SYNTACTIC STRUCTURES IN FUNCTIONAL TONALITY

THESIS

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

MASTER OF MUSIC

By

James Phelps, B.S.
Denton, Texas
August, 1985

Phelps, James, Syntactic Structures in Functional Tonality, Master of Music, Music Theory, August, 1985, 97 pages, 43 examples, bibliography, 18 titles.

Chapter I examines linguistic structures fundamental to most tasks of comprehension performed by humans. Chapter II proposes musical elements to be linguistic structures functioning within a musical symbol system (syntax). In this chapter, functional tonality is explored for systemic elements and relationships among these elements that facilitate tonal understanding. It is postulated that the listener's comprehension of these tonal elements is dependent on cognitive tasks performed by virtue of linguistic competence. Chapter III examines human information processing systems that are applicable both generally to human cognition and specifically to tonal comprehension. A pedagogy for listening skills that facilitate tonal comprehension is proposed in the fourth and final chapter and is based on information presented in preceding chapters.

PREFACE

Music theory is a discipline that attempts to explain the aesthetic effectiveness of sound structures in the various styles, forms, and idioms of composition that have existed throughout the history of music. Music theory has always borrowed models and/or procedures from other disciplines. The earliest theorists were philosophers who used mathematics to clarify and to discuss sound relationships. In the twentieth century, mathematical methods are still employed to discuss sound relationships but are no longer confined to the discussions of harmonic arithmetic ratios used in earlier centuries. It is not uncommon to read of sets, linear systems, and manifolds being applied to discussions of sound structures.

Within the last several decades, the terminologies and procedures of disciplines other than mathematics have also been used to assist the theorist. The music journals continue to present articles that use methods from cognitive psychology, linguistics, and analytical philosophy to discuss various aspects of the composition, performance, and hearing of music. The theoretical writings of Heinrich Schenker have inspired musicians to look at music as a language and to view music-making the same way we view speaking, i.e., the creation of meaningful sonic structures that emanate from a competence to create such structures. Of course, musical structures are not "meaningful" for the musician in the same way that sounds in language are for a speaker or listener. Even though music need not have real-world referents unless it is programmatic, it is commonly conceded that music must be musically meaningful. Otherwise the art form would be of no value. Since music obviously is of value, room exists for investigating how sonic structures are organized and how they convey musical meaning.

This thesis uses linguistic entities and terminology to investigate sonic structures in one system of tonality, functional tonality. Scalar and harmonic elements are proposed to be musical syntactic units while their respective tonal functions are viewed as semantic referents. Relationships among these syntactic structures are examined to suggest ways musical comprehension may be enhanced for the listener. A pedagogy based on observations of these syntactic/semantic relationships is presented in the final chapter and is intended to demonstrate how music-syntactic structures may be used to teach listening skills to students of music.

TABLE OF CONTENTS

LIST OF EXAMPLES

Example Page

CHAPTER I

LINGUISTIC STRUCTURE

Introduction

The study of comprehension, termed cognition, is not often included in studies of music. Among the possible reasons for this neglect, and the one viewed by this author as most responsible, is the nature of aesthetic comprehension which, to date, has not been explicated. Unlike most other disciplines, art depends on the comprehension of ideas that are semantically ambiguous or even nebulous. Due to the inexact nature of aesthetic semantics, a work of art may arouse emotions or lead to interpretations of meaning different for each person experiencing the work. Translations of such semantics into less ambiguous modes of conceptualization such as language, however, may compound, if not cause, difficulties in studying cognition of aesthetic meanings. While such translations are necessary for verbal attempts at communicating many artistic ideas, failure to represent artistic semantics as products of art systems rather than of language systems hinders understanding of artistic comprehension. While it is impossible to definitively state how a musical work will be understood by each listener, this paper will explore cognitive processing of systemic structures in music that might significantly enhance understanding of musical paradigms examined in this study.

Art systems, like language systems, utilize symbolization. Comprehension for both art and language is dependent on linguistic processing of symbols that collectively form syntactic structures uniquely manifested by each individual mode of, respectively, artistic and verbal expression. Each of the expressive modes, therefore, must ultimately be examined independently in order to access the semantics innate and unique to that mode.

English is comprehended through the speaker's/hearer's use of English syntactic structure, not through a similar usage of Russian, French, German, or Italian syntax. Likewise, a musician may understand Mozart yet fail to comprehend Rembrandt if specific guidelines of form unique to music are the only syntactic concepts he applies to understanding the products of both these artists. All these modes of expression are similar in their reliance on the processing of artistic syntactic structures despite obvious syntactic dissimilarities requiring discrete interpretation for complete comprehension of the unique semantics respective to each.

Most students of music are exposed to syntactic units of tonal harmony <u>only</u> through Roman numeral analysis. Chord progressions are analyzed according to observations of root-movement while syntactic functions of these harmonies are only implied through recognition of tonal functions: tonic, subdominant, and dominant. Application of Roman numerals without regard for tonal function may not clearly imply the structural importance of the harmonies analyzed. Separate instances of a chord, all corresponding to the same Roman numeral and/or tonal function, do not necessarily exhibit the same syntactic function. Roman numeral analysis including recognition of tonal functions can, however, serve as a point of departure for the student to better comprehend methods of musical analysis.

Commonly confronted in discussions and lessons on music are terms such as "sentence," "phrase," and "cadence," all firmly fixed musical terms yet all owing to language in their etymologies. Other terms that imply language analogy include "paragraph," "chapter," "punctuation," and "articulation" while commas are found in some musical scores absent of text. While "music is a universal language" is a phrase that must be metaphorically interpreted, it could hardly be refuted that the artistic discipline of music involves linguistic concepts, and, one could assume even with no information other than such terminological cross-reference with language, in a significant manner. It should be noted that linguistics and language are not synonymous concepts as the latter is a result of the former, which is applicable to more than just language.

Analysis of the syntactic structures in specific styles of tonal harmony reveals innate systemic relationships through which comprehension is accessible. Such information must be obtained from and interpreted only within the context of systemic structures present in the tonal style chosen for examination. This does not, therefore, presuppose or imply a sharing of conceptual structures other than basic linguistic relationships with another style or mode of expression. It will be shown that this approach surpasses language analogy and Roman numeral identification in exposing structural relationships innate to a specific expressive mode. In this analytic method, the problem of comprehension is addressed specifically in its own context.

While it is the author's opinion that linguistic investigation could prove valid for a number of paradigms of tonal or even "non-tonal" music, this paper will focus on syntactic structure of eighteenth and nineteenth century harmonic practice, the harmonic "system" usually termed "functional tonality." This will allow a more complete investigation within the scope of such a thesis as well as provide an opportunity to broaden the field of resources from which concepts of tonal understanding are postulated and thus presented to students of harmony.

In this paper, an overview of the nature of linguistics as well as linguistic structures will precede a discussion of musical application of such concepts. This overview is obviously not complete. The author's intent is to outline the fundamental concepts and structures applied to the forthcoming study of eighteenth and nineteenth century "functional harmony." Examples from the English language are used because of familiarity, not to imply that structures introduced are limited to spoken languages. Symbol/syntax processing is the most, if not exclusively, used method in understanding meaning, whether or not such meaning is interpersonally communicated.

Before individual linguistic entities are discussed as musical structures, sound, silence, and time in music will be explored for innate systemic foundations. This discussion will be followed by similar yet more specific investigation of tonal harmony. Musical lexemes, morphemes, syntactic structures, meaning (semantics), and linguistic relationships encompassing these elements will be proposed and explored. It will be postulated that the understanding of tonality (tonal structures) involves the listener's processing of music-syntactic information.

The author's intentions for this paper include that the concepts presented be useful for college students after the second year of harmony study, a point in time where implications to a cohesion among cognitive and artistic concerns could prove fruitful.

Sign and Symbol

The nature and structure of linguistics depend on a relationship of symbolization and meaning. Symbolization is reference to "something" by "something else." Within this concept of symbolization I will distinguish "signs" from "symbols." A sign signifies and a symbol symbolizes. Signification and symbolization are distinct in the way they refer. A sign is concomitant to a specific instance of a condition or to a specific presence of an object to which it refers. A symbol refers to a condition or object in a manner not dependent on any concomitance to or *specific* instance of that to which is referred.

A dinner bell ringing at a specific time *signifies* dinner to the initiated listener. If a dinner bell is rung to demonstrate the sound that initiates *any* dinner, that sound *symbolizes* "dinner." This distinction in reference is thought by Langer, and by others mentioned by Langer, to be the foundation for language ability. Langer states, and supports in a manner this author considers sufficient for feasibility, that humans have an innate need to symbolize where animals do not.[1, 2]

Music is a structure of sound, silence, and time. It is important to examine these basic, intrinsic elements of music to determine how each may serve as sign and symbol both outside and within musical structure.

A yell can be a sign of trouble or a symbol for some trouble not related to a specific instance. The latter is evidenced by a yell presented as a direction of what to do in case of trouble. Silence can be a sign of absence of sound or, in the case of a ritual, a symbol for reverence. Time itself is neither sign nor symbol but time partitions can serve as either. A partition of time can serve as a sign of time merely elapsed or a symbol for a coinciding incident.[3]

In music, sound and silence are signs of certain physical and acoustic laws in evidence at a given moment and of a decision made to produce such sound and silence. A rhythmic unit (sound and/or silence)

---

1. Wilson Coker, Music and Meaning (New York: The Free Press; London: Collier-MacMillan Ltd., 1972), 6, 89-90.

2. Suzanne Langer, Philosophy in a New Key (New York: New American Library, Mentor Books, 1948), 20-41.

3. "Six-o-clock" does not literally symbolize "dinner." It symbolizes a time partition that symbolizes dinner. "Six-o-clock" may, however, abstractly as disjoint from its actual referent, symbolize dinner. This example refers, of course, to a hypothetical, yet likely, situation where communication of "six-o-clock" is intended to mean "dinner."

in music is a sign of a partition of time that is a sign of a decision made to present that partition. Therefore sound and silence are signs of time partitions.

Denotation and Exemplification

A bird's whistle can be a sign of a bird's presence, or a recording of that whistle can be a symbol of some bird of that species. In this latter case, the whistle denotes a bird. This bird whistle could also be another kind of symbol, one that exemplifies nature, beauty, simplicity, etc. Denotation and exemplification are two distinctions among symbolization. Denotation is symbolization of a subject and exemplification is symbolization of a predicate (i.e., a description).[4]

Onomatopeic sounds may both denote and exemplify. The referent of the denotation is explicit whereas the referent of the exemplification is ambiguous. When music is considered exclusive of any extra-musical meaning it might convey, it exemplifies but does not denote. Further, if exemplification in absolute music is acceptable, a relationship of symbol and meaning is indicated.

---

4. Nelson Goodman, Languages of Art (Indianapolis and New York: Bobbs-Merrill Co. Inc., 1968), 50-52.

Linguistics and Symbolization

The term linguistics is widely accepted to mean the study of human speech and language. In this paper, linguistic processes and terminology will be applied to music-theoretic analysis. Language results from cognitive processing of symbolized conceptual information. Such cognition, however, does not necessitate language as a result. This cognitive ability is included in linguistic study as is language; however, linguistic process and language are not necessarily concomitant events. Linguistic competence is antecedent to language.

Symbols are used to represent concepts of objects and conditions. The object or condition to which the symbol refers is termed the referent. Such symbolization allows reference to, in absence of, the actual referent. Linguistic processing of these symbols also allows for synthesis of concepts.

A synthetic concept may not even have an actual referent and may challenge our understanding of the world as we know it. For example, "loud silence" could not exist if literal definition of each word is recognized and applied. To an English speaking person, this phrase would either make no sense at all or would make sense only metaphorically. This and similar metaphorical terms may be results of what Silvano Arieti refers to as "cognition without representation." Arieti recognizes specific functions of such cognition, termed amorphous cognition, as endocepts, to be distinguished from concepts, specific functions of cognition with representation.[5] According to Arieti, an endocept "is a primitive organization of past experiences, perception, memory traces, and images of things and movements" and is abstract as meaning it has "not yet found embodiment in any particular object, something whose existence is suspected but not proved, something whose characteristics cannot be clearly described in words."[6] Arieti further states that endocepts cannot be transformed into verbal expression but can be translated, for purposes of communication, into other levels of expression, e.g., words, music, painting, etc. Artistic levels of expression such as music and abstract painting are proposed to be more endoceptual than less abstract forms of expression such as language.

A synthetic concept such as "loud silence" is, therefore, not only an example of formation of a concept with no actual referent that otherwise would not be conceptually accessible, but also a translation of a cognitive manifestation from endoceptual into conceptual levels of expression, both afforded by symbol processing. If art is indeed a more faithful translation of endoceptual cognition than other levels of expression, this condition at least approaches explanation for undefinable, yet seemingly meaningful, relationships in art systems. Furthermore, it supports need and validity for a method of investigating the syntactic structure of specific artistic modes in their own context, without further translation.

---

5. Silvano Arieti, Creativity: The Magic Synthesis (New York: Basic Books, Inc. Pub., 1976), 53-54.

6. Ibid, 54, 56.

Symbol, Syntax, and Semantics

Syntactic structure can be examined as a hierarchy of symbol and meaning.[7] Symbols are assimilated into a system (syntax) structured to facilitate meaning (semantics) through relationships among the referents. The smallest unit of syntax (symbol) that contains the most basic, essential meaning is termed a lexeme, e.g., the word "play." When a lexeme is given inflection, such as would be necessary to show possession or conjugation, the syntactic unit resulting is termed a morpheme, e.g., "play" is a lexeme where "played" is a morpheme. The word-symbol "played" does contain smaller meaningful parts: "play" and the inflection unit "ed."[8] Referential symbols organized in a syntactic system allow for the understanding and communication of semantics.

The degree to which symbol "strings" facilitate meaning depends on properties of the syntactic and semantic systems involved. The importance of these properties is evidenced in language and music as well as other symbol systems. Three primary properties are syntactic differentiation, semantic differentiation, and semantic explicitness.[9]

---

7. Phonology is a structural consideration in aural communication but is not included in this more general discussion.

8. Goodman, op. cit., 130-131. Terms such as mark and character could have been used, though not synonymously with Goodman's usage, in place of lexeme and morpheme in order to afford this discussion a more completely generic quality. However, in anticipation of much clearer identification with the latter terms, at least in this context, these will be used throughout the paper. The term inflection unit is this author's coinage.

