

Chapter 2

Review of literature and research data

Instructional methodologies

While it is true that instructional methods are chosen by the music teacher and the music curriculum he or she follows, many teachers rely heavily on instructional methodologies that emerged in recent generations and developed rapidly during the latter half of the 20th Century.

The major international music education methods are the Kodaly method, the Orff method, the Dalcroze method and the Suzuki method. Other methods are the Gordon Music Learning Theory and the Conversational Solfege method.

The Kodaly method

Zoltán Kodály (1882-1967), a Hungarian music educator and composer, stressed the benefits of physical instruction and response to music. Although not really an educational method, his teachings reside within a fun, educational framework built on a solid grasp of basic music theory and music notation in various verbal and written forms. Kodály's primary goal was to instill a lifelong love of music in his students and felt that it was the duty of the child's school to provide this vital element of education. Some of Kodály's trademark teaching methods include the use of solfege hand signs, musical shorthand notation (stick notation), and rhythm solmnization (verbalization).

Orff Schulwerk (Germany)

The Orff Schulwerk is considered an "approach" to music education. It begins with a student's innate abilities to engage in rudimentary forms of music, using basic rhythms and melodies. Orff considers the whole body a percussive instrument and students are led to develop their music abilities in a way that parallels the development of western music. The approach encourages improvisation and discourages adult pressures and mechanical drill, fostering student self-discovery. Carl Orff developed a special group of instruments, including modifications of the glockenspiel, xylophone, metallophone, drum, and other percussion instruments to accommodate the requirements of the Schulwerk courses.

Dalcroze method

The Dalcroze method was developed in the early 1900s by Swiss musician and educator Émile Jaques-Dalcroze. The method is divided into three fundamental concepts - the use of solfege, improvisation, and eurhythmics. Eurhythmics teaches concepts of rhythm, structure, and musical expression using movement, and is the concept for which Dalcroze is best known. It focuses on allowing the student to gain physical awareness and experience of

music through training that takes place through all of the senses, particularly kinesthetic. According to the Dalcroze method, music is the fundamental language of the human brain and therefore deeply connected to what human beings are.

Suzuki method

This method puts high value on the development of the aural skills. The author Shinichi Suzuki insists students learn to play by ear before learning to read. This of course develops the students ears in a very early stage. Shinichi Suzuki (Japan) uses music education to enrich the lives and moral character of its students. The movement is based on two principles: 1. all children can be well educated in music and 2. learning to play music at a high level also involves learning certain character traits or virtues which make a person's soul more beautiful. The primary method for achieving this is centered on creating the same environment for learning music that a person has for learning their native language. This 'ideal' environment includes love, high-quality examples, praise, and a time-table set by the student's developmental readiness for learning a particular technique.

Gordon Music Learning Theory

This method is based on an extensive body of research and field testing by Edwin E. Gordon and others. Music Learning Theory provides the music teacher a comprehensive method for teaching musicianship through audiation, Gordon's term for hearing music in the mind with understanding. Teaching methods help music teachers establish sequential curricular objectives in accord with their own teaching styles and beliefs.

Conversational Solfege method

Deriving influence from both Kodaly methodology and Gordon's Music Learning Theory, Conversational Solfege was developed by Dr. John M. Feierabend, chair of music education at the Hartt School at the University of Hartford. The philosophy of this method is to view music as an aural art with a literature based curriculum. The sequence of this methodology involves a 12 step process to teach music literacy. Steps include rhythm and tonal patterns and decoding the patterns using syllables and notation.

George Frederick Root (1820-1895) was widely known for his pedagogical approach to the teaching of music. He is one of the pioneers that wrote more than seventy works of considerable length for use in classrooms, colleges, normal institutes, churches, and the concert hall.

Root was greatly influenced by Pestalozzi (1746-1827) whose principles became the foundation for Root's pedagogy. Root believed that music Root's two editions of *The Musical Curriculum* (1864 and 1872) are unique works of the period which integrate the study of theory, harmony and sight-singing with piano and vocal training. His teaching method is comprehensive and progressive. Expressive and artistic performance is encouraged. The student is expected to think perceptively, engage in self-assessment, and develop creativity. These principles are also promoted in today's National Standards for the Fine Arts (2000).

Importance of ear training

Ear training is part of every serious music education program. It is agreed among music educators that ear training in specialized music programs is essential for success. (Deutsch, 1971) In a good curriculum ear training is taught in combination with basic music theory and harmony. They should complement each other and be coordinated because ear training is the practical implementation of the music theory.

Rogers (1984) emphasizes the interrelationship between thinking and listening in the study of music theory: "the more thinking that takes place, the more there is to hear; the more listening that takes place the more there is to ponder". He goes on to explain that musical analysis centers on this cyclical relationship, leading the student to question how and why a particular piece of music "works", which further leads the student to query how it might have been composed, and, subsequently, how it should be performed, heard, or taught.

