

2011

Moving the Heart and Soul: Using Baroque and Modern Theories of Musical Affect to Understand Telemann's Quartet #4 in B Minor

Katelyn Goll

Connecticut College, katelyn.goll@conncoll.edu

Follow this and additional works at: <http://digitalcommons.conncoll.edu/musichp>

Recommended Citation

Goll, Katelyn, "Moving the Heart and Soul: Using Baroque and Modern Theories of Musical Affect to Understand Telemann's Quartet #4 in B Minor" (2011). *Music Department Honors Papers*. 3.
<http://digitalcommons.conncoll.edu/musichp/3>

This Honors Paper is brought to you for free and open access by the Music Department at Digital Commons @ Connecticut College. It has been accepted for inclusion in Music Department Honors Papers by an authorized administrator of Digital Commons @ Connecticut College. For more information, please contact bpancier@conncoll.edu.

The views expressed in this paper are solely those of the author.

**Moving the Heart and Soul: Using Baroque and Modern
Theories of Musical Affect to Understand Telemann's
Quartet No. 4 in B Minor**

by Katelyn Goll

Submitted to:

The Connecticut College Department of Music

in partial fulfillment of the requirements for
Bachelor of Arts with Honors in the Major Field
Concentration in Music Theory

New London, CT

May 5, 2011

ABSTRACT

Moving the Heart and Soul: Using Baroque and Modern Theories of Musical Affect to Understand Telemann's Quartet No. 4 in B Minor

An Honors Thesis by Katelyn Goll

May 5, 2011

Chairperson of the Supervisory Committee: Professor Margaret Thomas
Department of Music

The question of whether music is capable of creating emotion and how it does so has been tackled by philosophers, music theorists, and psychologists, yet no single theory has proven satisfactory. The Baroque era and the modern era have produced the most research and speculation on the topic. Sad music poses a particular problem as people usually listen to music for pleasure. Beginning with Johann Mattheson (1681-1764), I explore how the Doctrine of the Affections can be used to understand the fifth movement ("Triste") Georg Phillip Telemann's Quartet No. 4 in B Minor (TWV43), from *Nouveaux Quatours en 6 Suites*. I also introduce two contemporary psychological theories: the mirror neuron theory and the expectations theory and describe how these can be used, either alone or in conjunction with Mattheson's theories, to analyze "Triste."

ACKNOWLEDGEMENTS

Professor Midge Thomas. Thank you. There is absolutely no way I can truly express how grateful I am to you for all of your help with this thesis. You let me work through about a half-dozen slightly different topics before settling on this one, allowed me to work from a different perspective than the typical music theory project, kept me motivated and on top of my research with our weekly meetings, encouraged me when I was starting to doubt that I would be able to do this (I don't even know if you knew I needed that), and listened to my rants as I tried to work through these ideas. Despite your crazy schedule and workload, you were always willing to take the time to help me out.

Professors Paul Althouse and Dale Wilson: Your thoughtful comments have helped me to look at my thesis from a slightly different angle and raise the quality of the work. I know you both are very busy, and you can't know how much it means to me that you have taken the time to read my thesis and offer suggestions.

Professor Patricia Harper: I just might have fallen apart without your understanding and encouragement as I struggled to juggle my senior recital and thesis.

And to all the professors who have shaped my education: This is really the capstone of all you have taught me over the last four years, and I never could have accomplished this without you.

To my family: Thank you for believing in me and for listening to my distressed phone calls all year. Thank you for all you have done that has allowed me to make it to where I am today.

To my friends: I know I worried and whined a lot about this thesis, yet you always listened patiently, offered encouragement, and forced me to leave my work for a while.

Du bist der Wind, der meine Flügel trägt.

PREFACE

The ancient Greeks used it to give their soldiers courage and instill morals in their children. Mothers have used it for ages to calm their screaming infants. Florence Nightingale, a nursing revolutionary, believed it was essential to the healing process.¹ Filmmakers use it to draw the viewer into the scene and portray the protagonist's inner thoughts. Music is more than an aesthetically pleasing sequence of pitches, but exactly what music does and how it does it is unclear. What features of music make sad music sad? What features calm the scared child or embolden the frightened soldier? What features can banish a sour mood or put us on the verge of tears?

The function of music is by no means a new concern. Philosophers as far back in time as Ancient Greece have tried to understand why music is so important to our lives and emotions. During the Baroque period, music theorists and composers added their approaches in an attempt to solve this conundrum. In the 20th and 21st centuries, psychologists, armed with empirical experiments and techniques for watching the brain at work, offered a new viewpoint. Despite the plethora of brilliant minds working to solve the problem, no discipline has yet suggested a solution that can effectively answer the question of how music affects us. Even technologically-advanced psychologists can only offer a nibble of the solution. For example, while it is clear music activates almost the entire brain, programs that analyze brain scans can only semi-accurately predict the genre of the music to which a participant is listening,² although the fact that the programs can

¹ Jane Elliot, "Bringing music medicine to the NHS," <http://news.bbc.co.uk/2/hi/health/8406006.stm>. 1 January 2010; accessed 3 May 2011.

² Michael Casey, "Scandora: Using Music Information Retrieval and Functional Magnetic Resonance Imaging to Predict Musical Meaning," Lecture, Digital Dialogues Series from Connecticut College, New London, CT, March 7, 2011.

recognize the genre more often than chance suggests our brains react differently to different features of music. We just do not know in which areas of the brain these differences occur or what features of music create these differences. Alternatively, some of the changes in brain activity may simply be too small to see using current brain scanning technology.

Sad music poses a particular problem for psychologists, theorists, and, especially, philosophers. If it makes us feel sad, why do we listen to it? Some philosophers believe that happy music can truly make a person feel happy, but argue that sad music is only recognized as sad and may instead create pleasure in the listener. However, others argue that although audiences may not break out in tears upon hearing sad music, its effect alters our emotional state. For example, Jarold Levinson claims a full-fledged emotion requires an affective, a cognitive, a behavioral, and a physiological response. Music does not generate a full-fledged emotion “because music neither supplies an appropriate object for an emotion to be directed on nor generates the associated beliefs, desires, or attitudes regarding an object that are essential to an emotion being what it is.”³ However, the physiological and affective components of emotion are retained, allowing music to “induc[e] at least the characteristic *feeling* of sadness.”⁴ But which features of the music separate sad music from happy music? And which features allow listeners to differentiate between sadness, despair, and anguish?

In the text that follows, I explore these questions from a musical standpoint, but psychology and philosophy, both Baroque and modern, play an indispensable role in

³ Jarrold Levinson, “Music and Negative Emotion,” in *Music and Meaning*, ed. Jenefer Robinson (Ithaca: Cornell University Press, 1997), 222.

⁴ Ibid.

shaping my perspective. I have selected “Triste” (mvt. 5) from Telemann’s Quartet No. 4 in B Minor (from *Six Nouveaux Quatuors en Six Suites*; TWV 43; 1733) to use as an illustration of the principles I discuss. For me, this is one of the Baroque period’s most intensely sad instrumental works, complex and beautiful. While I may not cry while I listen to this piece, long sighs frequently escape. I may recover rather quickly after the final notes of the piece, but my resulting mood is very different than if I had just listened to, say, the previous movement (“Vite”). For me, giddiness is nearly impossible during a performance of “Triste.”

Using this piece, I explore the ways in which affect in music has been explained, and examine how these theories can be used to understand a specific piece of music. Although many theories predate the Baroque period, the journey will begin with an exploration of the work of Johann Mattheson (1681-1764). As the first person to put a “Doctrine of the Affects” (*Affektenlehre*) into words, Mattheson created a cornerstone upon which modern psychologists could base their studies. However, Mattheson’s theories were based on his own observations of music, which were far less controlled than psychologists require for objective research. Even so, Mattheson’s theories have had a substantial impact on our current understanding of music. His straightforward theories, designed for practical use in composition, can help fill in gaps psychological research has not yet filled.

Our current understanding of the psychology behind musical affect is based on the theories of earlier philosophers and theorists, and in many ways these roots are still discernable in the modern theories. Undoubtedly, our knowledge of the human brain has grown exponentially since the days of Mattheson, so any attempt to explain musical

affect using only his theories would be antiquated and incomplete. Two recent psychological theories—the mirror neuron theory⁵ and the expectations theory⁶ offer especially promising ways to understand our powerful relationship with music and unique ways to understand Mattheson's *Affektenlehre* and Telemann's Quartet No. 4.

I believe psychology, philosophy and music theory are so closely linked it is impossible to study music in any of these disciplines without delving into the others. As such, the ultimate goal of this paper is to demonstrate a way of looking at and analyzing music that incorporates theories of both the past and present eras, attempting to explain how the music Telemann intuitively composed is capable of moving a listener's spirits.

To do this, I must first present a bit of the history of theories of musical affect and the social, musical and philosophical climate in which Mattheson began his theories; this is the topic of the first chapter. Chapter 2 explains Mattheson's theories and Chapter 3 suggests ways in which these theories can be used in an analysis of "Triste." The goal of Chapter 5 is to introduce psychological theories and show how these can also be used in an analysis of "Triste." The final chapter returns to one of the philosophical ideas that I present in the first chapter and offers an explanation of how the ideas presented in the first four chapters can be understood in this light and the usefulness of doing so in a musical analysis.

⁵ Katie Overy and Istvan Molnar-Szakacs, "Being Together in Time: Musical Experience and the Mirror Neuron System," *Music Perception* 26 (2009).

⁶ David Huron, *Sweet Anticipation* (Cambridge, MA: MIT Press, 2006).

Table of Contents

Acknowledgements-----	i
Preface-----	ii
 Chapter 1: Introduction	 1
<i>Historical Beginnings and Theoretical Underpinnings-----</i>	1
Greek Theories-----	1
Theory of the Temperaments-----	1
Rhetoric-----	3
<i>Johann Mattheson and Der vollkommene Capellmeister-----</i>	4
Mattheson-----	4
Controversies-----	6
<i>A Note About Language-----</i>	10
Chapter 2: Mattheson's Theories of Musical Affect	11
<i>Sad Music in Der vollkommene Capellmeister-----</i>	11
<i>Musical Elements in the Creation of Affect-----</i>	13
Interval Size-----	14
Direction of Movement-----	17
Dissonance and Consonance-----	18
Examples-----	19
Rhythm-----	23
Tempo-----	28
Key-----	29
Instrumentation-----	31
Melody-----	32
Chapter 3: The Theory in Practice	34
<i>Telemann's Quartet No. 4 in B Minor-----</i>	34
<i>Affective Elements-----</i>	40
Tempo-----	40
Key-----	40
Interval Size-----	41
Direction of Movement-----	46
Dissonance and Consonance-----	47
Rhythm-----	48
All Together Now-----	50
Chapter 4: Adding The Modern Theories	55
<i>Introduction to Recent Research-----</i>	55
<i>The Mirror Neuron System-----</i>	57
<i>Musical Expectations-----</i>	61
<i>Comparing and Combining the Theories-----</i>	65
<i>Understanding Telemann-----</i>	70
<i>Surprise as a Trigger-----</i>	74
<i>Context-----</i>	77
Chapter 5: Conclusions-----	82
Bibliography-----	86

CHAPTER 1: INTRODUCTION

Historical Beginnings and Theoretical Underpinnings

Greek Theories

Although Johann Mattheson (1681-1764) is frequently attributed with documenting the first complete Doctrine of the Affects in 1739, the theories on which Mattheson's ideas are based date back as far as ancient Greece. In this era, philosophers such as Plato, Aristotle, and Aristides Qunitilianus tried to explain the ways in which music could influence human's emotions. For example, in *Politics*, Aristotle writes, "for when we hear [music and poetry] our very soul is altered; and he who is affected either with joy or grief by the imitation of any objects, is in very nearly the same situation as if he was affected by the objects themselves."⁷ Like Mattheson, the Greeks even attempted to define which features of music could create certain emotions, although their logic is beyond the scope of what I cover.

Theory of the Temperaments

The Baroque Theory of the Affects grew from these roots. While beliefs about music's power continued through the intervening ages, the influence of these theories reached a new apex during the 17th and 18th centuries. This resurgence of writing on musical affect is due in large part to a renewed interest in two theories. The first of these, the Theory of the Temperaments, offers an explanation of how music can create affections rather than merely reflect them. According to Rene Descartes, on whose work

⁷ Aristotle, *The Politics of Aristotle: A Treatise on Government*, trans. William Ellis (London: J. M. Dent & Sons Ltd., 1947), 246.

many of Mattheson's ideas are founded, emotions are caused by "the spirits contained in the cavity of the brain making their way to nerves which serve to expand or constrict the orifices of the heart in a distinctive way from other parts of the body, or to maintain the passion in some other way."⁸ To commence this process, an external stimulus, such as music, induces the appropriate organ to produce a humor. The humor enters the blood stream and combines with vital spirits, the smallest subparticles in the blood,⁹ and travels throughout the body via the nerves, creating an emotion.¹⁰ Baroque musicians and philosophers believed that different styles of music would stimulate the production of different humors, each of which would create a different affective state (see Figure 1). Thus, by stimulating the production of these humors in a particular ratio, music forced an affective state upon the listener.

Figure 1. The Four Humors and Corresponding Emotions and Temperaments.

Humor	Emotions	Temperaments
Blood	Love, Joy	Sanguine
Yellow Bile	Anger, Fury	Choleric
Black Bile	Sorrow, Pain	Melancholic
Phlegm	Peacefulness, Moderate Joy, Sorrow	Phlegmatic

⁸ Rene Descartes, "Passions of the Soul," in *Philosophical Writings of Descartes*, vol. 1, trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch, (New York: Cambridge University Press, 1985), 342.

⁹ Dietrich Bartel, "The Concept of the Affections in German Baroque Music," in *Musica Poetica*, (Lincoln: University of Nebraska Press, 1997), 37-38.

¹⁰ *Ibid.*, 37.

According to the process thus far, it seems as if a single musical selection should have the same effect on every listener, but even Mattheson concedes that this is not the case. In the *Theory of the Temperaments*, each individual begins with a different ratio of each of the four humors, which is partially determined by astrology at birth,¹¹ and this ratio will alter the listener's experience. For example, when a person with a sanguine temperament hears music that induces the production of blood, it causes that individual to become even more loving or joyful than when a choleric individual hears the same music.¹² Mattheson uses similar reasoning when he describes the way in which a sonata can bring pleasure to all listeners, saying, "A person who is sad will find in it something plaintive and sympathetic; a sensualist will find something pretty; an angry person can find violence, etc., in the various movements of the sonata."¹³ While Mattheson's language differs from that of the *Theory of the Temperaments*, the basic idea that each listener will experience the music differently based on their temperament remains.

Rhetoric

The rules of rhetoric also impacted the development of the Doctrine of the Affects. This influence on the theory also dates back to the ancient Greeks; in fact, the term "affect" was taken from ancient Greek doctrines on rhetoric.¹⁴ More recently, the rhetorical techniques used in music evolved from the Renaissance preoccupation with

¹¹ Ibid.

¹² Ibid., 39.

¹³ Hans Lenneberg, "Johann Mattheson on Affect and Rhetoric in Music (I)," *Journal of Music Theory* 2, no. 1 (April 1958) : 68.

¹⁴ George J. Buelow, "Rhetoric and Music," *Grove Music Online*, <<http://www.oxfordmusiconline.com>> (Accessed September 20, 2010).

ensuring that the lyrics were legible.¹⁵ The orator and musician both need to achieve a response from their listeners. In fact, Mattheson devotes a rather large section of *Der vollkommene Capellmeister* to a description of how the different rhetorical rules can be applied to music, believing that orators and musicians could use similar techniques to arouse the affections of the listeners.

For example, Mattheson uses rhetorical terminology to describe the movement at the ends of phrases. The more final the *punctuation*¹⁶ term used, the stronger the cadence. For example, a *comma* might not include a cadence at all even though the melody suggests a pause, whereas a *semicolon* may utilize a half cadence and a *period* probably requires a perfect authentic cadence. These *punctuation marks* are important places for conveying emotion, just as they are in speech. Mattheson also suggests using other rhetorical techniques such as beginning and ending the music with the strongest material and taking care to not add so many ornaments that the melody is lost (based on the rhetorical strategy of not using such florid language that the meaning is lost).

Mattheson and *Der vollkommene Capellmeister*

Mattheson

In order to understand Mattheson's point of view, it is important to know a bit about his history and character. Although Mattheson is not nearly as well known as his contemporaries (Bach, Handel, and Telemann, to name a few), he was a force to be reckoned with during the Baroque era. Beginning as a child prodigy in organ and voice

¹⁵ Ibid.

