifying preexisting constituents and morphemes of language, in order to subjugate the word or phrase to the undominated constraint F-MPH. However, what happens when the artist originates within a language? By originate, I mean when one coins phrases (or idioms), invents or introduces a new word into the language, or even expresses meaning via an onomatopoetic sound. The key criterion distinguishing innovation from modification is convention (a Peircean Thirdness).

Indeed, a further analysis will show that the same patterns of Peircean Semiotics discussed above are also applicable to original innovations. The artist will be in Firstness until he/she originates the needed lexeme. Once a word, phrase, or sound is chosen, the artist segues into Secondness. Here, the artist makes the needed (if any) adjustments required to avoid violating the highest ranked constraints. Lastly, the original word, phrase, or sound will be conventionalized, as the artist enters into Thirdness. Furthermore, Peirce's Triad also parallels the mechanical nature of Optimality Theory, where the infinite number of possible outputs offered by the generator (GEN) mirrors the endless potential of Firstness. Secondness resembles the 'hard work' of ordering constraints (CON), and Thirdness completes the process by recognizing the conventionalized form of the output (EVAL).

Before turning our attention to original innovations, however, it would be wise to consider a very common form of modification (modification as defined above), as this modification is often mistakenly included in the corpus of examples motivated by F-MPH. This modification, however, is solely motivated by rhyme scheme. Once again, OT can be used to show the difference between F-MPH and Faithfulness to Rhyme Scheme (F-RS). The example used here is from the very popular holiday season song, "Sleigh Ride". The line of interest and its rhyme are marked in bold.

"Sleigh Ride" lyrics by Mitchell Parish (1950)
Our cheeks are nice and rosy,
and comfy-cozy are we.

We're snuggled up together,
*like two birds of a feather would **be**.*

Applying OT to weed out modifications solely motivated by rhyme scheme

The constraints needed for this analysis are given below:

a) F-RS	Faithfulness to a rhyme scheme
b) Ident (V)	Maintain the identity of verb conjugation
c) F-MPH	Faithfulness to a musical phrase
d) F-CO	Faithfulness to constituent order (for English SVO)

The input for this analysis is the correct English syntactic word order of the lyrical line:

and we are comfy-cozy (input)

While it is a well-known fact that English once tolerated verb 2nd constructions, examples, like the one above, were not common innovations in the 1950s.[3] Surviving phrases with the syntactic order of **predicate adjective – verb – subject**, though not strictly forbidden in English, are almost always the result of archaisms, and were not productive innovations in the mid 20th century. Therefore, it's safe to assume that in 1950, there would have been no practical advantage for a songwriter (who was a native speaker of English) to choose an antiquated word order, unless motivated by rhythm (F-MPH) or rhyme (F-RS).

Figure 3.1

Input: *and we are comfy-cozy*	F-RS	Ident (V)	F-MPH	F-CO
1. *and comfy-cozy we are*	*!			*
2.☞ *and comfy-cozy are we*				**
3. *and comfy-cozy we be*		*!		*
4. *and we are comfy-cozy*	*!		*	
5. *and comfy-cozy we seem*	*!			*

* = violation of a constraint

[3] SVO requires the subject to precede the verb. However, languages, like modern German, require the finite verb to remain in second position (in main clauses), regardless of what precedes it, e.g., an adverbial phrase or predicate adjective, forcing the subject to follow the verb, like our example.

! = fatal violation of a constraint
☞ = optimal form

This OT analysis demonstrates the process by which a songwriter chooses the optimal form of a rhyme and how it differs from one in which the artist is solely motivated by musical phrase. The tableau shows how language in the musical environment exhibits more freedom than it does in spoken language, with all but one of the five generated forms being potential outputs (if rhyme weren't a goal). As it has already been shown, in the musical environment, as long as the generated form does not violate the F-MPH constraint, it can be optimal, and F-CO can be violated at the expense of remaining faithful to higher ranked constraints. What is different about this analysis is the insertion of F-RS and Indent (V) as higher ranked constraints than F-MPH. In the generated forms above, candidates (1) (4) and (5) fatally violate Faithfulness to a Rhyme Scheme. Candidate (4), though grammatically the strongest candidate (with proper SVO syntax and subject-verb agreement), is the worst candidate, since it violates both rhyme scheme F-RS and F-MPH. Candidate (1), with a syntax that at least preserves SV order, violates rhyme scheme. Candidate (5), also with a syntax that preserves SV order, still violates rhyme scheme, but at least maintains a level of assonance that is normally tolerable, if no other candidate had been available. Candidate (3) is also a more tolerable candidate, as it does not violate F-RS (assuming one allows rhymes with the same word — a debate that will not be pursued here). However, (3) violates the equally ranked subject-verb agreement constraint, Ident (V). Since *we be* is subpar to *are we*, candidate (3) is eliminated. Ultimately, with its archaic word order, candidate (2) emerges the victor. Even though candidate (2) violates F-CO twice (one violation for *comfy-cozy* preceding the verb *are* and the second violation for the subject *we* following the verb), it satisfies rhyme scheme and subject-verb agreement the best.

What's obvious about this analysis is how all four generated forms do not violate F-MPH (only the original input form does). This result is very different from the above analysis of Stevie Wonder's "Living for the City". In that analysis, Wonder's modification of the common idiom, '*something is like trying to find a needle in a haystack*' was transformed into '*haystack needle*'. That modification was necessary to satisfy both F-MPH and IDO-INT (idiomatic integrity). All the other generated candidates in that analysis were eliminated because they did not satisfy F-MPH. Conversely, in our present analysis, all of the generated candidates satisfied F-MPH. Instead, the optimal form emerged because it did not violate the higher ranked F-RS and F-Ident (conj) constraints. This analysis reveals two important points: the rank of F-RS over F-MPH further limits the amount of potential outputs, and the lower ranking of F-MPH allows for multiple possibilities.

If we eliminate the need for a rhyme scheme, but leave the constraints as they are, the result will be enlightening. First, let us alter the context of the lyric, from one demanding rhyme, to one that doesn't require it:

Our cheeks are nice and rosy,
**and comfy cozy we _____.*
We're snuggled up together
**like two birds in a nest all warm.*

Once again, the input for this analysis is the correct English syntactic word order of the lyrical line:

and we are comfy-cozy
Figure 3.2

Input: *and we are comfy-cozy*	Ident (V)	F-MPH	F-CO
1. *and we are comfy-cozy*		*!	
2. *and comfy-cozy are we*			**!
3. *and comfy-cozy we be*	*!		*
4. *and comfy-cozy we are*			*
5. *and comfy-cozy we seem*			*
6. *and comfy-cozy we live*			*

In this hypothetical version of the song, rhyme scheme has been eliminated, so there's no need to include F-RS in the tableau. Here, candidate (1) is eliminated by violating F-MPH and candidate (3) is eliminated by violating Ident (V). However, candidate (2), the previous winner, is now eliminated because it incurs two violation marks for F-CO. Without any other constraint, candidates (4), (5), or (6) could emerge as an output because none of the remaining candidates violates F-MPH, and they all only violate F-CO once each. This analysis shows how, though F-MPH is powerful enough to modify word order and morphemes (the latter through both elision and epenthesis), it still leaves the artist with multiple, potential outputs. The hierarchical position of F-MPH sets the **minimum threshold of artistic license,** which allows the songwriter (or poet) more freedom to communicate in the musical environment. However, when a higher-ranked constraint is introduced, the amount of potential outputs diminishes. Therefore, we can assume that F-RS is a constraint that sets the **maximum threshold**. We can also postulate that when a phrase violates F-MPH, it runs the risk of ceasing to be good art. And when a rhyme scheme is established, failure to satisfy it adequately (by violating F-RS) also diminishes the artistic integrity of the song or poem. Lastly, there are degrees of rhyme, as well as alliteration. Faithfulness to assonance would be ranked below rhyme, but higher than faithfulness to alliteration, which in turn, would be ranked higher than F-MPH. The linear hierarchy is indicated below:

F-RS, Ident (V) >> F-Asson >> F-Alit >> IDO-INT, F-MPH >> F-CO

a) F-RS Faithfulness to a rhyme scheme
b) Ident (V) Maintain the identity of verb conjugation

c) F-Asson	Faithfulness to assonance
d) F-Alit	Faithfulness to alliteration
e) IDO-INT	Idiomatic integrity must be maintained
f) F-MPH	Faithfulness to a musical phrase
g) F-CO	Faithfulness to constituent order (for English SVO)

While the previous example, "Sleigh Ride", relies on modifications to English word order to satisfy F-RS, the next example relies on a combination of phonotactics, morphotactics, and word order to avoid violation of F-RS. The following example also demonstrates the lengths to which an artist will go to preserve rhythm scheme, pushing further than just modifying language and coming very close to innovation.

Don McLean's 1971 folk-rock song, "American Pie", was a number-one US hit for four weeks in 1972. The song became an anthem for a disillusioned generation, traumatized by the Vietnam War. The song is also an enigma, as the lyrics read more like a list of ambiguous metaphors than anything normally representing a No. 1 song on the pop music charts. The song establishes a rhyme scheme in both the chorus and its six verses, with the rhyme falling on the final word of each line. The patterns are somewhat random, as a rhyme can last 2 – 4 lines.

In verse 2, with lines 11, 12, and 13, the rhyme scheme is based on the stem, -uck (shown in bold), and continues for three lines:

11. *I was a lonely teenage broncin'* ***buck***
12. *With a pink carnation and a pickup* ***truck***
13. *But I knew I was out of* ***luck***
14. *The day the music died*

In line 11, it is clear that the phrase McLean desires to use is *bucking bronco* – a term used idiomatically to describe a young, restive man. However, in order to preserve the F-RS, as well as F-MPH and IDO-INT, McLean has to modify the phrase. He does this by reversing the order of the two words and applying apocope to eliminate the *-ing* suffix from *bucking*, as well as from the coda -o of *bronco*. He then reattaches the present progressive participial suffix *-ing* to *bronc-* before reducing it to [ŋ]. The process is shown in the OT tableau below:

The constraints needed for this analysis are as follows:

a) F-RS	Faithfulness to a rhyme scheme
b) IDO-INT	Idiomatic integrity must be maintained
c) F-MPH	Faithfulness to a musical phrase
d) F-CO	Faithfulness to constituent order (adjective before noun)
e) Max (suffix)	Maintain the identity of the suffix
f) Max (coda)	Elision forbidden
g) Dep (suffix)	Epenthesis forbidden

The input for the analysis is the conventional form of the phrase, understood and spoken by native speakers of English:

bucking bronco

Figure 3.3

Input: *bucking bronco*	F-RS	IDO-INT	F-MPH	F-CO	MAX (suffix)	MAX (coda)	DEP (suffix)
1. *bucking broncin'*	*!	*	*			*	*
2. *bucking bronc*	*!					*	
3. *buck bronc*	*!	*	*		*	*	
4. *broncin' bucking*	*!	*	*	*		*	*
5. *broncin' buck*				*	*	*	*
6. *bronco buck*				*	*		
7. *bronc buck*		*!	*	*	*	*	

The OT analysis is quite revealing and sheds light further on the creative process of songwriting. Candidates (1-4) are eliminated due to their violation of F-RS with (2) incurring the fewest violation marks and (4) the most. Candidate (2) would most likely qualify as the best candidate if rhyme scheme weren't a primary constraint, as it only incurs one additional violation mark for the elision of the coda *-o* from *bronco*. Candidate (4), on the other hand, is the worst candidate, as it only avoids one violation mark (for maintaining the suffix on *bucking*). The three generated forms that do not violate F-RS, (5-7), are not without their own idiosyncrasies. Candidate (7) is ruled out by its violation of IDO-INT, but also violates F-MPH. These eliminations leave us with the two best candidates (5 and 6). Candidate (5) incurs violation marks for reordering the two words, turning the participial adjective, *bucking*, into the noun, *buck,* and the former noun, *bronco*, into the adjective. We saw a similar pattern of noun compounding with Stevie Wonder's *haystack needle*. Candidate (5) also incurs violation marks for elision of the suffix *-ing* (from *bucking*) and the coda *-o* (from *bronco*). Lastly, (5) violates DEP for adding the *-ing* suffix to the stem *bronc-* (phonetically realized as /ŋ/). Candidate (6) emerges with even fewer marks than (5), as it maintains the integrity of *bronco*.

So why does McLean pick (5) over (6)? In order to decide this tie, we need to zoom in on IDO-INT, and we will see that the violations of MAX (coda) and DEP (suffix) are necessary in order to maintain idiomatic integrity.

If we return to the original phrase, *bucking bronco*, we notice how the bronco, a horse, is preforming an action – the action of bucking. It is this action that conveys the restlessness of the young man, when the phrase is used idiomatically. The *-ing* suffix is what does all the heavy lifting of this action, so removing it from the root, *buck-*, which is necessary to satisfy F-RS, leaves the phrase without its primary indicator of action. Mclean instinctively knows the importance of the *-ing* 'action' suffix and reattaches it to the stem, *bronc-*. Even though **broncing* is not a word in the English language, in the context of the line, it successfully maintains (and conveys) the idiomatic integrity of the more common, conventionalized version of the phrase, *bucking bronco*. Therefore, the

additional violations incurred by (5) are necessary in order to preserve IDO-INT, making (5) the victor. The result of which is shown below in figure 3.4

Figure 3.4

Input: *bucking bronco*	F-RS	IDO-INT	F-MPH	F-CO	MAX (suffix)	MAX (coda)	DEP (suffix)
5. ☞ *broncin' buck*				*	*	*	*
6. *bronco buck*		*!		*	*		

If we consider the possibility of (6) emerging as the victor, we should revisit Wonder's compounding of *haystack needle*, where the haystack is describing a kind of needle (which was necessary to avoid violating F-MPH). The idiomatic integrity of the original idiom, *S is like trying to find a needle in a haystack > S is like a haystack needle* (where the value *S* = something), is also maintained. However, here, with *bronco buck*, *bronco* is describing a kind of buck. But *bronco* is merely a type of horse, and while the connotation of the bronco's unruly nature is expressed in the meaning of *bronco*, the noun, by itself, lacks the continuous action of bucking. As stated above, the ongoing action of bucking, expressed via the *-ing* suffix, is necessary to maintain the idiomatic integrity of the phrase. As a result, (6) emerges as the loser, even though it incurs fewer violations.

McLean's modification of *bucking bronco* is very close to a real innovation within the English language. But why does it fall short? An innovation has to be conventionalized (a Thirdness) in order to enter into the canon of the language. Despite the success of McLean's song, "American Pie", McLean's modification did not conventionalize, and today, native speakers of English still use the original form of the idiom, *bucking bronco*, and not his modification, *broncin' buck*. Much like Stevie Wonder's *haystack needle*, which also remains a unique modification of the idiom and not a true innovation (very few, if any, native speakers of English favor the form, *haystack needle*, over the conventionalized form given above), McLean's *broncin' buck* is a great example of the 'artistic license' that is necessary for the art to function on a high level, but falls short of becoming a true innovation within the language.

Thus far, this analysis has shown that modifications to language within the musical environment are quite common. With Stevie Wonder, we saw how a songwriter modifies an idiom for the sake of fitting into a musical phrase. Likewise, with Max Raabe, we saw how songwriters modify phonological and morphological elements of words for the sake of satisfying musical phrase. With Mitchell Parish's "Sleigh Ride" we saw how modifications to syntax helped to preserve rhyme scheme. Lastly, with Don McLean's "American Pie" we saw how modifications to phonotactics, morphotactics, and word order were used to preserve rhyme scheme and idiomatic integrity, while still satisfying the musical phrase. However, while Raabe's truncation of *wäre* to *wär*' is quite common in modern German, and Parish's syntax archaic (a convention of the past), Wonder's and McLean's modifications truly push the boundary of conventionalized English. Yet, neither one of these modifications can be considered a true innovation because neither has been conventionalized by native speakers, which is required for the

new, modified form to replace the older/prior usage in everyday common usage.[4] In the next section, however, we will look at an artistic example that does offer a true innovation to the language – one that has been conventionalized by native speakers and has replaced an older/prior usage.

Innovations

Now that we have investigated the difference between rhyme-motivated modifications and those motivated by rhythm, we can turn our attention to innovations. As stated above, this study distinguishes between artistic modifications and artistic innovations in language. Though, the difference between these two artistic outputs might be hard to notice at first. For instance, it can be argued that a modification to an idiom (as is the case with Wonder's *haystack needle*) is just as much an original innovation as the example that will be given below (in Poe's "The Bells"). However, there are some key distinctions: unlike a modification, an innovation creates something new out of nothing or very little, and also, unlike a modification, an innovation must conventionalize and be added to the lexicon.

If we consider Stevie Wonder's modification from *S is like trying to find a needle in a haystack > S is like a haystack needle*, we don't find the latter version having ever replaced the former, even though Wonder's song, "Living for the City", was released in 1973. Likewise with Parish's lyrics to "Sleigh Ride", native speakers of English didn't start drifting away from solid SVO word order after the song's release in 1950. In fact, the odd nature of **predicate adjective – verb – subject** word order is rarely (if ever) used in casual speech. For example, the phrase *we are happy* yields over 90 million results on Google, while *happy we are* yields slightly more than 10 million, but *happy are we* only 258,000. There can be no doubt that (SVO) is the most common word order in English and (OVS), one of the least.

For a more in-depth analysis of true innovation, we will turn our attention to a poem by Edgar Allen Poe. In the first stanza of Edgar Allen Poe's "The Bells", he introduces a new word into the English language. In line 11 (of 14), the word, *Tintinnabulation*, is innovated to satisfy faithfulness to a poetic phrase (F-PPH), as well as an onomatopoetic constraint. The example is given below in context:

1. Hear the sledges with the bells— (7)
2. Silver bells! (3)
3. What a world of merriment their melody foretells! (13)
4. How they tinkle, tinkle, tinkle, (8)
5. In the icy air of night! (7)
6. While the stars that oversprinkle (8)
7. All the heavens, seem to twinkle (8)
8. With a crystalline delight; (7)
9. Keeping time, time, time, (5)
10. In a sort of Runic rhyme, (7)

[4] English speakers still prefer to say 'a needle in a haystack' instead of 'haystack needle', and 'bucking bronco' instead of 'broncing buck'.

*11. To the **tintinnabulation** that so musically wells* (15)
12. From the bells, bells, bells, bells, (6)
13. Bells, bells, bells— (3)
14. From the jingling and the tinkling of the bells. (11)

The cynosure of our present analysis is originally derived from the Latin verb *tinnire* 'to ring', which then, through a process of reduplication, became the Latin noun, *tintinnabulum* 'tinkling bell'. Instead of incorporating the Latin word into his poem in its original form, Poe deletes the final syllable *-lum*, replacing it with the disyllabic *-la-tion*. The following OT analysis differs from our previous examples in the sense that Poe's modification becomes a true innovation within the language. The analysis will shed light on Poe's methodology; his need to remain faithful to a rhythmic phrase, and his choice of word, no doubt, motivated by onomatopoeia.

The constraints needed for this analysis are given below:

a) F-RS	Faithfulness to a rhyme scheme
b) F-PPH	Faithfulness to a poetic phrase
c) Max (suffix)	Maintain the identity of the suffix

The input for this analysis is the original Latin form of the word:

tintinnabulum (input)

The constraint, faithfulness to a poetic phrase (F-PPH), is similar to its musical counterpart. However, in addition to the main criterion (described above as 'cannot be a random event'), F-PPH is stricter than F-MPH when it comes to syllable structure. The reason for this sterner syllabic requirement rests in the fact that song lyrics have the extra element of music that creates a bed in which the lyrics can lie. Poetry, on the other hand, has only the words to maintain the rhythm of the phrase. Therefore, syllable count is of the utmost importance in poetry. As a result, F-PPH is ranked higher than F-MPH, as the latter is more forgiving with regard to syllabic consistency. F-PPH is incorporated into the linear hierarchy below:

F-RS, F-PPH >> F-MPH >> Max (suffix)

Until further evidence is presented, F-PPH will remain at the same hierarchical position as F-RS. F-MPH will not be included in this analysis, since our example is not a song.

If one reviews the first stanza given above, one will notice the inclusion of parenthetical numbers at the end of each line. These numbers mark the total number of syllables for each line. The syllable count for each line is important because it reveals the rhythmic pattern to Poe's poem, making it clear that it is not comprised of a series of random lines. Remember, in order for F-PPH to be relevant, the input most NOT be a random event. If it were, the constraint would not apply. But how is Poe's line, containing *tintinnabulation*, not a random event? On the surface, there doesn't seem to be

any repetitive pattern evident in the stanza. However, upon further inspection, we can see that the first stanza contains 14 lines. If we split this stanza into two groups of seven lines each, we can count the total number of syllables in each group; each group yields 54 syllables. The line containing *tintinnabulation* (line 11) contains 15 syllables, 6 of which belong to the chosen word. Therefore, it's safe to assume that Poe had to find a word with the right amount of syllables (in this case 6) in order to satisfy the phrase structure of the stanza. This is not a random event! Poe's limitations (under the pressure of Secondness) were set in motion once he began constructing this particular rhythmic pattern, comprised of two sets of 7 lines, containing 54 syllables each. He was further limited by needing a line with 15 syllables, and then, a word with 6. That word had to convey a particular meaning, evoke a particular feeling, or mimic something perceivable. He found that word in *tintinnabulum* (2), but it contains only 5 syllables, which therefore, does not satisfy F-PPH.

Figure 3.5

Input: *tintinnabulum*	F-RS	F-PPH	MAX (suffix)
1.☞ *tintinnabul-ation*			*
2. *tintinnabul-um*		*!	
3. *tintinnabul-arium*		*!	*
4. *tintinn-ness*		*!	*

Candidate (1) is the victor in the tableau above, despite the presence of three other logically generated candidates. I use the term 'logically' to point out that candidates (3) and (4) are realistic alternatives to the form Poe eventually selected. Candidate (3) has the Latin suffix *-arium*, which indicates a specified function. This suffix is perfectly suited for Poe's poem, i.e., the function of bells ringing. However, (3) fails because it contains 7 syllables. Candidate (4) is another logical candidate, with the Germanic (as opposed to Latin) derivational suffix, *-ness.* Here, when attached to the Latin base, the suffix denotes a 'state or quality of ringing'. However, (4) fails miserably syllable-wise, containing only 3, and is thus eliminated through its violation of F-PPH. The winner, (1), violates the lower ranked MAX (suffix), but also violates something more obvious, *meaning*. This important constraint is not included in the tableau above, but will be added below with explication:

Ident (meaning) Maintain the meaning of the input

Figure 3.6

Input: *tintinnabulum*	Ident (meaning)	F-PPH
1. *tintinnabulation*	?	
2. *tintinnabulum*		*!

Because Poe was, for all intents and purposes, inventing a new word, he was hoping that his readers would be willing to transfer the meaning of *tintinnabulum* to *tintinnabulation*. As long as the reading audience understood and accepted the meaning

of his new word, *tintinnabulation* would not be in violation of Ident (meaning). However, if the targeted audience rejected his word, or if the word caused confusion or ambiguity, it would have been in violation of the meaning constraint.

Poe's modification did become an innovation, as more and more people (over the years since the publication of his poem) used his word to describe a ringing sound. Conventionalization of words is not unique (how else would we get our lexicons?). However, conventionalizations resulting from modifications that are motivated by artistic license are true innovations within the language. Additionally, Poe was aware (and motivated) by another factor, *onomatopoeia*. Poe knew that the success of his newly coined word depended, not only on the transfer of meaning, but also on the mimicry of bells. Poe's *tintinnabulation* had to literally 'ring off the page'.

Conclusion

This chapter has investigated the differences between modifications and innovations. It has shown that modifications to language are made to avoid violation of undominated constraints. If the songwriter violates the highest ranked constraints, the song runs the risk of becoming 'bad art'. This chapter has also posited that faithfulness to a rhyme scheme (F-RS) is a higher ranked constraint than faithfulness to a rhythmic pattern (F-MPH), and that the former (assuming the songwriter creates a rhyme scheme) marks a maximum threshold, while the latter marks the minimum threshold. In between these two constraints exists a hierarchy of additional constraints, including, but not limited to, assonance and alliteration constraints. It is within the extremes of these two constraints where most 'artistic license' occurs. Lastly, this chapter has demonstrated that convention (a Peircean Thirdness) is the primary difference between modification and true innovation within the language, and that conventionalizations resulting from modifications that are motivated by artistic license are true innovations within the language.

CHAPTER FOUR
Iconicity vs. Arbitrariness

The onomatopoeic nature of Poe's poem, "The Bells", is well known. However, the iconic nature of his innovation, *tintinnabulation,* is perhaps less considered. How does Poe settle on such a word, one in which the meaning, rhythm, and sound resonate so completely with the structure of the entire piece? Perhaps, the answer can be found if one considers Peirce's triadic signs.

The Object of our analysis is a small-sized bell, often referred to as a 'jingle bell' (during the holiday season). The Sign is the word *tintinnabulation*. The Interpretant is the word's meaning. *Tintinnabulation* is a Sinsign with the quality of ringing. The unique nature of this word leads to the possibility of it being an Icon or a Symbol. As a Symbol, the word refers to the Object (bells) by virtue of the conventions of the English language. As an Icon, it refers to the Object by virtue of onomatopoeia. The perception that the utterance of *tin-tin* resembles the sound a small bell makes is what gives Poe's word its onomatopoetic properties. This dual nature of *tintinnabulation*, i.e. as a Symbol and an Icon, gives it aspects of both arbitrariness and iconicity. Before we complete our analysis of Poe's word, perhaps it would be enlightening to consider other examples of signs that possess both arbitrariness and iconicity in a, somewhat, different way. These examples will shed light on the fractal nature of Peirce's semiosis and provide a foundation for further analysis in the proceeding chapters.

Iconicity in the world of art is somewhat different than it is in the world of linguistics. For instance, an onomatopoetic expression like *boom* has the properties of the sound an explosion makes, which is then conventionalized in the English language as a word. After its conventionalization, *boom* is subject to any (arbitrary) productivity the language currently has. In a sentence like, 'the booming sound of the supersonic jet was deafening', the *-ing* suffix on *booming* has nothing to do with the word's onomatopoetic nature. The shift from the word being a pure icon (via its mimicry of an explosion) to gaining a layer of arbitrariness (via its adaptability to conventionalized derivational and inflectional appendages) marks the basic pattern by which most onomatopoetic words become part of a lexicon. However, in pop culture (and most, if not all forms of art), the signs that are used by artists tend to be symbols (symbols as stated by Peirce, i.e. not icons or indices). Since symbols are completely arbitrary, they rely on conventionalization (a Thirdness) to resonate and acquire meaning.

The world of music is rife with symbols. For example, a composer will use a major scale to convey a feeling of happiness, a minor key to emote sadness, and a 7^{th} scale to express surprise. But the linear order of notes (comprised of duration of pitch) and the moods we associate with them are completely arbitrary. Yet, the feelings we experience and derive from these scales and chords are primal, which indicates the universality and ancient age of these conventions.[5] In chapter two, I used OT to demonstrate the process by which rhythm and blues morphed into rock and roll. However, this example is only partially accurate and deserves further explication now.

[5] Here, I mean the term universal somewhat loosely. Perhaps I should restrict this claim to Western cultures.

In the previous example, tempo change was the key factor and catalyst for rhythm and blues' transformation into rock and roll, as is shown again in the tableaux below.

Figure 4.1

a) F-MF Temp faithful to a moderate-fast tempo
b) F-SM Temp faithful to a slow-moderate tempo
c) F-MPH not a random event

Input: *Any linear series of: notes, chord progressions, or lyrics*	F-SM Temp	F-MPH	F-MF Temp
1. ☞*R&B*			*
2. *rock & roll*	*!		
3. *non-musical*		*!	