9. Ibid, 130-157. These and related properties are intricately examined by Goodman and termed "indifference," "finite differentiation," "unambiguity," and "disjointness." Properties in this paper are more

It is the experience of this author that such concepts are often found simpler in meaning than in explanation. An effort has been made here to simplify explanation as much as feasible and in accordance with the present objectives.

Syntactic and semantic differentiation requires that units of syntax (symbols) and their meanings each be distinct from other symbols and meanings thereby avoiding confusion of identity. Lack of syntactic differentiation can be dramatically demonstrated by trying to refer to one of two people (referents) both having the same name (symbol). Other methods of reference would have to be used to supply the distinction. Humanity, however, is semantically differentiated since no two people are alike.

Semantic explicitness requires that the meanings (referents) not be ambiguous within themselves. The word "slow" on a road sign indicates a referent that is semantically ambiguous due to lack of exactness in speed. However, if "slow" is replaced with "slow to 20 MPH" the referent is then semantically explicit.

Two other properties that can influence facilitation of meaning (in addition to consideration of differentiation and explicitness) are syntactic and semantic density. This means that, at least theoretically, for every two symbols, a third could be interpolated in between (e.g., marks on a ruler). These symbols could refer to referents of the same

---

rudimentarily defined in order to access present objectives as simply as possible. Coincidence with Goodman's terms do not imply exact correlation with his properties. Goodman's intricacies result from examination of "notational systems" and "notational schemes," distinctions that are not the focus of this paper.

condition (distance can theoretically be indefinitely dissected). Such could be indicative of symbol systems with theoretically indefinite numbers of syntactic units and semantic referents.

Primitive, Notional, and Formal Syntax

It has thus far been observed that meaning is decoded from lexical and syntactic information, that is, from the basic concepts of symbols and from relationships among these concepts. Another type of information influences meaning, pragmatic information, or, "how the world is as we know it." The previously used phrase "loud silence" would neither seem literally absurd nor metaphoric if not for pragmatic information that silence is an absence of sound, incompatible with the concept of volume. Physiological experience precludes this condition. Furthermore, pragmatic information assists understanding in lieu of syntactic information.

Two main categories of syntax are notional and formal syntax. A third, primitive syntax occurs when a symbol string is presented in absence of real syntax, the meaning of which is dependent only on lexical and pragmatic information. Meaning for short statements in English complying with such a condition could be derived as in "scratches cat boy." Although lexical and pragmatic information leads to a practical assumption in this case, some uncertainty persists. Due to this absence of actual syntax, primitive syntax is not included as a syntactic category.

Notional categories depend on meaning, not sequence. Syntactic units are categorized according to some semantic function(s) in common. Nouns, verbs, and adjectives are examples of notional syntactic categories in English. Formal categories depend on sequence, not meaning. In this case syntactic units are categorized according to sequence relationships allowed. Syntactic units sharing the same sequence function(s), e.g., first, second, third, etc., form one such category. However, it must be noted that such chronology is not the only provision for formal categories. More local antecedent/consequent relationships are also included.[10]

Autoclitic Frame

Notional and formal categories can collectively provide an autoclitic frame; that is, a certain sequence of notional categories.[11] Such a condition can aid in the understanding of a syntactic string. If precedence is established for a particular autoclitic frame, subsequent strings can be semantically determined accordingly. For an example in English, given the autoclitic frame verb-object-subject, the main idea of the following string can be established: hit bus car. In absence of the autoclitic frame, the meaning is not certain; "bus hit car" or "car hit bus."

---

10. Janice Moulton, George M. Robinson, The Organization of Language (N.Y.: Cambridge Univ. Press, 1981), 16-21.

11. Ibid., 17.

Scope and Dependency

To derive semantic meaning from any syntactic string, one must examine relationships among the units of syntax. It must be decided which syntactic units are grouped (scoped) and which of these units among the group are dependent on another unit for semantic meaning. "Red ball" is an example of two scoped syntactic units with "red" dependent on "ball" for overall meaning.

Example 1, given by Moulton and Robinson, represents a more involved relationship of scope and dependency.[12] The scenario represented is as follows: four children are at play including one girl running fast, one girl running slowly, one fat boy running, and one slender boy running. No names are known. The event witnessed by an observer is the fast girl pushing the fat boy. For precise comprehension of the event, lexemic information shown in (a) is selected from the complete set of lexemes available from the entire scenario. Scope relationships are recognized as in (b) and (c) as well as dependencies, (c). This same conceptual structure would be adopted into a syntax system for purposes of communication. It must be emphasized that the conceptual structure itself, unlike verbal communication of such structure, is non-linear, that is, non-sequenced by left to right or other such directives.

---

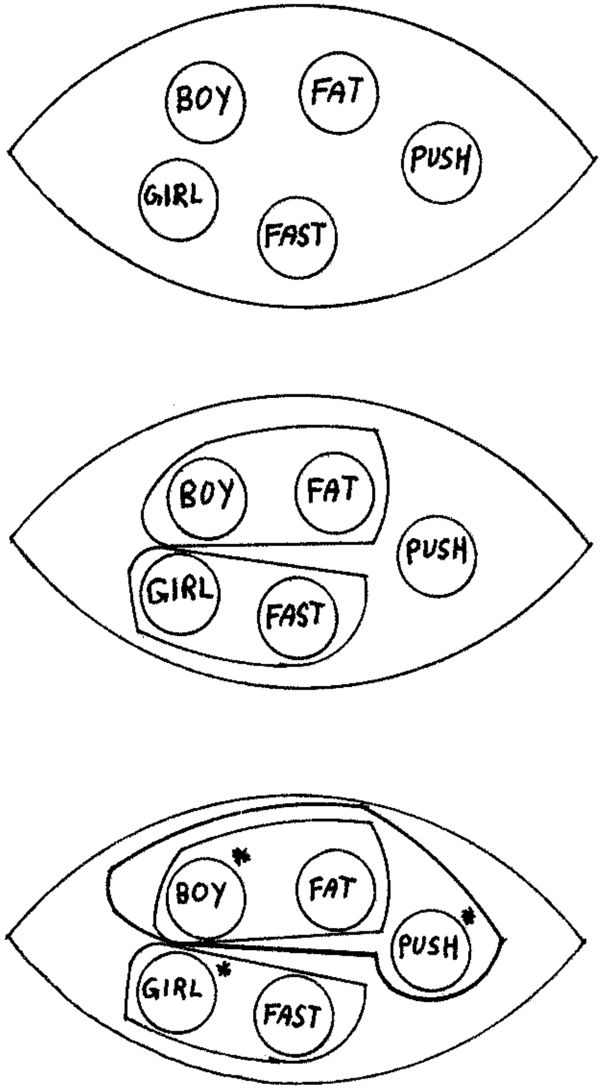
12. Ibid, 42-43. The scenario accompanying Ex. 1 and presented in this paper differs from the one given by Moulton and Robinson. The story presented here represents a simplification in interest of more directly studying conceptual structure.

Example 1. Conceptual structure for the given scenario showing: (a) lexemic conceptual information, (b) one phase of concept scoping, and (c) final conceptual structure showing all scope and dependency. Scoped units are encompassed by circles. Dependency information is shown by asterisks placed next to main component of a scope.

(A)

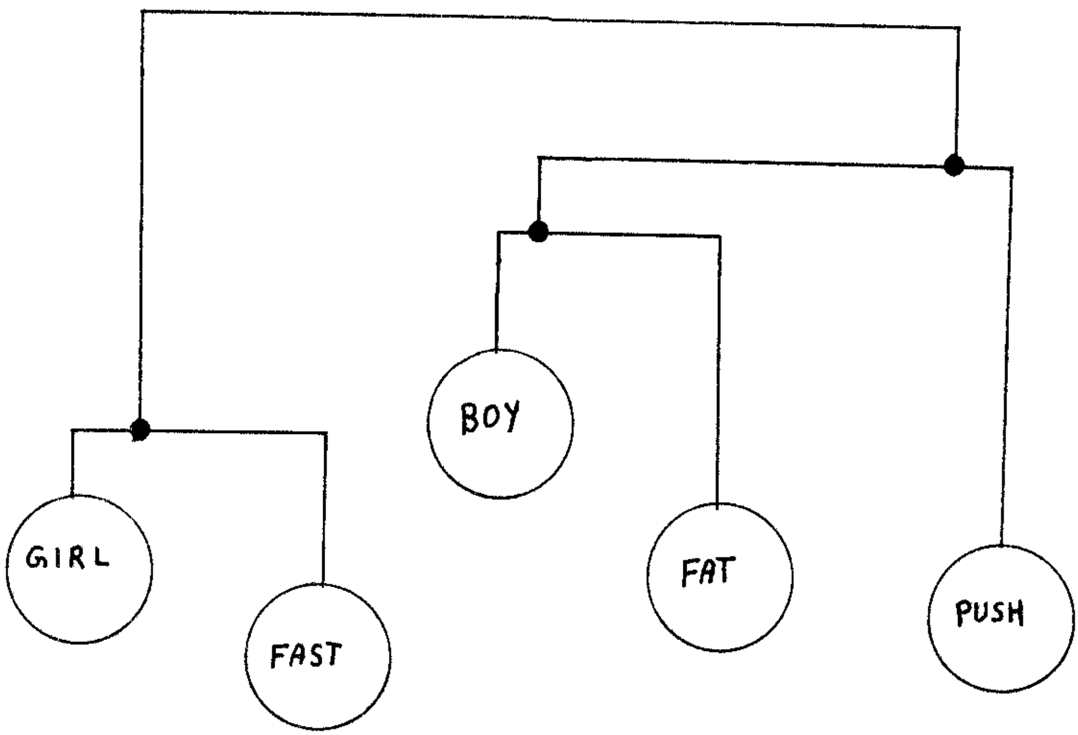
(B)

(C)



This method for demonstrating conceptual structure, while sufficient for simple examples, becomes unwieldy when applied to more complex structures. Even the present example of average complexity provides a more stressful reading than desired. A method exhibiting more clarity by design is available by adaptation of a model used to show planetary systems, the orrery mobile, named after the inventor's sponsor, Charles Boyle, fourth Earl of Orrery (d. 1731).[13] This adaptation, termed orrery model, is shown in Example 2 as applied to the previous hypothetical situation.

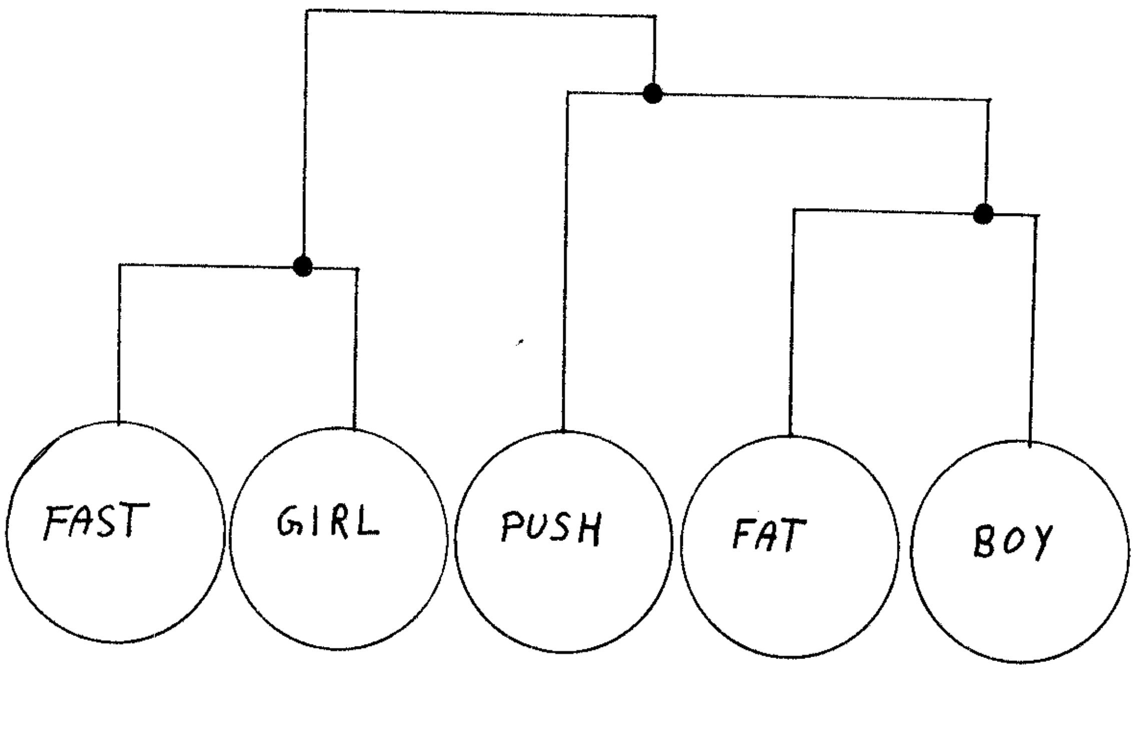
Example 2. Orrery model of the given scenario, information translated from Ex. 1.



13. Ibid., 42-45.

The planetary mobile analogy is visually apparent when imagining this entire structure suspended from above. The scoped units hang together while the points of connection with other scoped units are closer to the main individual units, therefore showing both scope and dependency. This orrery model, like the less clear method of presenting conceptual structure shown in Ex. 1, is not sequenced, but, can be "rotated by syntactic mechanisms to place lexemes in proper sequence," as demonstrated in Example 3.[14]

Example 3. Configuration of orrery model after rotation according to syntactic procedures of the English language.



---

14. Ibid., 45.

Such rotation allows for recognition of the three conditions provided by a syntactic system most useful for deciding scope and dependency: inflection, use of functors, and sequence. Inflection has already been discussed and sequence is obvious. Functors are special syntactic units used to group other syntactic units; examples in English include "to," "of," "with," etc. The extent to which each of these conditions is helpful is dependent on each individual symbol system.