¹⁶ Because the term *period* may be confused with the term referring to a double phrase, I have italicized all rhetorical punctuation terms.

by the age of nine, Mattheson continued his musical endeavors throughout his life, even while pursuing political and literary interests. Despite the fact that Mattheson's music is not as well known as that of many of his contemporaries (due in part to Mattheson's music being lost in World War II and not recovered until 1998), Mattheson was an active composer, composing operas, oratorios, passions, and vocal and instrumental chamber works. While continuing to compose and perform, Mattheson compiled biographies of the most important musicians known to him, began the first musical journal in Hamburg, worked as the music director at the Hamburg Cathedral and at the court of the Duke of Holstein and served as secretary to Sir John Wich, an English Ambassador. Mattheson also translated English pamphlets, articles, histories, novels, and philosophies into German.¹⁷

Mattheson's personality also makes him stand out among his contemporaries. Outspoken and self-assured, Mattheson often proposed new ideas about music with little evidence to support his position, a characteristic of which one must be careful when attempting to analyze his theories. Mattheson was often unclear and contradictory, both towards his and other authors' ideas, especially in his treatment of harmony. For example, despite the established practice of the day, Mattheson claimed that a perfect fourth was consonant without providing any evidence to support his conclusion.¹⁸ In addition one did not want to cross Mattheson, as illustrated by the duel between Mattheson and Handel. During a performance of Mattheson's opera, *Cleopatra*, Handel refused to relinquish his post at the keyboard so that Mattheson could claim the spot

¹⁷ George Buelow, "Mattheson, Johann," *Grove Music Online*.
<<http://www.oxfordmusiconline.com>> (Accessed November 12, 2010).

¹⁸ Joel Lester, "Mattheson and the Study of Melody," in *Compositional Theory in the 18th Century* (Cambridge, MA: Harvard University Press, 1992), 158.

(Mattheson had been acting in the opera and his character had committed suicide), so Mattheson challenged Handel to a duel. Thankfully, Handel's life was spared when Mattheson's blade broke on a button on Handel's coat, and the two later reconciled.¹⁹

From his first work, *Das neu-eröffnete Orchestre* (published in 1713) until his most famous, *Der vollkommene Capellmeister*²⁰ (published in 1739), Mattheson explored the ways in which music was capable of influencing or conveying emotion. However, the affections were by no means Mattheson's only interest in music, and in actuality, only a small portion of *Capellmeister* is concerned with them. Mattheson also discusses almost every other aspect of music—from melody to dissonance to rhythm to lyrics—hence the title of the work, which Hans Lenneberg translates as “The Complete Music Director.”²¹ Although Mattheson dedicated a rather large section of *Capellmeister* primarily to the affections, he also includes digressive comments about emotion throughout the work, as if to remind the reader of the omnipresent requisite of music to alter the listener's emotions.

Controversies

Capellmeister is a topic of debate for both Mattheson's contemporaries and modern music scholars. For example, debates center on whether or not music arouses emotions, and whether *Capellmeister* implies that they were capable of doing so. Peter Kivy is one contemporary philosopher who argues that Mattheson viewed music as

¹⁹ Walter Schenkman, “Johann Mattheson,” *Keyboard* 7 (September 1981) : 27.

²⁰ Hereafter, I refer to the work as simply *Capellmeister*.

²¹ Lenneberg, “Mattheson on Affect,” 48.

representational of emotions rather than arousing emotions.²² Kivy explains that emotion in music can be understood in one of three ways. First, music can express an emotion felt by the composer, which Kivy dubs “self-expression theory.”²³ While Mattheson admits that composers must have at some point felt the more complex emotions (such as love) in order to convey them effectively through music,²⁴ he does not claim that the composer needs to be currently experiencing the emotion in order to convey it. This theory is clearly not Mattheson’s point of view, so I will not discuss it further. Kivy’s second two theories are the source of the controversy. The first of these, which Kivy calls “arousal theory,” proclaims that a musical composition has the ability to create an emotion within the listeners.

Kivy’s other theory, to which he ascribes, is the “possession theory.” In this theory, emotions in music are “‘phenomenological’ properties, much in the way that a weeping willow or the jowly face of the Bloodhound are seen to be sad, in spite of the obvious fact that the weeping willow cannot be *feeling* sad, and the Bloodhound need not be.”²⁵ As an example, Kivy suggests that since people do not cry in anguish at a performance of the Second Kyrie in Bach’s *Mass in B Minor*, they are not experiencing a true emotion.²⁶ Because of this observation, Kivy rejects the arousal theory, asserting that music imitates the properties of sadness, but only on the surface. Music can neither be said to “be sad” or to “make one sad.” Kivy holds that this is Mattheson’s belief as well, claiming that while Mattheson may have occasionally slipped into the arousal

²² Peter Kivy, “Mattheson as Philosopher of Art,” *The Musical Quarterly* 70, no. 2 (Spring 1984), <<http://www.jstor.com/stable/742213>.

²³ Ibid., 250.

²⁴ Lenneberg, “Mattheson on Affect (I),” 53.

²⁵ Kivy, “Philosopher,” 251.

²⁶ Ibid., 251-252.

theory language of the day, the most common verbs he uses suggest that Mattheson really saw music solely as possessing phenomenological properties.

On the other hand, in Chapter 3 of *Capellmeister*, Mattheson tells the reader that he relies on “the doctrine of the temperaments and emotions, concerning which Descartes is particularly worthy of study, since he has done much in music.”²⁷ Mattheson’s reliance on Descartes for the crux of his theory implies that Mattheson believed that music was capable of influencing the emotions, as the theory of the temperaments provides explicit details regarding the process. In addition, the arousal theory was the accepted theory at the time, and although Mattheson may be known for suggesting radical ideas about music, his descriptions of how music relates to emotions suggest that he held this belief. For example, Mattheson claims that music can heal illness, as “health is so musical that all sicknesses consist of nothing other than discords and dissonances”;²⁸ this feat would only have been possible if music were capable of influencing the humors, the cause of both illness and emotion. Other modern philosophers have also disagreed with Kivy’s point of view, negating Kivy’s perceived obligation to credit Mattheson with ascribing to the possession theory. The idea that Mattheson subscribed to the theory of musical arousal, therefore, cannot be abandoned.

A second debate about Mattheson’s writing concerns whether Mattheson was attempting to write a formal doctrine. If *Capellmeister* was intended as a formal doctrine, its goal would have been to present a set of beliefs about how music behaves that should be taken as authoritative. Many writers claim that Mattheson’s writings are the first such

²⁷ Lenneberg, “Mattheson on Affect (I),” 53.

²⁸ Johann Mattheson, *Der vollkommene Capellmeister*, trans. Ernest Charles Harriss (Ann Arbor, MI: UMI Research Press, 1981), 103.

doctrine in the Baroque era, despite the universal use of the theories well before the treatises were written. In support of this idea, Lenneberg, in an introduction to a translation of the affect-related sections of *Capellmeister*, writes that “the doctrine of the affects and its sister doctrine of musical rhetoric were not merely theoretical approaches to a kind of music criticism; they were meant to be practical guides to composers.”²⁹ In other words, these works were designed to create a set of rules that composers could use to move the listener’s vital spirits in a certain direction.

Other music theorists, however, warn against taking Mattheson’s ideas as a formal doctrine. George J. Buelow explains that the term *Affektenlehre* does not mean “Doctrine of the Affections,” but rather describes what should occur in music. Buelow compares the term *Affektenlehre* to the term for physics, *Natur-Lehre* and says that as such, the term is meant to imply a set of observations. He says that *Affektenlehre* should be translated as “the Cartesian Theory of basing human emotions on physical laws for the body.”³⁰ Ernest Harriss also criticizes the idea that Mattheson composed a formal Doctrine of the Affections. Harriss believes that because Mattheson was a pragmatist and an empiricist, he would not have *wanted* to set down laws about affect in music.³¹ Instead, Mattheson’s works would have contained material based on observation rather than unbendable rules.

²⁹ Lenneberg, “Mattheson on Affect (I),” 47.

³⁰ George J. Buelow, “Johann Mattheson and the Invention of the *Affektenlehre*,” in *New Mattheson Studies*, ed. George J. Buelow and Hans Joachim Marx (Cambridge: Cambridge University Press, 1983) : 399-400.

³¹ Ernest Harriss, “Johann Mattheson: The Enlightenment, L’Éclaircissement, or Die Aufklärung,” in *Music in the Theater, Church, and Villa*, ed. J. Bunker Clark (Warren, MI: Harmonie Park Press, 2000) : 190.

Regardless of whether Mattheson intended to write a formal Doctrine of the Affects, he dedicated a rather large amount of time and space to a description of how he believed music affected the emotions and which types of music could induce specific affections. For my purposes, whether or not Mattheson's theories constitute a formal doctrine is of little importance; what is important is whether composers of the day used these techniques and how Mattheson's theories interact with modern psychological theories.

A Note About Language

I deal with a large range of “unpleasant” emotions in my discussion, such as sadness, unhappiness, despair, and sorrow. When referring to the group of emotions as a whole, I use the term *sad*, in italics. However, there are occasions upon which I wish to allude to sad music specifically, and in these instances, sad will be typed in roman font. Although Mattheson frequently distinguishes between more subtle categories of emotion, the theories that he uses are based on a minimal number of directions in which the vital spirits can move. To use an example I discuss in more detail later, Mattheson suggests that small intervals cause a contraction of the spirits, which leads to sadness. In this case, the vital spirits can only move in one of three ways: contract, expand, or stay the same. Therefore, all the emotions caused by a contraction of the vital spirits will be induced by small intervals, and other features of the music are needed in order to make the emotion more specific. I have chosen the *italic/roman* system to ensure that important affects are not neglected.

CHAPTER 2: MATTHESON'S THEORIES OF MUSICAL AFFECT

Sad Music in *Der vollkommene Capellmeister*

Mattheson's comments on the ways in which music creates emotion can be divided into two main categories. The first category includes comments on the affections themselves: how they are formed, people's preference for certain emotions, and the purpose of using affections in music. The second category includes Mattheson's theories on the specific ways in which music influences the affections, such as through tempo, key, or interval size. Since I have already described how the affections are formed, according to Mattheson and Descartes, I begin this section with a brief description of Mattheson's remarks in the former category and then shift to a more detailed discussion of Mattheson's writings in the latter category, providing musical examples where appropriate.

Mattheson believes that because *sadness* is a complex emotion, composing *sad* music demands a certain amount of experience. He claims that because "sadness goes against the purpose of life and interferes with human [self-] preservation (Lenneberg's addition)...although man often takes a kind of pleasure in sorrow, it requires more effort to master this emotion without feeling it."³² In order to master a complex and difficult emotion, a composer must really know how it feels to experience that emotion. This is not to say that Mattheson believes music is a type of self-expression; he does not say it is impossible to convey an emotion without feeling it or that one must be feeling it while one writes, but that in order to really write an affection well, one must know how the

³² Hans Lenneberg, "Johann Mattheson on Affect and Rhetoric in Music (II)," *Journal of Music Theory* 2, no. 2 (Nov. 1958), 54.

affect works. One must understand the movements of the spirits that will create an affect in order to recreate that movement through imitation in music. Writing a piece of *sad* music is not an instinctive process, Mattheson says, since *sadness* goes against our nature. Thus, unless you are experiencing *sadness*, you will have to fight your natural instincts, like a storm chaser defying his natural instinct to take cover and instead drive towards the tornado. While difficult, a composer with the patience and knowledge of the emotion could master it without having felt it himself.

Even though *sad* music creates an unpleasant emotion, Mattheson believes that it serves a critical role in the repertoire. In sacred music, “where this emotion [sadness] is most moving and beneficial, it rules all these: penance, remorse, sorrow, dejection, complaint, and the recognition of our misery.”³³ Mattheson also assigns *sad* music a role in secular music:

In secular music in which sadness has no special purpose, there is, nevertheless, infinite opportunity to use this fatal emotion as well as its varying degrees and kinds. Each of these [kinds] (Lenneberg’s addition), according to its particular character, can give rise to particular inventions and expressions through the manifold contraction of tones and intervals.³⁴

Mattheson tells the reader that people do enjoy *sad* music, despite that it creates an unpleasant emotion. This is a contradiction that philosophers have run into for ages, from ancient Greece³⁵ to modernity. Some philosophers believe that *sad* music does not create a genuine emotion, as we do not cry when we hear it, but others, like Jarold Levinson,

³³ Lenneberg, “Mattheson on Affect (I),” 54.

³⁴ Ibid.

³⁵ Plato, “The Republic,” in *Source Readings in Music History: From Classical Antiquity through the Romantic Era*, ed. Oliver Strunk (New York: W.W. Norton, 1995), 4.

suggest that the *sad* music problem is not solved by dismissing it. Levinson writes, “Something *very much like* the arousal of negative emotions is accomplished by some music, and so there is indeed something to explain in our avidity for such experience.”³⁶ Mattheson makes a cursory attempt at reaching a solution by claiming that people like to hear *sad* music, stating, “A writer we have already mentioned [La Mothe Le Vayer Francois, 1588-1672] gives a good reason why most people prefer to hear sad rather than happy music, namely, ‘almost everybody is unhappy.’”³⁷

Musical Elements in the Creation of Affect

Mattheson claims that any emotion can be created through a combination of musical features that imitate the movement of the vital spirits. Although music in its entirety is necessary to create an affect, each of the parameters of music contributes to the listener’s response. Mattheson outlines the use of these parameters in *Capellmeister*, naming key, tempo, rhythmic structure and size and direction of the intervals as a few of the features of music that contribute to its power.³⁸ The following section discusses each of these features and suggests musical examples that demonstrate the principles of the *Affektenlehre*.

³⁶ Jarrold Levinson, “Music and Negative Emotion,” in *Music and Meaning*, ed. Jenefer Robinson (Ithaca: Cornell University Press, 1997), 217.

³⁷ Lenneberg, “Mattheson on Affect (I),” 54.

³⁸ Mattheson also considers lyrics and musical form important in the creation of emotion, but these features are not essential to the present discussion.

Intervallic Size

As mentioned earlier, Mattheson bases his ideas on Descartes' theory of emotions in which emotions are created by a change in the balance of the vital spirits. Joy, Mattheson says, is an "expansion of our vital spirits...Sadness, on the other hand, is a contraction of those same subtle parts of our bodies. It is, therefore, easy to see that the narrowest intervals are the most suitable."³⁹ In Mattheson's opinion, the creation of *joy* or *sadness* is a direct effect of the melodic intervals used in the music. The vital spirits imitate the sounds that are heard in the real world and in doing so cause the listener to experience an emotion.

While the relationship between interval size and emotion seems straightforward, it becomes more complicated as the emotions become more complex. For example, Mattheson writes that "despair, which is the extreme to which cruel fear can drive us, requires, as one can readily imagine, the strangest extremes of sound for its natural expression. It can thus lead to very unusual passages and to the strangest, wildly disordered sequences of notes."⁴⁰ Despair and sadness are related in that sadness is one aspect of despair, a much more complex emotion that involves a complete loss of hope. Since the two emotions could be grouped into a larger overarching category of negative emotions, the means for expressing the emotions should be similar. However, Mattheson suggests that despair should be expressed by strange and disordered sequences of notes, almost a complete contradiction to the small movement (likely stepwise or triadic) that he suggests for sadness. To demonstrate this principle, Mattheson provides an example of a recitative sung by a person in despair. The disordered sequence of notes can be seen in

³⁹ Lenneberg, "Mattheson on Affect (II)," 51-52.

⁴⁰ Lenneberg, "Mattheson on Affect (I)," 56.

the melody of Figure 2. In the example, many of the notes are repeated, but these are necessary to make the music a recitative, so I focus on the intervals that move.

There seems to be no clear logic to the intervals. Nineteen of the 28 intervals are seconds or thirds, but the remaining intervals are large, making the shape of the melody unpredictable. The notes usually stay within the chord, but it would be nearly impossible to predict how big the next interval will be or in which direction the next leap would occur. His example of despair shows both a disorganized sequence of notes and a mix of interval sizes, both of which seem to contradict the suggestion that small intervals be used for sadness.

Perhaps one way to explain this apparent contradiction is by using Hill's model of the behavior of the vital spirits. According to Hill, emotions can be imagined to be on a two-dimensional continuum. Emotions, he says, are the result of either pleasure or pain and either an expansion or contraction of the vital spirits. This is perhaps best illustrated in the chart in Figure 3.⁴¹ On this continuum, pain would be one of the dimensions of sadness, but sadness would also require a contraction of the vital spirits, as sadness is generally an inactive emotion. Despair, on the other hand, might at different times be placed in different areas of the chart—at times near hate and at other times closer to sorrow. A person in despair, for example, may at one moment be thrashing about and the next sobbing quietly; this illustrates how the real life qualities of despair lead to its varied placement on a two-dimensional continuum. Following the idea, then, that narrow intervals are most suitable to a contraction of the vital spirits, sadness should use small intervals, since its induction relies on the contraction of the vital spirits. On the other

⁴¹ John Walter Hill, *Baroque Music* (New York and London: W. W. Norton and Company, 2005), 392.

hand, despair, as an unstable emotion, would require the disorganized intervals that Mattheson calls for in its expression.