Aural harmonic skills tend to be neglected. Alvarez (1980) compared scalar with root harmonic perception techniques. He states that current basic music series including state curricular guides tend to emphasize the development of notational rather than aural harmonic skills. Particularly when contrasted with presentation of rhythm and melody, harmony appears to be neglected. If harmonic aural perception is presented at all, it tends to be limited to the identification of isolated chords and arpeggios. His results show a superiority of the scalar method but admits that this could have been due to the implicitness of the procedure itself. Also the target group was 7 and 8 graders in high school, not music majors.

Funk (1975) and Hofsetter (1987) found that students frequently exhibit confusion regarding the perception of the acoustical root of chords. Their abilities to perceive the roots of the chords is affected by the changes in range, dynamics, doublings and context.

Purpose of ear training

The process of ear training consists of four phases: hearing remembering, understanding and notating. The final result of musical dictation is a visual representation of a sound or collection of sounds.

The purpose of this visual representation is not only to communicate what these sound(s) represent to someone who has not heard it but also to "develop the understanding ear and the hearing mind" as (Benward, 1969) describes. The purpose of dictation is to produce a certain kind of musician who can hear sound as meaningful patterns.

According to (Klonoski, 2006) the goal of aural skills training is to provide students with critical listening skills that they will use routinely for the rest of their lives. He says we must teach students how to synthesize those skills into a unified listening process. The skills to be extractive listening.

Rodgers (1984) states that learning how to hear a sound in its contextual relationship and knowing its meaning is crucial. It is even more important even than getting the right note.

Right answers can even be irrelevant or harmful if these are heard without the appropriate listening habits.

Ear training drill method

For reasons of convenience ear training and analysis are usually treated as two topics within music theory but should be taught as one. Kolonoski (2006) states that traditional dictation exercises isolate elements such as rhythm, melody and harmony. This is done to develop the student's listening skills from by constructing the whole from parts; first the intervals, then the chords and then chord progressions. He further states that this practice stems from the belief that real musical compositions are too complex for the students to handle, especially in the early stages of study. The downside here is that exercises in this system are either correct or incorrect, with little room for interpretation. This type of learning relies mostly on repetition.

David Salisbury (1990) points out that "recent research on cognitive learning suggests that the role of drill and practice in learning may be more important than has previously been realized". What has traditionally been identified as fundamental units of knowledge and skill can often be broken down into still smaller units. It is in learning these "subskills" that a drill approach seems to fit best. Merrill and Salisbury (1984) give this example: "Consider the musician learning a new piece of music. Once the mechanics of the piece have been mastered, the musician can then focus attention on interpretation. The implication of this research is that drill and practice can serve a very important role in bringing the learner to a level of "automaticity" on lower level subskills so that the learner can more readily perform some higher level complex skill. While it's true that there are inappropriate uses of drill and practice, it would seem that this is one of the most appropriate areas of computer-assisted learning, since it performs best in well defined routines with predictable and correct reactions" (Decoo, 1994).

Vazquez-Abad and LaFleur (1990) suggest the following: "Any time that a job or task calls for 'learnable' subtasks that have to be performed automatically, or when a skill has been targeted for instruction which must be brought in while performing a (more complex) task, we may then be dealing with prime candidates for drill and practice" .

Merrill and Salisbury (1984) suggest that "multiple discrimination skills" are often required to complete more complex tasks involving "classification, rule using, or problem solving". They define multiple discrimination skills as those that "involve distinguishing different stimuli from each other" (Merrill & Salisbury, 1984). Salisbury (1988) makes a distinction between drills used to target "factual" information, and those intended to address "intellectual skills such as concept learning, rule using, problem solving, or using procedures". This is especially applicable in music theory, where identifying and constructing correct musical progression often involves adherence to a set of rules or procedures.

Rogers (1984) says that many ear training classes focus too much using only the drill-and-repetition aspects of learning to hear. It is not enough just to recognize the sound(s) but we should hear this sound(s) in a musical context. "The weakness of this approach centers on a failure to distinguish between sound events (requiring just ears) and musical events (requiring ears and minds). A well-rounded ear-training program includes at least two

discernable phases--one preliminary and the other more terminal--just as true analysis in written work is prepared by the antecedent stage of description. In the case of ear training, the preliminary phase does not necessarily have to be mastered before moving on to the next level. The two stages can, to a large extent, be overlapped and in certain situations learned simultaneously. The second stage, in fact, like analysis itself, also incorporates the first, but moves beyond fragments to real musical contexts." (Rogers, 1984)

According to Rogers (1984) the first stage of ear training is concerned with the accurate perception and labeling of individual events: the quality of an interval or chord for example. The other stage involves the understanding of musical relationships and for teaching purposes implies, almost demands, a 'holistic approach' as he calls it. "The distinction is between letting sound simply strike the ear drum and plugging that sound into conceptual frameworks." (Rogers, 1984).