Input: *Any linear series of: notes, chord progressions, or lyrics*	F-MF Temp	F-MPH	F-SM Temp
1. *R&B*	*!		
2. ☞*rock & roll*			*
3. *non-musical*		*!	

However, if we consider the totality of the rock & roll genre, there are other aspects of rock that differentiate it from R&B: first, there is the lyric content. The 'blues' part of rhythm and blues refers to the lyrics, i.e. the lyrics are sad, and the singer is usually expressing this sadness as a state of feeling blue, e.g. he/she has a broken heart, no money, or no place to live. Secondly, the instrumentation of rock and roll is different from R&B. While the latter typically has an acoustic guitar or piano as its primary rhythm instrument, the former has an electric guitar. Additionally, the accompanying instruments in the standard rock and roll format include a trap drum set and bass guitar. In rhythm and blues, these accompanying instruments are optional. Lastly, there is a difference in how the two musical genres are performed. Rock and roll, being a happy, upbeat style of music, tends to be performed by high-energy musicians and performers. Rock music is extrospective with the goal of facilitating a good time.[6] Rhythm and blues, however, is introspective with the aim of cathartic therapy.

Armed with these differences between the two genres of music, we can modify our OT analysis in order to show more clearly how these constraints, ranked as follows, produce rock and roll out of rhythm and blues.

[6] Here, I am exclusively referring to rock and roll of the 1950s and early 1960s. A complete explanation of the multiple genres of rock music is beyond the scope of this paper.

a) F-SM Temp	faithful to a slow-moderate tempo
b) F-MF Temp	faithful to a moderate-fast tempo
c) F-MPH	not a random event
d) *Sad lyrics	sad lyrics forbidden
e) *R&B Instrumentation	change R&B instrumentation
f) *R&B Performance	change R&B performance

Since there is no hierarchical difference between our three new constraints and F-MF Temp, the order of these constraints doesn't make a distinctive difference in classifying rock and roll. They merely add more detail to our analysis. Though, if we were to add multiple genres of rock music to our analysis, the order of these constraints would be distinctive. However, since we are only concerned with the initial transformation of R&B to rock and roll, our hierarchy is as follows:

F-MF Temp, *Sad lyrics, *R&B Instrumentation, *R&B Performance >> F-MPH >> F-SM Temp

Placed in an OT tableau, we get the same result as before (with dotted lines separating the first four constraints).

Figure 4.2

Input: *Any linear series of: notes, chord progressions, or lyrics*	F-MF Temp	*Sad lyrics	*R&B Instr.	*R&B Perf.	F-MPH	F-SM Temp
1. *R&B*	*!	*	*	*		
2. ☞*rock & roll*						*
3. *non-musical*					*!	

We still find (2) as the victor, since (1) violates every constraint that defines early rock and roll. Also, notice that (3), anything that is non-musical, does not necessarily violate any of the rock and roll constraints. That is to say, noise can be at any tempo, with any kind of lyrics, played by any collection of instruments, and performed in any mode. What defines non-musical is its violation of F-MPH – the fact that the series of notes, chords, or lyrics lacks repetition, and is instead, a chaotic linear string.

The chaotic nature of something deemed non-musical is solely defined by its lack of form. The kind of form or pattern required is irrelevant, but it is an absolute prerequisite. Without form or an identifiable pattern, we don't have art. In general, form and pattern in art is rooted in arbitrariness. There is nothing iconic or indexical about the constraints given above. They are completely arbitrary, based on decisions made by the innovators of early rock and roll. Taken together, however, the constraints above are what define early rock and roll. Looking through the binoculars of Peirce's Firstness, we can see that the arbitrary nature of the constraints above is the result of spontaneity and potential. We can assume that the innovators of early rock and roll thought they were playing R&B, one could even say, a 'dialect' of R&B. The R&B of these rock innovators was faster (though it could have remained the same or been slower); it was played loud

with electric instruments (though it could have been played with more traditional instruments); it was performed in a casual/fun environment (but could have been performed in a conservative environment, much like classical music); lastly, the lyrics were happy and cheerful (but could have stayed melancholy and somber). All of the decisions the led to the birth of rock music were arbitrary. In fact, there could have been even more changes, further differentiating rock and roll from R&B. For example, the time signature of R&B, strict 4/4, could have evolved into 3/4 time, like a waltz, or 6/8 time, like many Irish folk songs. Early rock and roll could have had politically themed lyrics, similar to the American folk music of songwriters like Woody Guthrie or Pete Seeger. And last, but not least (and perhaps most importantly), early rock and roll could have abandoned the 12-bar blues chord progression, based on the I-IV-V chords of the key. This chord progression is the foundation of rhythm and blues, and if one doesn't have that chord progression, one is not playing the blues. All of the innovators of early rock and roll used the I-IV-V cord progression; this usage lends credence to the fact that the early rockers were really playing a modified form of R&B.

The key to understanding the modifications to rhythm and blues that eventually led to the creation of rock and roll is, once again, convention. Because the decisions to modify certain aspects of rhythm and blues were arbitrary, those decisions could have only led to a new genre of music through conventionalization. The modifications to R&B were copied, first by experimental R&B musicians and songwriters. There was an interim period where R&B and rock artists were indistinguishable, until eventually, the rock musicians and songwriters, through convention, considered themselves to be purely rock and roll artists. An arbitrary decision, e.g. writing cheerful lyrics over a blues progression, once considered sacrilege in the blues genre, eventually conventionalized and then became a requirement for early rock and roll music.

Conventionalization creates expectation and conditions productivity. If someone wishes to play traditional R&B, one must adhere to the conventions of that musical genre. However, if one modifies one of the core characteristics of R&B, e.g. speeding up the tempo, writing happy lyrics, or abandoning the I-IV-V cord progression, then, the music ceases to be R&B, and if conventionalized, becomes a new genre of music. With our example, early rock music was *defined* by its faster tempo and optimistic lyrics. It did not, however, abandon the I-IV-V cord progression, which served as its foundational form or pattern.

As the above analysis shows, there is a push-pull element to the creative process, where some quality, initially completely arbitrary, is conventionalized, creating an expectation and rule for production. This rule is so important to the realization of the genre that it becomes *iconic*. But the process does not stop when a conventionalized art form becomes iconic. Some aspect of that art form will be arbitrarily modified again, ultimately creating yet another new art form or genre, ad infinitum.

Returning to Poe's *tintinnabulation*, we can see that his word is different from our example on R&B and rock genres. His word has onomatopoetic qualities that make it iconic from the start. However, if we consider the genre of R&B holistically, it too is onomatopoetic in its catalytic ability to convey sadness. While it may be debatable whether evoking an emotion qualifies a genre of music to be onomatopoetic, it is equally debatable to what degree *tin-tin* actually sounds like bells, and if we are in the realm of degrees, that opens the door for a plethora of further examples.

Degrees of Similarity: Covers

The term "cover" is used in the field of pop music to express the concept of copying. An artist either re-records a song that has already been recorded and conventionalized by a former artist, or an artist performs (in front of a live audience) a song that is usually performed by a previous artist. In this section, we will first consider recordings, before turning our attention to live performances.

More often than not, the first recording and release of a song, if it has any commercial success, is the one that conventionalizes. It is the version of the song to which most people compare all other versions. In a sense, we can say that the first released version of the song is usually the "standardized" version. Similar to how dialects vary until an effort to standardize the language succeeds, a song will go through multiple interpretations until it is recorded, released by an artist, and finally conventionalized by the public.

Much in the same way that translation has semiotic properties, so does "covering" music. And therefore, questions arise when one is attempting to reproduce a conventionalized version: Can the original meaning or intent be preserved or conveyed? What is lost in translation? What is an acceptable amount of difference? What aspects of a copy are most important? What qualifies as an exact replica? Is an exact replica even possible?

Obviously, a cover has to retain enough of the original version so that the audience can recognize the song's reference. Copying the lyrics and primary melody are often absolute requirements, while musical accompaniment is reproduced hierarchically.[7] Because of the hierarchical nature of the copying process, covering songs lends itself very nicely to OT analyses.

The 1963 rhythm and blues single, "Time Is On My Side", written by Jerry Ragovoy (lyrics and music) and Jimmy Norman (additional lyrics), will serve as an example for a "covering music" OT analysis. The original release (1963), recorded by trombonist Kai Winding, is a semi-instrumental song, with background vocals repeating the chorus refrain, "Time is on my side, yeah," as well as, "You'll come running back to me" (Ragovoy). In this original version, the primary melody is played on the trombone, giving the song a somewhat incomplete quality; the song comes off as a "not quite" instrumental piece (due to the vocalized refrain), as well as an unfinished pop song (due to the lack of vocalization and lyrics in the verses). Suffice it to say, this first recorded release of the song did not conventionalize with the public audience.

The next released recording was by blues singer, Irma Thomas. Jimmy Norman was recruited to add additional lyrics for the verse melody, which completed the song's narrative. Formerly, the verse melody was played on the trombone by Kai Winding. But in the second version, Thomas sings the new lyrics, giving the song more commercial potential. The song did okay, but it was never intended to be a hit, since it was released as the B-side to "Anyone Who Knows What Love Is (Will Understand)." Because Thomas'

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[7] Often, musical accompaniment is also reproduced in covers if the instrumental parts are considered *hooks*. Hooks are catchy, repetitive, musical refrains that help to make the song more commercial. However, in many instances, hooks become an integral part of the song, to the point where they become iconic.

version was only intended to be a supporting track (a B-side to the intended A-side of the 45 rpm single), it remained far from conventionalization after its release, and in 1964, was still a relatively obscure song.

When the song was recorded and released for the third time, it was by The Rolling Stones. Their version, a designated A-side, climbed to #6 on the US Billboard Pop Singles Chart in 1964. It was the first Top 10 hit for The Rolling Stones. Their version will serve as our example. But first, we will need to look at a couple new constraints. These constraints are similar to those used in figure 4.2, but now they are being used for a performance analysis (as opposed to the previous analyses on songwriting).

a) F-PM	faithful to primary melody
b) Ident (lyrics)	changes to the original lyrics forbidden
c) Dep (lyrics)	adding new lyrics forbidden
d) F-Temp	faithful to tempo
e) Ident (accompaniment)	use the same instrumentation as the original

The hierarchy of these constraints is as follows:

F-PM >> Indent (lyrics), Dep (lyrics) >> F-Temp >> Indent (accompaniment)

When covering a song, faithfulness to melody and lyrics are supreme, but (as our example will show) faithfulness to melody is more important. Therefore, F-PM is our undominated constraint. The difference between changing, deleting, or adding lyrics is not distinctive in this analysis; hence, those two constraints are separated by a dotted line. F-Temp, if violated drastically, can lead to violation of F-MPH (not included in this analysis). As a result, it is ranked higher than Ident (accompaniment).

Figure 4.3

Input: *Original version of "Time is on my Side" by Kai Winding*	F-PM	Ident (lyrics)	DEP (lyrics)	F-Temp	Ident (accomp)
1. *Irma Thomas version*		*	*		*
2. *Rolling Stones version*		*	*		*
3. *Random non-faithful*	*!				

Our analysis shows that the only undominated constraint is F-PM. That is to say, if the primary melody is not emulated, the song ceases to be a recognizable copy of "Time Is On My Side". This schematic is, of course, hypothetical (random non-faithful is not an actual song). However, one may safely surmise that a version without the melody would either be a poem (absent of any melody), or a different song with similar lyrics (depending on the melody). Zooming in on our results will offer further explication.

Both candidates (1) and (2) do not violate the primary melody. This is the original melody written by Jerry Ragovoy and performed on the trombone by Kai Winding. It should be mentioned that violation of F-PM requires a divergence from the linear series of notes that comprise the melody. Minor embellishments on the melody that do not

cause a serious divergence from the original melody can be tolerated in degrees (similar to how minor artifacts in articulated sounds are tolerated in phonotactics). The way to measure degrees of embellishments is by adding violation marks to an alternate constraint Dep-PM (primary melody embellishments not allowed). This constraint (logically) will always be ranked below F-PM, and the violator will receive one violation mark for every embellishment. However, this kind of "fine tuning" is not necessary for our analysis above, as both Thomas' and The Rolling Stones' versions have minor embellishments that are not distinctive. Both (1) and (2) violate DEP (lyrics) by singing Norman's lyrics written for the verse (remember, the original version has instrumental verses). Both (1) and (2) avoid violation of F-Temp by performing the song at (or very near) the original tempo. They do, however, violate Ident (accompaniment) through the omission of the trombone, as well as other instrumental changes.[8] Though not indicated in our tableau, both candidates (1) and (2) very closely emulate the chorus refrain's melody and lyrics. Though they both incur a violation mark for violating Ident (lyrics) because the line, "Time is on my side, *yeah*" was changed to, "Time is on my side, *yes it is*". Conversely, our hypothetical, random, non-faithful version (3) is eliminated by diverging from the primary melody, ceasing to have any connection with the original.

The Rolling Stones' cover of "Time Is On My Side" is a classic example of art copying art – a true semiosis. Their version of the song is the one that would eventually conventionalize, as a commercial product, with a public audience (a Peircean Thirdness). As mentioned above, when a work of art conventionalizes, the audience develops expectations. When these expectations are met, and through repetition, become entrenched, they eventually take on an iconic nature. Simply put, the iconic version of the song is the one that most accurately meets the expectations of the audience, even though those conventionalized expectations were originally completely arbitrary. The more an artist deviates from those expectations, the more he/she runs the risk of losing the reference to the conventionalized version, and ultimately, being appreciated as 'good art'.

Furthermore, The Rolling Stones' version of "Time Is On My Side" serves as a good example of a cover that avoids violation of crucial constraints, while violating lower ranked constraints (a pattern we've seen throughout this dissertation). As a result, their version is not a carbon copy of the original, revealing that an identical copy is noncompulsory for success. There are many factors that contribute to the commercial success of a song, but with a cover, the artist's understanding of the semiotic nature (the Sign as either a symbol or icon) is paramount to its realization as effective art. Similar to translation theory, where a "word for word" translation from one language to another is often not the most effective one, an exact replica of an original recording is often not the most effective cover. Our following example will demonstrate.

Degrees of Similarity: Dissimilar Covers

In our example above, we considered a cover that copied the most important elements of its referent, i.e. melody and lyrics, but diverged from less important factors, such as instrumentation. This method of covering a song is the most common, and most

[8] Instrumental changes, as well as changes to musical arrangements, can also be measured in degrees by adding additional violation marks per violation.

often leads to a successful commercial release.[9] However, there are exceptions to this type of covering. A cover can sometimes diverge so much from its referent that it requires an advanced knowledge of music on the part of the listening audience to know that the song is a cover. In some instances, the audience will need to be familiar with the genre (from which the original song came). In other instances, they will need to know the artist (his or her influences and likelihood of covering certain songs). Regardless, when an artist covers a song and changes key factors, like the primary melody or the lyrics, he or she runs the risk of losing any benefits the cover's connection to its original version could bring. If the tempo and instrumentation are also altered, the cover could obliterate any connection to its referent, leading to the question, why is the artist even bothering to cover the song? While these types of covers are rare, they do exist. And in one particular instance, the artist experienced quite a bit of success with his cover.

Neil Sedaka's "Breaking Up Is Hard To Do" was co-written by Sedaka and Howard Greenfield and originally released in 1962. The song was a number one hit for two weeks that year from August 11 – August 18. The song is an excellent example of early doo-wop, with multiple layers of vocalized "nonsense" syllables, sung in two and three part harmony. The song is up-tempo, and the primary melody is simple and catchy.

Since 1962, the song has been covered numerous times by many artists, but none more surprising than Neil Sedaka himself. In 1975, Sedaka re-recorded and re-released his own song from 13 years earlier. This time, however, he did it as a ballad. The inspiration for doing a slower version came from singer Lenny Welch, who covered Sedaka's hit song in 1970 (as a ballad). Welch's version enjoyed moderate success, but the disconnect from the original was too great for Welch to benefit commercially from the success of the original number one hit. Sedaka's version, however, climbed to #8 on the pop charts, and to this day, is as iconic as the original 1962 version. But how is this possible? How can the same song be iconic at the same time in two completely different forms? We will turn to an OT analysis for answers.

a) F-PM	faithful to primary melody
b) Dep (primary melody)	adding embellishments (to PM) forbidden
c) Ident (lyrics)	changes to the original lyrics forbidden
d) Dep (lyrics)	adding new lyrics forbidden
e) F-Temp	faithful to tempo
f) Ident (accompaniment)	use the same instrumentation as the original

F-PM >> Dep (primary melody) >> Indent (lyrics), Dep (lyrics) >> F-Temp >> Indent (accompaniment)

[9] As stated above, the factors leading to a successful, hit record are manifold and beyond the scope of this dissertation.

Figure 4.4

Input: *Original 1962 version of "Breaking Up Is Hard To Do"*	F-PM	DEP (primary melody)	Ident (lyrics)	DEP (lyrics)	F-Temp	Ident (accomp)
1. *1970 Welch version*		!* x 17		*	*	*
2. ☞*1975Sedaka version*		* x 8		*	*	*

Our analysis shows that, though both versions incur numerous violation marks for embellishments, neither version (technically) violates F-PM. A melodic embellishment is any note, or series of notes, that deviate from the original primary melody. These embellishments are harmonious with the primary melody (achieved by being in the same key or part of the same linear series of notes as the original melody). An embellishment, though differing from the original melody, is not the same as completely ignoring or abandoning the original, primary melody. We can see in our analysis that both versions enjoy a large degree of freedom in the form of embellishments from the original melody. Welch's version has no fewer than 17 noticeable embellishments, while Sedaka has fewer than 10. Both versions equally incur violation marks for F-Temp and F-Indent (accomp), as each artist's respective ballad is slower and features different instrumentation than the 1962 version. Both versions also receive a violation mark for Dep (lyrics), as extra lyrics were added in the form of an introduction that is not part of the original version:

You tell me that you're leavin'
I can't believe it's true
Girl there's just no livin' without you

If this were a competitive OT analysis, with only one output form, Sedaka's version would win, based on his fewer number of embellishments, However, the point of this analysis is not to show how one, and only one, output form is produced. Rather, it is to show the degrees to which alternate renderings can differ. Furthermore, as stated above, the reasons why one song is commercially successful, while another is not, are multifarious and beyond the scope of this argument. However, this analysis does shed light on the subject. We can only speculate, but it seems likely that Sedaka's 1975 version not only benefitted commercially from being performed by the song's original artist, but also from having fewer embellishments, which made it easier for the public audience to recognize his version as a cover of his original 1962 version. Lenny Welch, on the other hand, did not benefit from such an obvious association with the original, while also embellishing on the primary melody twice as much. So while we cannot say that Sedaka's version is the winner in this analysis, we can definitely (empirically) observe that his version, though very different, is still *more like* the original 1962 version.

With his 1975 ballad version of "Breaking Up Is Hard To Do", Neil Sedaka was able to accomplish something very few recording artists have done – have a top 10 hit with two different versions of the same song. It is because of this accomplishment that both of his versions have become iconic. But there's more to this accomplishment than just commercial success. Sedaka was actually covering Welch's version when he re-recorded his own song. And yet, he knew, perhaps innately, to embellish less and stick to

the original melody closer than Welch did. In every other regard, save for the lyrics, Sedaka deviated from his own original version. And still, his 1975 version resonated and conventionalized (for a second time) with the general audience. It is, perhaps, because the audience believed that Sedaka was just offering a different performance of "Breaking Up Is Hard To Do" (a matter that we will take up below) that the second version of the song did so well commercially in 1975. However, there can be no doubt that his ballad version was a cover and not an alternate performance. In almost every regard, his ballad is more similar to Welch's 1970 version than it is his own 1962 version; the alternate instrumentation, intro, and modified tempo are a testament to it. The fact that he decided to re-record the song also supports the argument that he was covering his own song and not just offering an alternate performance of the song.

Sedaka's 1975 version of "Breaking Up Is Hard To Do" is a great example of a previously conventionalized song, reinterpreted and altered to the extreme, but still remaining recognizable to the audience as a cover. Unlike The Rolling Stones' version of "Time Is On My Side", which moderately deviates from the overall sound of the original recording by offering alternate musical accompaniment and minor embellishments, Sedaka's re-recording pushes the limits to the farthest degree before one would cease to recognize the song as a cover. The iconic nature of the 1975 version is largely based on the song's commercial success. However, Sedaka's artistry cannot be ignored, as he offered an interpretation that clings to the absolute minimum of similarity required to still connect to the referent, while deviating from almost every other aspect of his original 1962 version.

Now that we have looked at covers with moderate and extreme deviations from their referents, let's look at a cover that presents itself as an exact replica.

Degrees of Similarity: Exact Covers

In 1998, film director, Gus Van Sant, released his remake of the 1960, Alfred Hitchcock classic thriller, *Psycho*. Unlike the original 1960 release, the 1998 remake was a commercial failure; it was also panned by many critics. How could a remake of such an innovative, groundbreaking film fair so poorly at the box office? There have been countless remakes of films, not all of them commercial successes, but Van Sant's Psycho is different, perhaps, for the reason why it performed so miserably with a public audience. Early on in the planning phase of the film's production, Van Sant decided he would shoot the film as a "shot-by-shot" remake of Hitchcock's classic film. In the strictest sense, a "shot-by-shot" means that every camera angle and scene artistry be duplicated from the original film in the remake. *Psycho* (1998), though deviating in minor plot aspects (mainly to avoid anachronisms), as well as a couple character interpretations, does offer a "shot-by-shot" remake of the 1960 film. As a result, the film offers itself as an excellent example of the difference between a typical remake, where the director (similar to the musicians in our examples above) often applies a degree of his or her own artistic interpretation to the original, and a duplicate, which aims merely to copy the original as closely possible. As most directors strive to inject their own personalities into their films, and not just duplicate someone else's artistry, it is not surprising that there have not been many films made like *Psycho* (1998). As film critic Roger Ebert, commented, "the movie [*Psycho*, 1998] is an invaluable experiment in the

theory of cinema, because it demonstrates that a shot-by-shot remake is pointless; genius apparently resides between or beneath the shots, or in chemistry that cannot be timed or counted" (Ebert 1998).

Considering Ebert's quote, it is not too hard to see where he is coming from. A duplicate is not a remake of a film, in the classic sense. Nor is a duplicate a cover of a song, in most musical genres (we will address genres other than pop music in chapter 6). What Ebert is referring to in his statement, when he writes, "genius apparently resides between or beneath the shots" is the degree of artistry. If we consider the degrees of artistry in Peircean terms, we can say that these degrees are manifested through Firstness, Secondness, and Thirdness. Additionally, this artistry must proceed through the Peircean triad in that order, 1-2-3, respectively. Similar to the way order matters in generative grammar rules, the same applies in the realm of the creative process. Firstness governs inspiration, Secondness, the craftwork, Thirdness the presentation. However, there are degrees to which an artist can stray from the 1-2-3 series. Covers of songs and remakes of films challenge this linear process and the natural order of 1-2-3.

Unlike original work, which starts with an inspiration to create something new, remakes start with a desire to copy someone else's work. This inspiration to copy can, to a certain degree, count as a Firstness, since there is an amount of true inspiration motivating the artist. However, one cannot ignore that the nucleus of this inspiration is a Thirdness because the artist is attempting to copy something that has already conventionalized with the public.[10] In a sense, we can say that covers and remakes are actually a Thirdness – Secondness – Thirdness in their linear order of creation. This 3-2-3 (instead of the usual 1-2-3) series robs the artwork of its Firstness. But, as mentioned above, there are degrees to which this lack of Firstness can still exist.

In a cover, like The Rolling Stone's "Time Is On My Side", the Firstness was manifested in how they applied their electric guitars, rock style of drumming, and Mick Jagger's vocal style to the original R&B version. While a level of Thirdness was present as they proceeded into Secondness, the Thirdness was somewhat reduced by their inspiration to convert this R&B song into a rock song. The end result was a new rock version of "Time Is On My Side", which conventionalized as such with the public audience.

Even more so with Sedaka's "Breaking Up Is Hard To Do" do we find a reduced Thirdness. His many deviations from the original are all rooted in Firstness, while a level of Thirdness is maintained by him preserving the lyrics and primary melody, albeit, with many embellishments (another Firstness).

Contrasting these examples above is Van Sant's remake of *Psycho*. His film purposely lacks many of the elements of Firstness, and instead, relies too much on the conventionalized aspects from the 1960 version. So much so that it begs the question: "why bother making a film that offers nothing new for the audience?" Much in the way a lithograph print of a Mona Lisa is not considered an original work of art (the original is in the Louvre), exact duplicates do not carry the same intrinsic value as the original source. Andy Warhol's pop art of the 1960s experimented with the boundaries that separate art that is inspired by, or loosely based on, an already existing work of art (similar to the

[10] Here, I'm referring to famous works that have already been released to the public like *Psycho* (1960).

covers in this chapter) and exact duplicates. Works like his famous 100 cans (1962) and Jackie Kennedy (1964) are a synthesis of duplicates (as the foundation for the piece) and his unique silk screening process. This latter part of his process is the Firstness, while the foundation (a picture of a can of Campbell's soup or a photograph of Marilyn Monroe) is the Thirdness. When recordings of songs are mass-produced for distribution, they are carbon copies of the master recording produced by the artist. There is no artistry in the mass production of these duplicates. However, one can easily hypothesize that there exists a degree of wiggle room between a carbon copy and a cover or remake, with the former on the side of non-artistry and the latter being an acceptable form of artist expression. It is within this hypothetical wiggle room that a film like *Psycho* (1998) exists.

Figure 4.5

Mass Produced Duplicates	*Psycho* (1998)	"Time Is On My Side"	"Breaking Up Is Hard To Do"	Any Original Song, Story, Film
Non-Art-Copies	?Art?	< Covers/Remakes >		Original Art

This diagram illustrates degrees of similarity, regarding covers and remakes. On the far right, we find original art that is the product of the Peircean triad – Firstness, Secondness, Thirdness in the form of Original Inspiration – Craftwork – Presentation (the 1-2-3 template explained above). We can also imagine that on the far right side of this diagram is where unconventionalized art exists (or art that is incomplete). To the far left, we see copies that are void of artistry. This is also the place where all finished and conventionalized art exists. In between these extremes, we find the realm of the cover (song) and the remake (film). As we can see, a song like "Time Is On My Side" is closer to being a copy of the original version, but still offers an acceptable amount of artistry. "Breaking Up Is Hard To Do" is less like its referent, possessing more originality, while still qualifying as a cover. We can say that these two covers (like most covers) have qualities of both a Peircean 1-2-3 template, as well as a 3-2-3 sequence. The artists express their Firstness in the form of deviations from the original version (1-2-3), while also maintaining a conventionalized Thirdness by emulating the primary melody and lyrics of the original version (3-2-3).[11] In between the realm of Non-Art and Covers/Remakes is where a film like *Psycho* (1998) exists. And as noted, it is questionable whether this film really qualifies as art. It is a true 3-2-3, with very little, if any Firstness. Unlike the two covers, the film holds on too tightly to the conventionalized aspects of the original (1960) version, at the expense of Firstness. It is because of this strict 3-2-3 template, followed by Van Sant, that his film did not resonate with the viewing public and failed to gain any semblance of iconicity.

The three previous sections have primarily focused on covers, and while all covers of songs are a type of performance, not all performances qualify as covers. This distinction will be the topic of the next section.

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[11] Of course, when a cover or remake is finished and released to the public, it, like all finished art on this diagram, moves to the far left.