Figure 2. Mattheson's Example of Despair.⁴²

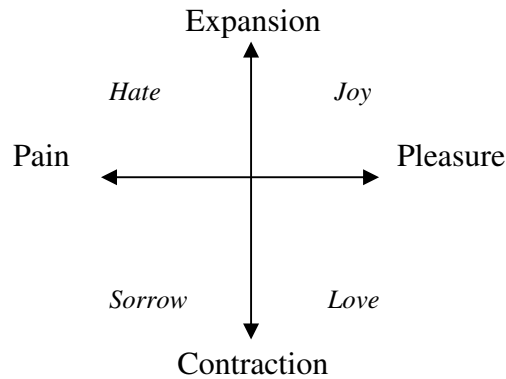
The figure displays a musical score in four systems, each consisting of a treble and bass staff. The music is in common time (C). Above the treble staff, interval labels (m6, m2, m2, M3, P5, P5, m2-) and arrows indicate punctuation marks where the melody falls. Below the bass staff, interval labels (M3, m3, M3, d5, m2) and arrows indicate punctuation marks. The lyrics are written below the treble staff.

System 1: Un-säg-lich ist mein Schmerz; un-zähl-bar meine
 System 2: Pla-gen; Die Luft be-seufftet, dass sie mich hat en-
 System 3: neht; die Welt die-weil sie mich ge-tre-gen,
 System 4: ist bloss da-rum Ver-bren-nens werth; Die Sternen werden zu Co-

Arrows indicate punctuation marks where the melody falls.

⁴² Lenneberg, "Mattheson on Affect (II)," 217.

*Figure 3. Classifications of emotions, modeled on Hill's description.*⁴³



Direction of Movement

The direction of movement may also contribute to the affect that is experienced by the listener. Mattheson points out that the direction of movement in the sample recitative (see Figure 2, above) is consistent with the despair of the character. He points out that at each semi-colon (as expressed in the text and marked with arrows), the melody falls.⁴⁴ The bass also falls by half-step throughout the entire piece.⁴⁵ When these two aspects of the piece are taken together, Mattheson seems to be suggesting that a falling motion throughout the music contributes to the affect of despair that is meant to be conveyed by the music. Because his focus during this section of *Capellmeister* is on the treatment of punctuation in music, Mattheson never addresses the function of downward motion with regard to affect in detail.

⁴³ Hill, *Baroque Music*, 392.

⁴⁴ Lenneberg, "Mattheson on Affect (II)," 216.

⁴⁵ *Ibid.*, 216-217.

Mattheson's descriptions of how the direction of movement contributes to the overall affect may not be as clearly outlined as some of his ideas, but the Theory of the Temperaments also provides evidence that despair is best expressed using a falling melody. Mattheson writes:

Hope is an elevation of the spirit; despair, on the other hand, a casting down of the same. These are subjects that can well be represented by sound especially when other circumstances (tempo in particular) contribute their share. In such a manner one can form a concrete picture of all the emotions and try to compose accordingly.

To create despair, a composer should follow the same principle that applies to interval size: the composer needs to imitate the vital spirits in the music he writes. If the Theory of the Temperaments suggests that the vital spirits fall in despair, the music should fall as well.

Dissonance and Consonance

While Mattheson does not specifically discuss the influence of dissonances in the creation of a *sad* affect, he implies that the careful use of dissonances and consonances can create an image or emotion. One example that Mattheson provides is that of using a large number of dissonances in order to depict lyrics concerning hellish furies or plagues.⁴⁶ While not sad, these images suggest that the reaction of the vital spirits to dissonances is perceived as unpleasant. Mattheson, I believe, would agree that dissonances can create more than the emotions that would be induced by images of hell or a plague, as he writes, "Just as ideas may be derived from either dissonance or

⁴⁶ Lenneberg, "Mattheson on Affect (I)," 79.

consonance, a variety of skillfully contrived interchanges between consonance and dissonance can lead to the derivation of many more inventions.”⁴⁷ If nothing else, Mattheson’s comment suggests that consonances and dissonances are one parameter of music that can affect the vital spirits and therefore the emotions.

Examples

One figure that demonstrates the function of all three of the elements discussed so far is the appoggiatura. The major or minor second created by the resolution of the appoggiatura, especially when played with the customary diminuendo, produces a rather believable imitation of a sigh, hence the more colloquial term “sigh figure.” The dissonant note and resolution comprise a small interval, downward motion (usually), and dissonance. However, the approach to the dissonant note is diametrically opposed to the resolution, as appoggiaturas are approached by a leap from a consonant note to the dissonant note. In addition, the leap that precedes the appoggiatura is typically upward, and these features would technically create the opposite emotion, according to Mattheson’s theory. Due to the accent on the dissonant note, it may be that the leap provides contrast to the figure of interest, making its motion and impact on the vital spirits all the more powerful. Clearly, some of the motives in a piece must carry more weight than others, or the listener’s vital spirits would move erratically, which would have the exact opposite effect from what Baroque composers intended.

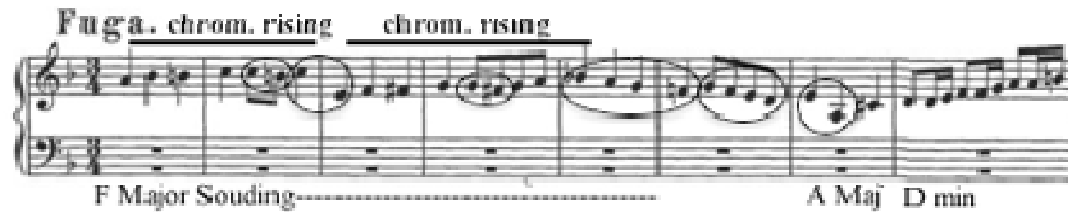
The tension of the appoggiatura is just as important to (perhaps it is an effect of) the creation of affect as the features described above. The dissonance of the strong beat

⁴⁷ Ibid., 79-80.

begs for a resolution; the leap needs to step down, returning to a more stable pitch. If the dissonant note is left unresolved, the listener feels unsettled. One can see the same effect of tension in the following example, regarding chromaticism, and I return to the topic in Chapter 4 to see if recent theories can shed light on this subject.

Chromatic passages are imbued with small intervals and should therefore create an intense *sadness*. Look, for example, at the subject of Bach's "Chromatic Fugue" in Figure 4. Except for the leap of a sixth in mm. 2-3, the movement in the first four measures of the subject is completely chromatic. The second four measures do not include nearly as much chromatic movement (although there is still some), but the movement continues in stepwise intervals with the exception of the outlined A major triad in m. 7. However, other features contradict the *sadness* the chromatic intervals imply. For example, although the subject is technically in the key of D minor, the first five measures sound as if they are in a major key. In addition, about two-thirds of the intervals (19/29) in the subject are rising. These two features seem to contradict Mattheson's statements about the other features of music that contribute to a *sad* affect. Even so, while the subject may not be described as distraught or mournful, the melody is on the *sad* side of the spectrum, even without the assistance of a harmonic line, showing the power of small intervals to influence music's tone.

Figure 4. Subject of Bach's Chromatic Fugue (BWV 903).⁴⁸



Circles indicate falling intervals.

Although interval size is important to the affect, neither the appoggiatura nor chromatic movement is designed solely for use in *sad* music, and the affect created by them is not always *sadness*. Other features of the music, especially when used in combination, can modify or overpower interval size just as the interval size seems to overpower the direction of movement in the Bach fugue. As Mattheson suggests by the many sections in *Capellmeister*, each dealing with a different aspect of music, many different features of music are needed in combination in order to create a complete affection. For example, the key and tempo contribute to the affect in Bach's fugue subject shown in Figure 4, and the expression that the musician uses during an appoggiatura can completely hide the sigh effect that is suggested by the notes. The complexity of music makes Mattheson's theories difficult to test empirically, and may be one reason that many scholars have suggested that Mattheson's theories are not a doctrine: a doctrine would need to provide some way to account for the ways in which conflicting affects alter the way music is experienced.

⁴⁸Johann Sebastian Bach, *Chromatische Fantasie und Fuge (Chromatic Fantasia and Fugue) in D Minor*, BWV 903 (Leipzig, Bach Gesellschaft Edition, 1899).

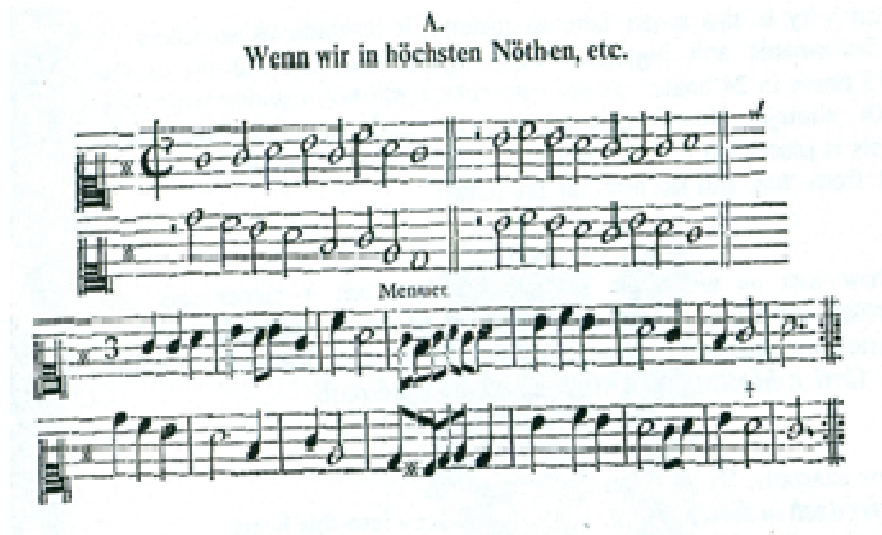
Rhythm

Though a less frequently cited factor than the aspects of music described thus far, rhythm also plays a role in determining how listeners receive the piece. Mattheson claims that by altering only the rhythms of well known church songs, he can make them into dances, and then provide examples of how this might be accomplished. For example, he demonstrates that the melody of the chorale *Wenn wir in höchsten Nöthen* can be made a minuet by changing only the time signature (from 2/2 to 3/4) and the note values (see Figure 5).⁴⁹ In making this change, Mattheson changes the character and affect of the music from the solemnity of a chorale to the “moderate gaiety,”⁵⁰ of a minuet. On the other hand, the music still retains the intervallic structure of the chorale, which, as has already been discussed, also influences the affect created by the music. Thus, while the metric modes can influence the affect of the music, they do not create the affect of the music in and of themselves, but serve to refine the affect created by other features of the music.

⁴⁹ Mattheson, *Capellmeister*, trans. Harriss, 345.

⁵⁰ Lenneberg, “Mattheson on Affect (I),” 57.

Figure 5. Mattheson's Example of the Effect of Rhythmic Feet.⁵¹



According to Mattheson, each metric mode has the potential to contribute to specific affections. For instance, the spondaic foot (two tones of equal duration, see Figure 6), he says, has a “respectable and serious character”⁵² and is commonly used in church hymns. Figure 7 is an example of the spondaic foot used in one of Bach’s chorales, *Da der herr Christ zu Tische sass*. The lower parts of this chorale also use mostly spondaic feet, creating the “devotional, solemn, devout, and yet easy to grasp” character that Mattheson assigns to this metric mode.

Figure 6. The Spondaic Foot.⁵³

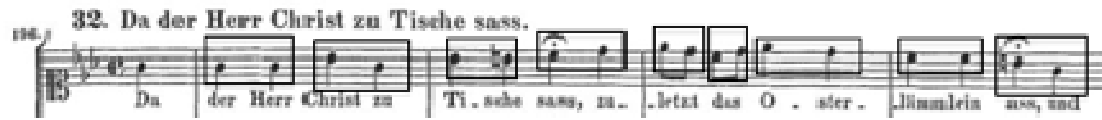


⁵¹ Mattheson, *Capellmeister*, trans. Harriss, 345.

⁵² *Ibid.*, 350.

⁵³ *Ibid.*

Figure 7. Spondaic Meter in Bach's *Da der herr Christ zu Tische sass*, mm. 1-4.⁵⁴



However, the rhythmic modes do not form a one-to-one ratio with the affections. Instead, each mode can create a variety of emotions, depending on the other features of the music. For example, the dactylic foot (long-short-short; see Figure 8) and the anapaestic foot (short-short-long; see Figure 9) are suited for both serious and jocose affections.⁵⁵ Even within Mattheson's guidelines, there is potential for variation. For example, one can find the spondaic foot in pieces that are not devout, solemn, or devotional. For instance, the spondaic foot constitutes approximately half of the first four measures of the second movement ("Aire") of Bach's Cantata 212, *Mein hahn en neu Oberkeet*, especially in the vocal parts, yet the affection of the music is far from solemn (see Figure 10). The dactylic feet in this excerpt may help to lighten the mood, but this does not necessarily account for the overriding of the spondaic foot, as Mattheson allows that the dactylic foot can be used in serious as well as jocose melodies.

⁵⁴ Johann Sebastian Bach, *Da der Herr Christ zu Tische sass*, BWV 285, Leipzig: Bach Gesellschaft (1899), Classical Scores Library, Connecticut College, <http://shmu.alexanderstreet.com/>

⁵⁵ Mattheson, *Capellmeister*, trans. Harriss, 355.

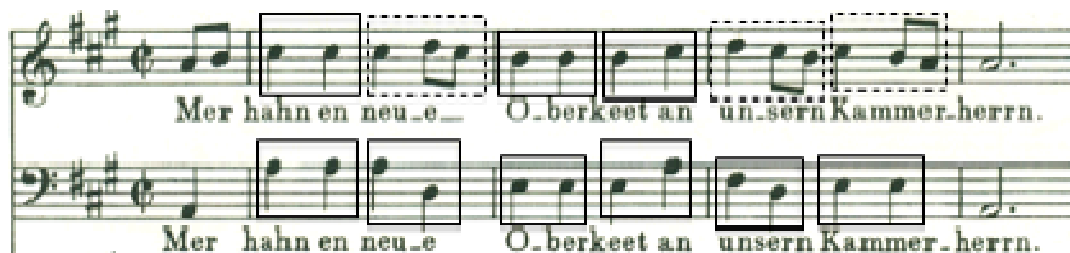
Figure 8. Dactylic Foot.⁵⁶



Figure 9. Anapaestic Foot.⁵⁷



Figure 10. Mein hahn en neu Oberkeet, Aire, BWV 212, mm. 1-4.⁵⁸



Solid boxes indicate spondaic foot; dashed boxes indicate dactylic foot.

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ Bach, Johann Sebastian, *Mer hahn en neue Oberkeet*, BWV 212, Wiesbaden: Breitkopf and Hartel (ca 2010?).

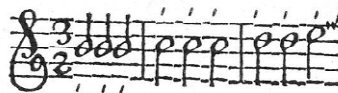
One mode, the molossic, does not have the flexibility of most of the modes.

Regarding this rhythmic mode, Mattheson writes,

The molossus, which gets its name from hard toil or from pitched battle, in which there is no small amount of work, has three long syllables or sounds, and expresses arduousness or something toilsome rather well. The majestic pace of this foot can also serve quite well for a march or procession, especially with drums. The molossus is little used in other cases, and is least suited for lively pieces or dances; but so much better for very serious, sad, or melancholy circumstances.⁵⁹

It is rather easy to see why Mattheson would connect the three long tones of the molossus with laboriousness or melancholy, as the notes seem to plod on, slowly, more like one would to his execution than to his friend's party. In addition, Mattheson indicates that these notes are usually played staccato, and in his example (see Figure 11), all three pitches of each molossus are the same.⁶⁰ These features contribute to the heaviness in a way that Mattheson does not comment on explicitly.

*Figure 11. Molossus.*⁶¹



⁵⁹ Mattheson, *Capellmeister*, trans. Harris, 355.

⁶⁰ *Ibid.*, 356.

⁶¹ *Ibid.*

Although Mattheson says that the molossus is rarely found in music, there are examples of its use, especially in the slow movements of sonatas. Unlike Mattheson's example, however, it is more commonly found in legato melodies in which the pitch changes. For instance, in Handel's Sonata in G Minor for Flute (HWV 360; see Figure 12), the melancholy third movement (Adagio) uses the molossus in over half of the measures, and uses nothing but the molossus in the first five measures. The molossus in this piece is divided between the recorder and continuo lines, but the effect is still a three-note rhythm of all long notes of equal length. There is no indication that the music is to be played staccato, and the three notes of the molossus are not repeated, but move about. It is possible that the inclusion of staccato, unison notes would have amplified the emotion, but this example illustrates that repeated staccato notes are not mandatory to the process of moving the affections. This ability lies in the right combination of musical features rather than any single feature.

*Figure 12. Adagio from Handel's Sonata in G Minor.*⁶²



Arrows show the molossic figures as they move within and between the parts.

⁶² Georg Friedrich Händel, "Movement 3: Adagio" in *Sonata in G Minor for Flute and Basso Continuo*, Nagels: Kassel, 1980.

The heaviness and melancholy that the molossus suggest are much clearer when the ornamentations and the realization of the figured bass are kept simple so the clear statement of each molossus can be heard. When this is done, the movement acquires a kind of trudging quality, just as Mattheson suggests the molossus will do for the affect of the music. This distinction can be clearly heard by listening to different recordings of the Handel Sonata. For example, Paula Robison⁶³ incorporates many ornaments that obscure the molossic figure. Laurel Zucker,⁶⁴ on the other hand, limits the ornamentation, especially in the first four measures, and the ornamentation in the harpsichord's line is restricted to rolled chords. Although Robison and Zucker take the same amount of time to play the movement (58 seconds), Robison's version seems much quicker than Zucker's and not at all melancholy.