Skills and subskills

A skill begins to reach "automaticity" as it "requires less and less attention and interferes less with other ongoing cognitive processes" (Merrill & Salisbury, 1984). This notion of "automaticity" holds especially true in many aspects of music theory and performance. Concepts such as note names and positions, clefs, rhythm and meter indicators, and key signatures are all "building blocks" that are essential elements in mastery of theory and adept performance.

A skill can often be broken down into still smaller units, subskills. It is in learning these "subskills" that a drill approach seems to fit best. (Merrill and Salisbury, 1984) It is time sufficient method. In ear training subskills are used extensively. For example practicing hearing chord qualities is a subskill that needs to be addressed first to be able to proceed to a more difficult task, hearing chord progressions because chords are the building blocks for the progressions.

Some scholars believe that traditional dictation activities do not necessarily result in enhanced listening or musicianship skills. (Gary Potter, 1990)

Covington (1992) suggests that current thought on aural training does not focus enough on active experiences, relationships between other musical concepts, and group aural experiences. Her findings are significant because they suggest some non-traditional approaches to teaching aural skills.

Delzell (1989) suggest that beginning instrumentalists develop aural skills through multi-faceted systematic procedures focused on modeling, imitation, and internalization.

Constructive brainwashing

The question "How does what we listen for affect what we will or can hear?" is an important element in learning strategies. Psychologists call this listening attitude our "mental set". They describe the job of music theory as creating and refining mental filters through which sounds pass to become organized as music, and defines this process with the delightful term "constructive brainwashing." (Rodgers, 1984)

Rodger (1984) says that "no topic is more important than the merging of mind training with ear training through analysis." It is not important whether ear training classes should be set up in a separate class or in a combined class. What matters is that we do not hear just to make analysis easier. We do analysis to make listening easier and it is this that is so often overlooked in the ear-training class. In his words: "It is surprising that such golden opportunities are often missed since analysis is the natural leader of the ear. Almost all students are more advanced conceptually than perceptually. Most students can absorb new thoughts faster than new hearing." Indeed the fact of learning the concept of a dominant chord can be done in a day but it takes longer to be heard.

His solution is simply stated: do as much listening as possible when teaching analysis and do as much analysis as possible when teaching ear training.

Whitener (1983) concluded that students who were taught through a structure of theory, music reading or similar-type framework, rather than a choir performance class, scored higher in determining intervallic relationships and recognizing major and minor modal keys.

Neuroscience

Musical ear training involves a complex process of perception and recognition of a sound or a group of sounds.

(Levitin, 2006) In his book "this is your brain on music" Levitin (2006) states that musicians use a process called 'chunking'. "Chunking refers to the process of tying units of information into groups and remember the group as a whole rather than the individual pieces. First, musicians encode in memory an entire chord, rather than the individual notes...second, musicians tend to encode sequences of chords, rather than isolated chords. "Plagal cadence", "twelve bar blues" or "turnaround" are shorthand labels that musicians use to describe sequences of varying lengths. ...allows them to recall big chunks of information from a single memory entry." (Levitin, 2006)

The reason why our brain processes by chunking is because our brain is severely limited in terms of working memory, generally to nine pieces of information. (Levitin, 2006)

Students must be taught how to increase their musical memory. Most people's short-term memory capacity lies somewhere between five and nine between five and nine events. Once that memory store is full, the listener cannot remember more. (Klonoski, 2006) To recall musical passages that contain more than nine notes, individual notes must be grouped, or "chunked," according to meter, harmony, and rhythmic patterning.

Harmonic recognition is developed in a later stage in children. Costa-Giomi (1994) researched the recognition of chord changes in children. Harmonic concepts are the most difficult to grasp. Studies show that harmonic discrimination occurs later than the discrimination of other musical concepts such as timbre, loudness, tempo and pitch. She says that in general the ability to discriminate harmonies improves noticeably at the age of nine. (Costa-Giomi, 1994)

Other nonmusical variables that influence ear training

Some sources (Thostenson, 1967) (Gordon, 1971) mention the relation between ear training and nonmusical variables. Thostenson (1967) investigated achievement in melodic dictation and sight singing as a function of demographic variables (e.g., sex or major instrument) and found that, particularly for college freshmen, the choice of performing medium (instrument) and length of previous training in a performing were important factors for success in these skills. Also (Gordon, 1971) has identified the relationship between musical aptitude and intelligence.

Harmonic recognition is developed in a later stage in children. Costa-Giomi (1994) researched the recognition of chord changes in children. Harmonic concepts are the most difficult to grasp. Studies show that harmonic discrimination occurs later than the discrimination of other musical concepts such as timbre, loudness, tempo and pitch. She says that in general the ability to discriminate harmonies improves noticeably at the age of nine. (Costa-Giomi, 1994)

Whitener (1983) concluded that students who were taught through a structure of theory, music reading or similar-type framework, rather than a choir performance class, scored higher in determining intervallic relationships and recognizing major and minor modal keys.