Performances vs. Covers

When an artist records a performance of a song for the sake of commercial gain, using all the resources provided by a record company, the song becomes frozen in time. Much in the same way a photograph captures a specific object, at a particular time in a particular place, the music that is recorded reflects the style, technology, and general trends of its period. However, unlike a photo, a song also has a live-performance component. Musical acts can perform, live for an audience, the songs that they recorded and sold to the public via the initial medium of lacquer, vinyl, CD, or MP3. This ability to perform the song live, in front of an audience, keeps the song in a contemporaneous state, and offers yet another layer of semiotics to the analysis.

While sharing a lot of similarities with a cover, a performance of a song differs in a few key ways: when an artist, in this case, let's say a rock and roll band, performs their own hit song live, they are indeed most often copying the original recording made in the studio. However, they also enjoy a degree of freedom from actually having to perform the song exactly like the studio version. The band often winds up copying the most important components of the song, i.e. the lyrics and primary melody, as well as the tempo, drumbeat, and chord progression. It will differ, however, in overall production, instrumentation, and arrangement. The reason for these deviations is practicality.

In the recording studio, because of the technology and ability to overdub (the details of which will be addressed in chapter 4), multiple layers of instruments are often recorded to give the song a "bigger than life" sound. This practice of overdubbing has become an art form in its own right, and was originally treated as such by Phil Spector in the early 1960s. His artificial (artificial in the sense that he achieved his sound by using recording techniques and not solely by capturing the sound of the instruments and voices in their natural state), but very effective, techniques were coined Phil Spector's "Wall of Sound" in reference to the massive sound he achieved in the recording studio. Since the early 1960s, it has become common practice to enhance, artificially, the sound of instruments and voices, as part of the recording process and overall production of music. It is precisely this process of production in the recording studio that makes it so impractical for artists to perform their songs like the recorded versions when they play live. In most instances, since the late 1960s, even the most basic pop song would require multiple guitar players, singers, keyboardists, and percussionists to emulate the studio version in a live performance.[12]

Regardless of whether the artist aims to replicate the studio version or just performs the essential lyrics and primary melody, the live version, having the ability to remain contemporaneous, gives the song a longer life of artistic expression than the frozen-in-time recording does. However, with the passage of time, and as musical genres evolve, the song eventually becomes obsolete, regardless of most live interpretations. Though there are some exceptions.

If we consider our example above of Neil Sedaka's "Breaking Up Is Hard To Do", we can posit that his performances of the song were similar to, but not exactly like,

[12] In recent years (since the development and application of computers), it has become easier for live performers to emulate their studio recordings. Instruments are digitally recorded and synchronized with the live performance.

his 1962 studio version (the version that the general audience was hearing on the radio and purchasing as a 45-rpm in their local record store). He continued performing this version of the song well into the late 1960s. Eventually, realizing that the 1962 version was outdated and no longer resonating with his audience, he stopped performing it live. In 1970, a different singer, Lenny Welch, covered the song. His interpretation almost completely ignored Sedaka's 1962 version. Instead, Welch offered a more mature, jazz-ballad version of song. Though Welch only enjoyed limited commercial success with his version, Sedaka recognized the value of a more mature interpretation and decided to cover Welch's version. Though similar, Sedaka did not record an exact copy of Welch's version. What was most valuable to Sedaka was the shift in genre, changing the song from one that depended on a youthful age-demographic (under 25 years), to an older demographic (35 and older). This shift in genre gave the song an atypical extended shelf life.

The difference between covers and performances is intent. If Neil Sedaka had only performed Welch's version in a live setting and had never re-recorded the song (which he did do in 1975), we could only say that Sedaka altered his live performance of the song. However, since he decided to cover Welch's version, with the intent of reselling the same song he sold to his fans in 1962, we call his 1975 version a cover. Therefore, the later version is both a performance and a cover, and over the years, both the 1962 and 1975 versions have become iconic renditions of the song.

To contrast our example above, we will look at two instances of live performances that are not considered covers. Though both versions were also recorded and have since become iconic versions of their respective songs.

In the summer of 1969, at the Woodstock festival in upstate New York, guitarist and rock and roll icon, Jimi Hendrix, performed his version of "The Star-Spangled Banner", the national anthem of the United States of America. The song itself is a hybrid of both American and British culture. The lyrics to the song, famously written by Francis Scott Key in 1814, were mated with music, originally written by British composer John Stafford Smith in 1773; the song officially became the national anthem in 1931. By 1969, the song had become ubiquitous, with a multitude of recorded versions and different interpretations in the public domain. While many instrumental versions, as well as those with musical accompaniment, were readily available to the listener in 1969, most live renditions (usually performed at public ceremonies and special events with a nationalistic theme) were (and still are) performed acappella, in order to highlight the lyrics. Hendrix's decision to perform the song as an instrumental, therefore, was somewhat uncommon.

His interpretation is, above all, a protest of the Vietnam War, and while there were many protest songs performed at the Woodstock festival, none were as memorable or iconic as Hendrix's performance of the National Anthem. Though his version is one of the seminal moments of the anti-Vietnam War movement and will forever be cemented in history as a watershed performance in rock and roll, his performance cannot be seen as cover.

First off, though Hendrix did record his version of the song in the recording studio, it is his live performance given at Woodstock in 1969 that has become iconic. Furthermore, though the song had been standardized in the early 20th century from its multifaceted nascent versions, there was no previous recording of the song (in 1969) that had truly conventionalized with the public. The closest version was probably the one

arranged by Igor Stravinsky, though in 1969, there were multiple (at least 4) arrangements of this version available to the public. With no conventionalized version to emulate, Hendrix was free to perform the song his own way. Choosing to perform the song as an instrumental, and with very little, if any, accompaniment, Hendrix played the primary melody with many embellishments. These minor departures from the melody were accented with sound effects, produced on his electric guitar. The effects simulated the sounds of bombs and machine gun fire, reminding listeners of the horrors of the Vietnam War. Halfway through his rendition, he briefly departs from the National Anthem's melody and interjects the melody from "Taps", normally played by a single bugle at military funerals. With all of these digressions from the actual primary melody, Hendrix pushes the boundaries of what actually constitutes the performance of a song, and because there existed no conventionalized recording, Hendrix wasn't deviating from established expectations. His performance, therefore, is a Firstness, with minimal traces of Thirdness. He performed elements of Smith's original melody, reproducing enough of the melody's recognizable linear pattern to maintain a connection to the referent, while innovating sounds on his electric guitar to evoke an emotional response from his audience. His performance is art in the truest sense of the word. And while it is somewhat dependent on Smith's 1773 melody, it is still more an *original* production of art than it is the more commonly inspired cover. With most covers, like our examples further above, the covering artists do add some aspect or quality of their own style to the original recorded version, but the original version is still recognizable within the cover. However, Hendrix's performance of "The Star Spangled Banner" goes so far in the direction of individuality and personal artistic expression that his performance eclipses the original referent. Consequently, Hendrix's rendition of "The Star Spangled Banner" never conventionalized with the general audience. His version is too unique, too one-off, and perhaps, too personal for the masses to accept it as "the" version of our National Anthem.

To demonstrate the extreme opposite of Hendrix's performance and give us one final example of the difference between covers and performances is the Rolling Stones' version of "Jumping Jack Flash". The Rolling Stones composed (Jagger-Richards) and recorded the song in 1968; it was released in May of that year. It eventually peaked at #3 on the US singles charts. The song is unique in that The Rolling Stones have never performed a live version of the studio recording. Indeed, they have performed the song live, continuously, since their studio release of it 50 years ago, but they've never performed a live version that attempts to emulate the studio version. Surprisingly, though, and unlike Hendrix's unique version of the National Anthem, the Rolling Stones' live version has conventionalized with the public audience, so much so that their live version has become the iconic, standardized version.

The studio version of the song was built on a guitar riff that guitarist Keith Richards crafted by playing one acoustic guitar in an open tuning, and then, overdubbing another guitar with a different tuning on top of the first one. The acoustic guitars were amplified, and subsequently, piped through an extension speaker (McPherson). The complexity of the process required to record this riff, no doubt, motivated the decision to abandon any attempt at reduplicating the procedure in a live setting. Additionally, the studio version has the typical layers of instrumentation (as mentioned above) found in a studio recording that are, for practical reasons, often ignored in a live performance.

The end result was a completely different approach to the song, when the band decided to perform it live. The live version preserves the primary melody and lyrics of the recorded version, but the music, especially the all-important guitar riff, which is the foundation of the recorded version, is played in a completely different (simplified) way. The bass line, as well as other rhythm instruments, is also altered greatly in the live version.

The Rolling Stones' live version of their own song has all the earmarks of a cover. But, it isn't cover; it's an alternate performance, similar to Hendrix's alternate performance of the National Anthem. It differs from Hendrix's performance, however, in the way it standardized the song. Additionally, unlike Sedaka's cover of his own song, "Breaking Up is Hard To Do", The Rolling Stones' ancillary performance of "Jumping Jack Flash" differs from the former by not having been re-recorded in a studio with the intent to re-release it to the public as an alternate production of the song. The Rolling Stones' live performance of "Jumping Jack Flash" was recorded at the 1969 concert in Altamont, California, and this version was later released on their live album, *Get Yer Ya-Ya's Out*. However, this live version was never promulgated as a potential single on the radio, the way the original 1968 version was. Nevertheless, their live version has conventionalized as the standardized version, primarily because that's the way they have performed it for decades.

Conclusion

Returning to our original point of the chapter – Iconicity vs. Arbitrariness – we can see that Poe's decision to choose the word *tintinnabulum* was motivated by iconicity. This iconic expression required an arbitrary (but conditioned) modification to the suffix, which, in turn, led to an innovation. This innovation eventually became a conventionalized expression in the English language. Viewed through the binoculars of Peirce's Ten Classes of Sign, we can gain a clearer understanding of how an artist relies on the cyclical nature of icons and symbols. *Tintinnabulation*, as it initially appears in Poe's poem, is functioning as a Qualisign; relative to its object (the sound of bells), it is an icon; relative to the interpretant, it is a Rheme; it connotes the sound of bells. However, once *Tintinnabulation* enters the lexicon of the English language (as a conventionalized Thirdness) it becomes a Legisign; relative to its object, it becomes a symbol; relative to the interpretant, it remains a Rheme; it denotes as a common noun. In order for the art of Poe's poem to function properly, one must perceive *tintinnabulation*, initially, as an icon before one interprets it as a symbol.

We also saw how arbitrary decisions, without violation of the highest ranked constraints, leads to the formation of new genres of music. Such was the case with certain kinds of Rhythm and Blues evolving into Rock and Roll.

Lastly, we looked at degrees of similarity in the process of art imitation. Once again, a level of arbitrariness is observed with regard to the decisions made by artists when covering songs and remaking movies. These decisions, however, are not completely arbitrary or random, as the artist must have a sense for what the undominated constraints are. An artist cannot implement arbitrary changes that eradicate the copy's connection to the referent, as the copy will then emerge as a new, original work of art. The artist must also avoid making too few changes from the referent, as the cover or

remake then ends up being a facsimile and ineffective as art. In each one of the examples revisited above, arbitrary decisions that do not violate the highest ranked constraints alter an existing form of art; this modified art then emerges as a potentially new form of iconic art.

The circular nature of arbitrary and iconic layers in art cannot be overemphasized. Indeed, arbitrary (but conditioned) decisions, made by artists, with the aim of modifying existing iconic forms of art, are the catalyst for the creation of all new art. When/if the modified forms of art conventionalize, they become iconic, and the process repeats, ad infinitum. Examples of this sine qua non process of creation have abounded in the pre-modern, modern, and postmodern eras.

To present a final example of this process in pop culture, let's consider the role of Captain James T. Kirk, a character from the pioneering television series, *Star Trek*. The role was played by actor William Shatner for the entire run of the show's three seasons from 1966 until 1969. The character of James T. Kirk became an icon of pop culture, so much so that his likeness was emulated for dozens of merchandized items. These items include the following: dolls and action figures, artwork on posters and on the sides of mugs and lunchboxes, and even Halloween costumes. The most basic of these costumes was in the form of a latex mask. This latex mask was nothing more than the face of William Shatner. In other words, the iconicity of Captain Kirk (and Shatner's face as such) was so conventionalized in the mid 1970s that a mask of Shatner's face was expected to be recognized as the fictional Captain; the two faces (Shatner's and Kirk's) had become symbiotic.

This kind of symbiosis, in the form of a mask, is unique, as most masks either depict an actual person (a mask with the likeness of a President, such as Richard Nixon), or a fictional character that a person plays (a mask of the Frankenstein monster). Regarding this latter example, there is such a mask, produced in the 1960s by Don Post Studios. This mask, with the likeness of the Frankenstein monster (from the 1931 film, produced by Universal Studios), has the monster's iconic characteristics, such as greenish skin tones, neck bolts, and a square shaped head. The mask also has facial characteristics of Boris Karloff, the actor who played the monster. When one buys this mask, one knows he/she is getting a replica of Karloff's portrayal of the monster, as characteristics of both the monster and Karloff are depicted on the mask. However, in the case of the Captain Kirk mask, the mask is really only a replica of William Shatner's face, and yet, the consumer is expected to interpret it as Kirk! The mask of Captain Kirk makes no modifications to Shatner's face. The mask boldly offers Shatner's face, pure and simple, with the expectation that a consumer will identify it, not as Shatner, but as Captain James T. Kirk.

The iconic nature of the fictional Captain Kirk cannot be denied, and yet, in spite of this iconicity, his likeness would provide the foundation for yet another iconic character in popular culture. Through a series of arbitrary (but conditioned) modifications, the mask of Shatner's face, formerly recognized as Captain Kirk, became the likeness of the fictional character, Mike Myers (aka The Shape), the deranged serial killer in the *Halloween* movie franchise.

Film director John Carpenter had a very limited budget to make the film (1978 *Halloween*). Therefore, when the artistic decision was made to have their villain wear a mask, the prop department arbitrarily chose the Shatner/Captain Kirk mask, which at the

time, was the cheapest one they could buy. The mask was then painted white, the eyeholes were cut out a little wider, and its "life-like" hair was teased a bit. But aside from these minimal modifications, the mask was still Kirk/Shatner. Despite this similitude, the modified mask, now worn by the villain, Mike Myers, conventionalized with the public as the primary image of this new fictitious monster/character.

The film and its associated franchise have enjoyed enormous commercial success over the decades, since the original film's release in 1978. And there can be no doubt that a huge part of this success is attributed to the character of Mike Myers (aka The Shape), who wears the mask of Captain Kirk. In fact, today, the mask is only available for purchase as a Mike Myers mask because the Shatner/Kirk mask is no longer even being produced.

The Captain Kirk mask becoming the face of a whole new iconic character in pop culture is an excellent example of how something iconic is modified in some arbitrary way and eventual becomes a whole new conventionalized icon. However, the modifications are not entirely random; there exists a conditioning factor based on a hierarchy of constraints, which means that an OT analysis can be used to shed light on this process. In order to apply constraints in an OT analysis, an understanding of what is actually conditioning the seemingly random decisions is required.

If one considers the parameters of what is required to quantify the process of the Shatner/Kirk mask becoming the image of Mike Myers, it becomes clear that there are certain characteristics that the Shatner mask cannot have. For example, a mask of Richard Nixon could not have worked because people would have just seen the villain as someone wearing a Nixon mask; the likeness to Nixon is too strong (this seems to contradict what I said above about the iconicity of Captain Kirk; explication is given below). Additionally, the mask could not have been that of an already existing monster, like Frankenstein. If it were, the villain in Carpenter's film would not have been an innovation, but rather just another version of the Frankenstein monster. Therefore, the mask needed to be of someone who was famous enough to have a mask made of him, but not too iconic or recognizable, either as himself, or as an already existing celebrity/monster.

So, if we consider these conditions, we can form our constraints for the output of the mask.

a) Ident (likeness) must be a recognizable person
b) Ident (monster) must be a recognizable monster
c) Max (mask characteristics) Maintain the identity of the mask

The hierarchy of these constraints is as follows:

Ident (likeness), Ident (monster) >> Max (mask characteristics)

Figure 4.6

Input: *Any commercially available mask*	Ident (likeness)	Ident (monster)	Max (mask characteristics)
1. *Nixon Mask*		*!	
2. ☞ *Captain Kirk Mask*			***

3. *Frankenstein Mask*	*!		

Our analysis shows how the Kirk mask emerges the winner, even though it incurs three violation marks: one for being painted white, one for having the eyeholes enlarged, and one for mussing the hair. These modifications are not only tolerated, but also required for the mask to gain its new identity. The equally undominated constraints, Ident (likeness) and Ident (monster), eliminate the other two candidates. By now, the contradiction mentioned in parentheses above should be obvious to the reader. Indeed, the constraint, Ident (likeness), relies on degrees of subjectivity. For example, the likeness of Nixon may be more obvious to one person than it is another. And a mask of Captain Kirk might be totally obvious to one person, while unrecognizable to another. So why doesn't the Kirk mask receive a violation for likeness? While each individual's subjectivity cannot be addressed in this argument, the author feels that some degree of objectivity can be observed if one considers the role characteristics play in the recognition of historical figures and famous celebrities.

Richard Nixon, the 37th president of the United States, had facial characteristics that are unique, chief among them are his nose and jaw. Any mask of his likeness would need to emulate these characteristics. These characteristics are crucial because they are, in a sense, primary characteristics. That is to say, without these characteristics, no one would recognize the mask as having a likeness to Nixon.

Conversely, William Shatner's face does not have the same kinds of unique characteristics that Nixon had. In fact, as already stated above, the likeness of the mask is indistinguishable between Shatner and Captain Kirk. Why then, would anyone buy this mask? The mask was intended to be worn in conjunction with a Star Fleet uniform (similar to the uniform Captain Kirk wore on the TV show), as well as with props of the devices the Captain would carry around on his person, such as a communicator and phaser gun. Simply put, these items (the uniform, communicator, phaser), along with the mask, constitute the primary characteristics for having a convincing Captain Kirk costume (unlike a Nixon mask, where the mask alone is enough to be the ex-president). Without the other accessories, the person wearing the Kirk mask is not quite Captain Kirk. Rather, it is someone wearing a mask with the likeness of a very generic looking person, William Shatner. It is precisely this mundane appearance of the Kirk mask that made it such a perfect candidate for use as a new potential monster/villain, albeit, with a few modifications. Why doesn't the Kirk mask get a violation for Ident (monster)? It is true that the original mask was not intended to be a monster. But since our evaluation is based on the Kirk mask qualifying as a monster mask it avoids the violation.

This final example sheds light on the cyclical nature of iconicity and arbitrariness, with new genres of art developing in either direction from the arbitrary to the iconic or visa versa. Today, the Kirk mask is no longer being produced and marketed to the general public. However, the Mike Myers mask is still being mass-produced, with thousands appearing in costume shops every Halloween. Most people today don't even know that the Myer's mask is actually that of actor William Shatner because the iconic nature of the mask has shifted from iconic (Capt. Kirk) > arbitrary (the mask alone, without the rest of the costume is really just William Shatner's face) > iconic (the monster Mike Myers). Art and pop culture abound with such examples, as the organic nature of art continues to evolve.

CHAPTER 5
Applying Firstness, Secondness, and Thirdness to Sound Recording

For the sake of brevity, the technical aspect of sound recording will only be briefly glossed over here. In the early years of sound recording (late 1880s to early 1950s), there was no multi-tracking.[13] Additionally, there was no possibility of overdubbing and no recall.[14] Therefore, due to these limitations in technology, a musical performance could only be recorded as a whole, i.e. the recording capturing a single performance event. For example, if a four-piece jazz ensemble (comprised of drums, upright bass, piano, and saxophone) were recording a song, the recording would capture *that* live performance of the song. If one of the performers, let's say, the pianist were to make a noticeable mistake, the recording would be of a flawed performance. The entire piece would need to be replayed, flawlessly, in order to record a flawless performance.

All recordings of this type (from the earliest recording technology, until approximately, the late 1950s) were subject to the same limitations; a recording of music was only as good as the musicians' performance. Upon further scrutiny, the ratio of 1 to 1 is the primary reason for this technology's limitation. If we consider the tape recorder as one distinct unit and the performance as another discrete unit, we have our ratio.[15] Why is this ratio important, and how does it differ from future advancements in recording technology? The 1 to 1 ratio lends itself to a Peircean Firstness.

The Firstness of the Earliest Recordings and the 1 to 1 Ratio

In a sense, we can say that the 'single performance event' is a Firstness, and from Peirce's classes of signs, a qualisign.[16] This designation is based on the fact that the

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[13] Multi-track recording allows for the separate recording of multiple sound sources (limited only by the number of tracks) onto one master reel of magnetic tape or hard drive storage device. This is made possible by combining (stacking) discrete recording 'tracks' onto one recording head (or a digital rendering of such), which allows for the synchronization of all musical parts regardless of when they were actually recording.

[14] Overdubbing is the process by which the recording of an instrument is added to a previously recorded instrument or instruments. Recall is the ability to access a previous mix, blend, or tone of any instrument, instruments, or of the entire recording.

[15] Here, I am referring to a mono, single-track tape recorder.

[16] A student of Peirce could, and more likely would, consider musicians playing music, either a sinsign (the musicians are reacting to the inspiration to play music) or a legisign (the musicians are following the law/convention of the composition they are playing). However, I am not referring to the 'single performance event' in the context of a public performance. The performance, in the context I'm using it, takes place in a virtual vacuum. The recording studio is a sterile environment, where the human audience is minimized. The principle audience in the recording studio is the microphone/s (usually plural, since there are typically more than one utilized). Second to the microphones is the recording source (tape machine or computer hard disk). To these inanimate objects (and it is from their perspective to which I'm referring), the 'single performance event' is a Firstness. Furthermore, as I will occasionally use Peirce's terminology from his ten

performance has a quality, a possibility, and a potential. Its reference is to itself and nothing else (unless the performance is a cover, see previous chapter). The music, as a single unit (we are still referring to a jazz ensemble made up of 4 individual instruments, but for now, we will refer to the ensemble as one unit), is the original source, the signified.[17] The sound waves that travel through physical space and eventually reach the diaphragms of the microphone (as well as the ears of the listeners) are indices. The microphone is the interpretant. Here, we must differentiate between Peirce's three different types of interpretants.[18]

We can rule out the Final Interpretant, since the microphone, in and of itself, is not a thinking being, which seems to be a prerequisite when considering Peirce's explanation of this interpretant: "the effect the Sign would produce in any mind upon which the circumstances should permit it to work out its full effect" and "[that it] is the one Interpretative result to which every Interpreter is destined to come if the Sign is sufficiently considered" (Letter to Lady Welby, SS 110-1, 1909). While dispensing with the Final Interpretant is rather easy, the same cannot be said for the remaining two.[19]

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classes of signs, I will more often try to avoid these terms. Instead, I prefer to refer to the signs in the form of fractals inside of Peirce's triad (Firstness, Secondness, Thirdness). I posit that there are, potentially, an infinite number of triads within triads, far more than Peirce's 66. While I'm yet to count or even test this hypothesis, the subject matter I work with in this chapter reveals multiple levels/layers of triads, leading me to assume the number of signs is greater than 66. Lastly, I feel that avoidance of Peirce's terminology simplifies the understanding of my analysis because it alleviates the writer and reader's need to translate in and out of terminology that is cumbersome and not always applicable to the matter at hand. When needed or applicable, however, as it is here, I will default to Peirce's terminology.

[17] Saussurean semiotics does not map onto Peircean semiotics too well. Here, I refer to the signified (a Saussurean terminology) only to emphasize the music as being the source, i.e. the referent. If I were to continue using Saussurean terminology, my model would leave elements of the analysis undefined. However, if I were to identify the signifier (to complete the dichotomous, Saussurean model), it would be the magnetic tape, onto which the sound waves are captured.

[18] The author of this study recognizes the context in which Peirce was describing his different interpretants to Lady Welby and William James between 1904 and 1911. This context, a pragmatist's (or pragmaticism as he coined it) explanation of semiosis is as far from the art form of sound recording as one could imagine. That being said, this chapter aims to meet the chief criterion of Peirce's 'Pragmatic Maxim': "Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object" (CP v. 5, paragraphs 388–410). It is precisely these "practical bearings" that are relevant to this chapter. The object of our conception is a sound recording of a rock or pop song. If we consider the music, conveyed via the process of sound recording, to be the "effect", then we can, in a practical manner, understand the usefulness of applying Peircean semiotics to the art form of sound recording.

[19] Once again, the author of this study is aware that Peirce's original conception of interpretants was phenomenological. I also acknowledge that Peirce's use of the terms

If we first consider Peirce's definitions of the Immediate and Dynamical Interpretants, we will see that an argument can be made for the microphone qualifying for either type: "The Immediate Interpretant consists in the Quality of the Impression that a sign is fit to produce, not to any actual reaction" (Letter to William James, CP 8.315, 1909). The Dynamical has an equally applicable definition: "[The] Dynamical Interpretant is that which is experienced in each act of Interpretation and is different in each from that of the other ... [and it] is a single actual event" (Letter to Lady Welby, SS 110-1, 1909). It is this last quote from Peirce that sounds very similar to the single performance event, listed above. And it is for this reason that we must identify the microphone as a Dynamical Interpretant.

In considering the microphone as an Immediate Interpretant, we can see that they are indeed converting the quality of sound waves (produced by the instruments) into electric current. Therefore, in a static environment, one in which the sound waves move linearly, directly toward the interpretant and nowhere else (which is a physical impossibility because sound waves radiate evenly from their source), the microphone is a theoretical Immediate Interpretant (Kadis 33). But the Dynamical Interpretant allows for the possibility of change and movement. This ability, to adjust to the source, is a requirement for a microphone because the proximity of the microphone from the musical source (in our example, the jazz ensemble) is distinctive. For example, a microphone moved closer to the ensemble will capture more of the 'direct sound', i.e. the sound waves radiating directly from the instruments. A microphone moved farther away from the ensemble will capture more of the reverberating sound waves (the sound waves reflecting and diffusing within the room), thus, capturing more of the room sound, i.e. how the ensemble sounds in the room.[20] The different proximal and distal points of the microphone are distinctive and result in interpretations that are "different in each from that of the other ... [and therefore, constitute] a single actual event" (Letter to Welby 1909).

With this analysis of a hypothetical live recording given above, one that would have been very common during the period ranging from the 1930s up until the mid 1950s (when recording technology was at its most basic level), we can already see the fractal nature of Peircean semiotics at work. Though the entire recording process can be explained as a Firstness (especially when compared to more modern recording methods), it can also be seen as a complete Peircean act, possessing its own degrees of Firstness,

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'Immediate' and 'Dynamical', has more to do with the limitations of language than anything else – Immediate Interpretant being the word used to describe analyses 'inside semiosis' versus the Dynamical Interpretant for those 'outside semiosis' (Deledalle 18). That being said, Peirce's own words lend support to my observation, as well as my usage. Furthermore, it can be argued that, since a microphone is actually controlled by a human, it is actually the human who is the interpretant. While this is a valid argument, it is my intent to remove (at least temporarily) the human element in order for the reader to gain a better understanding of the technological process of sound recording.

[20] Reflections are sound waves that strike any surface and bounce/ricochet against other surfaces, until they lose their energy. Diffusion is what happens to sound waves when they disperse unevenly, resulting in higher frequencies losing energy more quickly than the other frequencies of the sound source.