Tempo

Tempo offers another way to create an affect. In the simplest sense, slow tempos are reserved for *sad* or serious music, and faster tempos are used for lighter music (although this oversimplifies the effect, as not all *sad* pieces are slow, nor all *happy* pieces fast). However, Mattheson has little to say on this topic. The one time he mentions tempo in relation to affect is only a parenthetical reference. Tempo, he says, needs to contribute its share to creating the affect of the music in order for hope or

⁶³ Paula Robison, Kenneth Cooper, and Timothy Eddy, "Sonata in G Minor: Adagio," *G. F. Händel: The Complete Sonatas for Flute*, Compact Disc, Vanguard Classics (2004).

⁶⁴ Laurel Zucker and Robin Sutherland, "Sonata in G Minor, Opus 1, No. 2 for Flute by Händel: Adagio," *The G. F. Händel Flute Sonatas for Flute and Harpsichord*, Compact Disc, Cantilena Records (1995).

despair to be properly represented in music.⁶⁵ Thus, while it is clear that Mattheson considers tempo to be important to musical affect, he provides no guidelines on how it should do so. Perhaps this is simply because Mattheson considered it too obvious to need any further explanation.

Key

Today, when people think of the factors that influence musical affect, key is one of the features that is most frequently mentioned. Modern listeners, studies suggest, hear major mode music as *happy* and minor mode music as *sad*. Baroque listeners often associated the same general descriptors to the modes,⁶⁶ but Mattheson says that the real relationship between key and affect is much more complex than the two-mode system would suggest. Instead, Mattheson suggests that each key has its own affect, and explains how these in *Das neu-eröffnete Orchestre*. The affections of these keys do not always match the simpler major-*happy*/minor-*sad* dichotomy. For example, the affect Mattheson associates with E major is desperate or fatal sadness.⁶⁷

Perhaps the best explanation that accounts for this difference is that the equal temperament scale was not yet in use in Mattheson's day. The tuning systems in use in the 18th century varied widely between countries, and variations could be found even within the same city. The most common system in vogue was an irregular temperament in which the thirds in the C major scale were lightly tempered. This meant that the farther from C major the key moved, the more tempered the thirds would be. Because the

⁶⁵ Lenneberg, "Mattheson on Affect (I)," 56.

⁶⁶ Lenneberg, "Mattheson on Affect (II)," 235.

⁶⁷ *Ibid.*, 236.

size of the thirds varied, so did the size of the semitones. E-F and B-C were the largest of the semitones, and C-Db and F-Gb were the smallest. This characteristic of the tuning system would have created audible differences between the keys, both in the harmonies and in the scale.⁶⁸ The size of the leading tone would have been particularly influential in altering the affect of the key. The differing sizes of the important intervals would have affected the vital spirits in much the same way as other melodic intervals, as described earlier in this chapter. Because E major is a fair distance on the circle of fifths from C major, its tuning could well have changed the *happy* E major that listeners of the equal temperament scale know to the desperate and fatally sad key that Mattheson heard.

Mattheson did want an equal temperament scale to supercede the earlier temperaments (although he did not see how this could occur, as people had become so accustomed to the older systems),⁶⁹ but he makes no effort to describe how music would affect the listener if the switch were made, meaning that music's effect on the modern listener's ears is not explained. One possibility would be to take the simpler perspective that Mattheson acknowledges was common during the Baroque period: major keys are *happy* and minor keys are *sad*. A better solution would be to take Mattheson's description of C and G major (both of which are associated with joy) and A and E minor (which are both described by Mattheson as being calm, with A minor also described as plaintive),⁷⁰ as these keys had the least tempered thirds. We could also take Mattheson's

⁶⁸ Mark Lindley, "Temperaments," in *Grove Music Online*, *Oxford Music Online*, <http://www.oxfordmusiconline.com/subscriber/article/grove/music/27643> (accessed April 16, 2011).

⁶⁹ Schenkman, "Johann Mattheson," 32.

⁷⁰ Lenneberg, "Mattheson on Affect (II)," 235.

own advice and form our own theories about how each key affects the listener.

Mattheson writes:

The affects especially are like a bottomless sea; it cannot possibly be emptied, no matter how hard one may try. A book can present only the smallest part [of this subject] (Lenneberg's addition) and much has to be left unsaid, left to everyone's own sensibility in this area.⁷¹

Instrumentation

In his discussion of keys, Mattheson makes his only allusion to the relationship between instrumentation and affect. The key of D Major, Mattheson says, when played with a clarinet and kettledrum, is noisy, gay, and war-like. However, when it is played with a flute or violin, "it can very well be used for delicate things."⁷² The timbre of the instrument seems as if it would be important in determining the musical affect—even the ancient Greeks commented on the affective features of different instruments. However, Mattheson only slips in this tiny comment in his discussion of the impact of the key on musical affect in *Das neu-eröffnete Orchestre*, and the topic is left out of *Capellmeister* altogether. This is not uncommon for Mattheson to do; he frequently mentions an idea or concept and never returns to it or supports it with any examples.

Regardless of his reasoning for only including this brief comment, we can glean that instrumentation is important to Mattheson, even though he makes no effort to indicate how the timbre of instruments is capable of influencing the affections of the listener, leaving it up to the reader to deduce how this works. Mattheson probably would have attributed the effect to one of two phenomena. The first is the straightforward

⁷¹ Lenneberg, "Johann Mattheson on Affect (I)," 56.

⁷² Lenneberg, "Mattheson on Affect (II)," 235.

explanation that people associate instruments with different situations that represent specific moods. For example, the kettledrum is reminiscent of battle, whereas a flute has almost always been seen as a pastoral instrument (I refer here specifically to the flute, either transverse or recorder, and not the fife or piccolo).

The other explanation again relies on the ways in which intervals move the vital spirits. The distinctive timbre of an instrument is a result of the strength of each of the overtones in the harmonic series produced by the instrument. That is, a flute will emphasize different partials than a clarinet. Because the emphasized partials differ, so will the interval between the fundamental and the strongest of the partials. These intervals might move the vital spirits in the same manner as melodic intervals move the vital spirits.

Melody

Despite the many specific ways in which Mattheson suggests that different aspects of music can create an emotion, melody is what really matters. According to Mattheson, the melody is central to the composition, and a good melody, while difficult to write, will automatically create an affect. Mattheson explains, “It truly requires more knowledge to construct a single monody that will force its way into one’s heart than to construct a thousand canons.”⁷³ By incorporating the perfect intervals, pitches, meter, rhythm, tempo and key, a well-written melody can stand alone and still move the listener. Think of the opening violin solo in *Fiddler on the Roof* or a mother singing a lullaby to

⁷³ Lester, “Melody,” 162.

her child; both of these melodies can create a strong affect without the assistance of harmony.

A good melody must have facility, clarity, flow, and charm.⁷⁴ A melody with facility will seem familiar and natural. Flow is the continuous smooth motion of the melody, and charm is the result of a pleasing and singable melody that follows a number of rules (such as using mostly stepwise motion), yet retains variety. Regarding clarity, Mattheson again reminds the reader of the importance of projecting a single affect while following the accent of the words and avoiding excessive embellishment; in short, a clear melody has a “noble simplicity.”⁷⁵ A melody, therefore, with all it entails (pitches, intervals, tempo, key, and meter/rhythm) is the most important part of the music when it comes to creating an affect.

⁷⁴ Ibid., 163.

⁷⁵ Ibid.

CHAPTER 3: THE THEORY IN PRACTICE

Telemann's *Quartet No. 4 in B Minor*

In order to examine the ways in which Mattheson's ideas about musical affect are put into practice in Baroque music, the following section will examine the fifth movement of Georg Phillip Telemann's *Quartet No. 4 in B Minor* (TWV43), from *Nouveaux Quatours en 6 Suites* (see Figure 14). Telemann praised Mattheson highly for his ideas about music,⁷⁶ but this piece was written in 1733, six years before Mattheson published *Capellmeister*, showing that Telemann could not have modeled this piece on the suggestions in *Capellmeister*. The quartet follows the form of a French Suite, although the music also includes many elements of the sonata form of the classical era.⁷⁷ The six movements include both dance styles traditional to Baroque Suites, like the "Coulant" (mvt. 2) and "Menuett" (mvt. 6), as well as less traditional, descriptively named movements like "Gay" (mvt. 3) and the movement on which I focus, "Triste" (mvt. 5). "Triste" is sandwiched between two upbeat and pleasantly affective movements ("Vite" and "Menuett") and is the slowest of all the movements.

"Triste" can be broken down into two repeated sections. However, the repeated section is not identical to the first occurrence, but has minor differences incorporated into the written-out repeat: the flute and the violin exchange parts for the repeat of each major division and the second section uses a cadence instead of a transition in the second occurrence of the section (see Figure 14; melodic lines are boxed). Although some

⁷⁶ Beekman C. Cannon, *Johann Mattheson: Spectator in Music* (New Haven: Archon Books, 1968), 143.

⁷⁷ Ellinor Dohrn, preface to Georg Philipp Telemann, *Quartet in B Minor, No. 4*, trans. Edward Olleson (Nagels: Kassel, 1964 [1928]), ii.

aspects of the music, such as the repeated sections, suggest a rounded binary form, other aspects of the music do not. For example, except for mm. 25-28 and 43-46 (Theme C), the entirety of the piece is based on two melodic themes that are introduced in mm. 1-4 (Theme A) and mm. 5-8 (Theme B). These themes change minimally over the course of the movement. The biggest change from the original version occurs in mm. 19 and 37, where the melody leaps down a sixth instead of a step as originally heard in m. 3. However, the basic structure of the theme is still maintained and the phrase is still easily recognizable as Theme A'. The structure of the music could be diagrammed as in Figure 13. Notice the recurrent repetition of Theme B. Every other phrase is B and the movement ends with a continuation of B. The importance of this phrase will become evident later in the chapter.

Even with, or perhaps through, the insistent repetition inherent in the movement, Telemann has managed to make the piece interesting and beautiful. It is as if Telemann created interest through the monotony of the piece. Not only is there little variation in the melody, but the continuo rarely changes, moving throughout each occurrence of Theme A in a molossic rhythm, and dropping out for Theme B. During Theme C, the continuo line doubles in tempo to play mostly quarter notes. The chords are relatively simple and diatonic, with only four secondary dominant chords (m. 19 and 37 and m. 25 and 43). The phrase structure is regular and straightforward. Each phrase is four measures long with the exception of the last phrase of the second repeated section, which is extended to six measures, helping to strengthen the cadence. Yet despite this apparent simplicity, the music cannot be heard as simple, childlike, or lighthearted. Mattheson's work can play

an important role in helping us to understand how the music can create an intense and somber affect with a relatively simple structure.

Although in reality music is heard as a whole rather than as number of individual parts, I begin with a discussion of the ways in which Telemann's movement follows and strays from Mattheson's recommendations. I break the music down into the same parts as I did in the previous chapter: tempo, key, intervallic content, dissonance and consonance, direction of movement, and rhythm. Then I discuss the importance of the relationship between all of these features and how they work together in order to create the melancholy affect of this movement.

Figure 13. Thematic Structure.

Theme	A	B		A'	B	C	B'	
mm. 1 st time	1-4	5-8	•	17-20	21-25	25-28	29-34	•
mm. 2 nd time	9-12	13-16	•	35-38	39-43	43-46	47-52	•
Key	b	b	•	D	D	b	b	•

Figure 14. Telemann's Quartet No. 4 in B Minor.⁷⁸

Triste Theme A Theme B

(p) (pp) (p) (pp)

i i⁶ i iv VII III VII V⁶ i i V ; i

Repeats mm. 1-8 HC

Theme A

(p) (p) (p) (p)

vii^{o7} i i V ; i i⁶ i iv VII III VII V⁶ i i V ;

HC HC

Theme B Theme A

(p) (p) (p) (p) (mf) (mf)

i vii^{o7} i V ; i⁶ V⁶ i

HC D: I⁶

⁷⁸ Georg Philipp Telemann, "Movement 5: Triste" in *Quartett in B Minor for Flute, Violin, Violoncello and Basso continuo* from *Six Nouveaux Quatuors en Six Suites*, Nagels: Kassel, 1964.

Theme B

19

6 I⁶ V⁵/V V----- HC; I----- V⁵ V .I⁶

Theme C

24

ii^{o6}₅ V----- I; V[#]/ii b: ii^{o6} iv----- ii^{o6} V⁹ V⁸----- HC;

Theme B'

29

iv----- V[#] V⁴₂ i⁶ ii^{o7} i⁶ ii^{o6} V[#] i----- PAC

22 Repeats mm. 17-34

Theme A'

Theme B

35
6

D: III^6 V_3^6 I----- vi I⁶ V_3^6/IV V----- HC; I⁶-----

Theme C

41

V_3^6 V I⁶ ii⁰⁶₃ V----- I; V/ii ----- b: iv----- ii⁰⁶----- V----- HC;

Theme B'

47

iv----- V V_2^4 i⁶ ii⁰⁷ i⁶ ii⁰⁶ V----- i . PAC

Affective Elements

Tempo

The tempo of a movement titled “Triste” is generally rather slow. In the recordings I listened to⁷⁹ the tempo was between $\text{♩} = 48$ and $\text{♩} = 54$ beats per minute, played with a slight rubato. Although Mattheson only says that tempo can contribute to the affect of the music, it can be inferred from the large number of *sad* pieces with a slow tempo and the small number of *sad* pieces with an upbeat tempo that the slow tempo of “Triste” helps to create a *sad* affect.

Key

The key of B minor also contributes to the affect of the music. In *Das neu-eröffnete Orchestre*, Mattheson says that the key of B minor is “bizarre, moody, and melancholy,” and is seldom used.⁸⁰ Even when played with modern instruments that have less noticeable differences between the keys, the minor mode portrays the *sadness* that the title suggests. However, approximately one-third of the movement is in the relative major key of D. According to Mattheson, D major is “somewhat sharp and stubborn, very suitable to noisy, gay, war-like, and cheering things.”⁸¹ Even to modern ears, any major key is generally associated with *happy* music. So how is it that the music does not lose the *sad* affect when the major key is introduced? Perhaps, by m. 17, the

⁷⁹ William Hazelzet Trio *Sonnerie*, “Quartet No. 4 in B Minor from Paris Quartets,” *Telemann and Paris Quartets* (2005), Compact Disc, EMI Classics; Florilegium, “Quatuor No. 4 in B Minor,” *Telemann: Paris Quartets, vol. 3* (2006), Compact Disc, Channel Classics NI; and Barthold Kuijken, Sigiswald Kuijken, Wieland Kuijken, and Gustav Leonhardt, “Quatrième Quatuor,” *Telemann: Paris Quartets* (1997), Compact Disc, Sony.

⁸⁰ Lenneberg, Mattheson on Affect (II), 236.

⁸¹ *Ibid.*, 235.

tone has already been set. After all, Baroque music was designed to carry the same affection throughout the movement, even through a modulation to the relative major. Listeners would not be expecting a change of affect. Other features of the music, such as the tempo, intervals, or direction of movement, override the key in determining the affect. This seems to be Mattheson's suggestion, as can be inferred from his note that the affect of a piece in D major can change if the instrument changes.⁸² Although Mattheson does not go so far as to say that D major can be used for *sad* music, he allows that the key is by no means the determining factor in creating the affect.

Interval Size

Small intervals seem to dominate the movement, especially in the melodic lines. Because Mattheson considers the melody to be the ruling aspect of music, I focus this discussion on the melodic rather than the harmonic lines (I have taken the melody to be the part in the highest register; these parts are boxed in the score in Figure 13). The melody of Theme A contains only a single leap in the melody (see Figure 15). The rest of the motion, when the accented appoggiaturas are taken into consideration, is stepwise—the small, contracted intervals that Mattheson recommends to convey a sad affect. Theme B also contains mostly small intervals (see Figure 16). 86% of the intervals in this phrase are stepwise. Theme C begins with all stepwise motion (see Figure 17) and, like Theme A, only includes a single leap (again taking the appoggiaturas into consideration), this time of a descending diminished fifth in mm. 27-28 and 45-46.

⁸² Ibid.

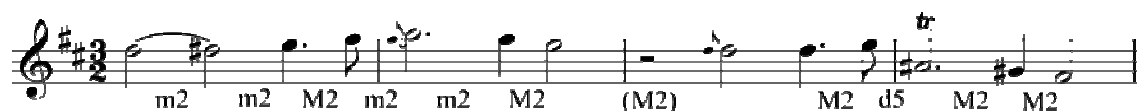
Figure 15. Intervallic Content of Theme A.



Figure 16. Intervallic Content of Theme B.



Figure 17. Intervallic Content of Theme C.



However, the most poignant, emotion-filled notes follow the larger leaps. For example, the initial leap of a perfect fourth from F# to B in the first measure of the flute line begs to be heard as a mournful cry. This is not the result of dissonance or instability, as the B occurs on a stable i chord, with octave B's in the flute, violin, cello and bass of the continuo. In the perfect octave, Mattheson says, “there is only unity.”⁸³ The leap of a perfect fourth in mm. 6-7 and 14-15 is another instance of a leap marking an emotional moment. At this point, the leap creates a vii^o chord, which is much more dissonant than

⁸³ Mattheson, *Capellmeister*, trans. Harris, 561.