Ear training texts

Ear Training: A Technique for Listening (Benward and Kolosick) is designed to accompany most theory texts. The Instructor's Edition Dictation Manual for Ear Training - A Technique for Listening contains music for dictation gives suggestions and procedures for class presentations. The text includes examples for melodic, harmonic, and rhythmic study. A cassette of musical examples is included with each book and includes excerpts from single line melodies to chromatic compositions in three and four parts. The book is designed "to develop the student's 'seeing ear' an ear that can perceive and identify patterns both large and small in music". (Benward a. k., 1990) Harmonic examples include identification of triad types and factors, harmonic analysis, harmonic progressions, identification of nonharmonic tones, harmonic rhythm, errors in four-part writing, modulation, various chords types, and common progressions in popular song styles.

Understanding the harmonic context is essential when doing harmonic ear training. Auditory images are heard with our mind's ear in a context (Klonoski, 2006), meaning our

mind associates every image with the context in which it was formed. In tonal music, harmony provides the context for the melody. Every pitch is heard either a member of the harmony (chord tone) or a not (nonchord tone) (e.g. passing tone, escape note, suspension appoggiatura, neighbor tone). Klonoski suggests the following activities: use of standardized patterns (such as twelve-bar blues), explore harmonic rhythm in various contexts, introduce all melodic exercises with harmonic accompaniment and sing arpeggiated harmonic progressions.

Tonal music and the common practice period

The term "tonal music" describes a vast range of musical styles from Monteverdi to Coltrane. (Tymoczko,2000).

"Tonal harmony is not limited to the period of 1650-1900. It began evolving long before and is still around today. (Kostka & Payne, 2000) Most of today's music is based on tonal harmony and so are most of the compositions analyzed in this work. Tonal harmony refers to music with a tonal center, based on major and minor scales using [mostly] tertian chords that are related to one another and to the tonal center.(Kostka & Payne, 2000) This feeling of centeredness is aurally perceivable for those who grew up with European music, and its verbal labeling is a basic skill for the musically trained.

We study "common practice period" music because in it we find the principles of tonal harmony most clearly presented thus efficient for pedagogical reasons. (Walton, 2006) The compositions of the common practice period follow typical chord patterns which can be visually presented for instructional use. They are suitable for both beginning and intermediate levels of harmonic ear training and harmony teaching in general. Furthermore the music from this period is still continuing today and is an example for many of contemporary popular music.

In order to be able to identify chord progressions in harmonic dictation we need not only to know what their characteristics are but more importantly we need to understand how they are used, how these chords move and how this is frequently done in music literature. This is especially the case with music from the common practice period.

In tonal music, the I, III and VI chords belong to the tonic family and acquire significance as the home chords, the attractors of tonal gravity. The II and IV chords are members of the subdominant family and the V and VII chords are dominant chords. The alteration between tonic, subdominant and dominant chords creates forward motion and tension in a tonal sense and literally describes the term "progression", which means to move forward.

Chord progressions between chords of the same family create a static feeling, as if you were walking but not moving forward. They are not wrong but are found less often in tonal music. Also, without alternation between tonic, subdominant and dominant, the perception of tonality ceases to exist.

Standard Chord Notation

The root of each chord is identified by a Roman numeral. This indicates a degree in the major scale of the keynote of the piece, *I* being the tonic and *VII* the seventh. The prefixes (flat, sharp) identify the root of the chord in question as being one diatonic semitone above or below the degree in question. For example, *bIII* indicates a chord whose root is the minor third of *I*. All chords are understood to be based on the major chord unless explicit indication is given that they are based on the minor by a small *m* immediately following the Roman numeral, as in *bIII^m*. The suffix 7 means that the minor seventh note, a tone below the tonic, is to be included, as in *III7* and *III^m7*. The suffix (M7), in contrast, indicates the inclusion of the leading note or major seventh, a semitone below the root, as in *IV(M7)*. The suffix #5 or +5 indicates the addition of the note an augmented fifth above the tonic (G) for the chord of C). It often occurs in combination with the dominant seventh, as in *V7+5*. The suffix 6 indicates that the major sixth is added. The suffix m7b5 (Halfdiminished) indicates that the minor third, the diminished fifth (Gb for the chord of Cm7b5), and the dominant seventh are included. The suffix o7 indicates that the minor third, the diminished fifth, and the diminished seventh (Bbb for the chord of Co7) are all included – this is the so-called diminished seventh chord. (Steedman, 2002)

Root motion theories

Because of the complexity of the musical language, a grammar for harmony that is valid for different types of tonal music is obviously not so easy to produce. The question whether there exists a general grammar (syntax) for harmony has troubled many scholars. "Indeed, there is an extensive pedagogical and theoretical tradition which attempts to provide rules and principles for forming 'acceptable' chord-progressions." (Tymoczko, 2004)

The main theoretical methods that have been used to explain tonal harmony during the last centuries are: root motion theories (Rameau, Schoenberg), scale-degree theories, function theories (Riemann) and linear theories (Schenker, 1906).² This thesis focuses on root motion theory.