Secondness, and Thirdness. As stated above, the music being played is a Firstness – the energy and skill required to produce harmonious sound from otherwise inert instruments, with each unrealized note having an entire universe of potential, is indeed a manifestation of Firstness. However, once the sound is produced and takes the form of sound waves, it ceases to have an infinite amount of potential; it becomes a sound wave that, not only is conditioned by the laws of physics, but also is conditioned by the rules of whatever piece of music the players have decided to play. This transformation from potential to realized sound waves can be characterized as entering into Secondness from Firstness. The sound waves themselves are indices. If one hears them from a distance and walks towards their origin, one will eventually find their source, the musicians. Lastly, as explained above, the microphone is the interpretant of the sound waves. The conversion of natural sound waves into a representation (a copy of the music) marks the transition from Secondness to Thirdness. So, while the earliest recording sessions can be seen as a manifestation of Firstness, they can also be deconstructed (due to the fractal nature of Peirce's triads) into smaller manifestations of Firstness, Secondness, and Thirdness.[21] In fact, if we zoom out, we will also find repeating manifestations of triads, which is no surprise, given that true fractals repeat the same patterns, regardless of whether one is zooming in or out.[22]

In a macro view of early recording sessions (one in which we consider the entire process, from the ensemble's performance to its rendering on magnetic tape), the music being performed is still a Firstness, but the microphone that captures the sound waves is now seen as a Secondness, and from Peirce's classes of signs, a sinsign. This is because the microphone is a reaction to the performance, since it transforms the performance into a singular object (electricity). This transformation of sound waves into electricity is the brute force that is so indicative of Secondness. The finished recording – sound waves captured on magnetic tape and balanced in such a way as to warrant completion – is a Thirdness, and from Peirce's classes of signs, a legisign. This is because the final recording is a representational relation to the object, making it possible for a Final Interpretant (a human being) to construe. How do we account for the differences in these analyses: the micro and macro perspectives? How can something be a Secondness and Thirdness simultaneously? The answer lies in how one views a given event. The microphone described above is both a Secondness and a Thirdness, but not on the same layer of analysis. If we are only considering the relationship between the musicians, the sound waves, and the microphone, then the microphone is a Thirdness. However, if we are considering the entire process, which includes the tape machine, the microphone is a Secondness. One can also see the differences in layers by keeping track of the different kinds of Interpretants. When the microphone is a Thirdness, it is either an Immediate or Dynamical Interpretant. However, when zooming out and considering the recording process holistically, the microphone first becomes a discrete Secondness, and then, part of a shared Secondness. The interpretant becomes either Immediate (captured sound waves), or Final (person listening to the final recording).

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[21] While Peirce never actually used the term fractal explicitly, he describes the nature of fractals in his 'inclusion rule' implicitly.

[22] "A fractal set is one for which the fractal (Hausdorff-Besicovitch) dimension strictly exceeds the topological dimension." Mandelbrot, Benoît B.

Figure 5.1

Firstness	**Secondness**	**Thirdness**
1) Live Performance	Sound Waves	Microphone
2) Live Performance	Microphone	Imprinted Sound Waves
3) Live Performance	Recording Session	Finished Recording

Figure 5.1 is a simplified table of the explication given above. In each instance, the live performance resides in Firstness. In example (1), a somewhat zoomed-in perspective, sound waves are a Secondness, and the microphone a Thirdness. Theoretically, the microphone can be either an Immediate or Dynamical Interpretant. But in actual application, the microphone is Dynamical. If we zoom out (2) and consider the entire recording process, the microphone becomes a Secondness. The sound waves (our previous Secondness) now become part of a transformational process. From this zoomed-out perspective, the live performance, as well as the sound waves emanating from the instruments, are a Firstness. When the sound waves vibrate the diaphragm (or ribbon) of the microphone, they are converted into electricity, and as a result, from a Firstness to a Secondness. As a Secondness, the converted sound waves travel as electrical current until they are imprinted onto the magnetic tape of the tape recording machine. These imprinted sound waves are a Thirdness. Unlike the microphone in the zoomed in layer, which (when applied in a real-world environment) is a Dynamical Interpretant, the captured sound waves on magnetic tape are an Immediate Interpretant, "… consist[ing] in the Quality of the Impression that a sign is fit to produce …" (Letter to James 1909). When we zoom out even more, we find the entire recording session is a Secondness to the live performance's Firstness, and the finished recording becomes a Thirdness. The interpretant of this last type of Thirdness is the Final Interpretant because the recorded music creates "the effect the Sign would produce in any mind upon which the circumstances should permit it to work out its full effect" (Letter to Welby 1909). If we zoom out even more, the earliest/first generation recordings, with a 1 to 1 ratio (1 performance recorded by 1 mono tape machine) can also be seen as a Firstness in their entirety. However, this analysis can only be made when comparing the earliest recording methods with later methods.

If we consider the 1 to 1 ratio at its most basic level, it is a facsimile of a live event, much like a photograph. The spontaneity, freedom, and potential that define Firstness are all present in a facsimile of a live performance. Even if the ensemble's performance is well rehearsed and is performed flawlessly, time and time again, the recording itself will pick up spontaneous actions, no matter how subtle. The potential to capture even the slightest deviation or embellishment on the performance is ever present, so much so that, if the ensemble were to perform the same song numerous times, with each individual performance being recorded, no two versions of the song would be exactly the same. Each recording would be a facsimile of each individual live performance of the song. But each recording would not be a facsimile of any of the other recordings of that same song. The 1 to 1 ratio is inescapable with this method of recording. Each individual performance of the same song correlates to a recording, i.e. a 'take'. Take 1 is a facsimile of live performance 1, but not of live performance 2, even though the performances are of the same song. No matter how well the musicians

perform the song, each performance is distinct and can only map onto one take. The numbers are, of course, arbitrary; I merely mapped performance 1 with take 1 to keep things less confusing and more symmetrical (see 5.2 below). For example, the ensemble could perform the song once (perhaps to warm up) without recording it. Technically, that performance would be performance 1, and therefore, take 1 would actually be of performance 2. Likewise, the ensemble could err so badly that they do not finish their performance. This flawed take, let us say it is performance 3, would still count as a take, but not as a full performance. However, for the sake of ease, let us not confuse the argument further and just keep a simple correlation of performances and takes.

Figure 5.2

Song	**Recording**
Live Performance 1	Take 1
Live Performance 2	Take 2
Live Performance 3	Take 3

The oversimplified table above conveys the 1 to 1 ratio at its most basic level: one performance, one take. Analyzing this earliest method of recording from an even more zoomed-out view, one can see how the entire process exists in Firstness. Because the music is performed and recorded in one live event, simultaneously, there is no time for the process to enter into a Secondness. As argued above, if one zooms in on this method of recording, complete patterns of Peirce's semiotic triad become evident. However, from the perspective of an overarching view, especially when compared to other methods of recording (below), the characteristics of a Firstness prevail. Each performance is delineated by the starting and ending points of the song. The tape machine starts recording, seconds before the ensemble begins to play; the tape machine stops recording, seconds after the song ends. If the ensemble errs and does not finish that performance of the song, that performance is no longer viable, and the take is marked as such. Simply put, the recording is only as good as the ensemble's ability to perform the song live. The simplicity of this observation is numbing, so much so that it requires an explicatory example for clarity: Let us say our jazz ensemble decides to record a song. They perform the song once and record it. That recording is now labeled Take 1. Each performance thereafter is recorded and labeled in successive order. Let's assume the ensemble records three viable takes of the song. All that remains is a process by which the record producer chooses the best take, i.e. best performance, for marketing to the masses.[23]

From this wide-angle view, with the recording process being a Firstness, we can also see the process by which the producer chooses the best take as being a Secondness, and the conventionalization (by the jazz ensemble's fans) of that chosen take as a Thirdness. As one can see, the recording process abounds with the Peircean triad, at multiple levels of analysis.

In the video, "Recording 50s Style", produced by *Sound on Sound* magazine published on May 2017, the entire process of recording music, as was done in the 1950s,

[23] The record or recording producer is equivalent to the director in film. The record producer is responsible for most creative decisions made in the studio.

is magnificently captured. Studio owner Dean Amos, a lover of pop and rock music from the 1950s, as well as a traditionalist, built a perfect recreation of a studio from the 1950s, complete with vintage audio equipment. The centerpiece of his anachronistic studio is his vintage Ampex mono tape recording machine. In the video, recording engineer and music producer, Lincoln Grounds, attempts to record a rock and roll band, limiting himself to the technology that was available up to around 1960. He first uses one microphone to record a five-piece ensemble of the following instruments: a drum set, comprised of a bass drum, snare drum, two tom-toms, hi hats, and a ride cymbal; an upright, acoustic bass; an electric rhythm guitar; an electric lead guitar; and a vocalist. All of these instruments comprise this rock ensemble, and each time they play a song, it is considered a single performance event. The one microphone used by Grounds converts the ensemble's combined sound waves into electric current, and the mono tape machine imprints the electrical current as sound waves onto the magnetic tape. Grounds then successively adds an extra microphone, until he reaches 4 microphones. Each time he adds an additional microphone, the ensemble replays the song, with each performance being recorded.

The goal of this experiment is twofold: firstly, Grounds wants to challenge himself by attempting to record a band without using computers or modern 'state of the art' technology. He not only uses audio gear that is roughly 60 years old, but he also employs the recording methods from that era. Secondly, by starting with one microphone and successively adding an additional microphone until maxing at 4, he attempts to see if there is a discernable audio difference, for better or worse, with each add-on. This latter part of his experiment is germane to our argument because I have posited that a 1 to 1 ratio exists between a single performance event (the band) and the tape recorder (as one distinct unit). So what happens when he adds extra microphones to the equation? Surprisingly, with each additional microphone, the sound becomes less desirable. The reason is quite obvious. With one microphone, the 1 to 1 ratio is preserved the best. With only one microphone, Grounds is forced to move that microphone (the Dynamic Interpretant) around the room, until he finds the optimal position to capture all four instruments, as well as the vocal. These five entities (four instruments and a vocal), captured by the microphone, are recorded onto the recording machine as one performance – a perfect triadic symmetry. When Grounds adds a second microphone, he has the luxury of isolating the vocal (microphone 1) from the rest of the instruments (microphone 2), which would, theoretically, give more clarity to the vocal (by having its own dedicated microphone). However, there is little to no perceivable difference between the use of one and two microphones. When he adds a third microphone, he has the luxury of isolating the vocal and bass guitar from the rest of the instruments. Once again, there is no discernable difference; in fact, the sound becomes more cluttered and less clear. Lastly, he adds a fourth microphone, allowing for isolation of the vocals, lead guitar, bass, and the drum set. This time, clarity is improved, but at the expense of sounding more sterile. As Grounds comments, "I wasn't massively surprised that the one mic setup was probably my favorite sound." He continues:

> Although the individual instruments, like the drums and electric guitar, are obviously more ambient [with only one mic], they're still really clear. When we went to two mics, and to a certain extent three, they were still ambient in the same

> sort of way, but they weren't as clear, to my ears, anyway.[24] When we got to four mics, all of that was fixed … where, sonically it was probably better, but I still prefer the first one, in a way. (Recording '50s Style)

As Grounds expanded the number of microphones from one to four, he did not expand the place to which the sound waves (as electrical current) were ultimately going – the tape recorder. In other words, the band, as a single performance event, was destined to wind up on a mono, single-track tape recorder (as opposed to a 4-track recorder). The number of microphones did not alter the 1 to 1 ratio. Adding more microphones may have eventually achieved more clarity, but at the expense of natural, organic acoustics. The reason why Grounds prefers one microphone is because it serves as the most natural catalyst between one performance and one tape source, i.e. one performance, one microphone, and one tape source. Once again, the ubiquity of our triad emerges.

As we will see in the following section, using multiple microphones on one source, when done properly, in the appropriate circumstances, can yield excellent results. The point being made by this video, however, is to demonstrate that in a 1 to 1 ratio recording, the amount of microphones is irrelevant. However, the number of microphones is not irrelevant when the number of sources to record to (i.e. a multi-track tape recorder) increases.

The Secondness of Multi-track Recordings and the 1 (or more) to 1 (or more) Ratio

The method of manipulating the recording process in order to capture a viable live performance did not begin with the invention of the multi-track tape recorder. Tape editing has existed since the introduction of magnetic tape as a medium for capturing sound waves. Because magnetic tape is comprised of a coat of magnetic particles affixed to a very thin layer of plastic film, magnetic tape is quite easy to cut with a razor blade. This kind of editing is referred to as tape splicing. It is simply the process of cutting the tape (at an angle) and reattaching it at a different severed point with an adhesive. When the two ends of tape are reassembled, assuming it is done competently, the splice is unperceivable. Why is tape splicing germane to our analysis? If we consider our analysis above, where a 1 to 1 ratio exists between performance and take, we assume that each take represents a viable live performance. However, a viable performance can also be crafted by splicing the tape upon which the performance was captured. Once again, offering a hypothetical, explanatory example is the best way to shed light on this process:

Let us assume that our jazz ensemble recorded three takes of the same song. On the first take, the ensemble played perfectly for the first two minutes of the song, and then, the pianist committed a noticeable error. On the second take, there were three errors made by both the pianist and the bassist. These errors were minor, making this second take preferable over the first take. The ensemble performs the song a third time. On this take, a noticeable error is made within the first minute, though the rest of the performance is flawless. If splicing weren't an option, take 2 would be chosen as the best (most viable)

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[24] Another reason cited by Grounds as to why more microphones are not necessarily better in this circumstance is due to phasing issues. This subject will be taken up in the next section on multi-tracking.

performance, even though it has three minor errors! That is because three minor errors are not as bad as one, very noticeable error. However, the splicing technique gives the record producer another option – use take 1, which is perfect for the first two minutes of the song, and cut the tape before the noticeable error occurs; splice the end of take 3, which has an error in the first minute, together with the flawless first two minutes of take 1. This technique produces a perfect live performance, albeit, via the manipulation of tape.

If we consider this method of tape manipulation and apply it to our analysis, we can see where it fits into the hierarchical order of our previous table:

Figure 5.3

Firstness	**Secondness**	**Thirdness**
Live Performance	Sound Waves	Microphone
Live Performance	Microphone	Imprinted Sound Waves
Live Performance	Recording Session	Finished Recording
Recording Session	Tape Splicing	Accepted Modified Recording
Recording Session	Choice of Take	Conventionalization of Recording

Above, we can see that either the live performance or the entire recording session itself is a Firstness, depending on how much one zooms in or out on the process. A recording session that requires further manipulation becomes a Secondness before it becomes an agreed upon modified recording, i.e. a Thirdness. An early, 1 to 1 ratio recording that does not require further manipulation is a Firstness. The choice of take is a Secondness, and the eventual conventionalization of that take is a Thirdness.

Now that we have covered all the permutations for classifying an early, 1 to 1 ratio recording, we can turn our attention to the next phase in sound recording: the multi-track recorder and the overdubbing process.

The invention of multi-track recording (mid 1950s) produced a procedural shift in the process of sound recording that likewise produces a semiotic shift in our analysis.[25] With this advancement in technology, the previous requirement, of a single performance event needing to be captured as a whole, was replaced by the overdubbing process.[26] If

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[25] The multi-track recording machine made it possible to record instruments on discrete tracks, each track being equivalent to one entire recording machine of the older, standard mono recorders. Therefore, a 4-track recorder was like having four, synchronized recording machines. Applied to our ensemble above, we could, theoretically, record our drums to track 1, our bass to track 2, our piano to track 3, and our saxophone to track 4. Since each instrument is captured on its own track, the musicians have more options and possible ways of recording their parts.

[26] The main advantage to using the multi-track recorder was the ability to overdub musical performances. The overdubbing process gives the musician or ensemble the ability to record in series (temporally), as opposed to contemporaneously. A previously recorded track can be played back on the tape machine, while a musician performs to it. While the live musician is performing with the previously recorded track, his performance is being recorded on a separate track. The live musician is, in a sense,

we return to our example from above, the four-piece ensemble (comprised of drums, upright bass, Piano, and Saxophone) may, through the use of overdubbing, perform separately. For example, let us assume the drummer, bassist, and pianist perform a song as a trio, with each instrument captured on its own dedicated track. The saxophonist, via the overdubbing process, may perform his part of the song on the following day, being recorded on his own dedicated track. If he makes a mistake, the mistake does not contaminate the rest of the recording (as it would have with the earlier, 1 to 1 ratio method). Because the saxophonist is not performing his part in the same room, or even on the same day as the other players, his mistakes cannot bleed onto the tracks that contain the performances of the other players. Remember, his performance is on a separate (discrete) track. The overdubbing method also makes it possible for the sax player to record, over and over, until he plays a flawless take. Because of the overdubbing process, we can see how the 1 to1 ratio shifts to a 1 (or more) to 1 (or more) ratio. The multi-track tape recorder not only allows for a 1 to 1 ratio, but also a multi-instrument to multi-track ratio. Our jazz ensemble can either record together, as a single live performance, or in series, as separate entities. They can either record to one track or any number of tracks, with the only limitation being the number of tracks available on the machine.

To explain our semiotic shift, let us first change our ensemble from one appropriate for jazz, to one more appropriate for rock music: drums, electric bass guitar, electric rhythm guitar, electric lead guitar (the soloist), and lastly, a vocalist. Our hypothetical rock band will be recording on a multi-track recorder. Much like our jazz ensemble above, the rock band will record a live performance. However, the rock band will only record the rhythm tracks (hereafter ‘basics’ or ‘basic tracks’) as a live performance. After the basics are recorded, the lead guitarist and vocalist will overdub their performances separately from the rhythm players and each other.

In rock music, the lead guitarist is a principal musician. He/she is not only the primary soloist, but also the main embellisher of accompaniments. Because of this elevated status, many record producers insist on recording the lead guitarist in a separate session, often one that is not contemporaneous with either the rhythm players, or the singer. The lead guitarist’s performance is often recorded on more than one track, accommodating both his/her musical accompaniment (guitar parts) and his/her solo (if there is one).

Much like the lead guitarist, the lead vocalist is also given a separate, distinctive session. The vocal melody is often recorded in multiple takes on multiple tracks. These tracks are then combined in a process called compositing, where the best sections of each take are internally recorded (bounced) to a virgin track. The composite track that emerges from this process is a ‘best of’ all the different takes the singer performed. One will recognize the similarity between the bouncing/compositing technique and the splicing method described above. While bouncing does not require cutting tape, the end result is quite similar, i.e. using the best portions of a linear performance and compositing them together, linearly, in order to craft a superior performance. Once again, this kind of tape manipulation shifts the recording process from a Firstness into a Secondness. In fact, the whole overdubbing and internal bouncing procedures take place in the realm of

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recording ‘over’, but not erasing, the previously recorded track, hence the moniker, ‘overdubbing’.

Secondness. Other musical layers added to the song, such as vocal harmonies, orchestral strings, or percussion, if overdubbed, are all taking place inside a Secondness.

If we compare multi-track recordings from the mono ones (above), we quickly notice the fractal nature of Peirce's triad once again. We can say that all three aspects of semiotics, i.e. Firstness, Secondness, Thirdness (as described above) are incorporated in the recording of the basic tracks (drums, bass, and rhythm guitar). However, we can also say that the basic tracks also constitute a new Firstness, from Peirce's classes of signs, an Icon, because as recordings, they resemble the original performance. The lead guitar and vocals, being overdubs, can be seen as a new Secondness. From Peirce's classes of signs, they are Indices, because they have a factual connection to their referent (the basic tracks).

Figure 5.4

Firstness	**Secondness**	**Thirdness**
1) Early Mono Recording	Multi-track Recording	Conventionalization of Recording

Entry (2) is in the realm of the Secondness listed above in (1)

2) Recording Basics	Overdubbing	Mixing the recorded tracks

In (1) of figure 5.4, we see that the entirety of the early recording method has now, from this zoomed-out perspective, become a Firstness. However, if we zoom in on the early recording method (as we did in the previous section with or fictitious jazz ensemble in varying degrees, as shown in figure 5.3), we can see layers of the Peircean triad do exist there. The multi-track recording method (a Secondness) builds on the foundation of the earlier method in the form of overdubbing instruments on top of the basic tracks (the basic tracks are recording similarly to the earlier mono method). Therefore, as figure 5.4 shows, we can see the entire process of the earlier mono method (the 1 to 1 ratio of the recording of a single performance event) becoming a Firstness when compared to the technological development of multi-track recording. On this layer, however, the Thirdness has not changed, since the final recording (regardless of how it was recorded) must still ultimately conventionalize with the intended audience. On the next layer (2), we are zoomed in on the Secondness (multi-track recording) of (1). Here, the recording of the rhythm tracks (Basics) is a Firstness and Overdubbing a Secondness. The mixing of tracks (a process that follows overdubbing) is a new Thirdness.

Once again, the ubiquity of fractals in Peirce's triad cannot be overlooked. If we zoom in on either, early mono recording, multi-track recording, or the process of conventions, we will find triads of Firstness, Secondness, and Thirdness existing within those categories. Likewise, recording basics, overdubbing, and mixing will reveal the triads. To keep clearer a 'blurring of the lines' between where a Firstness ends and a Secondness begins one should consider the difference between the ends and means of any given act (let's call them phases). This teleological point of view makes it easier to classify (at what point during a creative process) the Peircean category in which one is. For example, if one were recording drums, bass, and guitar in a session where the goal is to capture a live recording with no overdubs, one would be in Firstness while the

musicians were actually performing, in Secondness as the sound waves are converted into electricity, and in Thirdness when the decision is made (usually by a producer) to accept the recording of the performance as 'the take'. Conversely, if one were recording drums, bass, and guitar in a session where the goal is to capture a recording with overdubs and other forms of tape manipulation, one would also be in Firstness while the musicians were performing basics (the basics phase), but then in Secondness during the overdubbing (and other tape manipulation) phase, and in Thirdness when the decision is made to mix (the mixing phase) the discrete tracks into one cohesive, viable take.

Zooming in on the overdubbing phase, a Secondness, one will notice, once again, a plethora of Peircean triads. Similar to our analysis of a single performance event from the previous section, the recording of an instrument (or vocal) during the overdubbing process requires the same devices, such as microphones, preamplifiers, and of course, magnetic tape. Likewise, the sound waves produced by the instrument (or voice) must obey the same laws of acoustical physics. Therefore, the entirety of our analysis from above still applies during the overdubbing process. For example, while overdubbing an electric, lead guitar solo, the performance is still a Firstness, the sound waves emanating from the guitar amplifier, a Secondness, and the microphone that reacts to those sound waves, a Thirdness (a Dynamical Interpretant). We can reiterate our entire analysis (Figure 5.3) from above and apply it to the instruments or voices recorded during the overdubbing phase. Because of the fractal nature of the recording process, one can say that everything, which occurred in the earlier 1 to 1 ratio recordings, occurs in the Secondness of the overdubbing phase. Simply put, in the realm of multi-track recording exists the entirety of the earlier mono, single-track recording process. Nevertheless, there are also some significant differences between the 1 to 1 ratio recording method and the multi-track method.

In the previous section, I referenced *Sound on Sound* magazine's video on "Recording '50s Style". The result of that experiment showed how Lincoln Grounds, the sound engineer, preferred the sound of one microphone to two, three, or four. One reason for his preference had to do with phasing issues.[27] As stated above, the placement of the microphone is distinctive in a recording session. Close proximity of the microphone will produce a different sound than a microphone placed further from the sound source, with the latter producing a more ambient sound. In addition to proximity effects, sound waves captured at different distances from the microphones are recorded on the tape machine at differing points in time. For example, a microphone placed three feet from a drum set will capture sound waves twice as fast as a microphone placed six feet away. If we hypothesize that two microphones are recording a drum set with one microphone at a distance of three and the other at six feet, the closer microphone will be recorded a few milliseconds sooner than the more distant microphone. Therefore, the microphone placed at a distance of six feet will sound like an echo of the closer one, but only when both microphones are being used. If we eliminate the microphone at three feet, the microphone at six feet will no longer sound like an echo. Instead, it will be the sound of the drums, with a slightly more ambient sound than the one at three feet. It is precisely these kinds of

[27] This use of the word 'phasing' is different from the previous definition, where the meaning is referring to demarcating the beginning and end points of a process. The definition of phasing in this context is technical and will be explained presently.

acoustical physics that Lincoln Grounds did not like when recording a live band '50s style. In the worst case of using multiple microphones on a single source, the sound waves arrive to the tape recorder 180 degrees apart. This inversion of two sound waves results in the complete cancelation of both sound sources, i.e. they become inaudible. These instances are referred to as phasing issues, or reverse phasing issues. As a result of this phenomenon, sound engineers avoid placing microphones at distances that produce phasing issues at 180, or near 180 degrees. Grounds was limited in his experiment because the size of the room in which he was recording the band was not very large. Ultimately, one microphone, without phasing issues, was preferable to two or three microphones, with phasing issues. However, though he still preferred the sound of only one microphone, when he got to four microphones, he conceded that the sound had improved significantly. Why was there less phasing with four microphones than with two or three, as well as a noticeable sonic improvement?

In our previous analysis, we established that using one microphone in a recording session where there is one performance (by one ensemble) and one recording source (a mono tape machine with only one track onto which to record) there exists a kind of symmetry and an obvious triad, i.e. one performance, one microphone, and one mono tape machine. With two and three microphones, that symmetry became asymmetrical. However, when Grounds got to four microphones, he seemed to have achieved a new level of symmetry. He was almost back to the same 1 to 1 ratio, albeit, somewhat differently.

Using Multiple Microphones on One (or more) Instrument/s

With the advent of multi-track recording machines, there also arrived the potential to use more microphones, not only on a single source (like our Jazz ensemble above), but also during the recording of basics and the overdubbing process. We have already witnessed, through analysis of the '50s style recording experiment, that when Lincoln Grounds reached four microphones, he conceded that a certain amount of sonic clarity was achieved. However, he added a caveat to his acknowledgment: "When we got to four mics … by the time we got to that stage, we were more in a late 50s – 60s kind of area" (Recording '50s Style). What Grounds is referring to by "50s – 60s area" is the shift from mono, single-track recording methods, to multi-track recording methods. Essentially, what Grounds is saying is, if we are going to use four or more microphones, why don't we just multi-track the instruments. The reason for his logical conclusion is quite obvious when one considers the Peircean symmetry explained above. The 1 to 1 ratio of performance and tape source, with one microphone as a catalyst, grows to a 1 to 1 to 1 configuration. On this level of analysis, our first 1 is the ensemble (a Firstness). Our second 1 is the microphone (a Secondness), and our third 1 is the mono tape machine (a Thirdness). There can be no doubt that the elegance of this symmetry is a contributing factor to Grounds' preference for one microphone over two, three, or four. In fact, the improved sonic quality achieved when Grounds got to four microphones is also the result of this symmetry. It is important to remember that the rock ensemble that Grounds was recording was comprised of four individual instruments and a vocal. Altogether, the instruments and the vocal equal five discrete performances, though when they preform together, they become one ensemble. When Grounds uses one microphone, his focus is

on trying to record the sum of the individual players, i.e. the ensemble. Adding two or three microphones disrupts the aforementioned symmetry, confuses the focal point, and introduces phasing issues (explained above). However, with four microphones, Grounds is approaching a new equilibrium, as he can focus each microphone on an individual instrument. For example, he can dedicate a microphone to the vocalist, another to the bass player, another on the drum kit, and the last microphone on the two electric guitars. It is obvious what is happening here: with all but two instruments (the two electric guitars), a new 1 to 1 ratio is being achieved, albeit in multiple layers. If Grounds were to add a fifth microphone, a true 1 to 1 ratio would be achieved (with each electric guitar having its own dedicated microphone). Consequently, since Grounds was ultimately recording to a machine with only a single track, there existed one final problem: the tape machine itself. With his four microphones converging onto one tape source, the elegance of this new symmetry was compromised.