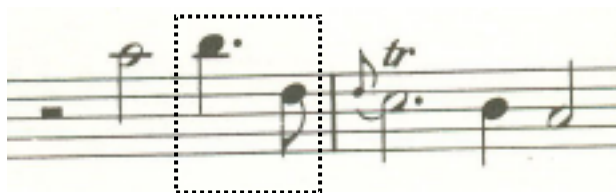
the tonic chord that accompanies the leap of the same size in mm. 1 and 9. The observation that these are two of the most emotional moments is subjective, but cannot be neglected since it is ultimately the listener's experience that determines the affect. However, the reason for the emotionality of the second note of the interval is unaccounted for by the idea that small intervals create *sadness*. Mattheson attempts to account for this apparent contradiction in his discussion of despair, which, he says, uses the "strangest, wildly disordered sequences of notes."⁸⁴ Thus, these larger intervals could hold so much emotional power because they are reminiscent of a more complex emotion—despair.

Even with the emotionally saturated leaps, the pattern of mostly small intervals continues throughout most of the movement. 82% of the intervals in the melody throughout the piece are seconds. Thirds and fourths add variety, yet even these are relatively small intervals. The larger intervals are especially likely to occur between phrases and often are broken by a rest, such as the leap from A₄ to D₅ in the flute part in mm. 20-21. On the other hand, this leap sounds bigger than a fourth because the melody is in the violin for the first beat of m. 21, making the melody leap from the D₄ in the violin to the D₅ in the flute. The largest contiguous leap in the movement is found in mm. 19 and 37. This leap of a major sixth suddenly breaks the trend that began in m. 17 of a slow but steady climb in the melody, breaking off the B before the listener expects based on the three times it has already been heard (see Figure 18). It is almost as if the major key and change in the melodic line will allow the music to escape the sadness set up in the first 16 measures, but this hope is lost when, after the B falls to the D in mm. 19

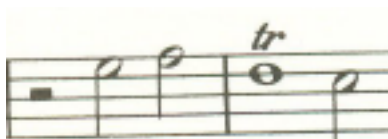
⁸⁴ Lenneberg, "Mattheson on Affect (I)," 80.

and 37, the melody continues a slow stepwise descent. Another possible explanation for this modification of Theme A could be that continuing Theme A as originally written would extend the range of the music into a higher register. While it would have been possible to play the D an octave higher on the Baroque flute, this pitch would have moved the highest note in the movement to a rather awkward position as the climax of the music is yet to come. The larger leap also facilitates a movement back to the melody's typical range in the piece, which lies between B₄ and G₅. Only rarely does the melody, in either the flute or violin, pass beyond these pitches—twelve notes lie above the G₅ and eight notes lie below the B₄.

Figure 18. Largest Leap and Corresponding Original Measure.



The largest leap, mm. 19-20



Original, mm. 3-4

The non-melodic voices also violate Mattheson's advice of using many small intervals to create a *sad* affect. The leaps in the bass are easily excusable, as these

pitches are needed in order to create the simple and rational harmony that Telemann chose for this movement. The inner voices (cello and either flute or violin, whichever does not have the melody) are required to fill out the harmony and leaps are found more frequently in these parts than in the melody line. In the cello, the large leaps frequently occur when the instrument doubles the continuo line (ex: mm. 7-8). However, some leaps are larger than would be necessary to complete the chords. For example, in m.18, the cello leaps down a 13th to reach the D that doubles the continuo. This seems to blatantly contradict Mattheson's statement that the "narrowest intervals are most suitable" to express *sadness*.⁸⁵

Based on "Triste," it seems as if the small interval rule only applies to the melody, which Mattheson considers to be the most important part of the music. A musical work comprising only small intervals would be rather dull, and in adding interest Telemann has done so not in the all-important melody, but in the harmonic lines. According to Mattheson, "Melody is the body, the beat or movement is the soul, and harmony serves as the garment."⁸⁶ The harmony's main purpose is to adorn the melody. It seems logical that this line would most influence the affections, as listeners tend to pay the most attention to the melodic line. As the most important manipulator of changes in the affections, the melodic line needs to follow the conventions more carefully than the harmonic lines.

⁸⁵ Ibid., 52.

⁸⁶ Mattheson, *Capellmeister*, trans. Harriss, 496.

Direction of Movement

Although Mattheson has little to say about the impact of the direction of the intervals in the melody in determining the affect, he does point out, as discussed earlier, that a falling melody contributes to the despair created by the example he cites.⁸⁷ While the majority of the movement in “Triste” is downward, other features of the music do not seem to support Mattheson’s guidelines as well. For example, in the melody in mm. 1-16, all the leaps are upward, while all the downward movement is stepwise. The downward stepwise motion in the movement is often reminiscent of an *appoggiatura*, whose relationship to *sadness* was discussed earlier. For example, the flute begins with an accented *appoggiatura* (m. 2),⁸⁸ but even the trilled G₅ has the effect of an *appoggiatura*, as it is the 7th of the A major chord on the second beat of m. 2 and resolves downward to the F#₅ on the weaker third beat. The effect here is that of a long, drawn-out sigh, like the flute player (or violin, later) reaches up for the B₅ but the stretch expends all of his or her energy and on the next repetition of the motive he or she does not even try to reach that high, instead only rising a major second. The primarily downward motion in the second measure tries to balance the upward leap in m. 1, as if to force the vital spirits to contract after the leap.

⁸⁷ Lenneberg, “Mattheson on Affect (II),” 216.

⁸⁸ I use a definition of *appoggiatura* written by William Rothstein in his essay “Playing with Forms: Mozart’s Rondo in D major, K. 485.” Rothstein writes, “The term ‘*appoggiatura*’ is used to indicate any embellishing note that precedes the main note, is not tied, and is played ‘on the beat,’ regardless of how the embellishing note is approached and regardless of whether it is consonant or dissonant. The term thus includes notes that might also be called rearticulated suspensions or accented passing tones.” This definition was chosen in order to emphasize the sighing motion associated with the *appoggiatura*, a motion that is heard frequently in Telemann’s music. (In *Engaging Music: Essays in Music Analysis*, ed. Deborah Stein (New York: Oxford University Press, 2005), 205.)

Like in Mattheson's example to illustrate despair, at each cadential *semicolon* or *period* in "Triste" the melody falls (mm. 4, 7-8, 12, 16, 20, 24, 28, 33-34, 38, 42, 46, and 51-52; see Figure 13). In fact, the more final the *punctuation*, the stronger the downward motion is. For example, at what might be considered the *comma* in mm.18 and 36, the melody rises a step. The E₅'s in these measures are non-chords tone added for ornamentation, but the rising note still weakens the falling motion. However, at the *period* at the end of the piece, a much stronger cadence is required. All of the movement in the melody in the final three measures is falling and scalar. This not only makes the line seem like a final declaration, but also emphasizes the downward movement.

Dissonance and Consonance

Telemann was known for the relative simplicity of his music,⁸⁹ and his use of dissonances in "Triste" follows that trend. The number of dissonances written into the music is rather small—usually less than one per measure, and the dissonant notes are almost always on a weak beat, with the exception of appoggiaturas and suspensions, which by definition occur on a strong beat. While Telemann utilizes passing tones, neighbor tones, suspensions, retardations, appoggiaturas and anticipations within this movement, nearly all of the non-chord tones are either passing tones, neighbor tones or appoggiaturas [should you be consistent in use of term appoggiatura? Earlier you refer to Rothstein's definition]. The other forms are only used once or twice during the movement. Also adding to the simplicity of the movement, most of the dissonances are diatonic. Telemann only includes a chromatic neighbor tone four times: in mm. 20 and

⁸⁹ Peter Burkholder, Donald Jay Grout, and Claude V. Palisca, *A History of Western Music*, 7th ed. (New York: W. W. Norton and Company, 2006), 440.

38 and in mm. 29-30 and 47-48. The non-chord tones often serve a dual function: to ornament and contract the intervals. Mattheson concedes that a piece without any dissonances would be rather dull, so in order to have a large effect on emotions, an exaggerated number would be needed, which this movement could not be described as containing. Thus, the dissonances in this piece offer no support for the interpretation of Mattheson's comment that many dissonances, which are ideal for depicting "hellish furies or plagues,"⁹⁰ generalize.

Rhythm

The predominant rhythmic meter in the movement is the molossus. As explained earlier, the molossus comprises three even, long notes and "has a quality of heaviness and laboriousness."⁹¹ Like in the Handel sonata shown earlier, the three notes of the molossus in "Triste" are exchanged between the parts, although Telemann tends to allow the steady molossic rhythm to persevere throughout Theme A in the continuo line. Beginning in the very first measure of the piece, the molossic rhythm weaves in and out of the texture, only disappearing completely during Theme B. Also like the Handel sonata, the molossuses in this movement differ from Mattheson's example in that the pitches change within each molossus and there is no indication that the rhythm is to be played staccato. Even with these diversions from Mattheson's recommendations, the music has a melancholy quality, and the nearly continuous molossic rhythms suggest a slow, steady movement that could be described as trudging.

⁹⁰ Lenneberg, "Mattheson on Affect (I)," 79.

⁹¹ Lenneberg, "Mattheson on Affect (II)," 234.

The only other recurring rhythmic motive, which appears in Theme B, is a combination of two meters described by Mattheson. Its insidious repetition makes this rhythm central to the character of the piece, creating an almost taunting character with its anapestic foot followed by two instances of the spondaic foot. The anapestic foot, Mattheson says, is “named for certain sarcastic and satirical poems” and is most frequently used in “merry and unusual melodies,”⁹² whereas the spondaic foot is “devotional, solemn, devout” and frequently found in church hymns.⁹³ It is almost as if this two-measure figure is a combination of different voices; this effect is enhanced by the abrupt switch between the rhythmic feet and by the melody moving, at least in the first of the two measures, between instruments. “Lighten up!” the anapest taunts, followed by the spondees’ groan and sluggish rise to the step above. This exchange continues throughout the piece, at each appearance of Theme B, with the only change being at the end of the second section (mm. 29-30 and mm. 47-48) where Telemann introduces a lower neighbor instead of an upper neighbor. Although I mentioned above that Mattheson considers the anapestic foot to be a *happy* rhythm, he adds that when used in combination with other feet, the anapestic foot can be useful in serious pieces, as it is here. The combination of the two feet adds to the solemnity of the movement by providing a fleeting glimpse of a more lighthearted motive that is quickly abolished by the spondaic foot as if to remind the listener what the music is really trying to do.

⁹² Mattheson, *Capellmeister*, 355.

⁹³ *Ibid.*, 350.

All Together Now

Mattheson promotes the idea that hundreds of shades of emotion can and should be represented uniquely in music. For example, when discussing love, Mattheson writes that “the diffusion of the spirit that causes the sentiment can happen in a variety of ways and one cannot possibly treat all kinds of love similarly.”⁹⁴ Later, he writes that there are many occasions to use sadness in music, “as well as its varying degrees and kinds. Each of these [kinds], according to its particular character, can give rise to particular inventions and expressions through the manifold contraction of tones and intervals.”⁹⁵ In addition, he uses a range of terms to describe particular emotions rather than grouping the emotions into overarching categories. For example, to describe *sad* emotions Mattheson selects terms such as *sadness*, *sorrow*, *despair*, *plaintiveness*, *melancholia* and *expressive of grief*, as well as qualifying terms such as *fatal*, *lethal*, or *desperate sadness*. Obviously, there is no way that any single property of a musical selection could evoke such a wide range of emotions, especially since many of the characteristics are bipolar (ex: ascending or descending); therefore, all of the features of the music need to work together in order to create an affect, which may be slightly different for each person due to the manner in which the music influences the listener’s vital spirits. Because all of the features of the music are necessary to the music’s character, changing any one of them will alter the character of the music. For example, I recomposed “Triste” by changing only the final note of each motive in the melody, as well as a few other notes in order to maintain the rules of Baroque music. The affect of the music is very different in the new version, and is a little confusing at some points (see Figure 19). At the beginning, it

⁹⁴ Lenneberg, “Mattheson on Affect (I),” 52.

⁹⁵ *Ibid.*, 54.

seems as if the music is going to be *sad*, but the rising interval at the end of the first two measures in the flute part sounds unexpected and disconcerting. The beginning of the phrase creates an initial affect, and in Baroque music, the change of affect created by the rising final interval is unorthodox. As Mattheson or Descartes would explain the process, the first part of the phrase causes a contraction (due to the small intervals) and a calming (due to the slow tempo and falling intervals) of the vital spirits. The minor key and molossic rhythm also suggest a *sad* affect. The rising finale of these two measures contradicts the *sadness* created by the beginning of the motive. Then in m. 3, the music again suggests a *sad* affect, but by the end of m. 4, the melody once again rises, creating the same contradiction.

In mm. 5-6, the effect of adding rising intervals is not as surprising, which may be due to several factors. First of all, the melody continues its upward trend after a leap of a fourth and rises throughout each of the two measures. Then, the molossic foot is abandoned in favor of a mixed rhythm that begins with an anapaestic foot and concludes with a spondaic foot, both of which Mattheson says can assume several different characters, including piety and respect for the spondaic foot and jocoseness or seriousness for the anapaestic foot.⁹⁶ While harmonic motion slows down, the note values decrease, increasing the perceived speed of the music, with the main unit of motion moving from the half note to the quarter note. This new rhythm creates less contradiction between the new rising phrases and the other aspects of the music. However, even with these features, the revision retains some features that suggest that the music will not be *happy*, such as the prolongation of the B minor chord. The final two

⁹⁶ Lenneberg, "Mattheson on Affect (II)," 233.

measures return to the same pattern as the first four, obfuscating the intended affect of the music in the same manner.

Figure 19. "Triste," Recomposed, with Rising Intervals, mm. 1-8.

The musical score for "Triste," Recomposed, measures 1-8, is presented in 3/2 time. The score includes parts for Flute, Violin, and Violoncello. Measures 1-4 show the initial pattern with altered intervals boxed. Measures 5-8 show the recomposed pattern with rising intervals indicated by dashed boxes. Roman numerals are provided below the staves.

Measures 1-4: i, i^b, i, iv⁷, VII, III, VII, V⁶, i, V

Measures 5-8: i, vii⁰, i, V

Altered intervals are boxed. A dashed box indicates the new interval is rising.

Obscuring the mollosic foot has a similar effect to changing the direction of movement. For example, when the movement is set in 4/4 as opposed to 3/2 (see Figure 20), the molossic foot is lost and is replaced by a slow dactylic foot (which Mattheson says works well for both serious and jocose music⁹⁷). To accomplish this change in meter, I recomposed the music and left the first beat as a half note but then divided each

⁹⁷ Ibid., 233.

note value in the final two beats of the measure in half. This changed the long-long-long molossus into a long-short-short dactyl. While the music still has a rather somber quality about it, it loses the sense that the music is trudging along, step-by-step. The slow, even character of the music is lost even though all other aspects of the music are held constant. The character of the new rendition is serious, but it does not have the “quality of heaviness and laboriousness”⁹⁸ that Mattheson assigns to the molossus. The music assumes the character of a regal march more than a dirge.

Figure 20. “Triste” in Common Time, mm. 1-8.

Flute

Violin

Violoncello

dactyl

i i⁶ i iv VII III VII V⁶ i V

5

Fl.

Vln.

Vc.

i vii⁰ i V

Arrows show dactyls as they move within and between the parts.

⁹⁸ Ibid.

Of course, Telemann chose to write the music as he did for musical as well as affective reasons. In other words, the music loses much of its beauty when changes like the ones above are made. When the music is put into common time, it not only loses its trudging quality, but also the flow of the melody. When the direction of even just the tail of each phrase is changed, it not only obscures the sigh, but also violates the general expectations of music. In reality, separating the musical/theoretical aspects of music from the affective intentions is not possible, as the purpose of Baroque music was to move the affections. It could be argued either that Western theory arose from a desire to move the vital spirits or that the reason certain figures affect us in a particular way is due to their adherence to or divergence from Western theory. A familiar axiom to psychology students is that correlation does not equal causation, and this is a perfect example of that situation. Affect and theory are related, but we have no real way of knowing which is the cause and which is the effect.

CHAPTER 4: ADDING THE MODERN THEORIES

Introduction to Recent Research

Mattheson's theories are grounded in philosophy and observation, but modern theorists have another perspective from which to try to understand music's power over our emotions: psychology. As a science, psychology requires all hypotheses to be tested empirically and theories are held under intense scrutiny. From this different viewpoint, psychologists are working to understand many of the same phenomena that philosophers have pondered for thousands of years. Despite the benefits of a scientific standpoint, technology and more accurate information from fields such as biology and chemistry, no theory has yet been unequivocally proven, and there is still much that psychologists have barely begun to understand. The way music influences our emotions is one of these problems.