Root motion theories started in 1722 with the publication of Rameau's 'Traité de l'harmonie' (Treatise on Harmony), one of the first significant publications on music harmony. It was the basis for further research by Schoenberg (1969), Sadai (1980) and Meeus (2000). These educators and theorists analyze the harmonies in a composition through the intervallic distance between successive chord roots.

The best academic definition I found was of Tymoczko. He says that a pure root-motion theory involves two principles. The first might be called *the principle of scale-degree symmetry*. This principle asserts that *all* diatonic harmonies participate equally in the same set of allowable root motions. It is just this principle that distinguishes root-motion

² Tymoczko notes: "Certainly, many theorists have drawn freely on all three traditions. (Rameau in particular is an important progenitor of all of the theories considered in this paper.) "

theories—which focus on the intervallic distance between successive harmonies—from more conventional views, in which individual harmonies are the chief units of analysis. (Tymoczko, *A grammar for elementary tonal harmony*, 2000)

“The second principle is *the principle of root-motion asymmetry*, which asserts that certain types of root motion are preferable to others. For example: in tonal phrases, descending-fifth root motion is common, while ascending-fifth root motion is relatively rare. (The strongest forms of this principle absolutely forbid root motion by certain intervals, as Rameau did with descending seconds). Meeus and other root-motion theorists take these asymmetries to characterize the difference between modal and tonal styles.” (Tymoczko, 2000)

Rameau’s ‘Basse fondamentale’

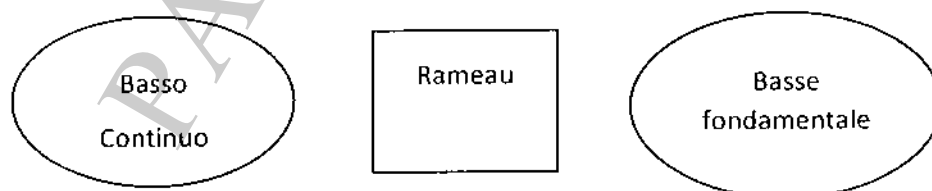
Jean Phillippe Rameau (1683-1764), a foremost French musician of the 18th century, is the godfather of chord progressions. Rameau’s theory ‘The art of the Fundamental Bass’ (Rameau, 1722) is not about chord inversions, as the title implies but about chord progressions. It is a primitive manual of tonal harmony for the student; it is (arguably) the first harmony text in the modern sense of the term.

Rameau’s Theory

Rameau considered the chord the primal element in music rather than the melody or interval as had previously been the case. He believed that the major triad was developed through division of a string into equal parts. Later, the overtone series supported his theory.

He is the first to pin down the terms tonic, subdominant and dominant and stated that a chord kept its identity no matter what note is in the bass. We have to see this in the historical perspective of the 18th century in which music notation used figured bass as a means of outlining the harmonies to be played. In other words he introduced a theory that transformed the ‘basso continuo’ into a system with the root of the chords, what he called ‘basse fondamentale’. This was a revolutionary concept at that time.

Rameau considered the I IV and V chords as the pillars of tonality. But what is more important for me is that he restricted the movements of the ‘basse fondamentale’ (roots) to fifths and thirds, which is the basics for a root motion theory, further developed by Schoenberg.



“Rameau’s claim is that tonality is ruled by the leading of the fundamental bass line. From considerations of what he calls the resonance (the production of harmonic partials), he deduces not only that progressions by a second must be forbidden (except in special cases), but also that progressions down a fifth or a third are better than those up the same intervals.” (Meeus, 2000)

Schoenberg (1969)

Schoenberg further explains vertical harmonic formations as Rameau did but focuses on the relationships between chords and key structures. The main difference with Rameau is that he (Rameau) did not allow or consider a motion up or down by a second, in other words stepwise motion between chords. He (Rameau) considered the IV V motion as an variation of the ii V as does Meeus(2000).

Schoenberg classifies root progressions in three types. In his publication "Structural functions of harmony" Schoenberg writes: "The structural meaning of a harmony depends exclusively upon the degree of the scale. The appearance of the third, fifth or seventh in the bass serves only for greater variety in the "second melody". Structural functions are exerted by root progressions." (Schoenberg, 1954)

The three types of root progressions.

Strong or ascending progressions	A fourth up (fifth down)	A third down ³
Weak or descending progressions ⁴	A fourth down	A third up
Superstrong progressions	A second up	A second down

His view is also different from Rameau's in that he includes all possible root progressions and in that he makes a distinction between a motion down a by 3rd and the relatively rare motion up by a 3rd. Schoenberg does admit that no theory can be 100% perfect.⁵

I believe that a root motion theory should also consider an extra case where a chord progresses to another chord without changing the root. Although the root stays the same a chord can definitely take another form. A common example is the II7 chord changing into IIm7 or the C07 into Cmaj.