Figure 5.5

Firstness	**Secondness**	**Thirdness**
1) Focus on Rock Ensemble	1 Microphone	Mono Tape Machine (symmetrical)
2) Focus on Rock Ensemble	2-3 Microphones	Mono Tape Machine (asymmetrical)
3) Focus on Each Instrument	5 Microphones	Mono Tape Machine (asymmetrical)
4) Focus on Each Instrument	5 Microphones	Multi-track Machine (symmetrical)

Figure 5.5 illustrates the differences between symmetrical and asymmetrical recording configurations. We hypothesize that Lincoln Grounds adds an additional microphone so that each instrument and vocal has its own dedicated microphone. When all five microphones are mixed to a single mono track, the configuration is asymmetrical. But when each microphone has its own dedicated track, symmetry is achieved once again.

Figure 5.6 is zooming in on (4) from Figure 4.5 (above).

Firstness	**Secondness**	**Thirdness**
Drums	1 Microphone	Track 1 on a Multi-track Machine
Bass	1 Microphone	Track 2 on a Multi-track Machine
Vocal	1 Microphone	Track 3 on a Multi-track Machine
Electric Rhythm Guitar	1 Microphone	Track 4 on a Multi-track Machine
Electric Lead Guitar	1 Microphone	Track 5 on a Multi-track Machine

Figure 5.6 zooms in on the last entry of figure 5.5 to reveal the reemergence of the 1 to 1 to 1 ratio, i.e. 1 instrument (or voice), 1 microphone, and 1 track. Every instrument listed in figure 5.6 is a symmetrical configuration.

Returning to Grounds' experiment, he never got to five microphones and stopped at four. It matters not whether he knew anything about semiotics or that a truly symmetrical configuration could not be achieved (due to the mono tape source). Rather, through his experience as a producer and engineer, he could sense that something wasn't quite right with the multiple microphone configuration, and he concluded that adding

more microphones would defeat the whole point of the experiment (i.e. to record a live rock ensemble, 50s style, to a mono tape source). Regardless of his awareness, this application of semiotics to his experiment succeeds in quantifying his process. He realized that, while adding more microphones has its advantages, if done so, he would have been getting away from the recording methods of the mid 1950s and getting into "… a late 50s – 60s kind of area," an era in which multi-track recording methods were replacing the older mono methods. An era when maintaining a 1 to 1 to 1 ratio on individual instruments required a different tape machine, causing a semiotic shift, resulting from the evolving methods.[28]

However, the desire for an engineer to maintain a 1 to 1 to 1 symmetry, when recording any given source, is not always possible. Therefore, in many instances, a "less than ideal" configuration must be tolerated. As such, there have been countless asymmetrical recordings since the inception of sound recording.

To understand further how Peircean semiotics is applied to sound recording methods, it is necessary to analyze instances that seem not to fit so easily in the Peircean models I have highlighted in this chapter. If we consider the shift from monophonic to stereophonic sound, we find such instances where semiotic patterns are harder to see, but are there.

The popularity of rock and pop music in the 1960s helped to usher in LPs (long play records) that were mixed in stereophonic sound. The shift from mono records (meant to be played on a one speaker system) to stereo records (with distinctive left and right channels, meant to be played on two speaker systems) caused yet another procedural shift in the methods used for sound recording. As 2 and 3-track tape machines started to replace the older single-track, mono recorders, the ability to recalibrate the amount of microphones with the number of instruments also ensued. For example, a 3-track machine would make it possible to use 3 microphones and still maintain a perfect symmetry. This method was often used with popular artists, such as Frank Sinatra. The focal point of a typical Sinatra song, Sinatra's voice, would have its own dedicated microphone and track. The orchestra backing him up would commonly have two discrete microphones evenly spaced apart for stereo separation. When mixed to stereo, the two tracks of the microphones dedicated to the orchestra would be diametrically opposed, with one track being sent to the left channel (only playing out of the left speaker) and the other track being sent to the right channel (playing out of the right speaker). Sinatra's voice would be on the third track with the amplitude being sent evenly to both the left and right channels. This even distribution of amplitude to each channel results in Sinatra's voice playing equally out of both speakers, which puts his voice in the center of the stereo spectrum.[29] Unlike the earlier monophonic sound, where all the instruments

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[28] The aim of this study is, in part, dedicated to shedding light on the universality of Peircean semiotics. While the author of this dissertation is convinced that instances of Peircean semiotics are manifold in the methods of sound recording, I do not contend that it is being done consciously. An analysis such as the one being presented in this paper demonstrates how prevalent Peircean semiotics is in this art form and how engineers and producers use and apply semiotics unwittingly.

[29] The stereo spectrum is a synthetic 180-degree field made up of amplitude being sent simultaneously to two separate channels that manifest in a left and right sound source,

and voices of a sound recording would eventually wind up on a single channel and play out of only one speaker, the advent of stereo sound made it possible for the instruments and voices to be placed in three different locations (left, right, center), once again, a triad appears!

Figure 5.7

Firstness	**Secondness**	**Thirdness**
1) Voice and Orchestra	1 Microphone	Mono track and Mix (symmetrical)
2) Voice and Orchestra	2 or more Microphones	Mono track and Mix (asymmetrical)
3) Voice and Orchestra	3 Microphones	3-tracks and Stereo Mix (symmetrical)

Figure 5.7 shows how the use of a 3-track machine restores a symmetrical configuration. As noted, many recordings *were* made with multiple microphones recording onto a mono tape machine (like the asymmetrical configuration above in fig. 5.7). However, this practice was typically the result of recording engineers pushing the boundaries of sound recording methods, experimenting with every possible permutation available to them. And as seen with Lincoln Grounds' experiment, the elegance of a 1 to 1 to 1 configuration usually was preferable to multi microphone configurations. If we analyze the entries in figure 5.7, the single microphone configuration (1) would need to feature the vocal, while capturing enough of the orchestra. This blend, when achieved, would then be recorded onto a single track. With this configuration, the vocalist and the orchestra are treated as one ensemble. With a configuration of two or more microphones (2), the vocal would still need to be featured (by having its own dedicated microphone), but elements of the orchestra could also have dedicated microphones. These additional microphones, while potentially adding some extra clarity, also bring more ambiance and unwanted phasing issues to the sound. With this configuration, the vocalist and the orchestra are treated as separate entities, but since the multiple microphones are ultimately recorded onto a single track, the listener does not experience (by hearing them as such) the vocal and orchestra as separate entities. Lastly, with 3 microphones going to their own dedicated tracks, there are three distinct configurations of the 1 to 1 to 1 symmetrical ratio, as well as a dedicated space for each microphone in the stereo spectrum, resulting in a 1 to 1 to 1 to 1 recording and mixing chain. With this configuration, the vocalist and the orchestra are treated as separate entities. But since each signal path gets its own dedicated track and position in the stereo spectrum, the listener can hear, not only the separation between the vocal and the orchestra, but also the separation of the individual instruments, such as the brass section from the string section,

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usually two external speakers or smaller speakers inside of headphones. Increasing the amplitude exclusively to one channel creates the illusion that a recorded instrument is more to that side of the spectrum. 100 percent amplitude to one side and zero to the other puts the instrument completely to the left or right of the spectrum. An equal distribution of amplitude to both channels puts the instrument dead center of the spectrum. Since human beings listen with two ears, and the brain perceives distances of sound sources stereophonically, recordings that are mixed in stereo seem more realistic to the listener than monophonic recordings do.

in a large orchestra. In fact, with instrumental recordings, the microphone and track normally reserved for the vocal could be added to the center of the orchestra, resulting in even more separation and depth of the orchestra.

The Advent of 4 and 8-track Tape Machines

By the 1960s, rock bands, like The Beatles, were relying almost exclusively on the overdubbing process to make their records. The Beatles primarily used a 4-track tape machine, which allowed them to take advantage of stereophonic sound. However, most Beatles' records (up to about 1968) were recorded with the intent to be released in mono, and when their records were released in stereo, they did not convey a sense of balance or symmetry. This lack of symmetry was due to the limitations of the technology, but also a level of ignorance regarding the stereo spectrum.

The early Beatles' records (1962-65) were recorded very similarly to Lincoln Grounds 2-3 microphone method referenced above. The rhythm section (drums, electric bass, and electric rhythm guitar) was usually treated as one ensemble and recorded with one microphone onto one track on the 4-track machine. A lead guitar was overdubbed onto a separate track, leaving two more tracks for lead and backing vocals (sometimes percussion was also overdubbed on the backing vocal track).[30] These tracks were symmetrical when recorded (as seen in fig. 5.8). But when these tracks were mixed to mono, the separation of all the instruments was diminished, resulting in the type of asymmetrical configuration given in fig. 5.9.

Figure 5.8

Firstness	**Secondness**	**Thirdness**
Rhythm Section	1 Microphone	Track 1 (symmetrical)
Lead Guitar	1 Microphones	Track 2 (symmetrical)
B.Vocals and Percussion	1 Microphone	Track 3 (symmetrical)
Lead Vocals	1 Microphone	Track 4 (symmetrical)

Figure 5.9

Thirdness		
All four tracks	>	Monophonic Mix (asymmetrical)

However, unlike the symmetrical configuration that emerged above when mixing 3 tracks to stereo, The Beatles stereo mixes were often still in an asymmetrical configuration.

As explained above, the stereo spectrum is 180 degrees of space, in which any instrument can be placed at any point within that spectrum. As the spectrum roughly approximates a human's ability to hear (assuming the person has unimpaired hearing), it

[30] Due to the paucity of tracks, tracks were often used for different instruments during different parts of a song. For example, if a backing vocal only occurred during the chorus of the song, that same track would be empty during the verse. Therefore, a tambourine could be added in the verses, and that track would be comprised of two different performances, happening at different parts of the song.

is advantageous to place instruments inside of the spectrum similarly to how we perceive them in the real world.[31] We see such an example with the 3-track recording explained above, where, when listening to the recording, one can close his or her eyes and imagine an orchestra in a concert hall with a singer like Frank Sinatra standing in the center of the stage, slightly in front of the orchestra. However, in reality, one is sitting in front of two speakers, one to the left, and the other to the right of the listener.

The Beatles' stereo records were asymmetrical because the instruments were placed in an unnatural way within the stereo spectrum. In some instances, the entire rhythm section (drums, bass, rhythm guitar) was placed completely on the left side and a lead vocal on the right side, other instruments and vocal parts could appear in the center or on either side of the spectrum. This kind of asymmetry may have preserved the clarity of the four discrete tracks, but conveyed a sense of unnatural disjointedness to the listener, with the recording sounding lopsided. The reason for this lopsidedness was due to a misunderstanding of how to use the space available within the stereo spectrum. While one would think that there are 180 spaces within a 180-degree arch, and therefore, ample space for dozens of instruments, the 180-degree spectrum is somewhat of an illusion. It is, in actuality, made up of two channels of amplitude. As explained above, center placement is achieved by balancing the amplitude to both channels. Since the stereo spectrum was designed to mirror how humans actually hear, instruments should be placed within the spectrum similarly to how they sound in an actual room or space.

When listening to a rhythm section performing live in a room, one does not hear them only through one's left ear – even if the musicians were playing in the left corner of a room, with the listener standing in the center of the room. The listener would still hear the rhythm section through both ears, albeit more in the left than the right. Furthermore, the singer of the band would not be performing on the opposite side of the room from the rhythm section. Yet, this is precisely the way many early Beatles' songs sound when mixed in stereo. A more natural placement for their instruments would have been to put the rhythm section and lead vocals in the center, as if they were on a center stage in front of the listener, exactly where they would be if it were an actual performance. Other instruments, such as the lead guitar and piano accompaniment, as well as other vocals, like the harmony and backing vocals, could have been placed more on the left and right sides of the spectrum. It should be obvious that there is a correlation between natural sound placement (that which mirrors sound sources in a natural environment) and the triad of the left, right, and center spaces that constitute the stereo spectrum. Simply put, if the center is not utilized as the focal point, and the sides (left, right) not used for placement of supporting instruments and voices, the stereo mix sounds unbalanced to the listener. This naturalness is the result of how we orient ourselves in the direction from where the music is coming. As humans, we naturally try to center the music in front of us.

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[31] I say 'roughly' here because stereophonic sound is not 360 degrees, and therefore, lacks a true front and back spectrum. The development of quadrophonic sound adds a front and back to the left and right of stereophonic sound.

The bottom line with many, if not all, of the stereophonic mixes of early rock and roll music was that there was no industry standard, no convention (no Thirdness). [32] Ironically, with fewer tracks, like the Ampex 3-track machine, the stereo spectrum was better utilized. With an obvious left, right, and center, most engineers and music producers instinctively knew to put the focal point in the center and the accompaniment on the sides. But as tape machines with more tracks were developed (primarily those with 4, 8, 16, and eventually 24 tracks), a quandary as to where to place all these tracks in the stereo spectrum developed. Concurrently, as the tape machines were expanding in the number of tracks they offered, so was rock and pop music becoming more complex, not only in the sophistication of the compositions, but also in the instrumentation and orchestrations used in the production of these musical genres.

In 1967, The Beatles released their masterpiece, watershed album, *Sgt. Pepper's Lonely Hearts Club Band*. The album was recorded using two 4-track tape machines through a process of dubbing down (or bouncing).[33] The machines were also synchronized at one point during the recording sessions, creating a virtual 8-track machine (Lewisohn 2009). The album marked a turning point in the understanding of utilizing the stereo spectrum. While there were still songs on the album that ignored the importance of placing the focal point of the song (usually the vocals) in the center, the majority of the songs were mixed in a way that still maintained a symmetrical balance. Though there still was no industry standard for stereo mixes in 1967, George Martin, The

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[32] Until the late 1960s, most radio stations that played pop and rock music were AM (amplitude modulation), which is mono. The dominance of AM radio facilitated a need for mono recordings. However, by the 1970s, FM (frequency modulation) radio stations rapidly began to replace the AM stations for playing most genres of music. The primary reason for this replacement was due to the frequency modulation stations ability to broadcast stereophonic sound. With the ubiquity of FM stations and industry standardization of the stereo spectrum, mono recordings fell into obsolescence.

[33] The process of bouncing tracks used by George Martin (The Beatles' producer) was executed by recording on the first three tracks of a 4-track machine, and then recording those three tracks (internally) to the remaining open fourth track. Once those three tracks are recorded to the fourth track, they are frozen together as one sound. With track four now being a composite of tracks 1-3, the engineer is free to erase over tracks 1-3. This process can be repeated by recording new instruments or voices to tracks 1 and 2. Those tracks can be recorded (internally) to track 3, which now becomes a frozen composite of tracks 1 and 2. At this point, the internal bouncing process is maxed out, since bouncing one instrument to one track is a net gain of zero. When counting the permutations of internal bouncing, a 4-track machine can yield a total of seven tracks (track 4 consisting of three frozen tracks, track 3 consisting of two frozen tracks, and tracks 1 and 2 remaining single, dedicated tracks: 3+2+1+1=7). With two 4-track machines, The Beatles could theoretically gain a track by bouncing all four tracks from machine 1 to one track of machine 2, and then, continue the bouncing method on machine 2 (4+2+1+1=8). They could even, theoretically, record tracks from machine 2 back to machine 1 to gain even more tracks. This method was used on the Sgt. Pepper's album, but rarely taken to far extremes, since the quality of the original analog signal degrades with each bounce onto magnetic tape.

Beatles' record producer, finally had at his disposal, enough tracks (through the bouncing process) to map with the multiple instrumentation used in the production of The Beatles' songs. This gain in the number of tracks allowed Martin the luxury to pick and choose the instruments he wanted to treat as individual representations versus ensemble representations. One song from the Sgt. Pepper's album that serves as an example of a symmetrically balanced stereophonic mix is titled "Getting Better". The following figures will demonstrate The Beatles' recording of "Getting Better" through the binoculars of Peircean semiotics.

Figure 5.10 (figures 5.10 – 5.15 as documented in *The Beatles Bible* 2018)

First day of recording "Getting Better", March 9th 1967, take 7.

In the realm of Firstness, recording onto the first 4-track machine

Firstness	**Secondness**	**Thirdness**
Drums and Rhythm Guitar	1 Microphone	Track 1 (symmetrical)
Guide Vocal	1 Microphone	Track 2 (symmetrical)
Electric Pianet	1 Microphones	Track 3 (symmetrical)

Taking place in Secondness

Firstness	**Secondness**	**Thirdness**
Overdubbed Drums	1 Microphone	Track 4 (symmetrical)

In Figure 5.10, each configuration maintains the symmetry of a 1 to 1 to 1 ratio. Recorded onto track 1, the drums and rhythm guitar are considered one ensemble, with the microphone primarily picking up the electric rhythm guitar as the focal point and the drums as accompaniment. Track 2 is guide track. This vocal performance is only meant to cue the other musicians to the arrangement of the song. It is not a final performance, as much as it is a guide, hence the name. Nonetheless, it is still one performance, recorded with one microphone onto one track (1 to 1 to 1). Track 3 is an electric piano, performed simultaneously with the drums, rhythm guitar and guide vocal. The instruments recorded on those three tracks constitute the seventh take of a live performance. Track 4, however, is an overdub. These extra drums were recorded onto track 4 after the performance recorded on the other three tracks. Because the Firstness of the recording happens during the initial performance of the song (in this case, on the other three tracks), everything recorded thereafter takes place in Secondness. Viewed on this level, we can say that there exists a Firstness, Secondness, and Thirdness in the realm of Secondness, giving rise to another fractal.

Figure 5.11

Second day of recording "Getting Better", March 10th 1967

Still taking place in Secondness, bouncing onto a second 4-track machine

Tracks 1, 3, and 4 from the first 4-track machine are bounced to track 1 of a second 4-track machine (asymmetrical)

Firstness	**Secondness**		**Thirdness**
T1) Drums and Rhythm Guitar	Bounced		
T3) Electric Pianet	Bounced	>	Track 1 (asymmetrical)
T4) Overdubbed Drums	Bounced		

The drums and rhythm guitar, pianet, and overdubbed drums were all bounced to one track on the second 4-track machine (the guide vocal was omitted from this process). We can say that this process ends at a Thirdness, inside of a Secondness (but we are not yet at an actual Thirdness, which will only be reached when the entire recording is completed). These tracks, if not reinterpreted as a single rhythm track (aka, basics), would be an asymmetrical recording, i.e. multiple instruments, recorded by multiple microphones, mixed to one mono track. However, because the song was far from finished at this point in the process, and these tracks combined to constitute one building block of the overall recording, their asymmetrical nature, while not ideal, is tolerable.

Figure 5.12

Still taking place in Secondness, recording onto the second 4-track machine

Firstness	**Secondness**	**Thirdness**
Tracks 1, 3, and 4	Bounced from first 4-track	Track 1 (asymmetrical)
More Drums	1 Microphone	Track 2 (symmetrical)
Bass	1 Microphones	Track 3 (symmetrical)
Tamboura	1 Microphone	Track 4 (symmetrical)

As The Beatles continued to build up the recording with more tracks, they remained in a Secondness. The bounced tracks (1, 3, and 4) from the first 4-track machine were now seen as a composite rhythm ensemble, that is to say, the three instruments that comprised the Firstness, upon which the song is built, the electric rhythm guitar, original drums, and pianet, were now being interpreted as one rhythmic instrument. Recorded on track 2 (via the overdubbing process) are more drums, an electric bass guitar (track 3), and string instrument called a Tamboura (track 4). All three of these instruments maintained a 1 to 1 to 1 symmetrical ratio.

Figure 5.13

Third and fourth days of recording "Getting Better", March 21st and 23rd 1967

Still taking place in Secondness, bouncing and recording on the first 4-track machine

Tracks 1 and 4 from the second 4-track machine are bounced back to track 1 of the first 4-track machine (asymmetrical).
Tracks 2 and 3, from the second 4-track machine are bounced back to track 2 of the first 4-track machine (asymmetrical).

Firstness	**Secondness**	**Thirdness**
Tamboura & Rhythm	Bounced from 4-track	Track 1 (asymmetrical)
Bass & Drums	Bounced from 4-track	Track 2 (asymmetrical)
Vocals	1 Microphones	Track 3 (symmetrical)
Vocals	1 Microphone	Track 4 (symmetrical)

On the 21st, previously recorded tracks were bounced again, this time, back to the first 4-track machine. The original rhythm tracks (our Firstness) were combined with the tamboura on track 1. Bass and drum elements were bounced to track 2. Vocals were attempted, but not deemed useful on tracks 3 and 4. On the 23rd, vocals (both lead and backing) were successfully recorded to tracks 3 and 4. Then, one last bounce was preformed, sending all the recorded tracks back to the second 4-track machine.

Figure 5.14

Still taking place in Secondness, bouncing and recording on the second 4-track Machine

Firstness	**Secondness**	**Thirdness**
Tamboura & Rhythm	Bounced from 4-track	Track 1 (asymmetrical)
Bass & Drums	Bounced from 4-track	Track 2 (asymmetrical)
All Vocals	Bounced from 4-track	Track 3 (asymmetrical)
Multiple Instruments	Multiple Microphones	Track 4 (asymmetrical)

The final phase of overdubbing saw the two vocal tracks (formerly tracks 3 and 4) being bounced to track 3 of the second 4-track machine. The final open track (track 4) was used to record four more instruments at different points in the song: handclaps, piano, congas, and electric guitar. With the conclusion of the fourth and final track, a complete set of asymmetrical tracks is what comprises "Getting Better". However, while these tracks are asymmetrical in how they were recorded, they still wind up being symmetrical in the final stereo mix.

Figure 5.15

Mixing "Getting Better" in Stereo, April 17th 1967

In the realm of a Thirdness		
Tamboura & Rhythm	Mixed to left channel	(symmetrical)
Bass & Drums	Mixed in the center	(symmetrical)
All Vocals	Mixed in the center	(symmetrical)

Multiple Instruments Mixed to right channel (symmetrical)

We can see in figure 5.15 that the stereo mix winds up using the stereo spectrum in a 4 to 3 manner. That is to say, the four composite tracks wind up in three spots. By placing the vocals in the center, along with the bass and drums overdubs, the focal point is in a natural position, much like the earlier 3-track recordings we saw with Frank Sinatra recordings of the 50s and early 60s. The bass and drums do not interfere with the vocals because the vocals occupy a higher frequency than the lower pitched drums and bass. The composite of the original rhythm tracks, now bounced to track 1 and mixed to the left channel, serve as accompaniment, along with the composite of melodic and rhythmic embellishments on track 4, which are mixed to the right channel. The whole mixing process is a Thirdness, which will be taken up in the next section of this chapter. However, the significance of the instrument placement within the stereo spectrum must be recognized as a Peircean triad, further emphasizing the importance of the number three in Peircean semiotics. George Martin, The Beatles' producer, intentionally or unintentionally mixed "Getting Better" in a way that aimed at correcting the asymmetrically recorded composite tracks by placing them into the stereo spectrum in a symmetrical manner, and this mix foreshadowed what was right around the corner.

Conventionalizing the Stereo Spectrum

By the early 1970s, the recording industry had standardized the stereo spectrum via convention (a Thirdness). The lead vocals, of course, were centered.[34] The bass drum and snare drum, along with the bass guitar, were also centered.[35] Solos, often played when the vocals are not present, were also centered. Rhythm guitars, keyboards, backing vocals, percussion, and other musical embellishments and accompaniment were mixed to the side channels, i.e. left and right. This standardization, with occasional exceptions to the rules, has been the industry standard for over 40 years, not only for rock and pop music, but also for most other genres of music. As seen in our Beatles' example of "Getting Better" (figures 5.10 – 5.15) achieving a stereo mix that closely approximates the eventual standardize model, was not easy to do in 1967. George Martin (producer) and Geoff Emerick (balance engineer) had to plan multiple steps ahead when recording instruments in order to insure a balanced (symmetrical) stereo mix. As stated above, mono recordings were still favored for rock and R&B music in 1967, and stereo mixes were considered cutting edge and experimental. This is (perhaps partly) the reason why some of the stereo mixes on *Sgt. Pepper's* were asymmetrical – the planning for stereo mixes was not considered or prioritized, so the composite tracks were incapable of being mixed symmetrically. That said, there seemed to be a motivation, either wittingly or unwittingly, to achieve as much symmetry as possible.

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[34] Often, the linear harmony vocals are also centered.

[35] The bass drum and bass guitar, occupying lower frequencies than the human voice, do not interfere sonically with the vocals. The snare drum, however, does contain some frequencies that can overlap with the vocals. But, due to the percussive nature of the drum and how it is hit in rock and pop music, its interference with the vocals is minimal.

Because of the limitations with 4-track recording, and The Beatles' striving for as much isolation as possible on each instrument, the composite tracks wound up asymmetrical. There were simply too many instruments and not enough tracks. While the overall amount of instruments was not technically the problem (remember that a 60-piece orchestra can be recorded with one microphone onto one track, or with two microphones onto two tracks), the insistence on perceiving each instrument individually, as opposed to grouping instruments and perceiving them as ensembles, was where the limitations of the 4-track caught up to The Beatles and their producer/engineers.

In our examples above of early to mid 1950s recording methods, Lincoln Grounds had to decide how to perceive the instruments. With one microphone, he perceived the four instruments and vocalist as one ensemble. This perception yielded the most favorable results, since it preserved best a 1 to 1 to 1 to 1 ratio (one ensemble, one mic, and one track, mixed in mono). When he added two and three microphones, nothing was gained, but symmetry was lost. When he got to four microphones, he was approaching a new potential symmetry (he would have reached it with five microphones), where each instrument and voice would have its own dedicated microphone. However, each instrument could not have its own track because he was recording everything to one track. Realizing this limitation, he stopped at four microphones.

The Beatles, on the other hand, had four tracks onto which to record. If "Getting Better" had only consisted of drums, bass, guitar, and vocal, each instrument could have had its own dedicated microphone and track (symmetrical). The song could have been mixed in the stereo spectrum with vocals and drums centered, and guitar and bass to the side channels (once again, symmetrical). Of course, as seen in our figures, "Getting Better" was not comprised in such a manner. However, they could have approximated something like it by treating each track as an ensemble, as opposed to individual, isolated instruments. In other words, they could have recorded onto each track the way Lincoln Grounds recorded onto his one and only track. For example, track 1 could have been one microphone, recording a live performance of drums, bass, and rhythm guitar (perceived as one ensemble). Track 2 could have been a performance of tamboura, piano, and handclaps, all captured by one microphone, perceived as one ensemble. Track 3 could have been live vocal performances, recorded by one mic and perceived as a vocal ensemble. And Track 4 could have consisted of the remaining instruments, performed live, recorded by one mic, and perceived as yet another ensemble. The reasons why The Beatles did not record "Getting Better" this way are manifold. Firstly, the primary songwriter of the song, Paul McCartney, had not yet written, or even conceived of, all the instrumentation that would eventually comprise the song, before recording commenced. In actuality, the song was pieced together gradually, in layers. Therefore, it would have been impossible to record all the instruments at once (without overdubbing). Secondly, the practicality of such a live recording would have been extremely hard to achieve. While not impossible, it would have required no fewer than 12 musicians and singers to perform all the parts that constitute the song, with each group separated enough from one another to reduce unwanted bleed and phasing issues between the microphones, yet close enough to communicate as groups of individuals, simultaneously performing a song. Lastly, and most importantly, are the individual Beatles themselves. What role would they play in this hypothetical, colossal recording session? Each Beatle was capable of playing multiple instruments, but could only play one at a time. For example, McCartney,

via the overdubbing process, plays both electric rhythm guitar and electric bass guitar on the actual recording. It is impossible for someone to play both instruments at once. He also sings lead vocal on the song. And while it is possible for him to play bass and sing at the same time (he often did that in their live performances), it is not ideal to play an instrument, while singing lead vocals in a recording session. McCartney also harmonizes with his own lead vocal which is only possible via overdubbing because the human voice is monophonic. He also contributes to the handclaps, which is impossible to do when playing a stringed instrument. So what would McCartney do in a live recording, just sing, just play bass, or guitar? Suffice it to say, the recording would not have been the same if he had only performed or sung one part.