Although cognitive neuroscience is still a relatively young field, our understanding of how music affects us has received a great deal of attention. To begin with, most psychologists argue that music really does create an emotion in the listener, as opposed to Kivy's argument that musical emotion is only phenomenological.⁹⁹ Studies using both subjective and objective measures provide evidence for this position. For example, countless experimenters have systematically altered features of music and asked participants to subjectively rate how the music sounded emotionally and how it made them feel emotionally. The results of these studies echo Mattheson's statements made in the 18th century: rising intervals lead to increased arousal and falling intervals lead to

⁹⁹ Kivy, "What Mattheson Said."

decreased arousal;¹⁰⁰ fast music engenders happiness whereas slow music engenders sadness;¹⁰¹ major mode promotes happiness whereas minor mode encourages sadness.¹⁰² Other studies have shown that dissonance and consonance can contribute to the perceived emotion. For example, in one study, music with a large percentage of octaves and unisons was considered to be potent, energetic and vigorous, whereas music with a large percentage of tritones was heard as tense.¹⁰³ Timbre¹⁰⁴ and rhythm¹⁰⁵ have also been shown to affect the ratings of emotion in music, although the specific ways in which they do so is not yet clear. Objective measures of emotion in music have included skin conductance, heart rate and respiration rate, all of which are physical manifestations of emotion. However, not all of these reactions will be affected by all the features of music. For example, Patrick Gomez and Brigitta Danuser found that tempo and staccato articulation were correlated with respiration, but not with heart rate.¹⁰⁶ Functional Magnetic Resonance Imaging (fMRI) studies have shown that music activates a large number of brain areas: the limbic system (emotion and motivation), Broca's Area (syntax

¹⁰⁰ Kari Kallinen and Niklas Ravaja, "Emotion-related Responses to Audio News with Rising versus Falling Background Tone Sequences," *Musicae Scientiae Special Issue* (2003).

¹⁰¹ Lise Gagnon and Isabelle Peretz, "Mode and Tempo Relative Contributions to "Happy-sad" Judgements in Equitone Melodies," *Cognition and Emotion* 17, no. 1 (2003).

¹⁰² Gagnon and Peretz, "Responses to Audio News."

¹⁰³ Marco Costa, Philip Fine, and Pio Enrico Ricci Bitti, "Interval Distributions, Mode, and Tonal Strength of Melodies as Predictors of Perceived Emotion," *Music Perception* 22 (Fall 2004).

¹⁰⁴ Julia C. Hailstone et al., "It's Not What You Play, It's How You Play It: Timbre Affects Perception of Emotion in Music," *The Quarterly Journal of Experimental Psychology* 62 (2009).

¹⁰⁵ E. Glenn Schellenberg, Ania M. Krysciak and R. Jane Campbell, "Perceiving Emotion in Melody: Interactive Effects of Pitch and Rhythm," *Music Perception* 18 (Winter 2000).

¹⁰⁶ Patrick Gomez and Brigitta Danuser, "Relationships Between Musical Structure and Psychophysiological Measures of Emotion," *Emotion* 7 (2007).

of speech), cerebellum (coordination and movement), basal ganglia (movement) and hippocampus (memory), along with numerous other areas.

Even with all the recent research on the cognitive effects of music, no single theory that explains the effects of music on emotion has yet been accepted. Two of the more interesting theories utilize the mirror neuron system and musical expectations. In the next section, I explain and evaluate these theories, which attempt to explain the mental processes behind the emotions caused by music, and then I explore how the two of these theories can be understood in conjunction with Mattheson's.

The Mirror Neuron System

Mirror neurons were first discovered in a macaque monkey when researchers trying to track the neurons involved in motion realized that the same neurons fired when the monkey watched the researcher make a movement as when the monkey moved.¹⁰⁷ The mirror neuron system (MNS) is hypothesized to help “an individual to understand the meaning and intention of a communicative signal by evoking a representation of that signal in the perceiver's own brain.”¹⁰⁸ In humans, it is believed that the MNS is responsible for social cognitions, including social interaction and empathy. Studies have shown that by forcing a smile, such as by holding a pencil between their teeth, people feel happier and rate things more positively,¹⁰⁹ suggesting that the imitation of these actions by the MNS could also activate an emotion. Through the process of one individual's

¹⁰⁷ Giacomo Rizzolatti and Laila Craighero, “The Mirror Neuron System,” *Annual Review of Neuroscience* 27 (2004), 169.

¹⁰⁸ Istvan Molnar-Szakacs and Katie Overy, “Music and Mirror Neurons: From Motion to ‘E’motion,” *Scan* (2006), 235.

¹⁰⁹ Robert Soussignan, “Duchenne Smile, Emotional Experience, and Autonomic Reactivity: A Test of the Facial Feedback Hypothesis,” *Emotion* 2 (2002), 52-74.

MNS imitating the physical manifestations of another's emotion, the first individual is able to experience the emotion of the second.¹¹⁰

The same process is at work when we hear music. Overy and Szakacs propose that “musical sound is perceived not only in terms of the auditory signal, but also in terms of the intentional, hierarchically organized sequences of expressive motor acts behind the signal.”¹¹¹ In other words, what we hear in music is linked to physical gestures and vocal expression. When we hear a melody, our brain translates that into what it would feel like to sing that melody. When we hear a rhythm, our brain shows us what it would feel like to clap it. If we know how to play the instrument, our brains can show us what the instrument would feel like in our hands and how we would be expressing the music. The MNS then relies on our experience with emotion in other contexts to tell us what emotion the physical movement conveys. The mental re-creation of the movement initiates the associated emotion.

One study that is particularly relevant to the MNS theory was performed by Meagan E. Curtis and Jamshed J. Bharucha. The study comprised three parts. In the first part, actresses were asked to convey anger, happiness, pleasantness, or sadness in a two-word utterance (“Let’s go,” “Okay,” “Come here,” or “Come on”); in the second part, participants were asked to identify the emotion; in the third part, participants were asked to identify the emotion in musical intervals that paralleled the intervals the actresses used when speaking the lines (some were out of tune to accurately represent the speech representation). Most of the musical intervals showed a correlation to the spoken

¹¹⁰ Katie Overy and Istvan Molnar-Szakacs, “Being Together in Time: Musical Experience and the Mirror Neuron System,” *Music Perception* 26 (2009), 491.

¹¹¹ *Ibid.*, 492.

intervals (see Figure 21), and participants were able to identify the emotion equally well in music and speech. The effect was especially prominent in the case of the minor third, which was found to convey sadness in both music and speech. The direction of movement also seemed to play a role in the perception of emotion; for example, rising minor seconds were heard as conveying anger, while falling minor seconds were heard as conveying sadness. It is important to note, however, that the speech-music parallel did not hold for all intervals; for example, the tritone was correlated with happiness in speech, but anger in music.¹¹²

Figure 21. Summary of Curtis and Bharuch's Findings Regarding Emotional Intervals in Speech and Music.¹¹³

Emotion	Music	Speech
Sadness	*Descending Minor 3 rd Descending Minor 2 nd Ascending Minor 2 nd	*Descending Minor 3 rd Descending Minor 2 nd
Anger	Descending Minor 2 nd Ascending Minor 2 nd Ascending Diminished 5 th	Ascending Minor 2 nd Ascending Perfect 5 th
Pleasant/Happy	Ascending Perfect 5 th	Unison, diminished 5 th , and octave+

* *Descending Minor 3rd* was the most consistently used interval to convey sadness
+ *Not statistically significant*

The results of this experiment support the MNS theory and show how the system might work. Since, at least in English, humans consistently speak using the tone and

¹¹² Meagan E. Curtis and Jamshed J. Bharuch, "The Minor Third Communicates Sadness in Speech, Mirroring Its Use in Music," *Emotion* 10 (2010).

¹¹³ Ibid.

pitches of their voice to convey emotion, pitch intervals in speech might be nearly as good a predictor of emotion as facial expression. After all, most people do not have any more trouble inferring a friend's emotional state on the telephone than they do when they see them across the room. Thus, when we hear an interval, whether in speech or in music, our MNS may imitate the motion that would be required to produce that interval in our own vocal cords and connects that information with emotional knowledge that suggests how we would be feeling if our vocal cords moved as such. This process allows us to experience a somewhat-weakened form of the emotion.

At first glance, it does not seem as if the *sad* intervals of the experiment are important in "Triste". Thirds are rather rare, occurring a total of eighteen times in all four voices (again, not including thirds that would be broken by appoggiaturas). Of these, eight are major thirds. However, listeners are able to detect the emotion of a piece of music in a very short amount of time, and first impressions are difficult to overcome. The first interval heard in a single voice is a minor third in the continuo line. This minor third is followed by another, again in the continuo. As our MNS imitates this motion in the neurons that control our vocal chords, we recognize and feel the *sadness* conveyed by the first measure and our familiarity with this style of music suggests that the emotion will not change. It is also possible that the notes that form the intervals do not need to be subsequent in order for our MNS to imitate and respond to the interval, but can be simultaneous. The minor third between the first and third in the tonic chord might be a large part of the reason that minor keys are heard as *sad*.

This makes Mattheson's ideas seem like more than random musings. His ideas about the specific ways in which music moved the emotions is eerily similar to what we

have learned through scientific methodology. Mattheson believed that emotions were created by the vital spirits imitating the musical sounds. Although the language and understanding of the anatomy of the brain are much more advanced in modern theories, at the most basic level, the processes are not that different. We now know the anatomy that makes up the human brain (which does not contain humors or vital spirits), but current research still suggests that an imitative process causes musical emotions. For Mattheson, music had the ability to move the vital spirits; research shows that music has the ability to move electrical impulses and neurotransmitters through the emotion centers of our brain. The vital spirits imitated the movement of the music; the neurons of the MNS imitate the actions associated with the music.

Musical Expectations

Another theory was proposed by David Huron.¹¹⁴ In this theory, emotion is based on the listener's expectations about what music should do. The fundamental premise is that humans do not like surprise; if we can predict what will happen, we are better able to prepare for it, which, from an evolutionary point of view, meant getting a head start. But surprises can come in many other forms, most of which are not as dangerous as the predator that surprised our ancestors. According to Huron, these surprises can be as mundane as the car ahead of us changing lanes or a flower losing a petal.¹¹⁵

The theory states that as soon as the musicians raise the instrument to their lips, listeners make predictions about what will come next. For example, if we are in the key of F major, we expect to hear an F at certain moments in the music, such as at cadences.

¹¹⁴ David Huron, *Sweet Anticipation* (Cambridge, MA: MIT Press, 2006).

¹¹⁵ *Ibid.*, 22.

If our predictions are right, we misattribute the pleasure we derive from being right to the stimulus itself; if they are wrong, the stimulus acquires a negative valence. However, this is not the end of the process, as the stimulus is then appraised, and this appraisal response, while taking longer than the initial reaction, prompting the listener to use other aspects of the music to formulate a more specific emotional response, which may not be at all related to the pleasure/displeasure reaction.¹¹⁶

A study by Nikolaus Steinbeis, Stefan Koelsch, and John A. Sloboda provides evidence for this theory. These researchers asked participants to listen to a series of chord progressions taken from Bach chorales, in which the final chord was changed at the cadence. The experimenters designed the changes to be heard as expected, unexpected, or very unexpected (an example of a progression and its manipulations that were used in the study can be seen in Figure 22). The results of this study showed an increase in electrodermal activity (EDA), a measure frequently used to calculate the physiological response to tension, as well as increased activity throughout the brain. Thus, the authors concluded that “music-syntactically irregular chords elicit brain responses related to the processing of musical structure (i.e., early anterior negativities), and also trigger processes related to the processing of emotional stimuli, as indicated by the systematic increase in EDA.”¹¹⁷ In other words, the increased tension created by the unexpected chords jumpstarts the creation of an emotion.

¹¹⁶Ibid., 138.

¹¹⁷ Nikolaus Steinbeis, Stefan Koelsch and John A. Sloboda, “The Role of Harmonic Expectancy Violations in Musical Emotions: Evidence from Subjective, Physiological, and Neural Responses,” *Journal of Cognitive Neuroscience* 18, 1392.

**Figure 22. Example of Chord Progressions Used in Steinbeis, Koelsch and Sloboda's
Study on Musical Expectations.¹¹⁸**

Figure 2. One example of a cadence within the stimulus set and its manipulations: Version A is an excerpt of the original composition by Bach, with a harmonically unexpected event (indicated by the dashed square); Versions B and C are identical to the original, apart from the harmonic events enclosed within boxes, which were rendered to be either harmonically more expected than the original (Version B) or less expected than the original (Version C).



The expectations theory can help to explain the results of some experiments cannot be accounted for by the MNS theory. For example, some studies suggest that listeners may not evaluate the emotion of a culturally unfamiliar piece of music as accurately as they will a piece of music from their own culture. Since physical expressions of emotion are universal, the MNS should be able to interpret any music as the composer intended. Expectations theory, on the other hand, requires that the listener have some knowledge of the musical system by which to make predictions. Having said that, listeners are still able to use cues such as tempo and volume to help assess the

¹¹⁸ Ibid., 1384.

emotion,¹¹⁹ suggesting that some cues either do not rely on familiarity and expectations in music or that these cues are cross cultural in musical systems.

The argument could be made that if all notes have the potential to be a surprise and surprise is necessary to create an emotion, people unfamiliar with Western music would feel the emotion of the music more strongly than those who are familiar with the music, but this is not necessarily true. Because listeners rely on the contextual cues following the surprise, and these cues differ from culture to culture (both in music, and in some cultures, speech), novice listeners would be less affected by the intended emotion. The perpetual surprises would, however, keep them in a hyperaware state through most of the music, which could trigger emotions (such as curiosity or disgust), but the intended emotion is less likely to be recognized.

Nevertheless, the theory cannot account for some of the other recent findings in music cognition and psychology. For example, the expectations theory cannot account for why people hear major mode music as happy and minor mode music as sad. Both are equally likely to occur, so unless we consistently predict that the music will be in major, our reaction would probably differ with each new piece. In addition, subtle differences in musical emotion, such as mourning and yearning, are not predicted by this model and yet can be detected relatively accurately by listeners.

Despite the problems inherent in the expectations theory, it helps explain how our expectations about music impact the ways in which music affects us and why musical analysis holds value. In the most basic sense, when looking at a musical selection,

¹¹⁹ Laura-Lee Balkwill, William Forde Thompson, and Rie Matsunaga, "Recognition of Emotion in Japanese, Western, and Hindustani Music by Japanese Listeners," *Japanese Psychological Research* 46, no. 4 (2004).

analysts try to explain what makes the music interesting—which is often a function of comparing our expectations for the music with what the music actually does. I propose that by overlaying the expectancy theory onto the mirror neuron theory, we can come to a better understanding of how our expectations of music influence both the way it affects us as listeners and our emotional assessments of the music.

Comparing and Combining the Theories

Both theories rely on one specific brain area, Broca's area, implying these two theories might feed off of each other. Although music activates almost every brain area, from those involved in memory to movement to emotion to language, Broca's area holds an important role in both the mirror neuron and expectancy theories. This brain area is responsible for detecting and generating the syntax of language. Thus, people with damage to this area of the brain have a form of aphasia that prevents them from creating grammatical sentences. Instead, they speak in very short, ungrammatical sentences, such as "Bed hard." Broca's area is also important to the processing of musical syntax. For example, in an fMRI experiment by Stefan Koelsch, Angela Friederici and their colleagues, Broca's area was activated when the experimenters played chord progressions. The activation was slightly different when a progression landed on an expected chord than when it landed on an unexpected chord, suggesting this area recognized when the music held an "ungrammatical" surprise. Areas of the brain associated with musical meaning were activated shortly thereafter (between 100 and 150

milliseconds later).¹²⁰ Mirror neurons are also believed to be located in Broca's area, perhaps contributing to the learning of language¹²¹ and to the ways in which our expectations for music lead to an emotion. The mirror neurons in Broca's area assist in the learning of language and in recognizing the syntax of musical language. It is in this brain area that unexpected notes trigger a surprise response. However, the neural signal of the music must travel farther to create an emotion, and the MNS plays a role in this as well.

Recall that the purpose of the MNS is to help the observer understand the *meaning and the intention* of the observed behavior. Pretend you are the macaque monkey who facilitated the discovery of mirror neurons when his handler reached for a banana. As you watch your handler, Iacomo Rizzolati, through the bars of your cage, your mirror neurons follow the sequence of what they see happening in the real world. But other parts of your brains are also active, and predict the goal of the action the mirror neurons are performing is to reach for the banana. But if Rizzolati instead reaches for the lock on your cage, which is just next to the banana, the parts of your brain that predicted the goal to be to pick up the banana are disappointed, triggering an emotional response that may begin as disappointment at being wrong, but then be reevaluated as positive since the banana is still there.

Returning to music, imagine that you are listening to a new piece of music. Your mirror neurons are again firing, following the physical attributes of the music. You know exactly what it would feel like to sing this melody. You can feel yourself walking with

¹²⁰ Daniel J. Levitin, *This is Your Brain on Music* (New York: Plume, 2006), 127.

¹²¹ Molnar-Szakacs and Overy. "Music and Mirror Neurons," 235-241.

the beat, following every movement the music makes. When you reach a cadence point, your experience with Western music lets you predict that the goal of this action is to move from V to I. But the cadence is deceptive! The surprise triggers an emotional response that is then assessed as more than surprise or disappointment. Instead, the stimulus is appraised to coincide with the emotion suggested by your MNS. Huron would propose that if the cadence moved from V to I as expected, the positive reaction to predicting the correct movement would trigger an appraisal and emotion. However, as I describe in more detail later, the lack of surprise will weaken the emotional reaction.