Meeus (2000)

³ He does not make a distinction between a minor third down and a major third down. (or a perfect fourth and a augmented fourth) Although these or not uncommon progressions they would involve chromatic harmony and chords borrowed from minor. Harmony is not just major or minor but in most music a combination of both.

⁴ "Sometimes appear as 'mere interchange' or (I - V - I etc.) are better used in combination of three chords resulting in strong progressions" (Schoenberg, 1954)

⁵ "It should not be overlooked that harmonies with multiple meaning (vagrant chords) may occasionally conflict with the theory of root progression. This is one of the shortcomings of every theory-and this theory cannot claim to be an exception; no theory can exclude everything that is wrong, poor or even detestable, or include everything that is right, good, or beautiful." (Schoenberg, 1954)

Meeus approach is the closest to pure root motion theory. Meeus' classification is in essence not different from Schoenberg's. "In most cases, these writers have supplemented their theories with additional considerations foreign to the root-motion perspective. Meeus, however, comes close to articulating the sort of pure root-motion theory." (Tymoczko, 2004)

He states that substitution techniques, for example of I by iii (and vice versa) can simplify Schoenberg's classification. "When Schoenberg includes progressions a fourth up and a third down in one category, a fourth down and a third up in another, it obviously is because the two progressions in each category can be considered substitutions for each other--or, in other words, because the two progressions belonging in the same category differ merely by the substitution of one chord for another. Both V -->> I and V -->> III, for instance, are strong progressions because I and III can be considered substitutes for each other. But the same reasoning could be applied to superstrong progressions as well, a second up or down, which also can be considered substitutions for progressions a fourth up or down. As we saw, IV -> V, a "superstrong" progression, is a substitution for II -->> V, a "strong" progression. The same could be said of V -> VI, a substitution for V -->> I, etc. This allows reducing Schoenberg's and Sadai's categories to two, each of which including one "principal" and two "substitute" progressions. This view actually returns to Rameau's conception of the dominant and subdominant functions, so that the categories may be renamed as "dominant" and "sub (Goldstein, 1993)dominant"" (Meeus, 2000)

"The idea (which is Rameau's idea) is that the succession of harmonies can be represented synthetically by the succession of their roots; this creates an artificial, abstract bass line which Rameau named "basse fondamentale". The representation is synthetic because whatever the particular presentation of the chords, including their possibly being reversed, they will always superpose the same voice movements (the idea of the basse fondamentale is not far from a contrapuntal conception). Consider a perfect cadence, V7-I, in C major. It will certainly involve the following melodic lines: B-C, D-C, F-E and G-C, which you can superpose in any way you like, e.g. with F-E in the bass, possibly G-C in the treble, etc. Whatever the presentation of the chords, the fundamental bass will always be the same. Note also that if you perform Roman numeral analysis (e.g. if you write V-I under cadences), you do number the fundamental bass." (Meeus, 2007 email with the author)

Pure root motion analysis is useful because it claims not to need a key center as a reference point for further analysis and is therefore suitable for compositions that tend to move away from pure tonal works or compositions with an ambiguous key center. "The problem with Roman numeral analysis is that you cannot start without having decided which note is the tonic (which is going to be numbered "I"). The hypothesis of scale-degree symmetry (or better, undifferentiation) allows the study of both pre-tonal and post-tonal music. When I see a root motion down a fifth, I don't have to wonder whether it is V-I, or I-IV or ii-V, etc. I may wonder whether it is from major to major, from minor to major, or from major to minor, and still not draw conclusions about the tonality -- this point is essential for the study of "modal" harmony." (Meeus, 2007, email)

CATEGORY	PROGRESSION	SUBSTITUTES
Dominant	A fifth down	A third down or a second up
Subdominant	A fifth up	A third up or a second down

Meeus (2000) hypothesizes that fully 90% of the progressions in a typical tonal piece (for example Bach's chorale) are of the "dominant" type.⁶

Meeus says that when Schoenberg includes progressions a fourth up and a third down in one category, a fourth down and a third up in another, it obviously is because the two progressions in each category can be considered substitutions for each other--or, in other words, because the two progressions belonging in the same category differ merely by the substitution of one chord for another. Both V -->> I and V -->> III, for instance, are strong progressions because I and III can be considered substitutes for each other. But the same reasoning could be applied to superstrong progressions as well, a second up or down, which also can be considered substitutions for progressions a fourth up or down. As we saw, IV -> V, a "superstrong" progression, is a substitution for II -->> V, a "strong" progression. The same could be said of V -> VI, a substitution for V -->> I, etc. This allows reducing Schoenberg's (and Sadai's categories) to two, each of which including one "principal" and two "substitute" progressions. This view actually returns to Rameau's conception of the dominant and subdominant functions, so that the categories may be renamed as "dominant" and "subdominant".

He uses a graphic device that helps to illustrate this. (Fig. 11) The bass roots are arranged on horizontal lines following the cycle of fifths, and connected either by thick lines (main progressions) or by dotted lines (substituted progressions, with a vertical dotted line linking the implied root to the real one). Dominant progressions appear as lines descending from left to right. The overall Z shape of these figures, which I take to be characteristic of a well formed tonal phrase, differs only in the position of the dotted lines.