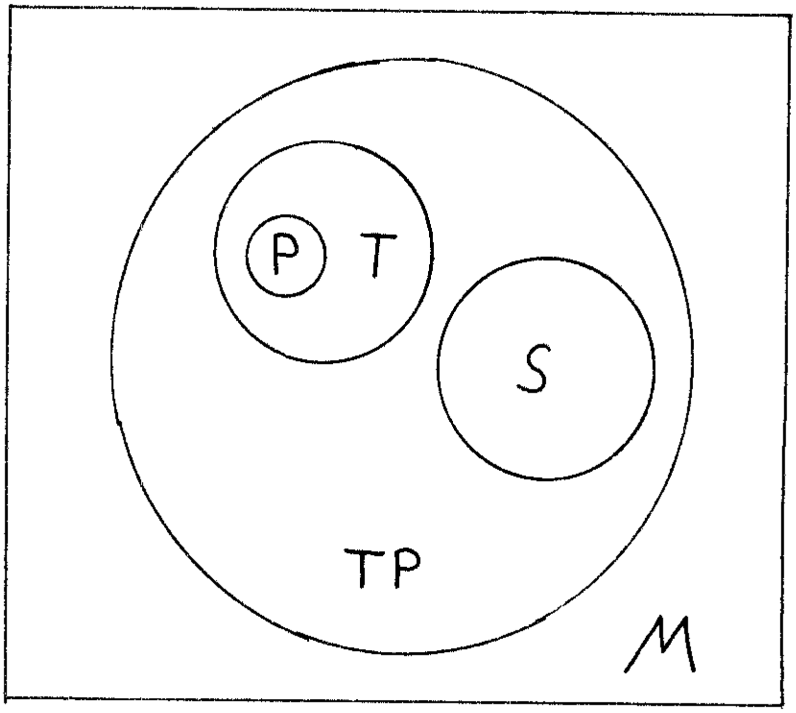
The significance of the orrery model is the ability to show conceptual structure both in lieu of specific syntactic procedures of a linguistic system and, through rotation, in accordance with a system of syntax. This ability is valuable in the examination of conceptual and syntactic structure in functional tonal harmony, as is demonstrated in following chapters of this paper.

Musical Syntax and Semantics

Since music is structure of sound, silence, and time, these elements must be the provisions for symbol and syntax. Four notional categories of syntactic units are proposed: pitch, timbre, silence, and time partitions.

In Example 4, P is pitch, T is timbre, S is silence, TP is time partitioning, and M is the overall musical syntax system. P and T collectively represent sound. The circles represent scope and dependency relations to be discussed shortly. Pitch and timbre may or may not be coincidental depending on whether or not the sound has discernible pitch. Sound will always involve timbre and each unit, pitch, timbre, and silence will always signify time partitions.

Example 4. Scope and dependency among the four notional categories of musical syntax.



P = pitch

T = timbre

S = silence

TP = time partition

M = musical syntax

It can be seen that P/T and S stand in a similar relationship to TP as does TP to M.

Sound, P/T, includes amplitude as a smaller category while pitch and timbre each include smaller categories of their own. Pitch includes sequential (melodic) and simultaneous (harmonic) pitch, and timbre includes as many categories as are feasibly distinguishable. Of course, finer distinctions are possible within pitch and silence, e.g., interval categories and lengths of silence, respectively. Time partitions can be distinguished individually or categorically according to duration and chronology. These and other subdivisions may be necessarily considered for detailed examination of each individual element.

Example 4 represents a simple syntactic statement illustrating scope and dependency among notional categories of the syntax of musical sound. P and T represent, if coincidental, an asymmetric scope $P \rightarrow T$, both collectively as P/T (sound) scoped with S, if both occur in a given musical work, so that $P/T — S$. Each of P/T and S, and collectively as $P/T — S$ depend(s) on TP, shown as $(P/T — S) \rightarrow TP$. This entire unit $(P/T — S) \rightarrow TP$, or similarly (P/T) <u>and</u> $(S) \rightarrow TP$ if P/T and S are not coincidental, is dependent on M, the all inclusive musical syntax: $[(P/T — S) \rightarrow TP] \rightarrow M$.[15]

Dependency information is obtained through implied functors: timbre <u>of</u> sound, pitch <u>of</u> sound, sound units <u>of</u> time partitions, etc.[16] Should finer distinctions be included within P, T, and S the relationships of Ex. 4 would not be altered but constituent elements elaborated.

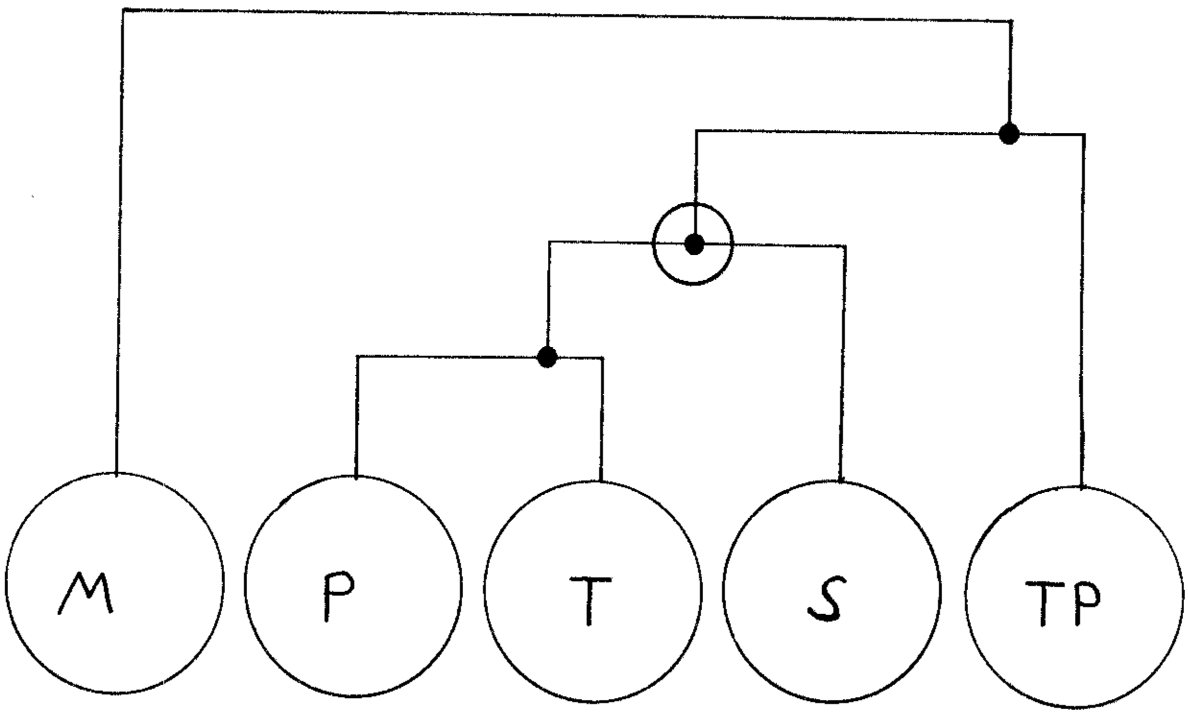
Example 5 shows information in Ex. 4 translated into an orrery model. This model represents musical sound in general but could be modified to demonstrate specific examples without pitch and/or silence. In such cases, P and S would be omitted, all other relationships remaining the same. It should be noted that this conceptual structure is non-sequenced, as is also the case in Ex. 2.

---

15. Straight lines are used to show scope. When dependency is a factor, arrows will indicate the direction of dependency ("$\rightarrow$" = "dependent on existance of") and will indicate either symmetry ($\leftrightarrow$) or asymmetry ($\rightarrow$, or $\leftarrow$).

16. Refer to subtopic <u>Scope and Dependency</u>, 14.

Example 5. Orrery model of notional categories of musical syntax. Centered point of connection between P/T and S, shown as ⊙, indicates no confirmable dependency between these two units.



It can be deduced from previous discussion that these notional syntactic categories and their constituent elements denote nothing. No symbolic reference is made to any subject. Our experience with music, however, may signify presence of meaning. If this is true, this meaning must be by virtue of exemplification of predicates. These predicates are, theoretically at least, undefinable and ambigious. This author proposes that an intermediate ground of referents can be found and examined that in turn functions as symbol for the set of referents just described.

Each notional category can be examined for such intermediate referents. Silence, dependent on time partition, produces referents of sound/time partition organization, that is, length, order (which are both time partition factors) and content of sound/time partitions evidenced by interludes of silence. Time partitions produce referents of musical (sound/silence) time organization, that is, the time-duration/segmentation of sound and silence within the overall time frame of the music. Sound produces referents of tonal/timbral organization within time partitions.

Example 6. Intermediate referents for notional categories of musical syntax.

NOTIONAL CATEGORY	INTERMEDIATE REFERENT
S	sound and time partition
TP	musical (sound/silence) organization
P/T	tonal/timbral organization of time partitions

It is seen in Example 6 that this syntactic/semantic statement follows the syntactic statement of Examples 4 and 5. Each notional category references semantics <u>through</u> any category on which it is dependent, where such a category exists. Sound and silence do not partition time but rather are dependent on and signify time partitions. Therefore any study of the understanding of sound or silence involves time partition whether or not expressed. Time and time partitions exist exclusively of signification thereof.[17] Likewise, any study of pitch would necessarily involve timbre whether or not expressed. A study of timbre, however, would not necessarily involve pitch.[18]

Further chapters will focus on one such notional category, sound, and one type of sound organization, tonal organization. One system of tonal organization will be examined: functional harmony of the eighteenth and nineteenth centuries. It is necessary to precede syntactic analysis of such a tonal system with discussion of tonal concepts in general and as they are manifested in functional harmony. It is the experience of this author that much misrepresentation in tonal analysis, especially harmonic analysis, is due to confusion and misunderstanding of tonal concepts. This is at least partly due to misunderstanding of inherent musical syntactic relationships (Examples 4 and 5) previously presented.

---

17. As time progresses it theoretically can be partitioned at infinitely measureable intervals. Sound and silence do not produce these partitions but signify them.

18. In the case of a pitched timbre, harmonic overtones are of course involved. However, timbre is a resonance property resulting in accentuation and suppression of frequencies. In speech analysis, the linear prediction algorithm enables a computer to represent the timbral or resonance characteristics of a spoken word or syllable without consideration of its pitch.

CHAPTER II

LINGUISTIC STRUCTURE IN FUNCTIONAL TONALITY

Tonal Concept

The term "tonality" describes a systemic manifestation of some styles of music that allows one pitch to serve as focus, usually in a context of many different pitches. This term applies to most art music composed from 1600 to 1900 and to virtually all popular music after 1900. "Tonality" has been generally accepted to apply specifically to the major-minor system of music that followed the use of modes in the sixteenth century.

After the extended chromaticism of the late nineteenth century, some composers in the twentieth century avoided tonal focus manifested in the earlier musical system by disallowing functional relationships used in the previous tonal system. Arnold Schoenberg is attributed with invention of "atonality," i.e., absence of tonal focus; yet, Schoenberg terms this style of composition "pantonality," i.e., inclusion of all tonalities. The difference in concept between the two terms is important because it raises the question of whether or not literal "atonality" can exist. Though functional relationships of the eighteenth and nineteenth century styles are avoided in this latter style, it could be argued that other organizational factors, e.g., registration, timbre, points of repose, etc., still allow tonal focus on a single pitch or several pitches, the tonal scope of which might, however, be local rather than global.

This paper will examine one system of tonal music--functional tonality. More specifically, it proposes to examine systemic elements that contribute to an understanding of tonality. Within this system, the term "tonality" is often used in reference to a pitch, a scale or mode, a major or minor chord, or a key. Actually, tonality involves all these entities and more. It has already been shown in Chapter I that pitch in music involves time partition.

F. J. Fetís understood tonality to be a multifaceted system. Combined in Fetís' understanding of tonality are melody, harmony, and rhythm. Nichols identifies the following as four components of Fetís' "tonalité":

A. aesthetic principle that music as an art derives from basic material selected metaphysically--contains the laws of its development and of the aesthetic judgment of its products (founding aesthetic principle of all music).

B. scale

C. relation among individual intervals of scale--their progressive tendencies--resolve and repose.

D. a single pitch-key.[1]

Fetis understood these components, along with rhythm, to be concomitant factors of tonality. While individual components were at times discussed,

---

1. Robert Shelton Nichols, F. J. Fetís and the Theory of Tonalité, Ph.D. dissertation, University of Michigan, 93. "Tonality" rather than Fetís' "tonalité" will be used in this paper. Though rhythm is not explicitly represented in Nichols' list, it is implied. Fetís discusses rhythm as a tonal factor within these four groups.

all were understood as essential and inseparable elements of tonality. Notice that in Ex. 4 and the discussion that followed, finer distinctions within notational categories that could be included in the syntactic statement presented in that example parallel Fétis' components B, C, and D. Also significant is Fétis' agreement that rhythm (time partition in Ex. 4) is a necessary constituent of pitch organization. It is important to note that Fétis' understanding of tonality could also apply to tonal styles other than the "functional tonality" in the music of his time.

A change from C major to c minor, for example, is inadequately represented by the sole description "change of key," but is more precisely described as a change in "scale" (component B) while "pitch-key" (component D) remains the same. A change from C major to d minor represents a change of scale (B) and pitch-key (D). Key signature as the sole criterion for key relatedness allows for consideration of scale (component B) but not pitch-key (component D). Such a method for discerning relatedness emphasizes scale more than pitch-key. It is this author's opinion that Fetis' concept of tonality does not propose systemically innate dominance of singular components B, C, or D. Any analytic system describing tonality, therefore, should not, itself, presuppose dominance of a singular component by emphasizing that component.

From Ex. 4 and the discussion that followed we postulated that a structural hierarchy exists within the syntax of musical sound. An explication of the possible relationships among such events suggested that this hierarchy permits understanding of tonal structures. It logically follows, then, that understanding of tonality relies on recognition of hierarchy of structural significance among musical elements within notional categories; e.g., melodic pitches, harmonic intervals, and rhythmic and metric units. Chord-by-chord Roman-numeral analysis by itself, often the final step in classroom analytical studies, implies equivalence of structural significance among the harmonies. Such misconception through exclusively linear analytic application of harmonic understanding is often evidenced through students' attempting to listen to music the same way they analyze, left-to-right. A student's comprehension of a tonal work would better be facilitated by his understanding of its syntactic structure. A student may begin to apply this understanding when an analogy is made to similar concepts in English. For example, it is difficult, if not impossible, to completely interpret the meaning of the word "red," as it appears in "red ball," before recognizing that the following word, "ball," "goes with" (is scoped with) "red" to provide one meaning, "red ball."