If one of the main functions of the MNS is to determine the *meaning and intention* of an action, its purpose as it imitates music is to help the listener understand where the music will move next. For example, if the music is ascending a scale, your MNS might relate this scale to the action of climbing a hill, where the goal is to get to the top. It will thus predict that the goal is to reach the tonic an octave above its starting point. This could also be explained from an evolutionary standpoint. Imagine you are watching as a lion strolls across the African savannah. He has his eyes set on the river just ahead and his movements do not suggest stalking. Your mirror neurons are also following this sequence, showing you what it would be like to be walking in that way and helping you to understand that the lion's goal is the river bank to get a drink of water. Suddenly, the lion turns his head towards you. This was a rather unexpected movement; you knew it was possible, but his actions suggested otherwise. This unexpected movement triggers an increase in tension, just as the unexpected chords in Koelsch and Friederici's study did. From there, you are on an even more heightened alert for the next

movement of the lion—will he start running towards you (triggering fear) or continue his meander towards the water (triggering relief or perhaps even celebration)?

By combining the research on musical affect with the MNS and expectancy theories, we can gain a better understanding of how Mattheson's suggestions for creating an affect through music work. If you look once more at the chart that was discussed earlier (replicated in Figure 23a),¹²² you will see how Mattheson might have come to his conclusions about the features that create emotions. Except for the terms used, the chart is nearly identical to those used in modern theories of emotion (see Figure 23b). Based in these theories then, a slow tempo suggests emotions that are low in arousal. Physically, actions that are low in arousal suggest a calm and deliberate action, more like meandering through a meadow than running to greet a prodigal son or fleeing from a vicious animal. This may then be combined with a feature that suggests a negative valence, such as a large number of dissonant chords. The combination of arousal and valence create a specific emotion, which, in this example, would probably be on the *sadness* spectrum, although other features of the music would also need to be taken into account as well.

¹²² Hill, *Baroque Music*, 392.

Figure 23a. Baroque Emotions, modeled after Hill's Description.¹²³

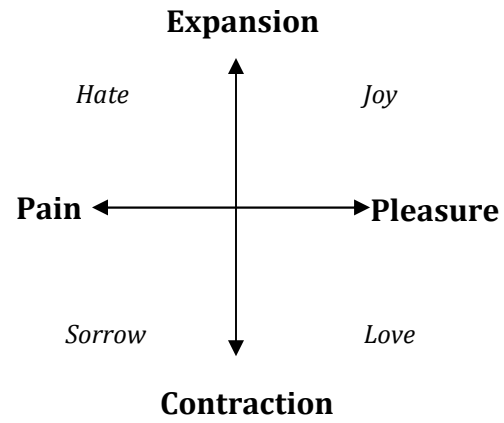
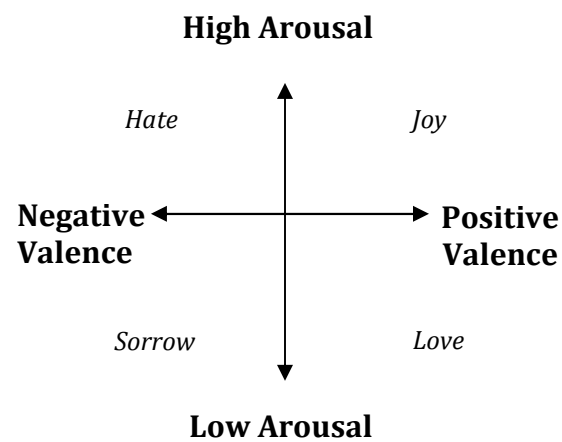


Figure 31b. Modern Emotions, modeled after Psychological Theories.



¹²³ Ibid.

Understanding Telemann

The two theories discussed in the previous section not only explain the psychological processes behind musical affect, but can be used with a specific piece of music to help understand how the music works and why it affects us as it does. In order to do this, one must first recognize where the surprises occur in the music. Although each note has the potential to be a surprise, certain notes and chords hold more tension and create a greater sense of surprise than others, and these notes are pivotal in shaping the affect of the music. This type of surprise is easy to find in “Triste.” For example, the stark contrast between the end of Theme A and the beginning of Theme B (mm. 4-5) is almost jolting. The extension of the cadence of Theme B in mm. 23-24 catches our attention when the I chord does not occur until the fifth measure of the phrase after all the previous phrases have been four measures long. In mm. 29-30, Theme B uses a lower neighbor instead of an upper. The change may be small, but because this phrase is so distinct, even the small change catches the listener off guard. In fact, this small change may be even more shocking than a larger change because when the phrase begins like its predecessors, we expect it to continue in this way, and the single note that is “wrong” jumps out.

Surprises can occur in the harmonic lines as well as the melody. For example, the silence of the continuo line in mm. 5-6 is unexpected. For that matter, one could argue that even when the harpsichord rests for the second beat of m. 3, the listener is caught off guard. The iv chord in mm. 29-30 is surprising because we have already heard this theme use a tonic chord three times. The sudden exchange of the melody from the flute to the violin and cello in m. 5 is also unexpected, as is the flute’s solo echo of the anapest in m.

6. However, one of the most surprising moments, in my opinion, occurs in m. 9 when the first section is repeated but uses a different instrument to croon the melody.

The surprise occurs when the flute enters on the downbeat, creating the impression that the flute player has miscounted and begun the line one beat prematurely. Obviously, the part is right, but why does it sound wrong? The half cadence in m. 8 suggests the beginning of a new section, prompting you to make a prediction about the next pitch, chord and phrase. If you predicted that the music would continue before repeating, as eight measures is rather short to stand on its own as a section, there would be no reason for this sense of prematurity, as you would expect the flute to play something different. Even so, this note sounds out of place. Based on our experience with this piece so far, the flute has consistently played the melody and the melodic phrases in the flute have never started on a downbeat. Yet here the flute lands strongly on the first beat. The prediction that the pattern would continue and the measure would begin with the violin or cello was wrong, but had been so strongly embedded that instead of merely being surprised by the change, we briefly question whether the flute player has counted correctly.

Even if you predicted the first section would repeat, the pitch and register of the flute would have been unexpected, which would have triggered a revision of your prediction. You would still be surprised by the fact that your prediction was wrong, but probably would not hear the flute as entering early. The MNS may be to blame. The cues that are most responsible for creating an emotion are the ones that most strongly activate the MNS. The opposing forces at the point in question are the timbre, which, if it is the stronger force, would create the effect of a repeat with the flute entering early, and

pitch, which would indicate the prediction that the section would repeat was wrong.

While both pitch and timbre convey emotion in speech, timbre plays a larger role. It is easier for most people to imitate a timbre and to associate it with a change in emotion. Humans change the timbre of their voice to fit their emotional state—perhaps using a smooth, pure voice when calming a baby, a nasally voice when complaining, and a gruff voice when holding back tears. Pitch varies with the speaker's emotional state, too, but there are also natural variations in pitch that are a function of the speaker's anatomy; one person may naturally speak a third or an octave lower than another. It is the variations in pitch that convey emotion more than the absolute pitch—for example people raise the pitch of their voice when they are excited. A perfect fifth is a large difference, but if the MNS is relating the music to physical actions like speaking, a change in pitch of this size would most likely be accompanied by a change in timbre as well, lending yet more strength to the prediction of future musical events using timbre. Because surprises are a violation of predictions, hearing the timbre of the flute before we expect it surprises us so much that we momentarily blame the musician.

Even on the second beat of the measure, it is not clear what is happening in the music; it is not until the third beat, when we have heard the memorable major fourth beginning of the phrase, that we understand that the flute and violin have switched roles. Here we are struck by two new surprises: that the music is repeating and that the melody is now in the violin. After these surprises, we reevaluate and modify our understanding of the emotion in the music and our own emotions created by the music.

In fact, the surprise created by a mistake, whether composed or not, is so instrumental in the creation of emotion in music that some performers strive for the

effect. For example, in an interview with the New York Times, one of the Beatles recording engineers, Geoff Emerick, said the Beatles would use mistakes, especially in the rhythm track, to their advantage. “Often when we were recording some of those Beatles rhythm tracks,” Emerick remarked, “there might be an error incorporated, and you would say, ‘That error sounds rather good,’ and we would actually elaborate on that. When everything is perfectly in time, the ear or mind tends to ignore it, much like a clock ticking in your bedroom — after a while you don’t hear it.”¹²⁴ Like the bedroom clock, a perfect performance, with every pitch held for the exact amount of time specified and all at an equal volume holds little emotion. Thankfully, good performers intentionally stray from perfection in pursuit of expression. And good composers can capitalize on this by writing little “mistakes” into the music to surprise even the performer.

In “Triste,” the performer can emphasize the surprising note even more than the written music would suggest emphasizing the surprise and strengthening the emotional impact. For example, in m. 9, the harpsichord player might use the same realization of the i chord as he or she did in the first measure to fortify the sense that this measure initiates the repeat of the section. The flute player could also reinforce the sensation that he or she has entered prematurely, perhaps by coming in strong and then backing off a little as if realizing that he or she is not really sure about the entrance.

¹²⁴ Pam Belluck, “To Tug at the Heart, Music Must First Tickle the Neurons,” *The New York Times*, 18 April, 2011, D1.

Surprise as a Trigger

One important factor that Huron does not explain in his theory is that surprise creates arousal. It would seem as if this would make it hard for low arousal emotions to stem from surprise. After all, the function of a surprise is to activate our sympathetic nervous system, which creates a fight-or-flight response that increases our heart rate, dilates our pupils, and releases adrenaline, among numerous other physical responses that would assist in facing or running away from a predator. However, the mournfulness and grief this piece induces are low arousal emotions. Three surprises in rapid succession should strip the music of its melancholy affect as the listener's arousal heightens, but the surprises have no such effect.

This problem prompts me to theorize that surprise acts not as an emotion in and of itself in music, but as a trigger that stimulates the brain to pay attention to what is occurring in the music, activating the MNS and producing an emotion. When we are surprised, our perceptions are heightened; a startling crack of a branch in the forest necessitates that we focus our attention on the surroundings in order to ascertain whether the sound was created by a friend or a foe. While we may have been oblivious to our surroundings before, suddenly we are hyperaware of everything in our vicinity. The surprise also alerts us to an emotion, whether that emotion is fear or relief.

The same principle holds in music. When we are surprised by an unexpected note or chord, we are suddenly hyperaware of the musical surroundings. A personal anecdote may help to describe the veracity of this. I had already heard the fifth movement of Telemann's Quartet No. 4 numerous times, but as I listened one day while focusing most of my attention on another task, my head suddenly jerked up. "What just happened?" I

thought. “That wasn’t right!” The music was at m. 9. Telemann constructed this surprise so carefully that even being intimately familiar with the piece did not buffer me from the effects of the surprise while my attention was elsewhere.

The physiological arousal created by surprise not only heightens our perceptions, but also strengthens our emotions. As an example, if you have ever had a surprise party, think back to it. After you got over the initial surprise, and perhaps embarrassment and pain over jumping back far enough to slam your head against the doorframe, chances are you were in a very good mood and had a wonderful time at the party. On the other hand, if you had known about the party ahead of time, while you still would have been happy, the emotions were probably not as intense as if you had been surprised. Or imagine the relief you would feel if a fire drill interrupted a pop quiz compared to the relief of the interruption of one you knew about, even if you were equally prepared. We can see the same effect in music. For some reason, music with big surprises—like the fourth movement of Haydn’s String Quartet No. 2, “The Joke,” or his “Surprise Symphony”—tends to strike us as even happier than it might otherwise, even if this surprise occurs at the very end as it does in “The Joke.” *Sadness* is just as easily magnified by surprise.

By focusing the listener’s attention, surprise allows listeners to recognize the emotion in the music and then magnifies the emotion, but this does not explain why the music creates a specific emotion. The surprise does not create an emotion; it is more of a trigger, or a necessary precursor like turning on the car before you drive. Instead, the emotion is created through the resolution to the surprise. Turning once again to a real-life surprise, imagine a person jumps out from behind a tree after dark. If this person turns out to be your best friend, you will either laugh and be happy to see them or be angry,

depending on your temperament. On the other hand, if the person is a stranger and proceeds towards you menacingly with a knife in his hand, the emotional response will be fear. The surprise alerts you to the situation, but it is in the resolution of the surprise that the emotion is determined.

This idea is necessary to an understanding of how the surprise of the “early” flute entrance creates an emotion. The resolution to the surprise in m. 9 is in the violin’s agonizing leap of a fourth that lands on an accented appoggiatura and then falls another step to the F#, as well as the extended i chord throughout m. 9. These features suggest an emotion that can be interpreted using either Mattheson’s theory or the mirror neuron theory. Mattheson would credit the appoggiatura (dissonance), the downward small intervals, the molossus, the key, and even the timbre of the melodic instrument. The mirror neuron theory would attribute the emotion to many of the same features, but would implicate the MNS in recognizing the associated physical movement and the intended emotion. Since the surprise here resolves to a mournful melody by either standard, the listener recognizes and experiences the mournfulness.

The basis for this theory is the idea of tension and release, which is a basic tenant of many music theoretical ideas. Often, this tension is described as the product of attributes of the music such as non-chord tones and unresolved chord progressions. There is always a tension pulling the notes in a certain direction until they finally come to rest at the final cadence. Tension is even, perhaps especially, present within the cadence itself. I frequently notice my toes tensing when a piece suspends the dominant chord for a particularly long time and then relaxing when the music lands on the tonic chord to end the piece. Until the tension is released by the resolution to the surprise, the emotion is

either not present or unchanged from earlier in the music. For example, in the Telemann movement, the initial leap in the flute from F# to B (m. 1) holds a great deal of tension. The chord at that point contains no dissonance, yet the leap of a fourth catches the listener by surprise and is followed with stepwise descending motion. This breaks the tension created by the leap and provides the resolution to the surprise that is needed in order for the music to convey *sadness*, which the listener can experience and recognize shortly after the musician moves from the tense note.

Context

The surprise needs to be taken in context, as musical cues before the surprising note account for why the figure captures our attention. These cues are based on the listener's understanding of the way music works and on his or her evaluation of the piece up until that point. For example, in Baroque dance music, the three quarter notes in the continuo line at m. 8, along with the half cadence, suggest the end of a section and insinuate a repeat, prompting the prediction that the music will do so. A repeated section is almost always played by the same instruments the second time as it was the first time and this cue, garnered from Western music theory, allows the listener to predict that the flute will again play the melodic line. When these expectations are violated, a surprise occurs, triggering the emotion-creation process.

The context also contributes to our prediction for the resolution of the surprise. Another late night example: Sitting with friends in your locked apartment and hearing a crash is very different from sitting alone inside a tent and hearing a crash. While both create the same sense of surprise, when you are in your apartment, you are more likely to

attribute the crash to your neighbor than to a bear. On the other hand, alone in a tent at night, a bear is a logical prediction. The same is true in the musical situation. Up until the surprise, the music has been melancholy. At the moment of the surprise, a stable but sad minor tonic chord supports the surprising note. The context at the moment lends support to the repeated section hypothesis, especially if the harpsichordist has realized the chord here the same way he or she did in the first measure. The context from earlier in the piece allows us to predict the resolution will use features that create melancholia. The context and prediction prepares us so that by the time the expectation has been confirmed, our brains are prepared to send the signal that will trigger the *sadness*.

The context of the piece in the bigger picture also contributes to the way in which we prepare for an emotion. In Baroque music, the emotion is intended to permeate the piece; the emotion at the beginning should be the emotion at the end. In later music, however, emotions can and do change frequently. Thus, in Baroque music, the expectation that the music will continue with the same emotion it has expressed so far is an excellent prediction, whereas it may not be as adaptive in later music. Because Baroque music tends to maintain a single affect, our predictions should more often be correct, as we have fewer choices. More correct predictions would lead to fewer surprises, which would provide fewer opportunities to trigger emotions. But Baroque music is just as emotional as later music, pointing to a possible flaw in the theory. The explanation for this could come in one of two forms. In the first hypothesis, the surprises are simply different in Baroque and later music. For example, while later music may use novel chord sequences and abrupt dynamic changes, Baroque music might use a new rhythm, a rest in an unexpected place, or a return of the main theme. In the second

hypothesis, Baroque music is able to achieve the same emotional saturation because it maintains the emotion throughout the piece, giving the listener more time to identify the emotion and replicate it.

Another possible flaw in the theory is that an emotion can be recognized very early in the music, when there is not much context in which to place the music. We might predict that, as a movement in a suite, the fifth movement of Quartet No. 4 will be a slow movement since the last one was upbeat, and movements tend to alternate tempos. Other than that though, there is little upon which to base a prediction, and according to the expectations theory a prediction is needed before an emotion can form. Yet, according to research, the mood of the music can be discerned within the first measure.