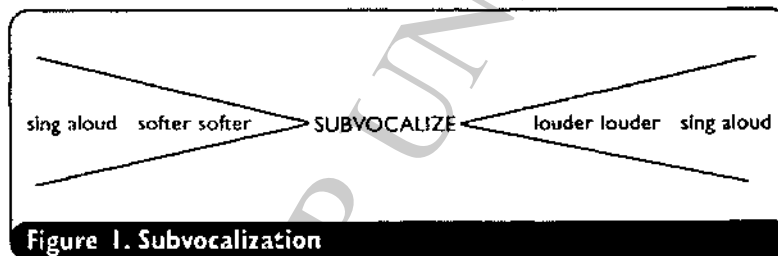
⁶ Example 4(a) of Tymoczko's paper "A grammar for elementary tonal harmony" suggests that the true percentage is closer to 75%.

Subvocalization

Some instructors don't allow students to sing during dictation exercises, so as not to disturb others in the room. However, recent research in auditory imagery reveals that the voice plays a prominent role in listening skills. According to Klonoski (2006) prohibiting students from singing during listening exercises seriously compromises the inner ear's ability to function.

Subvocalization provides a solution. Subvocalizing or silent singing is a way to keep the benefits of singing during listening activities without disturbing your fellow students. (Klonoski, 2006) Silent singing helps the brain to retain the auditory image because it has been internally sung.

He suggests the following steps as a guide for students doing subvocalization: 1. Sing a pitch aloud 2. While fully engaging the vocal mechanism—lips, vocal cords, tongue, breath, and so forth—gradually decrease the volume until no external sound is being produced. You should still be able to mentally "hear" the pitch, even though you aren't producing externally audible sound. 3. Reverse the process: Engage the vocal mechanism and do all that is necessary to sing the pitch, short of making audible sound. You should be able to hear the pitch with your inner ear as though you were singing it aloud. 4. Gradually increase the volume until you're producing audible sound.



Harmony

"Harmony is the sound that results when two or more pitches are performed simultaneously. It is the vertical aspect of music, produced by the combination of the components of the horizontal aspect. (Kostka & Payne, 2000)

Schoenberg gives a more detailed explanation: "the study of simultaneous sounds (chords) and of how they may be joined with respect to their architectonic, melodic, and rhythmic values and their significance, their weight relative to another." (Schoenberg, 1911)

The results of simultaneous sounds are chords, which are the basic elements of harmony. Chord structures in traditional tonal harmony are developed from the major and minor scales. Chords are built by stacking every note in the scale starting on any given degree of that scale. These chords are known as the diatonic chords. Chords can be extended by adding chord extensions (tensions). Several of these extensions can be used together to enrich the basic chord structure. For example, a major seventh chord may have a 9th or a #11 or a 13th or any other permutation of those three notes. (Goldstein, 1993) These extensions are an integral part of jazz harmonies but also of the impressionistic music of Debussy and in the later contemporary music.

Relevant Theory/Harmony Texts

I selected relevant harmony texts that reflect the issues of my research.

Kraft (1976) in his text entitled "Gradus: An Integrated Approach to Harmony, Counterpoint, and Analysis, Book I" encourages the student to look beyond the theoretical aspects of music and investigate "how sounds are organized into a coherent musical whole". The author states that conventional music pedagogy has formulated separate courses of study in which different aspects of music are studied: harmony, counterpoint, analysis. His book presents a unified approach to one goal "total musicianship". Kraft suggests that students need to develop skills in the areas of listening, analysis, writing, performing, and understanding the historical context of a piece in relation to other works and artistic and intellectual currents. Kraft comments on the pedagogical method used in the text. He begins with "a small nucleus of principles and processes" and then expands these gradually increasing in complexity. Each discussion begins with a musical example. An important difference found in this text from others used in the theory classroom is its inclusion of historical material. It is an interesting and detailed approach to harmony with lots of examples.

Harmonic progression (chord progression)

Chord progressions are central to most modern European-influenced music and are the principle study of harmony. "One thing that distinguishes Western art music from many other kinds of music is its emphasis on harmony. In other words just about any piece you play will involve more than one person playing or singing different notes at the same time. Even works for unaccompanied flute or violin and so on, imply a harmonic background." (Kostka & Payne, 2000)

A harmonic progression (also chord progression or chord sequence), as its name implies, is a series of chords played in order. The analysis of tonal harmonic progressions is the main focus of this study.

Generally, successive chords in a chord progression share some notes, which provides harmonic and linear (voice leading) continuity to a passage. In the common practice period, chord progressions are usually associated with a scale and the notes of each chord are usually taken from that scale (or its modally-mixed universe)." (www.wikipedia.com)

For example II-V-I is a very common chord progression used in a wide variety of music genres. It is a succession of chords whose roots descend in fifths from the supertonic to the dominant and finally to the tonic. In a major key, the supertonic (II) triad is minor, while in a minor key, this triad is diminished.