It is clear from this analysis that The Beatles unique way of writing and recording (where each member of the band preferred to overdub his own musical parts, instead of using a multitude of musicians to perform the parts as live ensembles) is what forced them to rely heavily on the overdubbing process and subsequent bouncing of tracks, creating composites of layered instruments. This unique method of recording is what gave The Beatles' studio recordings such a distinctive sound from 1966 until their breakup in 1970. They wanted to create the illusion that many musicians were playing the multiple parts in their songs, when, in actuality, it was only (for the most part) just the four of them. Because this method presents the instruments in a way where they are perceived as individually, isolated instruments (as opposed to ensembles), The Beatles needed a multitude of tracks to preserve symmetry. Having only four tracks, however, their maintenance of symmetry was impossible. Only when Martin mixed their tracks in stereo did they achieve a level of symmetry, and even then, only a fraction of the song is symmetrical. This claim, by no means, intends to suggest that The Beatles' recordings were not revolutionary. Their recordings have stood the test of time and are representative of some of the most innovative and ingenious sound recordings ever made. However, despite The Beatles' achievements, their asymmetrical methods were ultimately abandoned. And when more advanced technology was eventually introduced, sound engineers and record producers, either intentionally or unintentionally, strove to pursue a symmetrical recording path that best preserves the Peircean Triad: the Firstness of the performance, the Secondness of the microphone conversion of sound waves into electric current, and the Thirdness of capturing the electric current onto magnetic tape on one dedicated track.

The limitations of 4 and 8-track machines, necessitating multiple bouncing between machines, leading to asymmetrical composite tracks with diminishing fidelity, were eventually overcome with the introduction of 16 and 24-track machines (during the late 1960s and 1970s). Finally, with the 24-track machines, there were seemingly more than enough tracks to record each instrument or voice with one microphone onto one track to maintain a 1 to 1 to 1 ratio and eliminate the need for bouncing tracks. However, as we will see, the engineer's desire to maintain a symmetrical signal chain, on every instrument, quickly used up most of tracks.

As the amount of tracks was increased, so was the ability to maintain symmetry. With the 24-track machines of the 1970s and 80s, each instrument and voice could have its own dedicated microphone and track. In fact, with such a plethora of tracks, one electric guitar, for example, could have as many as three microphones recording it! The reason for this seemingly over-indulgent practice was twofold. First off, the technology

of microphone preamplifiers was improved to increase headroom. This increase in headroom made it possible for a technique called close micing, or the close mic technique. With this technique, microphones could finally be placed within inches of the sound source, without over distorting the signal. The close mic technique also creates a proximity effect, where an instrument or voice seems louder, due to an increase in low frequencies. If we return to our electric guitar with three microphones, one mic would be a close mic, an inch away from the speaker in the amplifier cabinet. A second mic would be, perhaps, a foot or two in front of the speaker cabinet, and the third mic would be somewhere in the room where the speaker cabinet is placed. Each microphone would capture the guitar at different distances from the speaker cabinet, adding depth to the sound of the guitar. The engineer would record each microphone to its own dedicated track, thus preserving the symmetrical 1 to 1 to 1 ratio.

Figure 5.16

Firstness	**Secondness**	**Thirdness**
Same Guitar Performance	1 Microphone 1-inch from Speaker	Track 1 (symmetrical)
Same Guitar Performance	1 Microphone 1-foot from Speaker	Track 2 (symmetrical)
Same Guitar Performance	1 Microphone Placed in Room	Track 3 (symmetrical)

The engineer would then blend the levels of these tracks to give the guitar a more natural, realistic sound. Comparing this technique with The Beatles' method from our above example, The Beatles could only record a guitar with one mic (placed in a room a few feet from the speaker cabinet), and that guitar would eventually be bounced from track to track before it was eventually mixed. As is clear from this example, engineers and producers were maintaining symmetry, at the expense of using up tracks, and this sacrificial use of tracks was most obvious with drums.

Up until the early 1970s, the drum set was perceived as one instrument. We can even say that the multiple drums, which make up a drum set, were perceived as an ensemble of individual instruments. This observation is consistent with our other views of grouped instruments being perceived as ensembles, as was the case with Lincoln Grounds' 1950s experiment, where he perceived the entire rock band as one unit. By the 1960s, evinced by our Beatles' example of "Getting Better", the entire drum set was often initially given its own track, as well as additional drum overdubs on other tracks. However, these drum tracks were ultimately bounced together with other instruments, negating the individual isolation of the instrument. Rarely could one of The Beatles' precious four tracks be dedicated solely for a drum set.

As was the case with gratuitously using three mics on a single guitar, the additional tracks of a 24-track machine make it possible for an engineer to perceive the entire drum set as a collection of individual instruments. The bass drum (aka kick drum), snare drum, hi tom, medium tom, low tom, and hi hat cymbals are all recorded using the close mic technique. That configuration constitutes six individual microphones, as well as six discrete tracks onto which the drums are recorded. Additionally, a drum set normally has (at least) three cymbals. These cymbals, as well as the entire drum set, are recorded by two microphones place anywhere from a few inches to a couple feet above the drum set. These two 'overhead' microphones are placed on opposite ends of the drum set, i.e.

one over the right side of the drum set and the other over the left side with both microphones pointing downward at the cymbals.[36] This placement of microphones creates a stereo image of the drum set when each of the two microphones is recorded onto its own individual, discrete track, with one track being sent to the left channel and the other being sent to the right channel (the term used to describe placement within the stereo spectrum is 'Panning'). When AB overhead tracks are panned hard left and right (diametrically opposed from each other), they increase the separation of the individual drums that make up the drum set. Lastly, engineers often still place one (sometime two mics) at a distance from the drum set in the room where the drums are being recorded. This mic records the drums as an ensemble, and as a result, captures a more ambient drum sound. It must be noted here that the room microphone is comparable to the single microphone that was used to record drums in earlier recording methods, during the 1960s. As we can see, with the increase of tracks provided by a 16 or 24-track machine, the amount of mics and tracks used on the drum set grew from 1 to 9 (in some cases, it can grow to as many as 14 mics and tracks on one drum set, depending on the size of the drum set!). The significance of the hypothetical example above is to highlight the shift in the perception of the drum set by engineers and producers. When recording onto machines with fewer than 16 tracks, one (room) microphone was often sufficient to record an entire drum set. The drums were either perceived as being part of entire ensemble (earliest recordings up until the early to mid 1960s), when one mic was often used to record an entire live ensemble to a single track, or the drums were perceived as one complete instrument (not a collection of individual drums), when one mic and track were used to record an entire drum set. But, as already stated, even when drums were recorded to their own track, they would often eventually be bounced down with other instruments and not wind up on their own track (as was the case with our Beatles' example).

Suffice it to say, the increase in tracks changed the way drums were perceived. This shift in perception was revolutionary for sound recordings of music. The shift resulted in drums becoming very prominent instruments in most rock and pop recordings. And just as we have seen throughout this chapter, the driving force behind this shift in perception was a desire to maintain symmetry via the 1 to 1 to 1 ratio, i.e. one drum, recorded by one microphone, onto one track. With the additional tracks provided by 16 and 24 track machines, a drum set could no longer be perceived as a collection (ensemble) of drums, but rather, individual drums, worthy of individual attention.

Figure 5.17

Recording drums with less than 16 tracks

Firstness	**Secondness**	**Thirdness**
Drums perceived as one of many instruments	1 Microphone	Track 1 (symmetrical)

[36] This technique for placement of overhead mics is called AB and is considered to be one of the most common ways to increase the stereo width of drum sets in recordings. However, it is not the only technique used by recording engineers when placing overhead microphones.

Drums perceived as one instrument	1 Microphone	Track 1 (symmetrical)

Figure 5.18

Recording drums with 16 or more tracks

Firstness	**Secondness**	**Thirdness**
Kick Drum	1 Microphone	Track 1 (symmetrical)
Snare Drum	1 Microphone	Track 2 (symmetrical)
High (pitched) Tom	1 Microphone	Track 3 (symmetrical)
Medium Tom	1 Microphone	Track 4 (symmetrical)
Low Tom	1 Microphone	Track 5 (symmetrical)
Hi Hat Cymbals	1 Microphone	Track 6 (symmetrical)
Overhead A	1 Microphone	Track 7 (symmetrical)
Overhead B	1 Microphone	Track 8 (symmetrical)
Room Mic	1 Microphone	Track 9 (symmetrical)

Despite the plethora of individual drum tracks listed above, all of the tracks still needed to be mixed in the stereo spectrum's three slots (left, right, and center). The challenge for engineers and producers was to maintain symmetry, while mixing the drums into those three slots and preserve a natural, realistic sound of the drum set. Ultimately, the decision was made to mix the drums one of two ways: from the drummer's perspective or from the audience's perspective. Regardless of which perspective chosen, the drums were positioned the same way, with either perspective being a mirror image of the other. Here is the positioning of a stereo drum set from the audience's perspective (i.e. looking at the drummer and assuming he/she is right-handed): The bass/kick drum and snare drum are mixed in the center position. Hi-pitch tom and hi-hat cymbals are positioned to the right, while the Low-pitch tom is to the left. Overhead mic A is to the right, while overhead mic B is to the left. If there is a single room mic, it is positioned in the center. If there are two room mics, they are labeled A and B room mics; the A mic is positioned to the right, and the B mic is to the left. That mid-pitch tom is positioned either in the center, to the right, or to the left, depending on the drum's pitch relative to the other two toms. If the mid tom is pitched in between the high and low toms, it generally gets placed in the center. If it is a mid-high tom, it will be placed farther to the right, and if it is mid-low pitched, it will be placed more to the left.

Of course, this example is hypothetical. A drummer may only have one tom, or no toms at all. On the other hand, the drummer could have as many as six toms! Despite the number of toms, there is always an effort to maintain symmetry with the toms. In instances where there are an odd number of toms, only the tom with the mid pitch is centered. Hi to mid-hi pitched toms will always be to the right, and low to mid-low pitched toms will always be to the left. In instances where there is an even number of toms, no tom will be centered.

Regardless of the actual amount of drums comprising the set, the goal is always the same: to maintain symmetry and balance in the stereo spectrum and preserve a natural, realistic sound of the drums. This symmetry is only achieved by maintaining a 1

to 1 to 1 ratio throughout the entire recording process, as well as during mixing by positioning each drum track in the stereo spectrum.

Mixing is a Thirdness

Mixing is the final step in the recording process.[37] Essentially, during the mixing process, all the separate tracks of any multi-track recording are blended together to sound like a 'single performance event'. The telic nature of the mix brings with it a bit of irony. If the goal of modern recordings is to sound like a single performance event (which had always been possible with the earliest recording methods), then what advantage has been gained through all the technological advancements in sound recording? The advantages are mainly, if not entirely, seen in the *methods* used by engineers and producers to capture the performances of the musicians and songwriters. Because the ultimate goal of a sound recording of music is to signify an actual performance, the further a method gets from capturing that performance, the longer that method has to travel back to where it began, i.e. as a single performance event. For example, as mentioned above, recording methods of the mid 1950s (when ensembles where recorded with one microphone onto a mono track) were only capable of capturing live performances. The mixing (or blending) of the various instruments comprising the ensemble could only be done by moving the microphone in the room, around the ensemble, until the desired blend was achieved. If the performance also included a vocal, the positioning of microphone was even more restricted, as the vocalist would almost always be the focal point of the performance. This technique of positioning a microphone was essentially the mixing process of early sound recording methods. If we revisit the first figure of this chapter, we can add this aspect of Thirdness to the figure.
Figure 5.19

Firstness	**Secondness**	**Thirdness**
Live Performance	Sound Waves	Microphone
Live Performance	**Microphone**	**Position of Microphone**
Live Performance	Microphone	Imprinted Sound Waves
Live Performance	Recording Session	Finished Recording

In figure 5.19, the positioning of the microphone resides in Thirdness when perceived as an action of capturing sound waves from the ensemble – the ensemble being a Firstness and the microphone a Secondness (shown in bold). This perspective, zoomed out from perceiving the microphone as a Thirdness, but more zoomed in than perceiving the imprinted sound waves as a Thirdness, is the only place where mixing (as a Thirdness) resides in the early recording methods of the mid-1950s. If perceived at the

[37] Mixing is also referred to as the final bounce down. That is because the tracks of the multi-track machine, in this instance a 24-track tape recorder, are mixed together through a stereo mixing board and then rerecorded onto a 2-track, stereo tape machine. This process is very similar to the bouncing process that was explained with the example of The Beatles' "Getting Better", albeit then, as part of the recording process. The mix is the final bounce down from one tape machine to the other.

most zoomed-in level, the positioning of the microphone becomes irrelevant because Thirdness is achieved when the sound waves hit the diaphragm of the microphone and are converted into electrical current. Conversely, if perceived at the level where the sound waves are imprinted onto magnetic tape, the positioning of the microphone is perceived as part of the Secondness that covers all aspects of the microphone.

When considering the technology of mid 1950s recordings, one can clearly see that the only goal was to capture a single performance event – a live performance. Therefore, there was very little to mix when the recording was finished, making the perception of mixing as a Thirdness elusive. As seen above in figure 5.19, with early recording methods, there are more variations of Thirdness existing as an end point to the linear nature of that process than there are as part of a mixing or blending process.

When recording methods evolved to maximize the advantages offered by improved technology, mixing became a distinct phase in the recording process. As shown with our example of the Beatles' "Getting Better", 4-8-track mixes were minimal. This minimalism had a direct correlation with the amount of bouncing done during the recording process. In essence, most of the mixing was being done with each bouncing and freezing of the tracks. When the recording process was finally finished, the engineer and producer were left with 4 tracks to mix and blend. But these 4 tracks were comprised of other tracks, as was shown in figure 5.14.

If we zoom out more and perceive the entire recording process of "Getting Better", we can find the proper position of mixing as a Thirdness. In order to zoom out, we need to condense figures 5.10 – 5.14 into a new Secondness. In this model, with mixing as a Thirdness, the original rhythm tracks are still a Firstness, and all of the overdubs and bouncing, become a Secondness.

Figure 5.20

Perceiving the recording of "Getting Better" as an entire process

Firstness	**Secondness**	**Thirdness**
1) Rhythm Tracks (basics)	Overdubbing, Bouncing	Mixing
2) Entire Recording Process	Mixing and Mastering	Released to the public

Figure 5.20 shows the position of mixing as a Thirdness in relation to the other phases of the entire process (1). If we zoom out even more (2), mixing becomes a Secondness (along with mastering).[38] In this hyper zoomed-out perspective, the entire recording process, including performances, recording, overdubbing, and bouncing, becomes a Firstness. The eventual release of the song to the public, as a viable commercial product, becomes the new Thirdness. Assuming the consumer accepts and approves of the product (as a song on the *Sgt. Pepper's* album), the song then conventionalizes (a Thirdness) with

[38] Mastering is the final phase of the sound recording process. It is a necessarily crucial step in the process of standardizing a recording to make it commercially viable to the consumer. Mastering, though vital in nuance, is most often performed as a completely discrete phase and is not considered part of the creative process. As a result, I have not included this phase in my analysis.

the consumer (fans of The Beatles). Having the advantage of hindsight, the recording of "Getting Better" did conventionalize with the consumer, and today, is considered an essential composition on one of rock and roll's most influential albums (Pollack 1995).

Mixing as a Thirdness really came into its own when 16 and 24-track machines became the industry standard in the early 1970s. As explained above, the greater quantity of tracks minimized the need for bouncing, while increasing the potential for maintaining a 1 to 1 to 1 ratio during the recording process. As a result, the plethora of discrete instruments on individual tracks presented the engineer and producer with a recording that was more sonically uneven than cohesive. During this era, mixing became an art form, with real time mixes becoming elaborate performances in their own right. Every track's frequency and amplitude level had to be adjusted relative to the focal point (usually the lead vocal performance) of the song. With earlier recording methods, when fewer tracks were available, the frequencies and volume levels of instruments were blended during the recording process (via mic placement and/or bouncing). However, with 24 tracks, most, if not all, the instruments were recorded at levels that maximized the sonic quality of each individual track, not the recording as a whole (remember, here, the 1 to 1 to 1 ratio refers to each individual track, not the overall recording). Hence, the need to readjust the levels of each track became an entirely new and essential procedure. Additionally, newer and newer audio devices, designed to simulate natural and organic sounds and reflections were entering into the recording studios. Audio gear, such as, reverb and compression/limiting had been around during the methods of the mid 1950s, but by the 1970s, delays, phase shifters, and flangers were also commonly used to help paint a sonic picture. Mixes were becoming so elaborate that a stratum of Firstness, Secondness, and Thirdness could exist within the realm of the Mixing-Thirdness.

Figure 5.21

Within the realm of Thirdness

Firstness	**Secondness**	**Thirdness**
Tracks as Recorded	Mixing	The Accepted Mix

As shown above in figure 5.21, the process of mixing has its own level of Firstness, Secondness, and Thirdness, creating yet another triadic fractal, this time, within Thirdness. The individual, unaltered tracks (henceforth referred to as 'Raw Tracks') are a Firstness. Using Peircean terminology, we can say that these tracks are icons of the original referents – the instruments and the voices. These raw tracks are different from those recorded using earlier methods. With the methods of the mid 50s, the mono track was an icon of the entire ensemble of instruments and voices, and with the methods used for 4-8-track recorders, the tracks were icons of composites of instruments and voices. Therefore, the raw tracks of a 24-track recording session, when a 1 to 1 to 1 ratio has been maintained, can be perceived as a new Firstness, signifying the referent without obstruction or modification. With the earlier methods, a recording of an ensemble onto a mono track is already arrived at Thirdness when it becomes sound on tape. And with the methods used for 4-8-track recordings, the tracks are in a Secondness, once they have been bounced and become composites.

Figure 5.22

Within the realm of Thirdness

	Firstness	**Secondness**	**Thirdness**
1-Track Recording of Ensemble	Live Performance	Recording	**Sound on Tape**
4 trks, Recording of Inst./vocals	Recording	**Bouncing**	Mixing Composites
24 trks, Discrete Tracks	**Raw Tracks**	Mixing	The Accepted Mix

Figure 5.22 shows the placement of mixing within the realm of Thirdness (perceived at a moderately zoomed level) for the recording methods already covered in this chapter. A mono track recording does not have a mixing phase, as mixing is done via microphone placement during the recording process. Therefore, the imprinting of sound waves onto the magnetic tape (shown as **Sound on Tape** in 5.22) is the Thirdness. A 4-8-track recording has mixing as a Thirdness. However, the tracks being mixed are composites that exist in Secondness (previously bounced tracks shown as **Bouncing** in the figure). The 24-track recording has a complete triad within the realm of Thirdness, with the **Raw Tracks** as a Firstness, the actual mixing process as a Secondness, and the completion of the mix (an agreed upon convention) as a Thirdness. It is also interesting to notice how the end result of each recording method (marked in bold in figure 5.22) moves from a Thirdness to a Firstness, corresponding to the evolving methods required for the advancements in audio technology. The 1-track (oldest recording method) does not have a triad existing in Secondness or Thirdness. It only has a single stratum of Firstness, Secondness, and Thirdness.[39] The 4-8-track recording methods have the stratum of the 1-track, as well as an additional stratum of Firstness, Secondness, and Thirdness existing in Secondness. And finally, the 24-track method has the two strata from the previous methods, as well as an additional stratum of Firstness, Secondness, and Thirdness existing in Thirdness.

Computers and Sound Recording

Initially, the introduction of computers into the world of sound recording did not affect mixing as a Thirdness. However, since the transition from an analog (magnetic tape) to digital (hard disk) format, computers have blurred the line that discriminates between mixing as a Secondness and Thirdness.

In the mid-late 1970s, computers were integrated into analog, tape-based systems in most 'state of the art' recording studios. Computers were used to automate the ever-

[39] Remember, here, our perception is from a moderate view of the recording process. As stated earlier in the chapter, if we zoom in on the recording process, the microphone will become the Thirdness. Likewise, if we zoom out, the release of the recording to the masses for commercial consumption becomes the new Thirdness. These shifting perspectives are variables that must always be specified before giving an analysis.

increasing complex mixes that were prevalent throughout that decade.[40] Since that era, rock and pop songs have no longer been the product of simple arrangements, comprised of four or five instruments and a vocal. The 24-track machine (then industry standard) made it possible for multiple tracks of drums, guitars, backing vocals, keyboards, and orchestral instruments. These elaborate recordings required multifaceted, nuanced tweaks and adjustments during the mixing process, for which computer automation was extremely well suited. That being said, in this early period of automation, the application of computers to the mixing process did nothing to alter the classification of mixing as a Thirdness. The decision to end the recording/overdubbing phase of a session and transition to the mixing phase still marked the shift from Secondness to Thirdness. Once in the mixing phase, the raw tracks still became a new Firstness, despite the aid of computer automation. The actual act of mixing, whether done by human hands or automation or a combination of the two, was still a clearly defined Secondness. The decision to accept the mix by the performers, engineers, producer, and record company (if one were financing the entire project) still marked the Thirdness within the Thirdness of mixing.

Computers Have Blurred the Semiotic Boundaries

The transition from the analog to the digital platform (1990s to present) has had a profound affect on the art form of sound recording, with numerous modifications to former methods of recording. But perhaps the most significant transformation has been with mixing, where mixing has reverted to a Secondness.

Digital (hard disk) recording, using a software program, a Digital Audio Workstation (DAW), has revolutionized the methods formerly used and discussed in this chapter. Because the recording is captured to a hard drive, via conversion of analog sound waves into binary code, the amount of tracks are limited only by the available space on the hard drive being used for the recording. For all practical purposes, DAWs offer an unlimited amount of tracks to the engineer. With this unlimited amount of tracks, the art form of internal bouncing has become obsolete. Another upshot of digital recording is its substance – digital information. As binary code, digital recordings never degrade, which means tracks can be copied and pasted *ad infinitum.* For an entire generation (the last 25 years), the modern recording engineer has enjoyed the luxury of the previously discussed 1 to 1 to 1 ratio with no fear, whatsoever, of running out of those precious tracks. Today (in most instances), instruments are recorded to their own dedicated track and are perceived as individual instruments and not as an ensemble. In instances where the instruments are intended to be perceived as an ensemble, e.g. a drum set, each individual drum is first recorded to its own track (as described above), and then a sub mix of the individual drums are blended to signify the separate drum tracks as a drum set.[41]

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[40] Computer automation was applied to the following properties of sound recording: controlling levels (amplitude), mute and unmute, equalization of frequencies, compression/limiting, and panning (position of track within the stereo spectrum).

[41] Sub mixes or sub busses/bussing should not be confused with the final mixing phase or final bounce. Sub mixing is a process by which the recorded tracks are grouped on the mixing board. Each individual track is routed through an auxiliary channel (also called a

However, despite the overabundance of tracks and lack of degradation of the sound waves, the multi-track recording must still be bounced into the stereo spectrum in order to be mass-produced, disseminated, and consumed by the masses. Because the stereo spectrum is a triad, consisting of three slots, it can sometimes be seen as a limitation or restriction. Of the different phases involved in sound recording, the mixing phase (comprised of amplitudes being sent to Left and Right channels with equal amplitude to both channels resulting in a Center position) has certainly been the least altered.[42] Ever since the late 1960s, when stereo became the industry standard, the process of bouncing tracks from the multi-track recorder onto a 2-track analog recorder (or digital equivalent) has continued, unabated. Therefore, it is paradoxical that it is within the mixing process where the foremost semiotic shift in the art of sound recording has occurred.

The reason for this shift is due to 'total recall'. Recording on computers has given the modern engineer and producer the ability to preserve all data. Every phase of the recording process is saved, and can, therefore, be recalled in its exact previous form (i.e. no data is ever lost or erased). Since the semiotic analysis of sound recording is conditioned by physical events – the beginning and end points of each phase – the

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bus) and sent to a master channel/s (or master bus). The objective is to group tracks of similar instruments for ease of control and to create the perception that there are fewer tracks, when in actuality, the bus is comprised of multiple, individually recorded tracks. For example, before the advent of the 16 and 24-track tape machines, drum sets were often recorded by two microphones, onto two tracks. These two tracks were then panned, hard left and right, to represent a drum set in stereophonic sound. Today, drum sets are recorded by as many as fourteen microphones, onto an equal amount of tracks. These fourteen tracks are then routed on the mixing board (via busses) to two master busses. These two master busses are then panned hard left and right to represent the drum set in stereophonic sound. We can see that the older (two track) method (that was restricted by the number of tracks available at the time) still resulted in a stereo recording of the drum set. However, with only two microphones, clarity and control were limited. If, for example, a particular drum (let's say a tom) were louder and buzzing in an undesirable way, there would be no way to change the sound of that drum because it would be frozen as part of the overall ensemble of the drums. On the other hand, with the new recording techniques, that same loud, buzzy tom would have its own track and could be dealt with. This extra control over every drum is the reason for using so many microphones and tracks. However, having fourteen tracks of drums can also be unwieldy and overwhelming. Therefore, the 'best of both worlds' scenario is to have complete control over each drum, but to group them together as if they were only two tracks. The fourteen individual drum tracks that are bussed to two master bus channels are still accessible for tweaking (unlike the older technique, where the individual drums are not accessible). In essence, a sub mix is an internal pre-mix of the final mix.

[42] This dissertation recognizes the currently conventionalized stereo spectrum as the industry standard. However, the author also acknowledges that other spectrums exist, e.g. the Quad spectrum, as well as the Virtual Reality Projectors created by BARCO, offering a more realistic 3D stereo spectrum.

eradication of these events affects the analysis. Total recall destroys the linear nature of this process.

Before computers and digital recording existed, there was a natural, linear order in which the recording process took place. This process has already been explained in detail above, but will be briefly reiterated here for convenience. First, the rhythm instruments (the basic tracks) were recording, thus laying down the foundation of the song. With the old (analog) method, it was imperative that (at least) the drums be recorded first because all subsequent instruments would play in time to the drum performance. During this phase, other instruments, such as bass guitar, rhythm guitar, and/or piano could perform simultaneously with the drums as an ensemble. Secondly, melodic instruments, embellishments, and vocals were recording. This second phase was primarily done via the overdubbing method. Lastly, the multi-track recording was mixed and bounced down (in stereo) to a 2-track source. As shown throughout this chapter, each one of these phases fits inside of Peirce's triad of Firstness, Secondness, and Thirdness. Furthermore, the fractal nature of Peirce's triad allows for triads to fit inside of triads. However, this fractal nature is contingent on one's perspective and perception of the event happening in real time.

Conversely, today's computer technology, with full automation and total recall, has affected the real time aspect of the recording process. Additionally, advancements, such as tempo mapping and quantization, have made it possible to record drums and other rhythm instruments at any point, and in any order, during the recording process. In short, any instrument or voice can be recorded in any order (assuming that instrument or voice is synchronized to the tempo mapping of the digital recording session). In essence, the conductor (the one keeping time, usually the drummer) is no longer a human being; it has become the internal clock of the computer itself.

Surprisingly, however, despite the ability to record songs in an unorthodox manner, most rock and pop songs are still recorded in the traditional way, i.e. as explained above, with rhythm instruments laying the foundation and most other performances recorded as overdubs. So while the potential is there for semiotic shifts to happen during the recording phase, they rarely do. It is primarily during the mixing phase where the technology has altered the process, resulting in mixing becoming more of a Secondness than its former Thirdness.