The first surprise might lie in the first pitch itself. In a live performance, we have cues such as the way the performers lift their instrument into playing position, their facial expressions, and even the speed and character of the preparatory upbeat. Telemann's audiences would have had the benefit of all these cues, but today most people hear recorded music more often than live music. Even in recorded music, the emotion is discernable early. Perhaps the first pitch is enough of a surprise to trigger the emotional response system. After all, we do not know exactly when the pitch will sound, which instruments will play the first pitch or whether the first chord will be major or minor. Enough factors play into even the first pitch that we cannot possibly predict everything correctly and something will surprise us. More importantly, although a listener may get an initial reaction to the music, the first pitch alone does not engender confidence in the listener's evaluation of the mood of the music. The second and third pitches are far more helpful. In fact, with each surprise the emotion we feel from the music is modified. In

Baroque music, this modification is almost always either strengthening the emotion or focusing it to a more specific emotion. In the first measure, a listener may be able to recognize whether the music is happy or sad, but probably will not be able to go into much more detail. By the end of the piece, however, listeners are usually able to use much more specific emotion descriptors like *despairing*, *beseeking* or *elated*.

In “Triste,” this process begins with the leap from the F# to the B in the first measure of the flute line. The context plays a role here as well. Even in the first measure of the piece, the music has contained valuable clues that both Mattheson and modern psychology say induce *sadness*. The minor key, slow tempo, minor thirds in the bass, mollosic figure, and perhaps even stepwise motion in the continuo (depending on the realization) work together to create a context from which to extrapolate a very general emotion and allow us to make predictions about each successive chord. We expect the next note to be the same or move a step, as this is the most common movement in music. When the next note is a fourth higher, we are surprised. Earlier, I mentioned that Mattheson’s rules could not explain why the B₅ feels mournful even though it is the tonic of the chord supporting it and no dissonant notes are in the chord. The expectations theory offers a solution to this problem: the B₅ is the point of surprise and tension, as we are not expecting the perfect fourth leap. It is the first time in the music that this tension has reached a noticeable level. The resolution of the leap, first to the appoggiatura and then to the G₅ and F#₅, follows Mattheson’s suggestion of using small intervals to create a *sad* affect. After the surprise note has prepared our nervous system to focus on the notes that follow, the vital spirits (mirror neurons) imitate and recognize the emotional material that the resolution contains.

Every single note in the music has the potential to be a surprise. The note does not have to be unusual, nor the chord chromatic. However, not every note creates the same level of surprise because our experience with music, and later in the piece with the piece itself, allows us to make relatively accurate predictions most of the time. But every good composer is able to write enough surprises into the music to keep the listener invested in the notes that follow. Most of these surprises are rather small; perhaps the melody moves up instead of down. Even these small surprises force the listener to pay attention to what happens next.

CHAPTER 5: CONCLUSIONS

In the first chapter, I described three philosophical theories about music and emotion: the self-expression theory, the arousal theory, and the possession theory. The biggest conflict arises between those who ascribe to the arousal theory and those who, like Peter Kivy, ascribe to the possession theory. In his article, “Mattheson as Philosopher of Art,” Kivy argues that Mattheson does not ascribe to the arousal theory, as he seems to do on the surface. Rather, Kivy argues that Mattheson’s work is grounded in possession theory, although Kivy admits that “Mattheson surely, and unmistakably, slipped into the familiar “arousal” idiom of his times.”¹²⁵ Based on the evidence presented, I do not agree that Mattheson “slipped” into arousal theory but rather he understood, through observation and experience, what modern psychology is only beginning to show: namely, it is possible for music to both possess and arouse sadness.

Kivy is correct that music cannot be *sad* in and of itself, and to say that music is *sad* is to say that music possesses emotions “phenomenologically.” If a tree falls, but nobody is near enough to hear it, it does not make a sound. It creates sound waves that have the potential for sound, but sound itself can only exist within the brain. The same is true of music. Music may have the properties that express emotion, but without a human to interpret the properties, music cannot be *sad*. Superficially, it can present the qualities that express sadness; we may one day be able to create artificial intelligence that is capable of naming the intended emotion of a piece of music based on the properties of the

¹²⁵ Kivy, “Philosopher,” 264.

music, but the music will still only have *properties* of *sadness*. However, once the brain interprets the music, the listener can interpret the sound and experience an emotion.

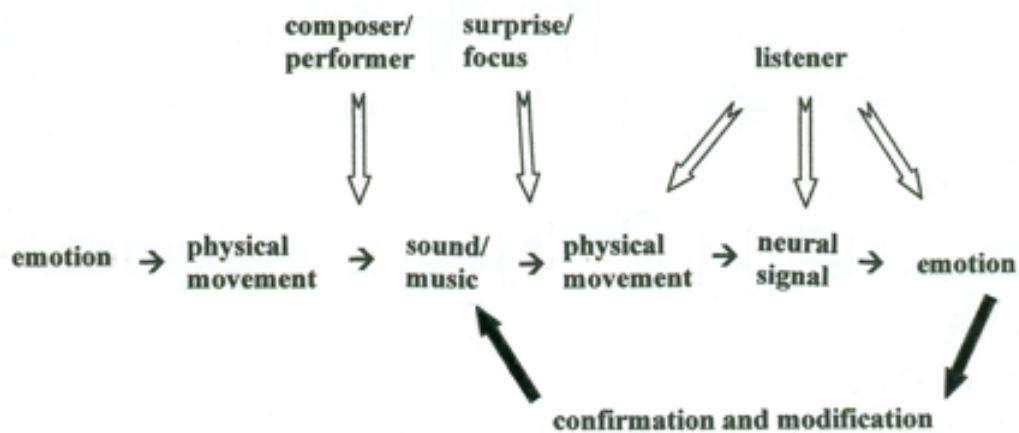
One more example before I go into the specifics of how this works. This example is based on what is thought to be one of the basic responsibilities of mirror neurons: empathy. A photograph of a person crying cannot be sad. The subject probably was, but the photograph itself, incapable of emotion, is no sadder than a weeping willow. However, when a person looks at the photograph, his or her mirror neurons recreate the physical state of the subject's expression and posture, the viewer or her sad. The viewer is probably not as sad as the subject, but the emotion is strong enough to be recognized.

Emotions created by music work in much the same way. The MNS imitates the music, imbuing it with the movement that we associate with our own experience, creating a kind of musical empathy that is then magnified into a full-fledged emotion by the introduction of musical surprises. In a lot of ways, Mattheson was right about emotion and music. The creation of an emotion is dependent on certain features, such as key, tempo, and intervals. These features of music are imitations of emotional states, but they use a different medium. Mattheson simply forgot a step, namely, that emotions must first be translated into physical movements and then back to a physical movement before the brain can imitate and recognize it.

The creation of emotions in music is a process that begins and ends with emotion. Emotions are coded in physical movements and tones (such as posture or tone of voice) that can be recognized by others. It is the composer's job to translate these movements into music, which he or she does by choosing intervals that imitate the physical properties of the emotion. The listener's brain then recognizes these musical symbols as signifiers

of movement and translates them back into a representation of the physical state via the mirror neurons. Then, like in the brain of the person viewing the photograph, the re-creation of this state allows the auditor to experience the emotion that the composer intended. Figure 24 illustrates this process.

Figure 24. Translation Process of Musical Affect



I am not making the claim that anything that phenomenologically possesses an emotion will necessarily arouse the emotion in a person seeing or hearing it. Without an association between a weeping willow or bloodhound and a sad memory, most people do not feel particularly sad when they see these items. Yet when people hear *sad* music, they often do feel *sad*. The biggest distinction between music and the bloodhound is that the music contains surprises that are capable of focusing the listener's attention on the encoded sadness,¹²⁶ which allows the listener's MNS to create a stronger imitation of the phenomenological properties of *sadness*.

¹²⁶ Having an image of a human, the photograph is imitated by the MNS much more easily than music is because there is less translation necessary and our brains place special emphasis on human faces, even providing a specific brain area dedicated to the

No single theory can explain how music shapes our emotions; music is far too complex for a simple explanation and the process most likely involves a number of steps, many more than I presented in the figure above. I do not want to claim that the process described is complete or that it is capable of finally solving the problem of musical affect. The theories are still just that: theories. However, the combination of these theories gives the analyst another way to look at music in an attempt to understand where it is that the music holds its power.

task of recognizing and interpreting human faces. Thus, even without surprise, a photograph can arouse an emotion.

Bibliography

- Aristotle. *The Politics of Aristotle: A Treatise on Government*. Translated by William Ellis. London: M. Dent and Sons, Ltd., 1947.
- Bach, Johann Sebastian. *Chromatische Fantasie und Fuge (Chromatic Fantasia and Fugue) in D Minor, BWV 903*. Leipzig, Bach Gesellschaft Edition, 1899.
- Bach, Johann Sebastian, *Da der Herr Christ zu Tische sass, BWV 285*, Leipzig: Bach Gesellschaft (1899), Classical Scores Library, Connecticut College,
<http://shmu.alexanderstreet.com/>
- Bach, Johann Sebastian. *Mer hahn en neue Oberkeet, BWV 212*. Wiesbaden: Breitkopf and Hartel.
- Balkwill, Laura-Lee, William Forde Thompson, and Rie Matsunaga. "Recognition of Emotion in Japanese, Western, and Hindustani Music by Japanese Listeners." *Japanese Psychological Research* 46, no. 4 (2004), 337-349.
- Bartel, Dietrich. "The Concept of the Affections in German Baroque Music." In *Musica Poetica*, 29-56. Lincoln: University of Nebraska Press, 1997.
- Belluck, Pam. "To Tug at the Heart, Music Must First Tickle the Neurons." *The New York Times*, 18 April, 2011, D1.
- Buelow, George J. "Johann Mattheson and the Invention of the Affektenlehre." In *New Mattheson Studies*, 393-407. Cambridge: Cambridge University Press, 1983.
- Buelow, George J. "Mattheson, Johann." Grove Music Online. Edited by Deane Root. <oxfordmusiconline.com> (Accessed 12 November 2010).
- Buelow, George J. "Rhetoric and Music." Grove Music Online. Edited y Deane Root. <oxfordmusiconline.com> (Accessed 20 September 2010).

- Burkholder, Peter J, Donald Jay Grout, and Claude V. Palisca, *A History of Western Music*. 7th ed. New York: W.W. Norton, 2006.
- Casey, Michael. *Scandora: Using Music Information Retrieval and Functional Magnetic Resonance Imaging to Predict Musical Meaning*. Lecture, Digital Dialogues from Connecticut College, New London, CT, March 7, 2011.
- Cannon, Beekman C. *Johann Mattheson: Spectator in Music*. New Haven: Archon Books, 1968.
- Costa, Marco, Philip Fine, and Pio Enrico Ricci Bitti. "Interval Distributions, Mode, and Tonal Strength of Melodies as Predictors of Percieved Emotion." *Music Perception* 22 (Fall 2004), 1-14.
- Curtis, Meagan E. and Jamshed J. Bharuch. "The Minor Third Communicates Sadness in Speech, Mirroring Its Use in Music." *Emotion* 10 (2010), 335-348.
- Descartes, Rene. "Passions of the Soul." In *Philosophical Writings of Descartes, Volume I*. Translated by John Cottingham, Robert Stoothoff, and Dugald Murdoch, 325-404. New York: Cambridge University Press, 1985.
- Dohrn, Ellinor. Preface to Georg Philipp Telemann, *Quartet in B Minor, No. 4*. Translated by Edward Olleson. London: Nagels Verlag Kassel, 1964.
- Elliot, Jane "Bringing music medicine to the NHS."
<http://news.bbc.co.uk/2/hi/health/8406006.stm>. 1 January 2010; accessed 3 May 2011.
- Florilegium. "Quatuor No. 4 in B Minor." *Telemann: Paris Quartets, vol. 3* (2006). Compact Disc, Channel Classics NI.

- Gagnon, Lise and Isabelle Peretz. "Mode and Tempo Relative Contributions to "Happy-sad" Judgements in Equitone Melodies." *Cognition and Emotion* 17, no. 1 (2003), 25-40.
- Gomez, Patrick and Brigitta Danuser. "Relationships Between Musical Structure and Psychophysiological Measures of Emotion." *Emotion* 7 (2007), 377-387.
- Hailstone, Julia C. et al. "It's Not What You Play, It's How You Play It: Timbre Affects Perception of Emotion in Music." *The Quarterly Journal of Experimental Psychology* 62 (2009), 2141-2155.
- Handel, Georg Friedrich. "Movement 3: Adagio" in *Sonata in G Minor for Flute and Basso Continuo*. Nagels: Kassel, 1980.
- Harriss, Ernest. "Johann Mattheson. The Enlightenment, L'Eclaireissement, or Die Aufklärung." In *Music in the Theater, Church, and Villa*, 187-194. Edited by J. Bunker Clark, Warren, MI: Harmonie Park Press, 2000.
- Hill, John Walter. *Baroque Music*. New York and London: W. W. Norton and Company, 2005.
- David Huron. *Sweet Anticipation*. Cambridge, MA: MIT Press, 2006.
- Kallinen, Kari and Niklas Ravaja. "Emotion-related Responses to Audio News with Rising versus Falling Background Tone Sequences." *Musicae Scientiae Special Issue* (2003), 85-110.
- Kivy, Peter. "Mattheson as Philosopher of Art." *The Musical Quarterly* 70, no. 2 (Spring 1984) : 248-265. <http://www.jstor.org/stable/742213> (accessed October 12, 2010).

Kuijken, Barthold, Sigiswald Kuijken, Wieland Kuijken, and Gustav Leonhardt.

“Quatrième Quatuor.” *Telemann: Paris Quartets* (1997), COMPACT DISC, Sony.

Lenneberg, Hans. “Johann Mattheson on Affect and Rhetoric in Music (I),” *Journal of Music Theory* 2, no. 1 (April 1958) : 47 – 84.

Lenneberg, Hans. “Johann Mattheson on Affect and Rhetoric in Music (II),” *Journal of Music Theory* 2, no. 2 (Nov. 1958) : 193-236.

Lester, Joel. “Mattheson and the Study of Melody.” In *Compositional Theory in the Eighteenth Century*, 158-174. Cambridge, MA: Harvard University Press, 1994.

Levinson, Jerrold. “Music and Negative Emotion.” In *Music and Meaning*, ed. Jenefer Robinson, 215-241. Ithaca and London: Cornell University Press, 1997.

Levintin, Daniel J. *This is Your Brain on Music*. New York: Plume, 2006.

Lindley, Mark. “Temperaments.” In *Grove Music Online*. *Oxford Music Online*, <http://www.oxfordmusiconline.com/subscriber/article/grove/music/27643> (accessed April 16, 2011).

Mattheson, Johann. *Der vollkommene Capellmeister*. Translated by Ernest Charles Harriss. Ann Arbor, MI: UMI Research Press, 1981.

Molnar-Szakacs, Istvan and Katie Overy. “Music and Mirror Neurons: From Motion to ‘E’motion.” *Scan* (2006), 235-241.

Overy, Katie and Istvan Molnar-Szakacs. “Being Together in Time: Musical Experience and the Mirror Neuron System.” *Music Perception* 26 (2009), 489-504.

- Plato. "The Republic." *In Source Readings in Music History: From Classical Antiquity through the Romantic Era*, 3-12. Edited by Oliver Strunk. New York and London: W. W. Norton, 1950.
- Rizzolatti, Giacomo and Laila Craighero. "The Mirror Neuron System." *Annual Review of Neuroscience* 27 (2004), 169-192.
- Robison, Paula, Kenneth Cooper, and Timothy Eddy. "Sonata in G Minor: Adagio." *G. F. Handel: The Complete Sonatas for Flute*. COMPACT DISC, Vanguard Classics, 2004.
- Rothstein, William. "Playing with Forms: Mozart's Rondo in D Major, K. 485." In *Engaging Music: Essays in Music Analysis*. Edited by Deborah Stein. New York: Oxford University Press, 2005, 202-214.
- Schellenberg, E. Glenn, Ania M. Krysciak and R. Jane Campbell. "Perceiving Emotion in Melody: Interactive Effects of Pitch and Rhythm." *Music Perception* 18 (Winter 2000), 155-171.
- Schenkman, Walter. "Johann Mattheson" Keyboard 7 (September 1981) : 26-32, 66.
- Soussignan, Robert. "Duchenne Smile, Emotional Experience, and Autonomic Reactivity: A Test of the Facial Feedback Hypothesis." *Emotion* 2 (2002), 52-74.
- Steinbeis, Nikolaus, Stefan Koelsch and John A. Sloboda. "The Role of Harmonic Expectancy Violations in Musical Emotions: Evidence from Subjective, Physiological, and Neural Responses." *Journal of Cognitive Neuroscience* 18, 1380-1393.

Telemann, Georg Philipp. "Movement 5: Triste" in *Quartett in B Minor for Flute, Violin, Violincello and Basso continuo from Six Nouveaux Quatuors en Six Suites*.

Nagels: Kassel, 1964.

William Hazelzet Trio Sonnerie. "Quartet No. 4 in B Minor from Paris Quartets."

Telemann and Paris Quartets (2005). Compact Disc, EMI Classics.

Zucker, Laurel, and Robin Sutherland. "Sonata in G Minor, Opus 1, No. 2 for Flute by Handel: Adagio." *The G. F. Handel Flute Sonatas for Flute and Harpsichord*.

Compact Disc, Cantilena Records, 1995.