From Ex. 4 it can be deduced that any study of tonality will necessarily involve pitch, timbre, and time partitions while functional tonality can be identified and studied by examining the organization of pitch, timbre, and time partition as consistently evidenced by music of that system. This is tantamount to saying a tonal system can be studied by examining syntactic units and syntactic relationships among units in that system.

Functional tonality as a hierarchical, multifaceted system involving components A, B, C, and D incorporating rhythm (time partition), will serve as the intermediate semantic referent through which syntax will be examined. By recognizing these components as syntactic units incorporated in syntactic relationships functioning within a musical syntactic structure, confusion of tonal pitch, scale, mode, chord, and key will be resolved. Nondiscrete structural indicators such as Roman numerals with their usual application will be organized and implemented to provide more meaningful structural information.

Statements of Functional Tonality

A tonality is defined, or described, by all the musical elements and the organization of such elements that comprise the tonality. For example, a passage in C major is defined by scale degrees as used in the harmony and melody and by time factors present, i.e., rhythm and meter. Other factors participating in the organization of these musical elements such as phrasing, dynamics, periods of silence, and timbres, also help define the tonality of such a passage. All these "parts" of the whole are inseparable constituents of this C major passage, a condition indicated by the syntactic statement of notional categories given in Ex. 4. If these "parts" are altered, the result is a different passage. Therefore, in this paper, such singular presentations are recognized and are termed "statements of tonality," and, stated for this present example, "statement of C major."

A passage that follows a statement and is identical to that statement is not merely a repetition (connotative of "the same thing again") but rather is a "restatement." The two passages, statement and restatement, cannot serve the same hierarchical function within the tonal framework because they are presented as two different time partitions. The restatement "comments" on or adds to the meaning of the statement just as a repeated phrase or sentence in English may supplement meaning by implying greater importance of the content of the original phrase, e.g., "Stop the car. Stop the car." In this example, meaning of the first sentence would likely be supplemented by further implications of urgency supplied through the second sentence. Regardless of the exact nature of the supplemental meaning, the two phrases are not the same. Both occur at different times under different conditions; one in which the listener is previously uninformed and the other in which the listener is already informed.

In summary, such a precise, individually discriminating view of tonality does not negate the importance of more general observations of a tonal system. As previously mentioned, a tonality is generally defined by all the constituent elements provided by a particular tonal system, whereas a "statement of tonality" is specifically defined by the elemental content of that statement. C major is generally defined by the diatonic scale degrees, the diatonic chords, and the temporal structures consistently evidenced in music of this system. Therefore, harmonically, C major is collectively defined by the quality of chords, the relationships among them, and idioms for their use. As a result, procedures of interval ordering (scale structure), chord structure and chord progression, and time-partition structure are included in the defining elements for C major. All of these elements collectively define C major, not just one or a few. These elements can be said to form the syntactic structure both generally, within the functional tonal system as a whole, and--along with locally precise elements such as timbre and dynamics--specifically within "statements of tonality."

Tonal (Autoclitic) Frame

The underlying systemic relationships fundamental to tonal understanding are represented by a sequence of notional categories: tonic → subdominant (dominant preparation) → dominant → tonic functions. Human ability to expect and evaluate future events through experience is not a recent concept but was postulated as early as 1781, before Skinner's "autoclitic frame."[2] Immanuel Kant (1781) introduced the term schema as a rule for organizing perception into a unitary whole. For example, from Kant, ". . . concept of dog means a rule according to which my imagination can always draw a general outline . . . of a dog."[3] In 1913, Otto Selz wrote of schematic anticipation as a network of concepts and relations that guides the thinking process.[4] Bartlett (1932) gave this operational definition of schema: ". . . an active organization of past reactions, or of past experiences, which must always be supposed to be operating in any well-adapted organic response. . . ."[5] Sowa added

---

2. Moulton and Robinson, op. cit., 17.

3. Immanuel Kant, Critique of Pure Reason, ed. by F. Max Muller (Garden City, NY: Anchor Books, 1966), 123.

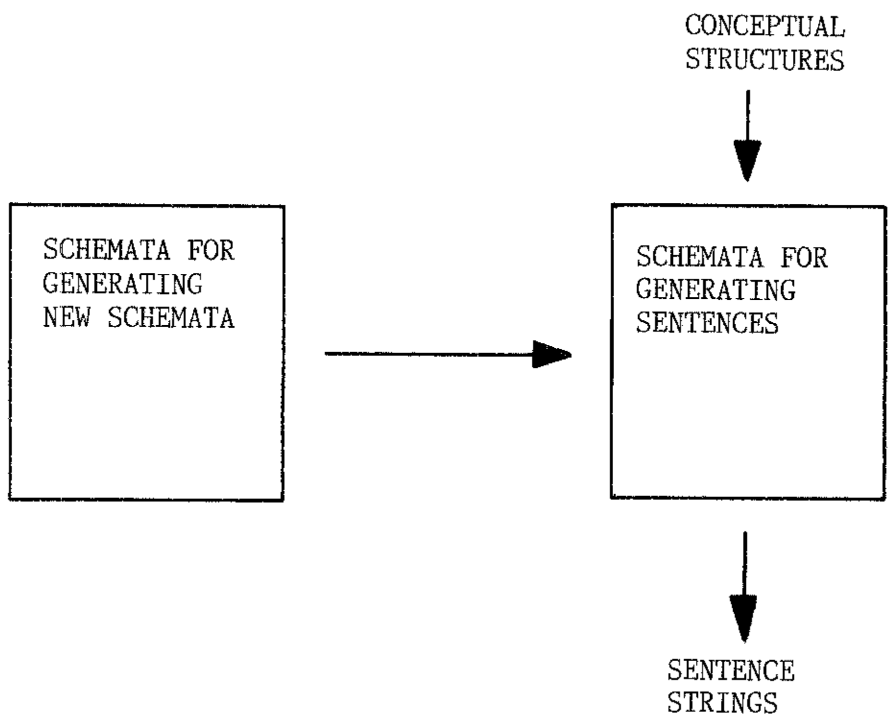
4. J. F. Sowa, Conceptual Structures, IBM Systems Research Institute (Reading, Mass.: Addison-Wesley Pub. Co., 1984), 43.

5. Loc. cit.

that ". . . Bartlett showed that the patterns stored in the brain impose as organization on the material that is recalled."[6]

After Skinner, Minsky (1975) discussed frames as prefabricated models that we retrieve when necessary to construct concepts for understanding new information.[7] Example 7 illustrates Chomsky's ideas for generating patterns through "production rules."[8]

Example 7. Chomsky's "production rules."



6. *Loc. cit.*

7. *Ibid.*, 44.

8. *Ibid.*, 49.

The block to the left represents schemata (production rules) that are used for making other schemata that in turn are used for making sentence strings by processing conceptual structures. It is certainly feasible to derive from the statements cited here that frames, or schemata, are important to cognition in general and it will be proposed in Chapter III, after detailed examination of musical linguistic structures involved in frames, that they are also fundamental to tonal understanding.

Through experience, listeners of functional tonal styles of music are likely to come to the listening experience with frames of tonal relationships, termed here and throughout the remainder of this paper, "tonal frames." This is accomplished by recognizing formal categories of musical syntax, i.e., which syntactic units precede or follow which other syntactic units. It is discovered that these formal categories often correspond to notional categories of musical function, e.g., tonic, subdominant, and dominant, and that the sequence of notional categories, T → S → D → T, permeates this style of music.

The three primary functions, tonic, subdominant, and dominant proposed by Riemann are the functions (notional categories) included in the tonal frame, a fundamental structure examined in this paper. Theories of tonal functions that do not include subdominant (e.g., Catel), are not subscribed to by this author. While the author recognizes that some local excerpts may exhibit only tonic and dominant chords, <u>three</u> functions will be acknowledged as essential, systemic tonal structures, whether or not all three occur together in <u>every</u> example.

Although tonal frames will be examined in detail in Chapter III, it should now be emphasized that neither chromatic progressions nor progressions involving modal mixture elicit a change in the initial, fundamental tonal schemata, T → S → D → T, whether such schemata is from a minor or major key. It will be proposed how such chromaticism may, however, influence tonal interpretation of subsequent "statements of tonality."

Tonal schemata must be recognized by the listener, either intuitively or through the learning of certain listening skills, before thorough tonal understanding is achieved. Until such frames have been assimilated by the listener, he cannot understand the tonal structure of a passage of music in this style.

Lexemes, Morphemes, and Inflection Units

Each diatonic scale degree is a musical lexeme with its own scalar function. (A lexeme is a syntactic unit that cannot be divided into smaller parts.) A diatonic triad can be comprised of one lexeme and two inflection units, or, can be comprised of only scalar lexemes (examples will follow).

Lexemes carry the most basic, essential information contained in a syntactic unit. This information, in tonal harmony, is notional and formal category information, i.e., the notional and formal categories to which the entire syntactic unit belongs. Inflection units of tonal harmony are syntactic units that do not represent the most basic (lexemic) information (function) of the larger unit to which they belong but, rather, present this lexemic function in a different form (e.g., harmonic rather than melodic) and, consequently, supplement the lexemic function.

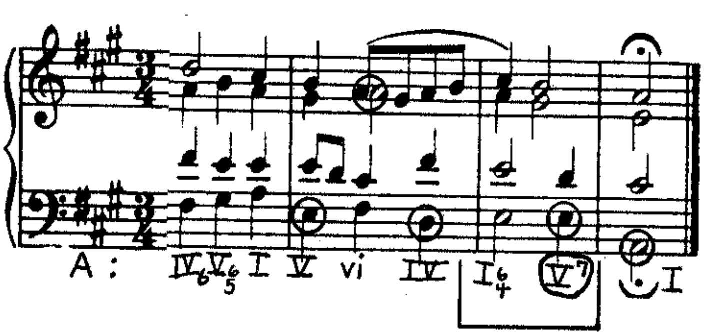
The lexeme and inflection units together form a morpheme carrying, obviously, both lexemic and inflective information. The two inflection units of a triad, though corresponding to scalar lexemes, do not function as morphemic lexemes but are subordinate to and dependent on the morpheme's lexeme for function. Scale degrees, therefore, have lexemic function as scalar units and both lexemic and inflective function as members of triads. For example, the submediant and tonic scale degrees in a IV triad are not lexemes in this morpheme but, rather, inflection units because they do not represent basic tonal functions of their own. That is, these two scale degrees, submediant and tonic, do not represent harmonic function but, combined with the subdominant scale degree, they represent a harmonic form of subdominant function for which the fourth scale degree in this triad serves as lexeme. These inflection units supplement the lexemic function of the fourth scale degree by becoming subdominant elements which, together with the fourth scale degree, either conform to or deviate from subdominant progression mandated by the style.

Sometimes, verticalities that appear to be triads are merely groups of notes that function contrapuntally as passing tones, neighbor tones, etc. Such verticalities do not have a true harmonic function. In such cases, the triad is non-morphemic and is comprised of only scalar lexemes, i.e., linear-functioning pitches.

Since lexemes carry the most basic, functional (notional and formal category) information in a morpheme, the lexeme of a particular triad may be different for various contexts in which the same triad appears. For example, a vi triad can serve as subdominant function in one context (Example 8), and tonic function in another context (Example 9). In these and following examples, lexemes are circled.

Example 8. Bach chorale Als der gütige Gott, mm. 1-2. The vi triad as subdominant function.

Example 9. Bach chorale Nun lob' mein Seel' den Herren, mm. 34-37. The vi triad as tonic function.

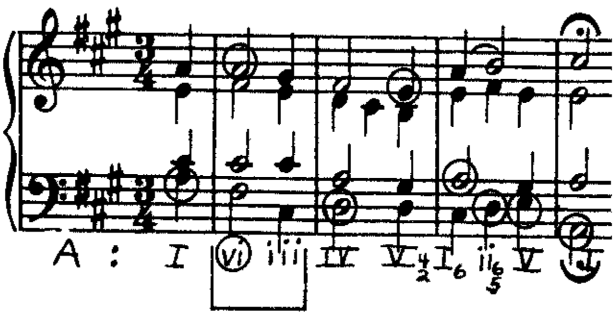


Tonal understanding of these triads differs in these two contexts because of application of a tonal frame. A vi triad can function as either tonic or subdominant, depending on context. In Example 8, a vi triad occurs between tonic and dominant functions, therefore allowing interpretation as subdominant function. This interpretation conforms to the tonal frame T → S → D → T. In Example 9, the same triad occurs as consequent to a T → S → D progression and suggests interpretation as tonic function according to the same frame. Consequently, lexemic function for the subdominant vi triad is represented in scale degree 6, a subdominant (pre-dominant) functioning scale degree; whereas lexemic function for the tonic vi triad is represented in scale degree 1, the tonic scale degree. Therefore, scale degrees 6 and 1, in their respective triads, simultaneously exhibit scalar and harmonic lexemic function while the remaining scale degrees exhibit only scalar function as inflection units within a harmonic morpheme.

Some triads do not function as independent morphemes while others do not function as morphemes at all. Ex. 10 illustrates the former condition. In this case, the vi triad is interpreted as tonic function because of both its placement in the progression (between I and IV rather than between I and V, the latter strongly suggesting subdominant) and its closer proximity to I, provided by intervention of the iii triad between vi and IV.

The iii triad serves as extension of the morphemic vi triad for which scale degree 1 is lexeme. Scale degrees 5 and 7 contained in the iii triad function as scalar lexemes, i.e., melodic (contrapuntal) function. This iii triad is not an independent morpheme but, rather, only a "part" of the preceding morpheme.

Example 10. Bach chorale Nun lob', mein Seel', den Herren, mm. 1-4.
Diatonic iii as extension or vi with scalar lexemes 5 and 7.