The dominant chord is, in its most basic form, a major triad. With the addition of chord alterations and extensions (most often sevenths), limitless variations exist on this simple formula.

In jazz, they serve two primary functions, which are often intertwined: to temporarily imply passing tonalities, and to lead strongly toward a goal. In the classical tonal tradition, the II-V-I progression is more often reserved for cadences, and is one of many often used cadential progressions. The II, V, and I can all appear in inversion, although usually without significant alteration beyond the addition of sevenths. One very common implementation of II-V-I in a classical piece would be this progression, where the ii chord appears in first inversion: II⁶-V-I

Chord progression tables

Writers like Weber and Piston (1978) have used tables of possible chord progressions. (Fig. 9) but these are only suggestions and much consideration needs to be given to other musical aspects. These basic charts which are helpful in understanding basic harmonic movement but I found them restricting when applied to harmony.

Music educators following the musical tradition of Rameau (1722) and Schoenberg (1969) believe that the study of harmony through root progressions is the right approach to educate students. They had a huge influence on today's music education as most textbooks follow this approach. It provides students with an overall harmonic view that is applicable from the start on, without going into little details. In Chapter II "The method of teaching harmony" (Schoenberg, 1911) Schoenberg writes: "The principle aim of harmony instruction is to connect chords with an ear to their individualities, to arrange them in such progressions

as will produce an effect suitable for the task at hand; and to achieve this aim, not much skill in voice leading is required. The title that is necessary to deal with forbidden parallels and dissonances and the like can be mastered rather easily. ... The realization of thorough bass may have had value formerly, when it was still the keyboard player's task to accompany from figured basses. To teach it today, when no musician needs it anymore, serves no purpose and is a waste of time, hinders more important work and fails above all to make the pupil self-reliant." Harmonic analysis of music is a vital element of music education. Tonal harmony is commonly studied through root-motion theory, functional theory and/or scale-degree theory.

Music education research

This section reviews music education topics published that I found are relevant to the this research.

Eisner (1985) says that "teachers ought to be involved in research processes with their own agenda" Choosing topics close to our own experiences is recommended. He also asks the question "can educational research inform educational practice?" The problem is that much research in music education is not practical.

Roberts (1994) also draws attention to what he sees as a "substantial gap between the results of research in music education and a reasonably expected degree of classroom implementation".

A method of addressing this is for the music teacher to become a reflective practitioner as described by Donald Schön (1994) in his book "The Reflective Practitioner", he believes that through engaging in reflective practice teachers could improve the quality of their practice. The reflective practitioner stance "demands a discovery of self, a recognition of how one interacts with others, and how others read and are read by this interaction".

The teaching of music should become much more than the transmission of knowledge - it should become a journey of discovery. (Roberts, 1994) Music teachers are able to reflect on their work and the work of their students. They are able to ask questions that outside researchers may not ask and they may see patterns emerging that others may not see.

Roberts (1994) believes that with some guidance from experienced researchers, music teachers can offer an agenda for enquiry based on first-hand lived experience in the contextualised situation found in the school classroom. He further reports that qualitative models provide opportunities not only to pursue research in a contextualised format but also to take advantage of the rather extensive lived experience that the teacher-researcher can bring to bear on the analysis of the situation.

Twentieth century research shows us that knowledge is received through the senses of visual, aural, tactile, and kinesthetic. This concept was promoted by Dalcroze (1865-1950). Barbe and Swassing (1979) have also documented their research in this field. According to their studies, the learner processes information through one of three sensory channels,

visual, auditory, or tactile/kinesthetic. They stress the importance of designing educational experiences which address these various learning modalities.

Previous data

Root motion analysis has been performed on compositions ranging from Renaissance music to romantic music. The data I previewed was collected from works of Palestrina, Bach, and Mozart. In "A grammar for elementary tonal harmony" (Tymoczko) includes root motion data collected from Bach chorales and Palestrina. (See Fig. 4, 6 and 7 of appendix) Bach's music was chosen because it is a model for tonal harmony.

The most important conclusion of Tymoczko's paper (Tymoczko, A grammar for elementary tonal harmony, 2000) are:

- Tonal harmonies do have a clear structure and that tonal music tends to involve a small number of recurring harmonic patterns.
- Root motion analysis of selected Bach chorales shows that there are 74% dominant progressions.
- Root motion analysis of selected Palestrina compositions shows that there are 65% dominant progressions.

The example below shows that root-motion asymmetry in general increases as one moves down the cycle of thirds from I to V, meaning in this order I vi IV ii viio V

Root-motion asymmetry

	Dominant Progressions	Subdominant Progressions
V	94%	6%
vii°	91%	9%
ii	81%	19%
iii	68%	32%
IV	66%	34%
vi	58%	42%
I	56%	44%