In the former era of manual mixing, and even analog automation, the mixing phase was an additional performance that took place in real time. This human element made each mix and attempted mix of a song a separate distinctive event. This uniqueness could not be exactly duplicated. No matter how similar one mix seemed to another mix (of the same recording of a song), the two mixes were not exact replicas. The reasons for this lack of similitude are manifold, from the human element, to fluctuations in the electric current running through the analog mixing board and other electrical devices used during the mix. The 'one off' nature of the analog mix led to many frustrating instances of multiple attempts, trying to achieve 'the perfect mix', each attempt being slightly different, but none ideal. For example, a mix that was perfect, except for a guitar being slightly too loud, would be remixed to lower the level of the guitar. The remix would solve the guitar problem, but in the process of remixing the song, the bass guitar would be altered in some way, and not sound as good as in the previous mix. And with each

permutation, this kind of 'trade off' could ensue – a slight difference in an instrument or voice could potentially 'ruin' the mix.

The reason for this seemingly inefficient method was practicality and logistics. Once a song was considered mixed, the mixing board would be reconfigured for the next song, essentially eradicating the settings of the previous song. Even with automated mixing boards, where almost total recall was attainable, it was impossible to get a mix exactly as it was before. In the most extreme cases, there was always the option of leaving the mix 'set up' until everyone involved in the process was absolutely sure the mix was acceptable to all. However, most detections of imperfections were not perceived until days after the mix; leaving the mix set up for that long was not practical and could lead to logistical nightmares, especially if the recording studio were booked with multiple clients. In most instances, clients of a given recording project would have to work within the scheduling parameters of the recording studio and could not be accommodated the luxury of leaving a mix set up for days. Ultimately, the decision to accept a mix did not rest on absolute perfection, but rather, on compromise and convention. Once the mix was accepted, it would conventionalize, and the previously perceived, subtle imperfections would go from being tolerated to accepted, and eventually become one of the unique characteristics of that particular recording, i.e. something that originally seemed bad (like a loud guitar) becomes a salient feature (in a good way) of that particular recording.

Computers, on the other hand, reproduce converted sound waves exactly the same, every single time. The total recall of a mix is not only possible, it is extremely simple to attain. If a mix exists like the example above, where everything is good, except for a guitar being too loud, that mix can be recalled instantaneously, the guitar can be lowered, and the mixed saved as a variant with lowered guitar; everything else about that mix will be identical. Furthermore, since mixes on DAWs are completely automated, most of the mixing process is done gradually, simultaneously during the recording phase. When the time arrives to bounce down a mix, all that is required is a mouse click.

However, while the mixing phase has almost entirely folded into Secondness, the acceptance of the mix as being finished still remains a Thirdness.

Figure 5.23

From a zoomed out view of the entire recording process

	Firstness	**Secondness**	**Thirdness**
Analog Recording Methods	Basics	Overdubbing	Mixing/Accepting a Mix
Digital Recording Methods	Basics	Overdubbing/Mixing	Accepting a Mix

Figure 5.24

Zooming in on the Thirdness from 5.23

	Firstness	**Secondness**	**Thirdness**
24 trks Analog Recording	Raw Tracks	Mixing	The Accepted Mix
Digital Recording	——	——	The Accepted Mix

The two figures above, 5.23 and 5.24, respectively, show the difference between analog and digital recording methods regarding mixing. In figure 5.23, we see the two recording formats from the perspective of the entire recording process. In both instances, the recording of basic rhythm tracks (basics) is the first phase of recording and regarded as a Firstness. In the second and third phases, we see where the shift happens. The analog format treats overdubbing and mixing as two discrete phases, while the modern digital format often treats mixing as part of the overdubbing phase (a Secondness). Because of this shift, the only action remaining in phase three of the digital format is the acceptance of the complete mix. Figure 5.24 zooms in on the Thirdness from figure 5.23. Here, we see that, inside of phase three of an older 24-trk analog recording, there exists another triad (a Firstness, Secondness, and Thirdness inside the Thirdness of mixing). The raw (and at this point, unprocessed tracks) constitute a Firstness. The actual process of mixing is a Secondness, and the decision to accept the mix (essentially conventionalizing the finished recording) is a Thirdness. In the digital realm, however, we don't have another triad, since the only action taken in this phase is the decision to proclaim the song finished. However, this paper will contend further that it is debatable if a Thirdness even exists at all in the phases of modern digital recordings. This argument is predicated on the ways in which music is currently disseminated to the masses.

In the years preceding the advent of the Internet, all music was distributed in the form of physical vehicles: first, via lacquer or vinyl records; then, 8-track cartridges and cassette tapes; finally digital compact disks. Each one of these mass-produced, manufactured items carried exact duplicates of the songs, as recorded and mixed in the recording studio. The physical nature of the product made it impossible for an artist to change or tweak a recording, once that recording had been released to, and conventionalized with, the masses. Therefore, in the pre-virtual era, the three phases of recording: Basics, Overdubbing, and Mixing and how those phases mapped onto the Peircean triad of Firstness, Secondness, and Thirdness, were unalterable. There simply was no practical way to recollect the first disseminated recording and replace it with a newer, slightly tweaked version. Today, however, in the information age, it is not only possible to replace an older version of a recording with a newer one, it is easy.

As more and more people purchase music as downloads, the dissemination of popular music is becoming more and more virtual. People no longer have physical record albums or compact disks. Instead, they have collections of songs in the form of digital information (the mp3 format) on their smart phones and computers. Because these devices are connected to the Internet, this digital information can be replaced in mere seconds, with or without the consent of the consumer. This revolution in technology has made it possible for the artist to deem his/her recordings of compositions in a constant state of Secondness and/or the ability to jump back to Secondness after achieving Thirdness. For example, a recording can be released to the public in the form of a digital download on any number of consumer or free websites. A month later, the artist decides he/she isn't happy with mix. He/she goes back to the recording studio and tweaks with the mix (remember, with total recall, this process is quite simple to do). The new mix is re-mastered (once again, with computers, no previous data is lost). The new recording is an exact duplicate of the previous one, save for the few minor tweaks that the artist intentionally made. The new recording is then uploaded to the websites and replaces the previous version. Fans have the option to download the new mix and replace the older

one, or keep both versions. This kind of flexibility was impossible before the information age, and it is, quite possibly, the most significant development in the art form of sound recording, since the invention of the multi-track recorder. It has redefined the meaning of the term "a work in progress", a term that is synonymous with Secondness. The term used to mean that the art is not ready for public consumption because it is still a work in progress. However, with today's technology, we can say that sound recordings are potentially in a constant "work in progress" state. The artist is no longer limited by technology that used to bring with it an absolute and completed Thirdness. Today, the difference between an artist's fickleness or resolve is all that separates a recording from reaching Thirdness, remaining in an infinite Secondness, or alternating between the two.

In summary, we can say:

- a recording of a single performance event, or recording of basics, can be a Firstness, Secondness, or a Thirdness. It can be classified by all of Peirce's ten classes, depending on the stratum (level of zoomed-ness [in or out]). When perceived as basic (rhythm) tracks, an initial performance is a rheme – icon – qualisign (Firstness). However, when perceived as tracks intended to be bounced down with other tacks, a recording of an initial performance becomes a dicisign – index – sinsign (Secondness). When perceived as a finished recording of a single performance event, it is a dicisign – symbol – argument (Thirdness). This scheme is the result of the following: The representamen is a legisign, consisting of a sinsign (a recording) and a qualisign (of a quality – sound). It relates to the object as a symbol (as a genre of music). These genres (as explained in chapter 2) are derived from strictly ordered constraints, which result from innovations that eventually become conventions. One must know how to interpret the symbol, in order to understand the genre. It is an index (as sound waves produced by the recording) and an icon (as a facsimile of the original performance). As interpretant, the recording has a quality (rheme), exists (dicisign), and communicates and produces a predetermined belief (argument) in the mind of the listener (MS [R] 597:2).
- the overdubbing/bouncing process and performances resulting from this practice are a Firstness or Secondness. As a 'work in progress', it cannot have signs from Thirdness on its basic level of perception. It can, however, contain triads (that include Thirdness), if one zooms in on the overdubbing process and considers it holistically.
- the final mix is a Secondness and Thirdness. As a finished work of art, it cannot have signs from Firstness on its basic level of perception. It can, however, contain triads (that include Firstness), if one zooms in on the mixing process and considers it holistically.

Conclusion

Chapter 5 has shown that Peircean semiotics, particularly, his triad of Firstness, Secondness, and Thirdness, can be applied to help quantify the art form of sound recording. At the heart of this Peircean application to sound recording is perception. The

level of perception must be clearly stated to avoid confusion and contradiction because of the fractal nature of the Peircean triad. However, once the perspective is stated and understood, predictable and useful patterns emerge. These patterns show that many of the primary decisions, collectively manifested as recording methods, are made in a fashion that is consistent with the predictable nature of the Peircean triad. Awareness of the Peircean triad is irrelevant because the engineer/producer is ultimately subject to the ubiquity and force of the Peircean triad. However, knowledge of the triads, and conscious cogitation on how they work, will only benefit the engineer/producer. From the awareness and maintenance of the 1 to 1 to 1 ratio, to the realization that one is not quite in Thirdness when mixing in the digital format, I have attempted to apply Peircean semiotics, as a pragmatist, not a theorist, to shed light on the recording process. In the current information age, the main shift has been with mixing (a former Thirdness), which has now folded into Secondness, making attainment of Thirdness an arbitrary decision. This arbitrariness shifts a fixed into a mutable; Thirdness is no longer defined as *the* rule for its interpretant, but rather, a *potential* rule for its interpretant. A recording may be finished and a 'work in progress' concurrently, a hybrid of Secondness and Thirdness.

CHAPTER SIX
Revisiting the Application of Firstness, Secondness, and Thirdness to Songwriting

In chapter 1, I explained the fundamental traits of Firstness, Secondness, and Thirdness, not in the context of a theoretical philosophy of ontology, but as a pragmatically useful tool that could thereupon be applicable to songwriting (or any form of art). In this chapter, I will support my claims from chapter 1 by offering examples. Additionally, just like in chapter 4, where we saw how Peirce's semiotic triad can be applied to the art form of sound recording, in this chapter, we will see that, by further understanding Firstness, Secondness, and Thirdness, one gains insight into the divisions of genres.

It will become apparent to the reader that the boundaries that delimit the songwriting process are conditioned, on one extreme, by the inspiration and spontaneity of Firstness, and on the other, by the conventions of Thirdness. In between these two extremes is the brute force of Secondness, which molds and transforms the composition into a conventionalized genre of music. The songwriting process, like all conscious acts, is immersed in the vast semiotic web that comprises the entire universe. Therefore, it is not essential that the composer be aware of the ubiquitous semiotic triad when he/she is composing a song. We saw a similar situation in chapter 4 with producers and engineers, and how the semiotic triad was present, regardless of one's cognizance of it. However, there is a difference between the act of songwriting and the process of sound recording. The main difference being that, over the last 70 years, advancements in technology have motivated shifts in the methods and techniques used in sound recording. These shifting processes have offered a set of variables that, if one is looking for it, help to reveal the influence of Peirce's triad. Contrastively, the process of composing a song has not (at its core) changed very much in the last few hundred years.[43] This static nature of the songwriting act does not necessarily make it harder to recognize the Peircean triad, but it does, through unchanging routine, make it less likely that a composer would analyze the process. Putting it in simpler terms, the more routine an act is, the more likely someone is to do it unconsciously, i.e. on autopilot. Once recognized, the truth of Peirce's triad is easy to see in the context of songwriting and musical genres. This chapter will contrast examples from Classical/Art music, Improvisational/Modal Jazz, and Popular/Rock music for analysis. I will also show where on the Peircean triad (depicted below) these genres of music reside and remain.

Redefining Firstness, Secondness, and Thirdness for the Sake of Artistic Application

As stated in chapter 1, Firstness is the realm of blankness. It is the realm in which nothing has yet happened. In a 'true' Firstness, only potential and inspiration exist. Peirce

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[43] There is evidence of musical notation dating back millennia. However, songs have also been passed from generation to generation via the oral tradition. Since the advent of tape recorders, and in more recent years, digital recorders, songwriters have used this technology to aid in the composition process. Therefore, there is some overlap between the two processes.

refers to "Universes of Experience" in the following quotes, but he is really just describing the essence of his triad:

> Of the three Universes of Experience familiar to us all, the first comprises all mere Ideas, those airy nothings to which the mind of poet, pure mathematician, or another *might* give local habitation and a name within the mind. Their very airy-nothingness, the fact that their Being consists in mere capability of getting thought, not in anybody's Actually thinking them, saves their Reality. (CP 6.455)

When a composer acts upon this inspiration in an attempt to realize its potential, the artist enters into Secondness. The vast majority of the creative process takes place in Secondness: "The second Universe is that of Brute Actuality of things and facts. I am confident that their Being consists in reactions against Brute forces, notwithstanding objections redoubtable until they are closely and fairly examined" (CP 6.455). The second sentence of this quote is prophetically similar to the tiered mechanism of Optimality Theory, and evinces my justification for using Peirce to support my OT constraint (FMP). Finally, when the composition is complete and released to the public, either as a live performance or a recording, the song conventionalizes: "The third Universe comprises everything whose being consists in active power to establish connections between different objects, especially objects in different Universes" (CP 6.455). For most Peirceans and semiotician, this overly simplified explanation of Peirce's 'triad in action' would suffice. As if every unique instance of thought creates a new, clean slate of Firstness, Secondness, and Thirdness, uninfluenced by what had just preceded it. However, as I have already pointed out in the previous chapter, due to the fractal nature of the triad, one needs to calibrate his/her perception of the object, by zooming in or out on it. Peirce refers to this necessity in a different way. He sees our interpretation of signs as being an inescapable reality because to him, the entire universe is composed of signs:

> It seems a strange thing, when one comes to ponder over it, that a sign should leave its interpreter to supply a part of its meaning; but the explanation of the phenomenon lies in the fact that the entire universe … is perfuse with signs, if it is not composed exclusively of signs. (CP 5.448n)

Therefore, instead of seeing his triad as an overarching structure that can be applied to a process (the way in which I am applying it to art forms), he saw it as the obvious manifestation of a universe of signs, interpreted by thinking beings whose entire cognitive structure is the result of the interpretation of those signs:

> When we think, then, we ourselves, as we are at that moment, appear as a sign. Now a sign has, as such, three references; 1st, it is a sign *to* some thought which interprets it; 2nd, it is a sign *for* some object to which in that thought it is equivalent; 3rd, it is a sign, *in* some respect or quality, which brings it into connection with its object. (W 2.223)

The fractal nature of his outside-in/inside-out philosophy is impossible to ignore. In its most stark sense, understanding Peirce requires the acceptance of never actually experiencing the 'true' Firstness, as well as accepting the reality of the final convention of Thirdness solidifying only upon one's death. If we accept these extreme boundaries, we can come to understand better how his triad actually works: "There is no exception, therefore, to the law that every thought-sign is translated or interpreted in a subsequent one, unless it be that all thought comes to an abrupt and final end with death" (W 2.224).

Peirce believed that every thought was derived from a previous interpretation of signs in one unbroken linear string of cognitive energy, beginning when one has developed a mental ability to interpret, and ending only when one dies. Logic dictates that, if our ability to interpret signs (running the course from Firstness to Thirdness) ceases only upon our death, then the only true Firstness must have taken place at the moment of our first thought. However, we can even push the boundary of the 'true' Firstness further back in time, when the universe was formed and the first signs came into being. For any living human, these boundaries (from the beginning of time to one's own demise) represent the widest margin of possible time. Therefore, we can posit that our existence is primarily one of Secondness. That is to say, we came out of an initial, prehistoric Firstness and only achieve the definitive Thirdness, manifested in the judgment of one's life, upon our passing.[44] We can think of this macro view as being the most zoomed out perspective, analogous to the way the universe is an environment in which galaxies exist, and star systems within galaxies, and solar systems within star systems. And while these environments are not fractals, they do help to convey the Matryoshka nature of Peirce's triad. Therefore, we can analyze (by zooming in on) any action from a perspective that allows us to consider multiple levels of Firstness, Secondness, and Thirdness, knowing that we are already existing inside of larger triads, until we reach the progenitor triad that starts with the beginning of time and ends with our death. Peirce deals with this aspect of his philosophy by introducing a theory, or class, of signs, with the ten classes of sign being the most useful to the semiotician. Ideally, he envisioned a class of 66 signs, but could not present it in an applicable way. Theoretically, armed with these classes of signs, one can understand the interpretation of signs within signs, as well as interpretations of signs that remain in between Firstness and Secondness, and Secondness and Thirdness. While there is an advantage to having discrete designations for every interpretation of an action, the class system can also be cumbersome, and in some instances, even confusing to the analyst. My aim is to avoid the class system, and instead, focus on the ubiquitous nature of the triad and how it enlightens the creative process. As I have already presented in chapter 5, the method of referring to a triad within a triad is sufficient, as long as the stratum of perception is always specified. There is no need to classify discretely every level of perception; it is enough to know that the object or action under scrutiny exists in a vast universe of signs. The task of this analysis is to use Peirce's triad to shed light on the creative process, not to label every step in the process.

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[44] Here, I am referring to the original etymology of the Latin-based word of judgment, *iudico*, *iūs* (what is conventionally thought of as right, or law) + *dicere* (to point out).

Explaining the Inner Workings of Firstness' Application to Composition[45]

In conducting a Peircean analysis of any genre of music, the first question asked should be, at what point does the songwriting process begin? Is it when the first notes are written down on the music staff or the initial lyrics put to paper? While songs can come into *Being* for a multitude of reasons, most compositions (and art, for that matter) are the result of 'realization of inspiration'. That is to say, something comes into Being out of nothingness, with the only impetus being inspiration. And of course, this nothingness is the realm of Firstness. Of the three elements of Peirce's triad, Firstness is the only one that can only be described theoretically. Secondness can be described clinically, by using real world examples. Thirdness then conditions Secondness by acclimatizing it. Firstness, however, is defined by its lack of anything concrete or tangible in the physical world. Yet, Firstness, in a theoretical sense, is where the artist exists until he/she takes action on the inspiration. The greater the inspiration, the stronger the desire is to move away or out of Firstness and into Secondness. The weaker the inspiration, the more likely the artist is to remain in Firstness (by not taking action on the inspiration), until the inspiration subsides. So therein lies the irony – the stronger the inspiration, the greater the force of the catapult that launches the artist into Secondness.

An artist can remain in Firstness while thinking about the potential of the 'yet to be' art. However, once the artist begins to make conscious decisions on the *form* of the art, he/she then enters into Secondness. In the context of songwriting or music composition, *form* is anything that conditions the song or composition. For example, if the composer decides the song will be in the key of A major, in 4/4 time signature, and at a 120 beats per minute (BPM), then that artist has shifted from Firstness to Secondness. With each one of these decisions, the potential of the song diminishes and becomes realized in form (it is birthed from pure inspiration). However, a conscious decision must not be confused with intuition. An artist can intuitively feel the nature of the composition without consciously deciding it will be so. Ultimately, the shift from Firstness to Secondness hinges on one's feeling state (Firstness) versus one's cognitive state (Secondness).

An artist is in Firstness while feeling the inspiration to create art, even if those feelings convey some knowledge of the forthcoming piece. The artist shifts into Secondness when the conscious mind takes over, feelings are reduced, and the cognitive process becomes dominant. So, to answer the question above, the songwriting process begins with an inspiration that is strong enough for one to act upon cognitively.

Many composers attribute the inspiration of Firstness to god, or some divine power. Peirce, though anti-nominalistic, was a very spiritual man. Indeed, the individual ego was an illusion to Peirce, but he did not believe the illusionary self to be non-spiritual. He defends his position by stating, "To deny the reality of personality is not anti-spiritualistic; it is only anti-nominalistic" (CP 8.82). The mysterious nature of Firstness easily lends itself to spiritual explication. Since no human, living or deceased, has ever offered an empirically testable description for inspiration, proposing god as its chief architect is just as good as any explanation. Quotes from famous artists abound with

[45] Since I already explained how Peirce's triad is applied to music in general, I refer the reader to chapter 2 for a review of those foundational details.

testimony of inspiration's divine nature. French Author André Gide elevates the contribution of the divine: "Art is a collaboration between God and the artist, and the less the artist does the better." Puccini equated inspiration with an awakening: "Inspiration is an awakening – a quickening of all man's faculties, and it is manifested in all high artistic achievements." Pop artist Keith Haring, like Peirce, diminished the role of the ego: "When it [art] is working, you completely go into another place, you're tapping into things that are totally universal, completely beyond your ego and your own self. That's what it's all about." And lastly, cellist Pablo Casals recognized the 'coming into Being' aspect of inspiration realized: "The greatest respect an artist can pay to music is to give it life" (All quotes from Skinnyartist.com).

We can then theorize that ALL art begins in the vacuum of Firstness, where nothing resides, except the spark needed to ignite the process of transforming inspiration into form. Firstness can manifest as a feeling while conscious, or an experience while dreaming. It cannot be a conscious thought, however, for that is the realm of Secondness.

Explaining the Inner Workings of Secondness' Application to Music Composition

When the inspiration is acted upon, the artist enters into Secondness. The vast majority (if not entirety) of the crafting process takes place in Secondness. However, just as we witnessed in chapter 4, there exist additional triads inside of the overarching realm of this Secondness. When the artist acts cognitively on the inspiration of Firstness, he/she is initially inside of a Firstness that exists inside of the larger Secondness:

Figure 6.1a

Firstness	**Secondness**	**Thirdness**
Inspiration/Potential	Acting on Inspiration	Potential Conventionalized

Figure 6.1b

Within the realm of the above Secondness exists another triadic stratum

Firstness	**Secondness**	**Thirdness**
Foundational Melody, Rhythm, or Lyric	-	-

Figure 6.1a illustrates the fractal nature of triads inside of triads. When the artist acts on the inspiration of Firstness, he/she enters Secondness, but on the level of Firstness within that Secondness. The foundational part (the first part of the song or composition cognitively realized) is a Firstness inside of a Secondness. The part can be anything: a melody, a beat, a chord progression, or just lyrics with no music at all. This part must remain the foundation upon which the rest of the song is built. If this initial part changes significantly and conforms to another part, it ceases to be a Firstness.

For example, if a set of lyrics is the first thing written from the initial inspiration, that set of lyrics is the Firstness in the realm of Secondness.[46] When a melody or beat (or both) is applied to those lyrics, the piece becomes a song.[47] As long as the beat is accompanying the rhythm of the lyrics, the lyrics remain the foundational part that originated out of Firstness (shown in figure 6.1b). However, if the lyrics are modified to fit the beat, then the beat becomes the foundational part, supplanting the lyrics as the Firstness that is inside of Secondness. Therefore, the cornerstone (Firstness) part is not necessarily the part that is composed first; it is the part that remains foundational (the part upon which all the other parts are built).

Until the foundational part is solidified, the artist remains in the Firstness inside of Secondness. However, once the foundational part is fixed, the artist moves into the Secondness inside of Secondness. The rest of the composing process exists inside of this realm.

Figure 6.2

Firstness	**Secondness**	**Thirdness**
Foundational Part	All Other Instrumental and Vocal Parts	-

The above figure shows that ALL other aspects of the composition reside in the Secondness inside of Secondness. The only action that can demarcate Secondness from Thirdness is the composer's decision that the song/piece is finished. Once this decision is made, the song is rehearsed for live performances, or recorded for the sake of capturing the composition as a 'work of art' or a product to be marketed to the masses (see chapter 4). It is also worth mentioning that the composing process can take place while the composer is either rehearsing or recording the song. That is to say, the composer can still make changes and modifications to the song until the very end of the process.

Once the song has been performed 'officially' before a live audience, or released to the public as a recording, the song enters into the Thirdness that exists inside of Secondness.

Figure 6.3

Firstness	**Secondness**	**Thirdness**
Foundational Part	All Other Instr. and Vocal Parts	Performed/Released for the Public

Figure 6.3 shows the final stage of the composing process. The creative phase ends, and the song, or piece, enters the realm of public consumption. As quickly as the creative process went from a Firstness of inspiration and potential into a Secondness of

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[46] If no music is added to those lyrics, the piece will not be a song, but rather a poem or a form of spoken word.

[47] The genre of music most commonly associated with songs comprised of just lyrics and drumbeats is rap music. Though, historically, many styles of folk music, as well as tribal/spiritual music of indigenous cultures, have had songs composed of only lyrics and rhythmic percussion.

production and realization, it just as quickly exits the Thirdness (inside of Secondness) and enters the Thirdness of the above stratum.

Figure 6.4

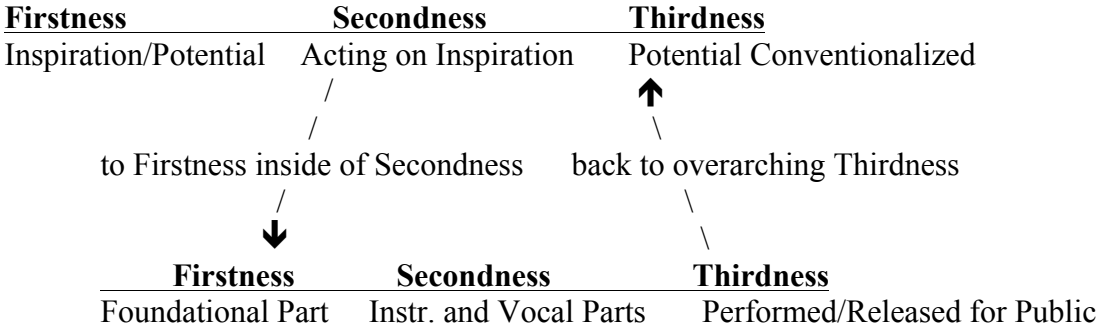

Figure 6.4 shows how the song exits the Thirdness (inside of Secondness) and solidifies in the Thirdness of the upper stratum. While the end of the creative process is demarcated by the artist's decision to declare the song (or piece) complete, the shift into rehearsals and/or recording is still technically a Thirdness inside of the overarching Secondness. And because the song is still in Secondness, modifications can still be made, though they are usually of the 'fine tuning' variety. The song solidifies as a Thirdness of the upper stratum only after it has conventionalized with the public audience.

Explaining the Inner Workings of Thirdness' Application to Music Composition

When a song reaches the Thirdness of the overarching stratum, it has usually conventionalized to the point where the public has expectations of, not only the song itself, but also the genre to which it belongs. These expectations are based on fundamental and aesthetic aspects of the composition. Ultimately, these characteristics comprise the criteria enjoyed, interpreted, and perhaps, even deconstructed, when one considers the artistic integrity of the composition. The songwriter often decides that the song is complete when enough of these genre-based expectations are met, and therefore, a song's artistry is not contingent on the 'best' performance or 'most' harmonious parts.

In a purely musical environment, one, for example, conducive to classical music, the qualitative properties of 'best' and 'most' are much different from an environment conducive to popular music. Therefore, these superlatives are relative to the genre and not absolute universals. A virtuoso musician is often required to play properly a composition by Mozart. However, a virtuoso is not required to play properly a punk rock song, or most forms of popular music, for that matter. Therefore, the goal of any composer is to satisfy (by not violating) the primary constraints of a musical genre, even if that means accepting subpar performances from a purely musical or harmonious standpoint.