The I_4^6 of Ex. 9 is another example of a triad without independent morphemic function. In this case, however, the morpheme (V) follows rather than precedes (as in Ex. 10) the dependent triad. The I_4^6, therefore, anticipates the morpheme and contains the morpheme's lexeme. Anticipation is, in this usage, just another type of extension. Both extensions are derived from the morpheme that either precedes the extension (Ex. 10) or follows the extension (Ex. 9). (Brackets will be used to show both types of extension. The circled Roman numeral will identify the independent morpheme.)

Example 11 illustrates a progression in which a triad corresponds to the spelling of the subdominant IV but does not function harmonically but, rather, melodically. This triad is not a harmonic morpheme and does not contain a harmonic lexeme but, rather, exhibits pitches of only scalar lexemic function. When a listener compares this progression to the tonal frame, an incongruity is noticed. The frame does not contain a V → IV progression and, instead, suggests that this (IV_6) triad is representative of non-harmonic function (i.e., non-essential harmony).

Example 11. Bach chorale Eins ist not! ach Herr, dies Eine. Non-morphemic g-b-d triad.

Roman numeral analysis applied irrespective of such melodic (scalar lexemic) function misrepresents the tonal function of this sonority. Parentheses have been used in examples in this paper to show vertical sonorities which are of melodic rather than harmonic function.[9]

From triads and progressions cited thus far, the following summary is suggested:

1. Triads are either harmonic or melodic function and are either (a) or (b):

   a. Harmonic function--lexeme with inflection units; Ex. 11, I, V, and V_6.

   b. Melodic function--only scalar lexemes; Ex. 11, IV_6.

2. Sonorities identifiable as triads may serve as extensions of preceding triads (Ex. 10, iii), or anticipations of subsequent triads (Ex. 9, I^6_4) and consist of both (a) and (b), below:

---

9. The author recognizes that a different, viable harmonic interpretation of Ex. 11 can be postulated. The V in the first measure could be interpreted as the non-morphemic triad rather than the immediately following IV_6. In this interpretation the IV and IV_6 would be considered morphemes. Both interpretations, however, recognize one progression that does not conform to the tonal frame, V-IV_6, of which either V or IV_6 serves as a non-morphemic triad.

a. No morphemic lexeme of its own but rather the lexeme of the preceding or following triad.

b. Scalar lexeme(s) with melodic (contrapuntal) function.

3. Roots of morphemic triads can serve as lexemes (e.g., Ex. 11, I, V, and V_6), or thirds can be lexemes as in Ex. 10, vi.

As suggested by Ex. 10(vi), roots of diatonic, morphemic triads may not always be the lexemes. A chromatic example is the deceptive progression V--bVI in a major key (Ex. 12). The lexeme is the third of the bVI triad, or, the first scale degree.

Example 12. Bach chorale Vater unser in Himmelreich, mm. 9-10. bVI as tonic function.

F: V/V V_6 I vi V bVI

Scale degrees b3 or b6 cannot serve as lexemes in this major key context because they do not represent the essential tonal function of the entire morpheme. The expectation of tonic following dominant function, as provided by the tonal frame, is partially realized by the presence of the tonic pitch, third of the bVI triad. The tonic scale degree supplies the morpheme with its basic diatonic function, tonic, and, therefore, is the lexeme of the entire unit.

The bVI triad has been given as one example of a "borrowed chord." Also included among this classification of chromatic triads are iv, ii°, bIII, and i. All these chromatic triads are "borrowed" from parallel minor. Examples 13 and 14 illustrate common usages of these borrowed triads. In the case of a lexeme that is doubled in the texture, only one has been circled but both sonorities may serve as lexeme. The doubled lexeme that is introduced and resolved contrapuntally may be thought to be subordinate in lexemic function to the one introduced by root motion.

Example 13. Brahms <u>Rhapsodie #2</u>, op. 79, mm. 57-61. Borrowed i_6, bVI, and $ii^{\circ 6}_{5}$

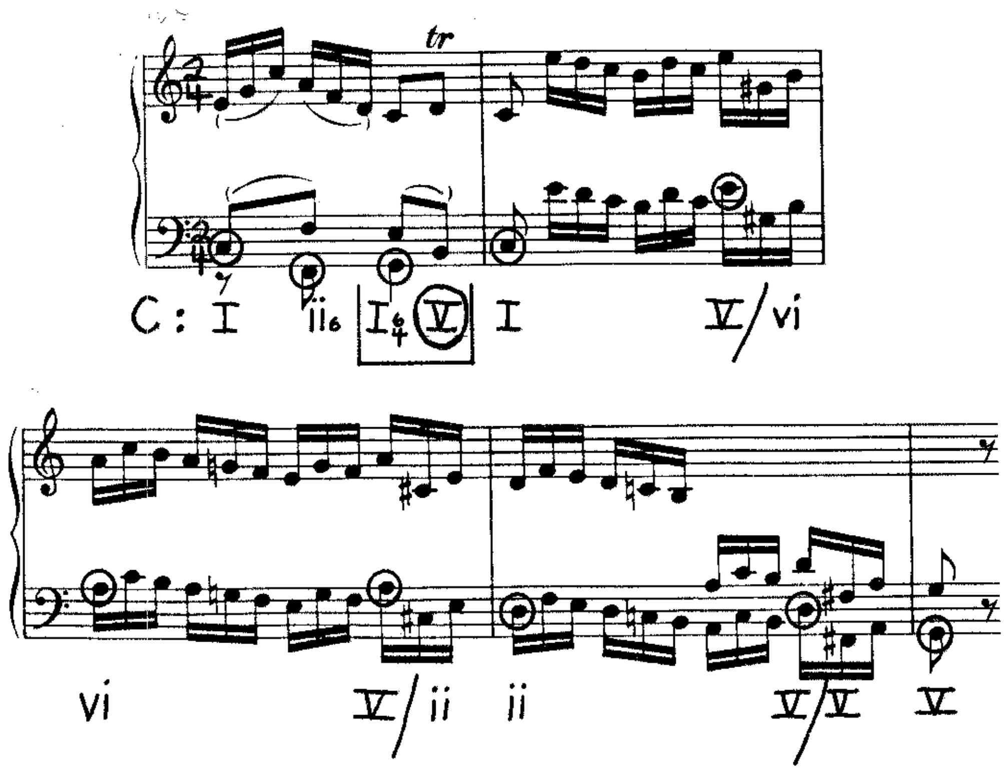
Example 14. Schubert, Jagers Liebeslied, Op. 96, No. 2, mm. 1-6. Borrowed bVI, bIII, iv, and i.

Scale degree 4 is considered lexeme for the ii°$_6$ and ii$_6$ triads. Diminished ii° and minor ii are often found in first inversion and the bass may be considered their functional roots due to harmonic similarity with, respectively, iv and IV. The root of both iv and IV, scale degree 4, is the lexeme for these triads when they appear as harmonic morphemes. Where minor ii appears in root position, the bass usually serves as lexeme unless the third is doubled.

In Ex. 14, the bIII, although a borrowed chord, serves as dominant to bVI and is therefore not tonic function but secondary dominant function, to be discussed in a subsequent section of this chapter. Ex. 13 presents a context in which it is difficult to discern an unambiguous function for the bVI triad. It does not follow nor immediately precede a V chord, but, rather, intervenes in a i-ii°$^6_5$ progression. The phrase immediately following that of Ex. 13 is melodically and harmonically parallel to that phrase. However, the bVI of this consequent phrase contains an additional doubling. Scale degree b3 is doubled along with b6. This author proposes that this doubling of b3, an inflection unit in the preceding i chord, supports analysis of this bVI triad as tonic function. It is likely that tonal understanding of this triad would influence understanding of the same triad occurring in the preceding phrase. It has already been suggested in Chapter I that comprehension does not necessarily depend on the chronology in which concepts are presented as stimuli.

Example 15 illustrates another classification of chromatic triads, secondary dominants.

Example 15. Mozart, Piano Sonata K.309, Rondeau, mm. 206-210. Common secondary dominants.



In all these secondary dominant triads, the lexemes are roots and the functions are dominant, though relating to a temporary tonic rather than to the original tonic encompassing the entire phrase.

Secondary dominant-tonic relationships may be expanded to include chromatic triads "borrowed" from modes parallel to the new temporary key. The condition illustrated in Example 11, melodic functioning triads, may also be included within the key of the temporary tonic. Both these types of triads, borrowed and melodic, functioning in a new temporary key, are chromatic in relation to the original key, yet diatonic in the new key and should be understood as simultaneously functioning as both, chromatic and diatonic.

The listener's ability to understand these chromatic chords as diatonic but in a different key is facilitated by the application of the same type tonal frame that is applied to the original key area. Due to the importance of both the tonal frame and the listener's ability to produce new frames from one set of production rules, schemata will be examined separately in Chapter III.

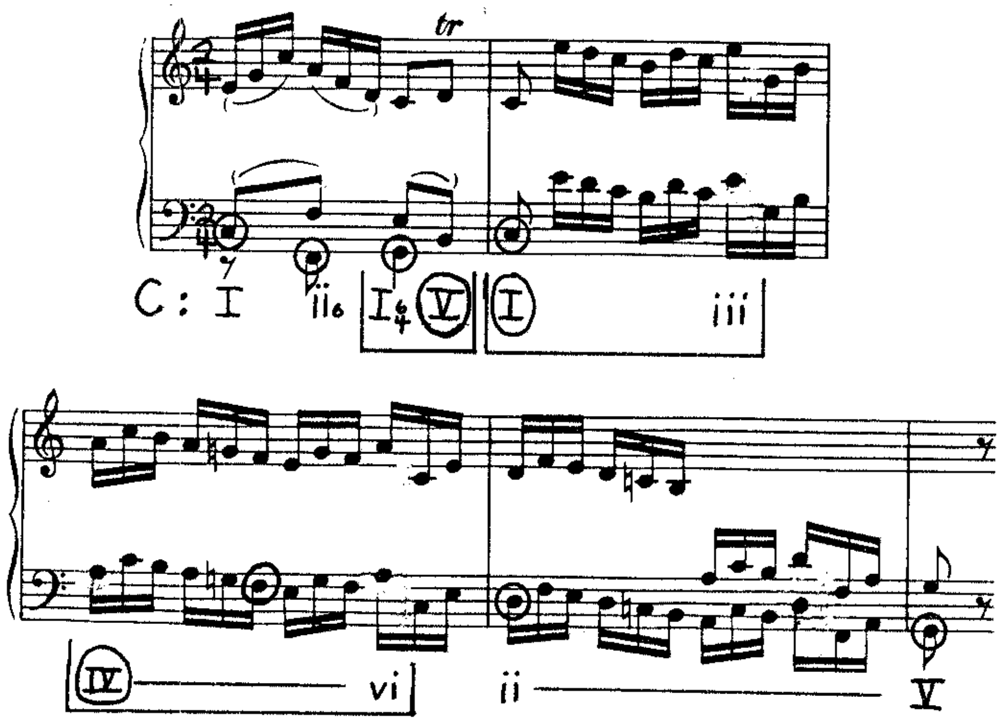
Comparison of Diatonic to Chromatic Lexemic Information

In the following examples, Ex. 16 is diatonic counterpart of Ex. 15, and Ex. 17 is diatonic counterpart of Ex. 14.[10]

---

10. Diatonic versions of chromatic examples were composed by this author.

Example 16. Diatonic version of Ex. 15.



Example 17. Diatonic version of 14.

Comparison of chromatic passages to corresponding diatonic versions suggests the following conclusions:

1a. Secondary-dominant type chromaticism alters notional categories of diatonic triads, i.e., it produces new temporary dominants and tonics that would otherwise, in unaltered, diatonic form, have different functions relative to the original tonic.

1b. Due to alteration of notional categories, most lexemes are changed. Ex. 16 shows diatonic arpeggiations of preceding morphemes that in Ex. 15 have become chromatic morphemes with their own identity and their own lexemes. It should be noted that in absence of the V/vi harmony appearing in Ex. 15 the first triad of measure 3 in Ex. 16 could reasonably be understood as IV rather than vi, thus representing another notional change.

2. Chromatic triads of the borrowed type do not necessarily change notional categories and, therefore, lexemes often remain the same for both chromatic and diatonic versions of triads.

3. Formal categories involved in both secondary dominant and borrowed chord progressions are not substantially altered but are more specifically defined by virtue of the listener's anticipation of resolution of chromatic elements.

In summary, for both borrowed triads and secondary dominant triads, chromatic inflection units (along with diatonic inflection units in some cases) supplement original, unaltered lexemic function and, in the latter triad, usually change lexeme identity. Chromatic inflection units in borrowed triads, while not significantly altering lexemic function (notional or formal categories) supplement this function by (as evidenced in music of this style) increasing emphasis on the formal category to which the morpheme belongs. The progression of its chromatic (as compared to diatonic) inflective constituents is more specifically anticipated in conformity to half-step tonal progression. Since the chromatic unit(s) conform diatonically with a new tonic and not with the contents of the original tonal frame, they are recognized as non-diatonic. They have no independent function, but rather are related to one of the frame functions.

Chromatic inflection units in secondary dominant triads do alter lexemic function. While the formal categories, i.e., sequential relationships among triads, are only further specified (e.g., V/ii → ii being favored rather than VI → IV, a progression that, in diatonic form, iv→IV, would be a possible expectancy), the notional categories, i.e., function categories, are expanded to present a different function from the one diatonically presented. In some instances, the lexeme itself is changed from that of the original, unaltered morpheme. For an example of notional expansion, a V/V triad maintains its subdominant (predominant) notional category in the original key, but also functions as dominant to V, the temporary tonic. The lexeme, scale degree 2, is the same for both original and new tonic relationships. This V/V triad is, therefore, a member of the predominant notional category in the original tonal frame as well as a member of the dominant notional category in a frame for which V is tonic. Should the dominant key become established (new tonal frame supported), the V/V triad would become simply a V chord in the new key, belonging to only one notional category, dominant.

Chromatic inflection units, therefore, emphasize or further specify formal category function in both borrowed and secondary dominant triads without significantly altering this function. Notional categories of borrowed triads are unaltered from their diatonic counterparts while secondary dominant triads expand notional category membership from that of the diatonic form and, in some cases, change lexemes.

This discussion has presented tonal lexemes, morphemes, and inflection units as simply and directly as possible. It should be emphasized that lexeme and notional category selection for triads is dependent on context as well as pitch content. Conclusions drawn from comparison of chromatic lexemic information to that of diatonic versions serve to propose basic syntactic differences between diatonic and chromatic contexts, not to imply that diatonic versions presented are necessarily and specifically the only context from which the chromatic versions derive.

Tonal analysis in this chapter is derived from linguistic principles postulated by the authors that are referenced in the text. Many functional relationships proposed in the analyses (e.g., relationships among non-morphemic and morphemic triads) parallel similar relationships in Schenkerian analysis. Schenker's proposals and those of the linguists, though similar in objective, were independently postulated by their respective authors. This author's conformity to linguistic techniques of analysis does not imply conformity to Schenker's techniques; neither does it imply that Schenkerian analysis is inferior to linguistic analysis. The two techniques represent different approaches to solving problems of function, with, perhaps, some different conclusions being drawn.

Functors

There are many musical features that delimit groups of musical syntactic units. Among these are changes in melodic shape, changes in rhythmic value, pitches occurring within the same time partition, etc. Some results of such delimiting features are: harmony (chords, intervals), melodic units, rhythmic units, phrasing, and voicing. Any such musical manifestation that groups syntactic units is a functor. Summarizing this function may perhaps be more easily accomplished by borrowing one of Allen Forte's types of "segmentation," a "primary segment." Forte offers the following explanation:

> "By segmentation is meant the procedure of determining which musical units of a composition are to be regarded as analytical objects . . ."
>
> ". . . the term primary segment will be used to designate a configuration that is isolated as a unit by conventional means, such as a rhythmically distinct melodic figure. For the most part such segments are indicated by some notational feature, for example, by a rest or beamed group, and offer no novel problem. Similarly, chords, in the sense of verticle groupings, and ostinato patterns are not difficult to identify as primary segments."[11]

Forte's application of this concept of segmentation within atonal, rather than tonal, contexts is not incongruous with the tonal application in this paper. Most, if not all, music will contain primary segments of some type regardless of tonal vocabulary.

Jackendoff and Lerdahl provide a detailed, rule-laden process for determining "grouping structure" in music. "Grouping Well-Formedness Rules (GWFR's)" and "Grouping Performance Rules (GPR's)" are proposed

---

11. Allen Forte, The Structure of Atonal Music (New Haven and London: Yale University Press, 1973), 83.

to facilitate selection of certain syntactic groups for analytic consideration and to disregard others.[12] While validity of these rules cannot be summarily refuted, as some or all would apply to various selected excerpts, it is the philosophic intent of this paper to avoid presupposition of anything other than fundamental linguistic structures in the music. The only presupposition of this paper is that music can be linguistically examined only to propose methods by which listeners may accomplish tonal understanding, rather than to stipulate what they must hear.

Syntactic Rules

The most obvious syntactic rule of the functional tonal system has been expressed in the tonal frame, i.e., the fundamental progression of tonic → subdominant → dominant → tonic functions through which a pitch, scale, and chord (though not necessarily all three concurrently) is tonicized.[13] This tonicization is accomplished through adherence to syntactic rules of chord progression (including temporal organization thereof) and voicing, e.g., root movement by fifth, third, and second with preferences for doubling and melodic progression evidenced in the texture. Many harmony textbooks used in college programs function as

---

12. Ray Jackendoff, Fred Lerdahl, "Generative Music Theory and It's Relation to Psychology," JMT, Vol. XXV/1 (Spring, 1981), 45-90.

13. The term "procedures" rather than "rules" would, perhaps, be less connotative of strict laws; however, the term "rules" is commonly found in linguistic studies and is employed in this paper.

guides to musical "grammar" (syntax). One textbook (in two volumes) perhaps most illustrative of this comparison is Robert Ottman's Elementary Harmony and Advanced Harmony.[14] Like some guides to English grammar, e.g., the Harbrace College Handbook, syntactic rules are referenced by numbers followed (where applicable) by letters, thereby grouping rules into categories.[15] These rules provide essential information about syntactic vocabulary and rules of syntax.

The tonal frame, representing the most fundamental production rules, should include more than just the most basic information: $T \rightarrow S \rightarrow D \rightarrow T$. It should also include specific syntactic rules as constituent elements of the frame. The production rules for a tonal frame have provided an analytic reduction, $T \rightarrow S \rightarrow D \rightarrow T$, of all the tonal components heard by the listener. Assuming the listener experiences music more complex than just containing exclusively the I-IV-V-I progression, less essential tonal material, such as the IV_6 of Ex. 11, has been filtered, leaving the $T \rightarrow S \rightarrow D \rightarrow T$ progression as underlying structure. However, this filtered material should not be omitted altogether from the frame but should be included as subordinate structure. The ability to include more specific information in the tonal frame enables the listener to understand a particular musical work better as well as to more discretely examine individual styles of tonal music.

---

14. Robert Ottman, Elementary Harmony and Advanced Harmony (Englewood Cliffs, NJ: Prentice-Hall, Inc.), 1970, 1972, respectively.

15. John Hodges, Mary E. Whitten, Harbrace College Handbook (New York, et. al.: Harcourt, Brace, Jovanovich, Inc.), 1972.

The tonal frame is fundamental to tonal understanding. The inclusion of various types of specific syntactic information within this frame, along with the T → S → D → T progression, enhances tonal understanding. For additional and/or new information to be included in the tonal frame, there must be procedures through which this is accomplished; procedures not unlike those that enable the listener to form the fundamental T → S → D → T progression of the frame. This fundamental tonal frame progression is not arbitrarily manifested and neither are other constituents. It is apparent that the concept of frames, or schema, and production rules for such entities involves processes eluded to but not yet elaborated in this paper. Frames and corresponding production rules (incorporating syntactic structures proposed in this chapter) as they apply specifically to the facilitation of tonal understanding will be examined in the next chapter.

CHAPTER III

TONAL SCHEMATA

Processes for Comprehension

Example 18 shows Noam Chomsky's model for perception.[1] The unit of perception, the percept, is an interpretation of a stimulus. The term "other factors" represents any of a number of possible variables that explain differences in the ways that individuals react to stimuli. These include general cognitive ability, extent of hearing ability, and other such personal data.

Example 18. Chomsky's model for perception.

• system of beliefs
stimulus → • perceptual strategies → percept
• other factors

Chomsky further explicates this process by including a model for "system of beliefs." This extended model is shown in Ex. 19.[2]

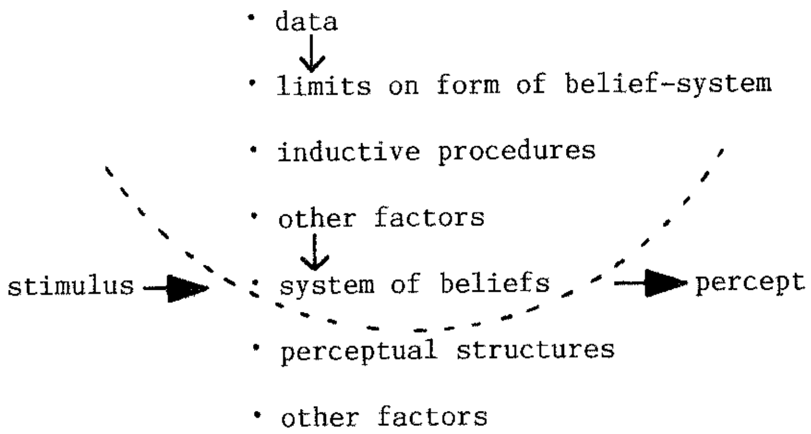
Chomsky states that this model can be used to describe linguistic process by replacing "system of beliefs" with "generative grammar," and,

---

1. Joseph A. DeVito, Language: Concepts and Processes (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1973), 97.

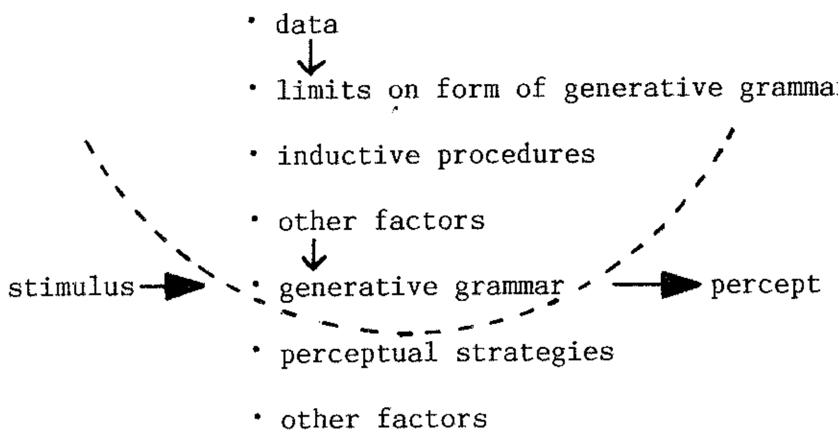
2. Ibid., 99.

Example 19. Chomsky's model for perception including model for "system of beliefs."



consequently, making necessary changes in the model for "system of beliefs," as shown in Ex. 20. Chomsky describes "generative grammar" as the "speaker's/hearer's knowledge of his language."[3]

Example 20. Chomsky's model for linguistic process.



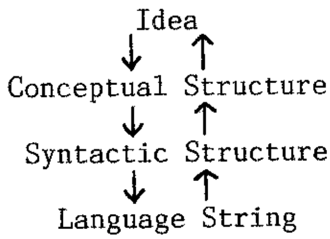
By incorporating a model given by Moulton for generating and understanding language (Ex. 21) into Chomsky's model, a more general model

---

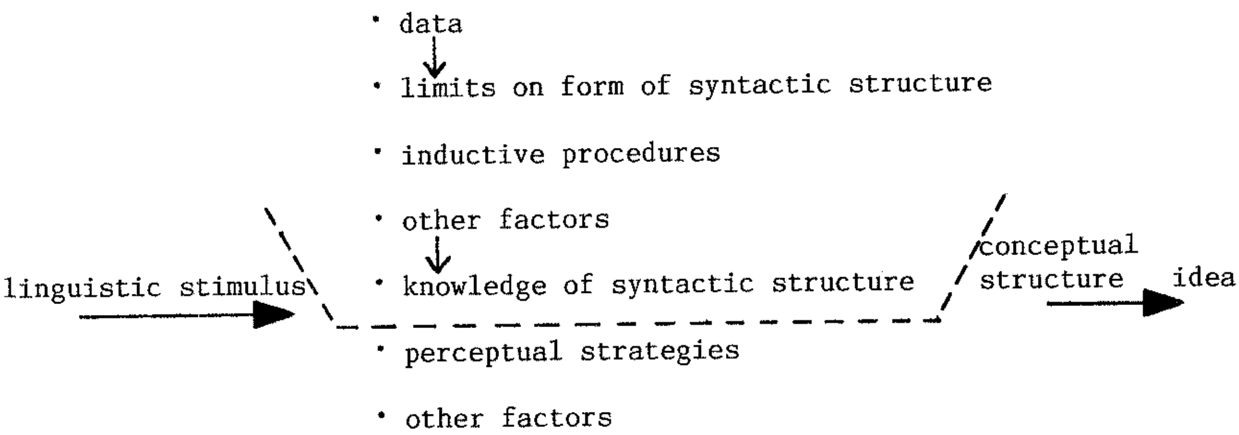
3. Ibid.

for comprehension through linguistic process is obtained, (Ex. 22).[4]

Example 21. Moulton's overview of language generating and understanding.



Example 22. Generic model for comprehension through linguistic process.



"System of beliefs," "knowledge of generative grammar," and "knowledge of syntactic structure" are all representations of schemata, i.e., previously processed, schematized stimuli. We are reminded that, as cited in Chapter II, new stimuli are evaluated according to schemata already formed.

The schematizing process is not explicitly understood to date, but appears to be an innate human ability. Kant proposes that schema are automatically used to describe objects; i.e., objects are

---

4. Moulton, op. cit., 34.

representations of schematic information, or, objects represent classes of schemata. Experience provides schemata that are formed through synthetical and analytical judgments of predicates of objects (stimuli). Stimuli are predicated (features are recognized) and then synthetically united to produce another form containing predicates of both individual stimuli.[5] For example, predicates, or features, of two squares can be combined in a particular manner to produce a rectangle. These predicates forming the rectangle produce new predicates represented by the new form (the rectangle). Analytical judgments in comparing the rectangle to either square allow differences and similarities to be detected. Certain predicates of the rectangle contradict certain predicates of either square while other predicates are not contradictory. For example, shape and circumference predicates contradict while the number of planes comprising boundary do not. Such synthetical and analytical judgments allow understanding of <u>complete</u> conditions, events, or objects rather than only isolated, singular stimuli. This understanding is provided by processing of schematic information (schemata) resulting from the predicating (schematizing) of objects or conditions rather than being provided by the objects or conditions themselves as "whole" units of form.

Example 23 illustrates the model for schemata as extracted from the model in Ex. 22. The operational element of the model, "inductive procedures," represents production rules that will be investigated for

---

5. Kant, <u>op. cit</u>., 128-132.

Example 23. Model for schemata.

- data
  ↓
- limitation on form of syntactic structure
- inductive procedures
- other factors
  ↓
- knowledge of syntactic structure
  (schemata for syntax)

their functions in the understanding of tonal music. The entire model for linguistic comprehension, Ex. 22, can be re-labeled to become a model for tonal comprehension, Ex. 24.

Example 24. Model for tonal comprehension.

- data from previous tonal experience(s)
  ↓
- limitation on form of tonal music
- interpretive listening procedures
- other factors (e.g., ability, hearing, musical competence
  ↓
- tonal schemata (frame(s))

tonal music → [interpretive listening procedures; other factors; tonal schemata (frame(s))] → tonal comprehension

- discriminative listening procedures
- other factors (local conditions)

It should be noted that "tonal comprehension" replaces "conceptual structure," not "idea." "Idea" is interpreted by this author to represent a more explicit semantic than is possible within aesthetic expression. "Tonal comprehension" as "conceptual structure" is, therefore, the necessary objective of this process.