Furthermore, once the composer feels that these expectations have been sufficiently met in the composition, the genre, itself, conditions the amount of modification or innovation (to the original composition) henceforth. In other words, once a composition is deemed to be finished by the composer, there are degrees to which the

composition can change. Depending on the genre, the work can be set in stone or in a constant state of 'work in progress'. If we return to my application of OT to musical genres (introduced in chapter 1), some light can be shed on the degree to which a composition remains unchanged:

Constraints

a) Max (comp)	truncation forbidden, i.e. nothing can be removed from the original composition
b) Dep (comp)	embellishments to the composition forbidden, i.e. nothing new can be added to the original composition.
c) Max (performance)	composition must be performed the same for every performance, i.e. the integrity of the lyrics, melody, harmony, tempo, and time signature must be maintained.

It should be clear to the reader that these constraints are motivated by convention (expectations of the audience for a song or composition).

The input for this analysis is any genre of music

Figure 6.5

Input: *Any genre of music*	Max (comp)	Dep (comp)	F-MPH	Max (performance)
1. *Modal Jazz*	*!	*	*	*
2. *Pop Music*	*!	*		*
3. ☞ *Classical (Art) Music*				*

As the tableau shows, classical music allows the least amount of modification to the original composition, and is therefore, the winner of this OT analysis, i.e. it is more committed to its Thirdness than the other two musical genres. While classical music does violate Max (performance), it usually does so minimally. I have added the violation mark here almost more as a concession to the realities of how hard it is to perform a song identically every single time it is performed. Of course, here we are primarily dealing with degrees similarity (see chapter 3). However, despite the tentative violation mark, most performances of classical music strive to preserve, as much as humanly possible, the integrity and vision of the original composition. The dynamism motivating performers of classical music to remain faithful to the original composition is the combination of convention and expectation. Consequently, a classical music composition, once it achieves Thirdness, has the least amount of freedom to evolve.

For example, a performance of Beethoven's Bagatelle No. 25 in A minor, "Für Elise", can only deviate from the original composition in feel, and perhaps, tempo, but not time signature, nor key, and certainly not melody. The tempo, written down on the original manuscript as *poco moto*, literally, 'a little motion', is usually translated as 'not too fast', but scholars and musicians have debated the tempo's meaning since the

composition's discovery in the 1860s. Some musicians have interpreted the tempo as 'having life, but not too fast'. Others understand it as meaning, 'don't romanticize it too much,' while yet others think it means 'play it like you're taking a nice paced stroll through the park.' Though these multiple interpretations of the tempo and feel would lead one to believe that the composition sounds radically different with each performance, the reality is that most traditional musicians perform the piece at 120 BPM. And though the feel does vary from pianist to pianist, it is subtle and not radically (or innovatively) dissimilar. Beethoven's "Für Elise" is but one example. But it is indicative of most classical music, where improvisation upon, and innovations to, the original composition are not often embraced by a very traditionally minded audience.

When innovation does take place in the classical music genre and is accepted and recognized by the community, the new composition is almost immediately classified as a new genre, so as to differentiate it from earlier Art music and preserve the purity of the Baroque, Classical, and Romantic subgenres. Appellations like Modern, post-Modern, and post-Industrial Modern abound in the contemporary Art music community. This static state of the Art music genre is not shared in the Jazz and Popular music genres, where songs and compositions that are over sixty years old are presently covered and performed with a multitude of improvisations and innovations to the original composition. These newer renditions are not automatically classified as a new genre just because they differ from the original compositions in varying degrees (once again, see chapter 3).

Because the influence of traditionalists is so strong in the Art music community, the conventions (Thirdness) and subsequent expectations stifle natural mutation, the driving force behind the creation of new works within the genre. When innovation does occur in Art music, it is cast out of the genre, triggering an automatic subgenre of music.[48]

Differentiating Subgenres of Folk Music: Modal Jazz's Firstness

As one can also see in figure 6.5, Folk/Popular music and Improvisational Jazz share the same violations. This similarity is not surprising when one considers the fact that jazz is a subgenre of folk music. Yet, improvisational jazz and modern popular music are not, and have never been, very similar in sound or presentation. Therefore, we can say that these two subgenres of music are only similar in their difference from classical (Art) music.

In the context of our OT analysis, we can consider Improvisational/Modal Jazz as the antithesis to Classical music:

Constraints

a) Ident (non-conf) non-conformity

[48] In this OT analysis, I am referring to Art music of the classical period, roughly (1730-1820). The broader term, Art Music, can be used interchangeably, since most forms of Art music share the same hierarchy of constraints. Therefore, music of the Baroque (1600-1750) and Romantic eras (1790-1900) should also be considered in this analysis.

b) *Replicate	do not replicate
b) Max (comp)	truncation forbidden, i.e. nothing can be removed from the original composition
c) Dep (comp)	embellishments to the composition forbidden, i.e. nothing new can be added to the original composition.

The input for this analysis is any genre of music

Figure 6.6

Input: *Any genre of music*	Ident (non-conf)	*Replicate	Max (comp)	Dep (comp)
1. ☞ *Modal Jazz*			*	*
2. *Pop Music*	*!		*	*
3. *Classical (Art)music*	*!	*		

As the tableau in figure 6.6 shows, the main difference between Improvisational Jazz and other forms of Popular music is the former's lack of conformity. Not only does this genre of music violate the constraints that do not permit removing and adding to an original composition, but it also does not violate the markedness *Replicate constraint. This constraint is essentially the opposite of the Max and Dep (comp) constraints from figure 6.5, where truncation and embellishments are not tolerated.[49] This genre of jazz evolved from more traditional styles of jazz that, like most popular music, do violate Ident (non-conf). Like most traditional genres of folk music, older styles of jazz, like swing and folk jazz, adhere more closely to repetition and chord structure. However, modal/improvisational jazz's main characteristic is one of non-conformity.

Modal Jazz (an earlier appellation for Improvisational Jazz) was popularized in the 1950s and reached its apex in the late 50s – mid 60s. The term refers to the modes or scales used for instrumental solos. What's different about modal jazz is its top-down approach to composition, which is based on non-conformity. For example, with most subgenres of folk music, the melody, embellishments, and solos are based on the chord structure. Putting it in Peircean terms, the instrument, vocal, or lyric that lays the foundation for the rest of the composition (the Firstness) is usually (in the folk music genre) a chord progression. Common instruments used to play the chords in the folk genre are piano, string instruments, or any instrument capable of polyphony. Conformity is required, once the chord progression is finalized. As already explained above, there is a correlation between the foundational instrument and Firstness, as well as a correlation between all subsequent instruments and Secondness.

The top-down approach mentioned above refers to the way in which modal jazz is composed. In this form of music, the modes and musical bars are the only foundation (Firstness) of the composition. I use the term 'top-down' because the musical mode chosen is for the soloist. In other words, the composition begins with the instrumental solo and forces the chord progression to follow – the exact opposite of most folk music.

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[49] Here, *Replicate is referring to degrees of truncation and embellishment. But for the sake of this simplified analysis, it will be violated absolutely.

In this regard, modal jazz is similar to many forms of Art music, where the melodies dictate harmonies and other chord embellishments. However, as pointed out above, Art music, once conventionalized, rejects innovations and modifications to the original melody. Modal jazz, however, since its foundational melody is in the form of a solo, encourages modification and innovation. If a solo in modal jazz is comprised of melodies that lend themselves to easy replication, it is possible, and certainly conceivable, that that solo could be played exactly the same way. But the aim of this genre of music is not to replicate. There are degrees of conformity in all styles of music, but modal jazz strives to reject conformity, much in the same way that Art music embraces it.

Perhaps, the best example of a modal jazz composition is Miles Davis' instrumental "So What" (1959). Essentially, the structure of the composition is quite simple, consisting of 16 bars of the Dorian mode (scale) in the key of D. Then, the song modulates up a half step to E flat for 8 bars, remaining in the Dorian mode. Finally, the structure concludes with 8 more bars in D Dorian. These 32 bars are then cycled until 4 solos have been played. In a classic performance from April 1959, Davis performs the song on CBS' *The Robert Herridge Theater* with the Gil Evans Orchestra. The video-taped performance offers a glimpse into the uniqueness of each musician's solo. The song was recorded only a month earlier in Columbia Records' New York studio on 30th street, so one could analyze the live performance in one of two ways: (1) the song had not yet been released to the public, so therefore, it had not conventionalized with an audience, making it possible for the artists to ignore the recorded version. (2) The artists were never intending to replicate the recorded version and strive to perform the song differently every time they play it. History has confirmed the latter analysis to be the correct one. On both renditions, Davis, on trumpet, takes the first solo. Comprised primarily of light motifs and Davis' unique style of bending and slurring notes, the melody from the original recording could have been replicated without much trouble. However, in the live performance, Davis offers a completely different interpretation of the original melodic structure. The second solo, performed by John Coltrane on the tenor sax, also differs drastically from his original solo performed on the studio recording. Julian "Cannonball" Adderley was ill, and therefore, did not perform in the live, television performance. Consequently, his alto sax solo from the studio recording is missing from the live version, with Miles Davis performing a second solo on the trumpet. Once again, no attempt is made by the soloist to replicate or conform to any former performance. Every performance is, in a sense, a fresh, new approach to the AABA bar structure. Since the foundational melody relies on the solos, and since the solos are always different with every performance, one can surmise that the composition reverts back to its Firstness with every performance. This mutability and desire to remain in Firstness is the essence of modal jazz.

Of course, the Firstness where modal jazz resides is not a supra-Firstness. It is a Firstness inside of a Thirdness:

Figure 6.7

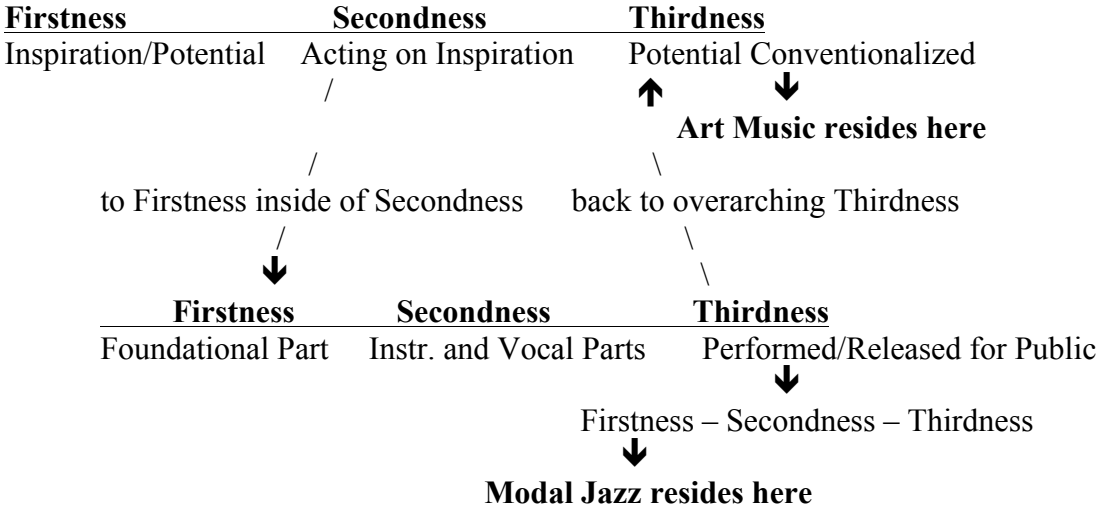

Figure 6.7 shows where the two genres already discussed in this chapter reside in the Peircean triad (in bold). Art (classical) music, once conventionalized, resides in a supra-Thirdness, resisting change and clinging to convention. Modal jazz resides in a Firstness that exists in a more zoomed-in Thirdness. This is the same Thirdness that exists inside of the supra Secondness. What is interesting about this placement is that the modal jazz composition reaches a level of Thirdness with every completed performance, but strives to remain in a state of Firstness by constantly reinventing the solos, which comprise the foundational melody of the composition.

Differentiating Subgenres of Folk Music: Popular Music's Secondness

Figure 6.6 shows how modal jazz gains its affinity for Firstness, while figure 6.5 demonstrates how classical/Art music stays in Thirdness. The figure below will illustration how Popular music shares attributes from both of the previous extreme genres, and as a result, winds up in a more moderate position on the Peircean triadic chart.

In the context of our OT analysis, we can consider Popular music as a balance between the two previous genres – classical music and modal jazz, respectively:

Constraints

a) F-MPH	Not a random event
b) *Replicate	Do not replicate
c) Ident (non-conf)	non-conformity

The input for this analysis is any genre of music

Figure 6.8

Input: *Any genre of music*	F-MPH	*Replicate	Ident (non-conf)
1. *Modal Jazz*	*!		
2. ☞ *Pop Music*			*
3. *Classical (Art) Music*		*!	*

Figure 6.8 shows the degree to which the constraint, F-MPH, can influence an output. In this analysis, Pop music is differentiated from Modal jazz based solely on tolerance of repetition. Since, in popular music, the melody that comprises the composition is a reoccurring sequence of notes, the composition does not violate F-MPH. Modal jazz is eliminated because it strives to avoid repetition. The tableau also reveals that Art music also tolerates repetition and is eliminated because of its violation of the (now elevated) markedness *Replicate constraint. While this markedness constraint is ranked higher in figure 6.8 (for Rock/Pop music) and the previous Max/Dep (comp) constraints omitted (because they are not decisive), we can posit that the latter are still part of the overall genre analysis. Notice that it is the opposite case in figure 6.5, where the faithfulness constraints are decisive.[50] A more complete list of all the constraints used here, as well as their hierarchy for all three genres, is given below:

Figure 6.9

Art Music
Max (comp)/Dep (comp) >> F-MPH >> Max (perf) >> *Replicate >> Ident (non-conf)

Modal Jazz
Ident (non-conf) >> *Replicate >> Max (comp)/Dep (comp) >> Max (Perf) >> F-MPH

Popular Music
F-MPH >> *Replicate >> Ident (non-conf) >> Max (comp)/Dep (comp) >> Max (perf)

These hierarchical chains show how each genre shares aspects of expectations, but also differ pretty drastically. Art music tolerates repetition, evinced by the high ranking of F-MPH. But it does not tolerate truncation or embellishments, hence, the higher ranking of the Max and Dep composition constraints. Popular music, like Art music, tolerates repetition, with F-MPH ranked high. However, it differs from Art music in that it also tolerates truncation and embellishments, shown by the higher ranking of the *Replicate markedness constraint. Both Popular and Art music rank Ident (non-conf) (lack of conformity) very low. Modal jazz reverses the hierarchies of Ident (non-conf) and F-MPH, but is otherwise similar to Popular music.

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[50] And in that same tableau, the markedness constraint is also part of the overall analysis, even though it is not shown in the chart, due to its low (irrelevant) ranking for Classical music.

Ultimately, this analysis shows that these musical genres share similarities and overlap in certain aspects. A more in-depth analysis, one in which degrees of differences are empirically measured and counted, would undoubtedly reveal even more similarities, i.e. a modal jazz composition can tolerate some degree of repetition, Art music a limited degree of embellishment, and Popular music, a lack of some conformity. But once the composition strays too far and starts to take on too many traits of another genre, it ceases to meet the expectations of the listener and is rejected. Therefore, we can assume that genres are formed by degrees of differences and can lean (in degrees) towards similarity. For example, if a composition invariably meets all of the constraints for a modal jazz song, the majority of listeners classify it as belonging to that genre of music. However, if the composition, from its conception, violates the constraints of the modal jazz genre, the audience will not consider that composition to belong to that genre. Yet, if our modal jazz composition originates as a member of that genre, and then violates the Ident (non-conf) constraint (by conforming in measurable degrees of structural repetition), its status as a member of the modal jazz genre will be contingent on the degree of conformity – the more the composition conforms, the less it will be considered a modal jazz song. We can also predict an opposite correlation between Ident (non-conf) and F-MPH, where, for every violation of Ident (non-conf), there is a non-violation of F-MPH. The problem with this kind of analysis is that there is no way to know when a composition has gone too far (incurred too many violation marks of a given constraint) and is now no longer a member of the genre. One can see how this kind of taxonomy is more subjective than scientific and can only be considered on a song-by-song analysis. Therefore, I have offered a more economical OT analysis by sticking with examples that unquestionably belong to one genre or another.

The Beatles' song "Yesterday" composed in 1965 by Paul McCartney (though equally credited to John Lennon) offers a great example of a song belonging to the Popular music genre. The vocal melody, which is the foundational part of the song, came to McCartney in a dream (Beatles Bible). Waking up the next day with the tune in his head, he thought it was a melody he had already heard, and it had merely slipped into his subconscious mind. However, when McCartney sang the melody to George Martin, the Beatles' producer (who was a pseudo music publisher and popular music aficionado) assured McCartney that the melody was an original piece. The vocal melody itself is quite simple, and McCartney decided to record the song with only an acoustic guitar accompaniment, finger picking the supporting chord progression. We know from McCartney's testimony that the guitar chords and lyrics were composed to the vocal melody. Therefore, we can postulate that the lyrics and chord progression were made to conform (a Secondness) to the subconsciously inspired foundational melody (a Firstness).

There is evidence supporting the secondary status of the lyrics. McCartney attested to the fact that his original title for the song was "Scrambled Eggs", which rhymed with what was a reference to his then fiancée's (model Jane Asher) great-looking legs (Miles 1997). These 'place holder' lyrics were used until he completed the actual lyrics, which are about reflection and regret, conveyed in a lamenting for yesterday. Both "Scrambled Eggs" and "Yesterday" are trisyllabic, perfectly conforming to McCartney's foundational melody. The composition is in F major with the opening bar consisting of the notes G-F-F. The G and first F are eighth notes, while the second F is a dotted half note. The trisyllabic nature of the two lyrical choices (above) conforms perfectly to the

two quick, punchy eighth notes, followed by the longer dotted half note (4/4 time signature = four beats per measure). The two eighth notes comprise one full beat, while the dotted half note comprises 3 beats. In our choices above, /ˈskræm.bld ɛgz/ and /ˈjɛ.stə.deɪ/, the first two syllables (combined) are 1/4 the length of the third syllable when sung as notes in the composition. This evidence strongly supports the claim that the vocal melody was conceived of first. Likewise, when one considers the chord progression of the composition, it is also clear that it was composed to conform to the vocal melody and not the other way around.

Once the song was recorded, with McCartney simultaneously singing and playing the acoustic guitar, George Martin suggested that the song could benefit from the addition of a string quartet. McCartney was eventually persuaded, and Martin composed the string arrangement that was performed by classically trained session musicians. Their performance was recorded onto McCartney's take via the overdubbing process.

The song was released in America as a 45 rpm single in 1965, and the recording quickly conventionalized with the public audience, topping the US charts. Additionally, in 2000, the composition was ranked the #1 pop song of all time by *Rolling Stone* magazine. The song was performed live multiple times by The Beatles, and again, has been performed multiple times by Paul McCartney as a solo artist, and finally, has been covered multiple times by various artists. With each performance, the accompaniment (guitar part and string arrangement) from the original recording has been modified – either through elision, in varying degrees, and/or embellishments, also in varying degrees. Even the vocal melody has experienced degrees of elision and embellishment.

The first cover of the song was a recording released by Matt Monro in 1965. This version subdues the prominent acoustic guitar, which, with the vocal, is predominant in The Beatles' recorded version, and instead, highlights a full orchestral arrangement (remember, The Beatles' version only has a string quartet, not a full orchestra). Monro's string arrangement is not the same composition George Martin wrote for the Beatles' version. It is, essentially, an entirely new score for the song. Monro's interpretation of McCartney's vocal melody is faithful enough to recognize, but the former's delivery is rife with rhythmic anticipations and hesitations that are not present in McCartney's delivery. Monro also has a tendency to over-enunciate words, as well as embellish on the melody itself. His version is also longer, adding an instrumental break and an additional refrain. The only aspect of the original composition that is unchanged is the lyrics, and, as already pointed out above, the lyrics are not the foundational part of the composition.

This example shows that pop music tolerates more alteration to a composition than Art music does, but needs more of its originality than modal jazz does for the song to meet the expectations of the audience. In the case of "Yesterday", the instrumental accompaniment of the original Beatles' recording is rarely ever duplicated for live performances or recorded covers. McCartney, being the composer and original performer of the song, has performed the song over the years with his acoustic guitar accompaniment, but often without the string arrangement. Other artists, like Matt Monro, took liberties with the instrumental accompaniment, as well as the vocal melody, but remained faithful to the lyrics. Regardless of the variations, the song has been recognized and enjoyed by the masses for decades since its initial release. Monro's version was also a hit with the pop music audience.

Figure 6.10

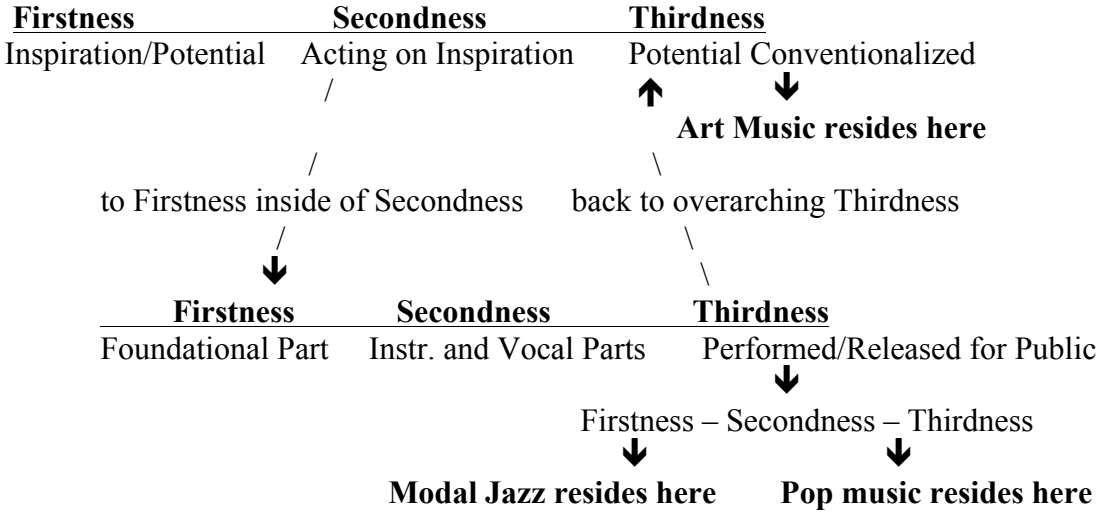

Figure 6.10 completes the diagram and shows the position of popular music in the Peircean triad. Pop music cannot reside in an overarching Thirdness (similar to Art music) because it tolerates too much modification. Therefore, it reaches the level of Thirdness (with each performance and conventionalized recording) that exists inside of Secondness. And similar to modal jazz, pop music resides in the sub-triad of that Thirdness. But where modal jazz strives for a Firstness within that Thirdness, pop music exists on the cusp of Secondness and Thirdness within that Thirdness. This position allows for the completion and conventionalization of the composition, but leaves the door open for different interpretations (in degrees) of the composition. These positions in the Peircean diagram can also be expressed in the numerical form.

We can say that a classical music composition is the epitome of a 1-2-3 sequence, i.e. it starts in Firstness, is crafted through Secondness, and conventionalized as a Thirdness. With every subsequent performance, it faithfully obeys the established conventions, and therefore, remains in Thirdness. Modal jazz has a sequence of 1-2-3 > 1. Like classical music, modal jazz initially completes the 1-2-3 sequence. However, with each performance, it reverts backs to a Firstness. The composition still works through a Secondness, but fights convention. The end result (after every unique performance) is it reaches what can only be described as a temporary Thirdness that always reverts back to a Firstness. Pop music also begins with a 1-2-3 sequence, but with each subsequent interpretation, it drifts towards a 2-3 sequence, e.g. 1-2-3 > 2-3.

Once again, the numerical sequences given above are generalizations, and we must consider degrees of modification to the original composition. What we can posit is that the expectations of the audience are what control the thresholds for each composition. A classical music composition that strays too far from its original melodic structure will more likely be rejected by the audience of that genre than a composition that stays true to form. Conversely, a modal jazz piece that mimics too closely any previous performance will not satisfy the expectations of that audience. Popular music is in the middle of these two extremes. Its audience expects salient aspects of the composition to remain the same, but also tolerates innovation and modification to certain aspects of the song. The 3 > 2-3 sequence can be explained as follows: A song is

conventionalized (either by performance or recording). This conventionalized version (a Thirdness) becomes the inspiration for a cover (or remake). Because the inspiration for the cover is a Thirdness, and not an original inspiration (a Firstness), the first numeral of the new sequence becomes a 3 (3-2-3). This Thirdness is then modified in some way (a Secondness), with the end result being a new Thirdness. Undoubtedly, it is the 3-2-3 sequence inherent in pop art that allows for so many covers of songs and remakes of films – any form of pop music can conventionalize (Thirdness) and then be reworked (Secondness) into a new Thirdness. The 3-2-3 sequence is extremely advantageous to the entertainment corporations because the latter prefer to invest their millions of dollars in previously successful/proven commercial ventures. Simply put, it is less risky to invest money in a remake/cover, one that has already been a blockbuster film or hit song, than it is to invest in a new (unproven) film or song.

Conclusion

This chapter has shown how the Peircean triad can shed light on, not only different genres of music, but also popular music's ubiquitous proliferation. The application of Optimality Theory also helps to elucidate the differences between the genres. A more detailed OT analysis, one that allows for measured degrees of similarity, could also help illuminate the creative process of songwriting, as well as the manifested genres.

CHAPTER SEVEN
Conclusion

This dissertation has offered the reader a new perspective on the way to consider art and the creative process. For too long, academics have deconstructed 'the song' in an attempt to explain how 'the art' in the song functions. Often, when the song is reduced to disconnected fragments, comprising an enormous corpus of raw data, the academic misses that special 'something' that songwriters refer to as magic, or divine inspiration that comes from a higher power or a mysterious place. Further compounding the hyper-academic method of analyzing art is the simple fact that many academics are not artists, and therefore, while the analyses of many academics are sound, they may often display a lack of familiarity with the actual creative process.

This dissertation, by using a combination of Optimality Theory and Semiotics, has presented an effective way to analyze the songwriting process holistically, with an emphasis on explaining why a songwriter, producer, or recording engineer makes those key decisions that transform a potentially pedestrian song into a form of 'high art'. The method used in this dissertation does not focus on the discrete building blocks that comprise a song, and by doing so, avoids that special 'something' in a great song; this dissertation's aim has been to explain precisely why those special somethings are there.

Admittedly, the scope of the dissertation is somewhat limited. Originally, in addition to multiple subgenres of supra folk music, I wanted to include more examples of art music (Baroque, Classical, and Romantic), forms of tribal music (from differing indigenous peoples), and music from languages other than English and German. However, in an attempt not to go down the rabbit hole of a corpus study, one in which impersonal statistical evidence is at a premium, while textual, authoritative, and anecdotal evidence is ancillary, I decided to minimize the amount of examples. I welcome and encourage further studies that build on the research I've started, in which more examples from the above listed genres are cited. Along with these goals, hopefully, others will cite more examples from the genres listed above. Regardless, I plan to further the research I've begun with this dissertation by publishing more in-depth works on the use of idioms (from both English and German) in songs, the Sign and the Referent in Pop Art/Popular Culture, and the continued application of Peirce's triad to the art forms of music production and sound recording. These publications will be written for the general public, with the aim of aiding the songwriter, music producer, and recording engineer, among others.

Lastly, it is hoped that this dissertation will play a role in the ever-growing advancements in the field of Artificial Intelligence. There is no doubt that computers and AI will eventually reach a level of complexity to be able to produce art independent of human input. The only question is – what kind of art will a computer produce if the algorithm does not take holism into account? It is my contention that Peircean Semiotics – notably, the Triad, and the Sign – will prove to be indispensable in Artificial Intelligence's fidelity to art, and ultimately, may even be decisive, making AI less artificial and more human, or beyond, i.e., making it humane.

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