The element "interpretive listening procedures," previously called "inductive procedures," is comprised of synthetical and analytical judgments as previously described. Without synthetical judgment three pitches forming a verticality would not be interpreted as one sonorous unit, and, without analytical judgment, the verticality as one sonorous unit would not be understood as being comprised of three individual pitches. The listener's understanding of individual syntactic units (e.g., pitches) collectively forming harmonic morphemes (chords) and subsequent interpretation of these syntactic units as either harmonic lexemes, inflection units, or scalar lexemes facilitates tonal understanding and depends on systematic interpretive listening procedures within the schemata-forming process. Before production rules as they are used in understanding tonal music are further explicated, a detailed examination of the cognitive systems required to produce such production rules is necessary.

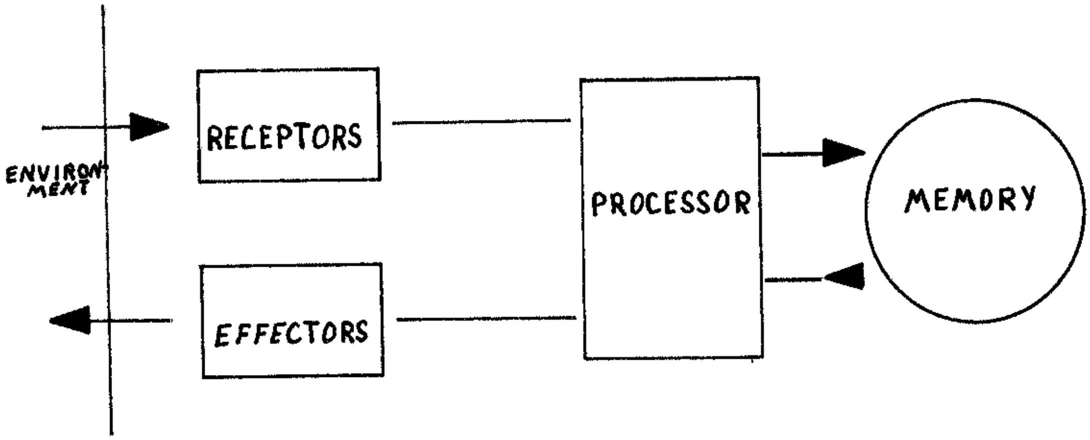
Information Processing Systems

Example 25 shows Newell and Simon's model of an information processing system (IPS).[6] The arrows leading from "memory" to "processor" and then to "effectors" represent transformation of an idea into communicative output. This same transformation process is illustrated by Moulton's model (Ex. 21) by the arrows proceeding down from "idea."

---

6. Allen Newell, Herbert A. Simon, Human Problem Solving (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972), 20.

Example 25. Simon's general model for an information processing system (IPS).



The arrows in Ex. 25 proceeding in the opposite direction (from "receptors" to "processor" to "memory") illustrate the same comprehension process represented in Moulton's model (Ex. 21) by ascending arrows and represented by Chomsky's model (Ex. 19), the latter of which presents only one direction of arrows, communicative output not being explicated.

According to Newell and Simon, "a memory is a component of an IPS capable of storing and retaining symbol structures." They describe "processor" as a "component of an IPS consisting of: a (fixed) set of elementary information processes (EIP's); a short-term memory (STM) that holds the input and output symbol structure of the EIP's; an "interpreter" that determines the sequence of EIP's to be executed by the IPS as function of the symbol structures in STM."[7]

The "processor" and "memory" modules in Newell and Simon's model (Ex. 25) collectively represent the same process illustrated in Ex. 23.

---

7. Ibid.

More specifically, Newell and Simon's "processor," with its three operational elements (EIP's, STM, and interpreter) corresponds to "inductive procedures" in Ex. 23. "Inductive procedures" is the model element relabeled "interpretive listening procedures" (Ex. 24) that contains production rules for tonal schemata. These production rules correspond to Newell and Simon's EIP's and the sequencing of these production rules are represented by their "interpreter." Therefore, an explication of both EIP's and "interpreter" is necessary.

Different functions among the EIP's can be represented by different types of EIP's, given by Newell and Simon as the following:

1. Discrimination. It must be possible for the system to behave in alternative ways depending on what symbol structures are in its STM. Furthermore, the behavior needs to be arbitrarily alterable; i.e., transfer of control to an independent program must be possible.

2. Tests and comparisons. It must be possible to determine that two symbol tokens [individual symbols] do or do not belong to the same symbol type [class of symbols determined by characteristics of members that are identical to each other]. Often comparisons are directly coupled with conditional behavior, but they may equally well lead to the production of a conventional symbol (e.g., true or false) that can later be discriminated.

3. Symbol creation. It must be possible to create new symbols and set them to designate specified symbol structures. Again, this process must be performable arbitrarily; i.e., whenever a new symbol is desired it can be created, and it carries no meaning other than that it designates the desired symbol structure. Whether the system must also be able to destroy symbols depends primarily on whether memory capacity is limited.

4. Writing symbol structures. It must be possible to create a new symbol structure, copy an existing symbol structure, and modify an existing symbol structure, either by changing or deleting symbol tokens belonging to the structure or by appending new tokens with specified relations to the structure. Many variations are possible, as long as they permit building up arbitrary structures.

5. Reading and writing externally. It must be possible to designate stimuli received from the external environment by means of internal symbols or symbol structures, and to produce external responses as a function of internal symbol structures that designate these responses.

6. Designating symbol structures. It must be possible to designate various parts of any given symbol structure, and to obtain designations of other parts, as a function of given parts and relations. Again, this can be achieved in many ways but it must be always possible; i.e., there must not be any parts of symbol structures that are in principle inaccessible.

7. Storing symbol structures. It must be possible to remember a symbol structure for later use, by storing it in the memory and retrieving it at any arbitrary time via a symbol structure that designates it. How much memory is available, of course, conditions strongly how complex the totality of stored structures may be. The memory must be highly reliable over time.[8]

The particular sequence of EIP types to be implemented is chosen by the "interpreter" mode and depends on the immediate objective (goal) at a specific time during the overall comprehension process. A sequence of goals, therefore, along with each goal's own EIP sequence, may be prerequisite to acquisition of some other goal; i.e., one goal may require previous acquisition of other goals. For example, comprehension of the word "dog" (representing one goal) depends on comprehension of its individual symbolic units (letters). Since "dog" contains three letters, acquisition of three goals of comprehension must precede the final goal (comprehension of "dog"). Each letter is attended first by EIP type 5 (Reading and writing externally) then by EIP type 7 (Storing symbol structure). After the first letter is processed, resulting in retrieval of that letter from the symbol-storing mechanism in EIP 7,

---

8. Ibid., 29-30.

the second letter, and so on, is similarly processed. This "comprehension-of-letters" goal terminates with comprehension of the letter "g." All these letters, collectively as one syntactic unit ("dog"), are then attended by EIP 2. When "dog" is found in the symbol storing mechanism, the goal is obtained and the process is terminated. This process is illustrated in Ex. 26. "W" represents the stimulus (a word) that has not yet been processed (identified).

Example 26. EIP sequence for comprehension of word "dog." Chronology is accessed by reading left-to-right first, then down, and continuing in this manner.

$$EIP5 \rightarrow \langle W \rangle \rightarrow EIP7 \rightarrow$$

$$EIP6 \rightarrow \langle W \rangle \rightarrow \langle d, o, g \rangle \rightarrow EIP7 \rightarrow$$

$$EIP5 \rightarrow \langle d \rangle \rightarrow EIP7 \rightarrow EIP5 \rightarrow \langle o \rangle \rightarrow EIP7 \rightarrow EIP5 \rightarrow \langle g \rangle \rightarrow EIP7 \rightarrow$$

$$EIP2 \rightarrow \langle d, o, g \rangle \rightarrow EIP7 \rightarrow \langle dog \rangle \rightarrow EIP7$$

Assumed, of course, is that all these symbols, separately and collectively (as "dog"), are found in the memory (EIP 7), and that semantic referents for each syntactic unit have been found (due to previous processing).

Should any symbol (letter or word in this case) not be found in memory, semantic understanding would be unlikely at this point in the process, and additional EIP's would need to be implemented. For example, if, after processing the individual syntactic units, "dog" is not found, EIP 4 (Writing symbol structures) would be added as demonstrated in Ex. 27. "$\langle\ \rangle$" represents a null finding.

Example 27. EIP sequence for attempting comprehension of "dog" when "dog" is not initially found in memory.

$$EIP5 \rightarrow \langle W \rangle \rightarrow EIP7 \rightarrow$$
$$EIP6 \rightarrow \langle W \rangle \rightarrow \langle d,o,g \rangle \rightarrow EIP7 \rightarrow$$
$$EIP5 \rightarrow \langle d \rangle \rightarrow EIP7 \rightarrow EIP5 \rightarrow \langle o \rangle \rightarrow EIP7 \rightarrow EIP5 \rightarrow \langle g \rangle \rightarrow EIP7 \rightarrow$$
$$EIP2 \rightarrow \langle d,o,g \rangle \rightarrow EIP7 \rightarrow \langle\ \rangle \rightarrow$$
$$EIP4 \rightarrow \langle dog \rangle_{Sm} \rightarrow EIP7$$

It should be noted that EIP 7 represents both storing and retrieval. If retrieval is impossible, EIP 3 and/or EIP 4, depending on specific circumstances, must intervene. The process would then procede to EIP 7 to store, rather than to retrieve, information. Since "dog" had not been previously stored, or at least not retained if ever stored, termination of the process at this point would likely render "dog" as a non-referential syntactic unit; i.e., "dog" would likely have no semantic meaning in this new memory. In such a case, "dog," as acquired by the final EIP 7, may represent a memory unit syntactically replete but semantically void (illustrated by the subscript, Sm). A complex network of goals, with their corresponding EIP sequences, involving other syntactic/semantic units is suggested to fill this semantic void for the word "dog." For example, if a description, or definition, of a dog is referenced to fill this semantic void, each word of the description would undergo a process similar, if not identical, to that of Ex. 26. This information would then be included in the symbol/semantic structure for "dog" by EIP 4 and stored in memory by EIP 7. This process renders "dog" a semantically replete syntactic unit (subscript Sm now deleted). This extended process is shown in Ex. 28 where "structure of dog's features" is assumed to include information processing of all syntactic units therein, accomplished through several processes, each similar, if not identical, to that of Ex. 26.

Example 28. EIP sequence for successful comprehension of "dog" when "dog" is not initially found in memory.

EIP5 → ⟨W⟩ → EIP7 →
EIP6 → ⟨W⟩ → ⟨d,o,g⟩ → EIP7 →

EIP5 → ⟨d⟩ → EIP7 → EIP5 → ⟨o⟩ → EIP7 → EIP5 → ⟨g⟩ → EIP7 →
EIP2 → ⟨d,o,g⟩ → EIP7 → ⟨ ⟩ → EIP4 → ⟨dog_{Sm}⟩ → EIP7 →
EIP4 → ⟨structure of dog's features⟩ → EIP7 →
EIP2 → ⟨d,o,g⟩ → EIP7 → ⟨dog⟩ → EIP7

Implied is the assumption that all EIP types address both syntactic information and corresponding semantic information. This could be shown in the models presented by adding superscripts "Sy" (syntactic) and "Sm" (semantic) to each syntactic unit (e.g., $dog^{Sy/Sm}$), where such a condition applies. However, inclusion of both syntactic and semantic information within syntactic units and operations on syntactic units will always be initially assumed in this paper; therefore, constant representation of such information by superscripts is unnecessary. Absence of either syntactic or semantic information, however, will be indicated by a subscript, either "Sy" or "Sm," attached to the figure representing the appropriate syntactic unit (e.g., dog_{Sm}, in Ex. 27).

The goal, and its processes, examined in preceding examples and discussion is relatively simple when compared to most cognitive activities attempted by humans. This goal, of comprehending "dog," would most likely be only one such goal among many, all represented within one sentence. This hypothetical sentence would, in turn, even with all its individual goals and processes, appear relatively simple when compared to the likely overall context, that of a paragraph, section, chapter, etc. The hierarchical nature of this cognitive process is, therefore, implied. A model, similar in structure to those of preceding examples (Ex. 26–28) but encompassing a more complex sequence of goals (as would be necessary for a paragraph) would necessarily be extremely intricate and limited in practical application to fields of cognitive science and/or computer programming. Such intricacies could be expected in models explicating tonal comprehension of musical stimuli when it is considered that the process of identifying a word like "dog" (consisting of three letters) is analogous to identifying a single triad (consisting of three notes) among all possible triads. A model for a musical phrase containing, for example, even as few as fifteen harmonies would, by virtue of the necessity for many goals within the hierarchical structure, be expansive and intricate. Such a model would also be limited in applicability to that particular musical example. If, however, general processes (in the form of a meta-model) can be postulated that can be used to formulate specific processes (models), an accessible and informative model (or more precisely, meta-model) for tonal comprehension in general would result. Such a meta-model would have practical use in music theory as well as in music pedagogy.

A Meta-model for Tonal Comprehension

Subsequent models and discussions will implement the following abbreviations (abbreviations previously discussed are not included here):

S = sonority

p = pitch (numbers as superscripts are used to distinguish different pitches

T = major triad, or t (minor triad), or t° (diminished triad), or t+ (augmented triad)

TM = major morphemic triad, (tm, t°m)

Lp = lexemic pitch

ToLp = tonic lexemic pitch (with superscript used as above)

SLp = subdominant lexemic pitch (with superscript)

DLp = dominant lexemic pitch (with superscript)

ToM = major tonic morpheme, (Tom)

SM = major subdominant morpheme, (Sm, Sm°)

DM = major dominant morpheme, (Dm°)

The following terms, not previously presented, will be used in models and discussions:

confirmation	=	procedure that confirms the presence of a syntactic and/or semantic unit in memory
explication	=	description given for a syntactic/semantic unit in terms of some relationship(s) with some other syntactic/semantic unit(s)
node	=	a "step" in the model, not an arrow
operational node	=	"step" representing a procedure accomplished by one of the EIP types, excluding EIP types 1, and 7.
terminal node	=	step representing a product of an operational node
storage node	=	step representing storage, in memory, of information contained in a terminal node; always EIP 7
retrieval node	=	step representing retrieval of information from memory; always EIP 7
subgoals	=	goals used in conjunction to acquirement the terminal goal

Example 29 proposes a model for tonal comprehension of a sonority. For this example, certain conditions have been presumed: the sonority is a major triad, contains a harmonic lexeme and is therefore morphemic;

the lexeme serves as one of the three primary functions and so does the morpheme; the listener has previously acquired knowledge of all those concepts; and, the listener correctly performs the given operations and draws accurate conclusions.

These presumed conditions negate necessity for some additional EIP's. These additional steps will be explicated in a subsequent example and discussion.

Example 29. Model for tonal comprehension of a sonority.

SUB-GOALS

A. reception, storage of stimulus

B. explication, confirmation, storage of separate units within the stimulus

C. confirmation, storage of triad (T is selected for this model)

D. explication, confirmation, storage as morpheme

E. explication, confirmation, storage of morphemic triad with a T, S, or D functioning lexeme

F. explication, storage of sonority as tonic, subdominant, or dominant functioning morphemic triad

TERMINAL GOAL: tonal comprehension of sonority(s)

Example 29, continued.

A: [E/P5 → ⟨S⟩ → E/P7] → B: [E/P6 → ⟨S⟩ → ⟨p^1, p^2, p^3⟩ → E/P7 →
E/P5 → ⟨p^1⟩ → E/P7 → E/P5 → ⟨p^2⟩ → E/P7 → E/P5 → ⟨p^3⟩ → E/P7] →

C: [E/P2 → ⟨p^1, p^2, p^3⟩ → E/P7 → ⟨T⟩ → E/P7] → D: [E/P6 → ⟨T⟩ → ⟨p^1, p^2, p^3⟩ →
E/P7 → E/P2 → ⟨p^1⟩ → E/P7 → E/P2 → ⟨p^2⟩ → E/P7 → E/P2 → ⟨p^3⟩ → E/P7 →
⟨Lp^1, or Lp^2, or Lp^3⟩ → E/P7 → E/P6 → ⟨L$p^?$, $p^?$, $p^?$⟩ → ⟨TM⟩ → E/P7] →

E: [E/P6 → ⟨TM⟩ → ⟨L$p^?$, $p^?$, $p^?$⟩ → E/P7 → E/P2 → ⟨L$p^?$⟩ → E/P7 →
⟨L$p^?$ with To, S, D function⟩ → E/P7] → F: [E/P6 → ⟨functional L$p^?$, with $p^?$ and $p^?$⟩ →
⟨ToM, or SM, or DM; depending on lexemic function⟩ → E/P7]

This model for tonal comprehension is comprised of six sub-goals that are listed and explained in the example. Explicating the model is accomplished by interpreting each sub-goal's model, beginning from the top-left and proceeding left-to-right, dropping to the next line and continuing as if reading English text. Understanding of each sub-goal's model is achieved by recognizing what operations are performed on what syntactic/semantic units and by following each operation to its resultant syntactic/semantic unit. Operations are represented by EIP types and are in three categories (termed nodes): operation nodes, storage nodes, and retrieval nodes. Results of these operations on syntactic/semantic units are represented in terminal nodes. Operation, storage, and retrieval nodes will always use one of the EIP types. Terminal nodes are represented by syntactic/semantic units.

Each EIP type, excluding types 1 and 7, can represent various specific operations depending on processes required to obtain the immediate goal. EIP type 1 indicates a general condition for the entire group of EIP types. EIP type 7 functions only for storage (input to memory) and retrieval (access to memory).

Several observations from Ex. 29 should be noted:

1. EIP 7 will follow any other operation and will either store or retrieve information, whichever is required by the preceding operation.

2. EIP 5 will precede any other operation on a syntactic unit, or part thereof, that has not been previously "received" by an EIP 5.

3. When it is necessary to explicate smaller parts within a syntactic unit (e.g., sub-goal "B"), or to explicate smaller parts as a group (i.e., combine smaller parts into one syntactic unit; e.g., sub-goal "F"), EIP 6 will be the first operation performed on either the "smaller parts" or the "one syntactic unit" to be explicated. Other necessary operations will follow.

4. The same EIP type may be used to perform different specific operations in different circumstances, each circumstance achieving different specific goals. For example, in sub-goal "C," EIP 2 is used to "test" a group of pitches for membership within a particular "class" of groups (in this case, triad). In sub-goal "D," pitches are individually "tested" for interpretation as the lexeme. Though specific operations differ, both occurrences of EIP 2 represent a similar "test" type of operation.

The model in Ex. 29 is interpreted as follows (proceeding by sub-goal):

A. reception of stimulus, stimulus stored.

B. "break-down" of stimulus into a three-pitch group, group stored - confirmation of pitch (1), pitch (1) stored.
confirmation of pitch (2), pitch (2) stored.
confirmation of pitch (3), pitch (3) stored.

C. test for compliance of pitch group with the "triad" class of sonorities, information about "triad" class retrieved, pitch group interpreted as major triad and stored as major triad.

D. "break-down" of triad into three-pitch-group, three-pitch-group stored, test for identity of lexeme, lexeme found and stored, three-pitch-group recombined into morphemic triad, morphemic triad stored.

E. "break-down" of morphemic triad into three-pitch-group containing lexeme, three-pitch-group containing lexeme stored, test for function of lexeme, function found, lexeme with function stored.

F. three-pitch-group with functional lexeme recombined into a T, S, or D functioning morphemic triad, morphemic triad with T, S, or D function stored.

The "presumed conditions" described at bottom of page 68 have allowed a more straightforward model for this comprehension process than would otherwise be possible. The presumptions have been made to simplify the explanation of the process, rather than, of course, to imply that the listener already knows the information that is provided by execution of the model <u>before</u> such execution. Excluding the presumptions will likely result in a model comprised of more complicated "test" operations, depending on the specific listener and stimulus involved. For example, if the listener cannot identify the lexeme as a particular function (sub-goal "E"), subsequent operations would differ from those in Ex. 29. The terminal node for sub-goal "E" would be a null finding (⟨ ⟩). One method for correcting this condition is proposed in Ex. 30.

Example 30. Model for correcting condition of a null terminal node, previously described.

EIP2 → ⟨L_p^1, or L_p^2, or L_p^3⟩ → EIP7 → ⟨ ⟩ → EIP7 → ⟨following models⟩ → EIP7 → EIP7 → ⟨terminal nodes of sub-goal "F" of preceding model⟩ → EIP7 → EIP7 → ⟨ p^1, p^2, p^3 from "D" of present model⟩ → EIP7 → EIP6 → ⟨terminal nodes of "F" of preceding model; p^1, p^2, p^3 from "D" of present model; terminal node of "F" of following models⟩ → EIP7 → EIP2 → ⟨same as immediately preceding node except as a unit⟩ → EIP7 → ⟨chord progression conforming to tonal frame with one sonority (p^1, p^2, p^3 of present model) yet unknown⟩ → EIP7 → EIP6 ⟨the above progression⟩ → ⟨separate triads within progression⟩ → EIP7 → EIP2 → ⟨p^1, p^2, p^3⟩ → EIP7 → ⟨one L_p, p, p⟩ → EIP7 → EIP6 → ⟨one L_p, p, p⟩ → ⟨ToM, or SM, or DM⟩ → EIP7

This model also contains assumptions. For example, this model could be successfully executed only if the listener had the ability to retrieve information from previously heard triads. Furthermore, it is not stipulated by the model how many "following" and "preceding" triads are to be included. It is also assumed that the overall progression he evaluated did conform to the tonal frame, T → S → D → T, or to a variation of the tonal frame (e.g., T → T → S → S → D → D → T). Once again, these assumptions merely simplify the model. This model, Ex. 30, serves as an example of steps to be taken by a listener who has reached at least one null node in the comprehension process. It must be realized, however, that "null nodes" are only one type of problem the listener can have. "Wrong answers" represent one common problem that would require similar correction steps as those demonstrated in Ex. 30 .

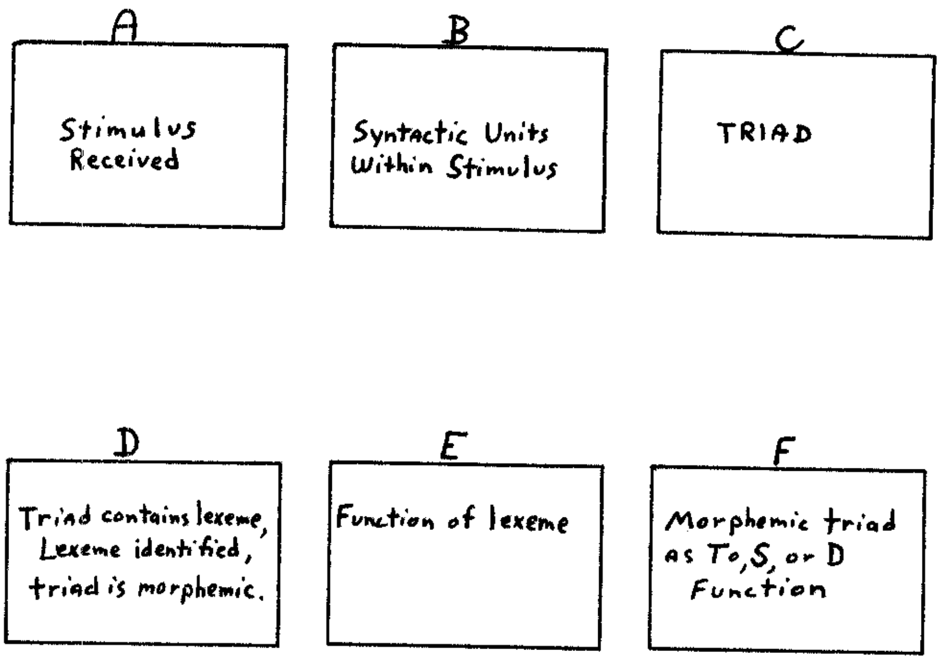
The model in Ex. 30 included, amidst attempted acquisition of one terminal goal, references to other terminal goals from executions of models for both preceding and following sonorities. This cross-reference among time partitions is not limited to correction operations but, rather, applies to many instances within the process of understanding a phrase of tonal music. This is obvious in view of previous discussions, presented in Chapters I and II, in which it was proposed that the understanding of conceptual structures does not depend solely on linear processing of the syntactic structure. Chronology assists presentation of syntactic structures but does not limit semantic processing to that same chronology. We remember that, in the phrase "red ball," neither "red" nor "ball" can be completely interpreted until both words have been understood to be concomitant units within one "scope." It has already been postulated that this same concept is important in music. Use of information incorporated within a tonal frame includes references to previously assimilated structures as well as expectation of structures not yet presented as sound events.

From Ex. 29 it was observed that EIP 7 is used for both storage and retrieval and that EIP 7 (as a storage node) followed each terminal node. On a larger scale, the tonal frame is likewise continually referenced either for storage or for retrieval. The model for each separate sonority is, therefore, "connected" to the tonal frame at, theoretically, all nodes in that model. In this respect, all models must, therefore, be "connected" to each other through the tonal frame.

Since pitch incorporates time partition(s), the understanding of a tonality incorporates rhythm. Therefore a model for the comprehension of a sonority must also include rhythmic information pertaining to that sonority (time partition). Consequently, information concerning time partition organization is necessarily implicit among the network comprised of models for comprehension of individual sonorities and constant references to the tonal frame. Tonal and rhythmic information in "statements of tonality" are therefore "encoded" into the tonal frame. Rhythmic organization influences the comprehension of tonal pitches through the execution of tonal models. The comprehension of rhythmic organization through interpretation of rhythmic manifestations such as, agogic stress, durational values, and rhythmic patterns must be concomitant to comprehension of the tonal organization. The listener's understanding of rhythmic structures, an explication of which is not within the scope of this study, must accompany his understanding of tonal structures.

A meta-model for the tonal comprehension of a sonority can easily be constructed by assembling the sub-goals of Ex. 29 into the structure shown in Ex. 31. Information acquired from each sub-goal operation is given within each block. The triad could be major, minor, or diminished.

Example 31. Meta-model for the tonal comprehension of a sonority that is a morphemic triad.



Non-morphemic triads as well as triads without independent morphemic function would be interpreted in a manner similar to that demonstrated in Ex. 29 and their comprehension could be represented by meta-models similar to that shown in Ex. 31. A meta-model for the tonal comprehension of a morphemic extension triad would be the same as the meta-model in Ex. 31 with the exception that sub-goal "D" would be expanded to include an operation to distinguish between morphemes and morphemic extensions (extended from previous or following morpheme). Tonal comprehension of non-morphemic triads would contain only sub-goals "A" through "D" with "D" resulting in "non-morphemic triad." These meta-models will assist in the presentation of the pedagogy given in Chapter IV.

CHAPTER IV

USING THE META-MODEL IN A PEDAGOGY

Overview of the Pedagogy

A pedagogy for tonal comprehension is proposed in this chapter. This pedagogy is, obviously, not an entire curriculum but rather a set of procedures that attempt to develop a student's tonal comprehension. The examples, along with their training procedures, are divided into two categories: preliminary and advanced training. Preliminary training procedures begin with the introduction of major, minor, diminished, and augmented triads and proceed with progressions comprised of two, three, and four triads, presented in that order. Each of these examples is intended to be used both in major and minor keys. Because this chapter proposes to provide only the highlights of a pedagogy, examples in major only will be presented. In the classroom, variations in mode, as well as in bass and soprano position would be necessary. Concepts that are discussed (e.g., interpretability of function as influenced by contrapuntal considerations) apply to both major and minor versions as well as to versions containing alternate voicings.

The advanced training procedures include examples from the repertoire. These examples are the same as those presented in Chapter Two and are presented, along with their training procedures, in the same sequence as that of Chapter Two. Each musical excerpt (except for Ex. 37) is preceded by a simplified version composed by this author. The simplified version is intended to be used to elucidate the functional aspects of the voice-leading in the repertoire example. The simplified version is played first and its training procedures are implemented. The repertoire example is then played, followed by its training procedures. Differences in contexts of these two versions should be examined with the student. Such observations may assist in explaining differences of interpretability of function that may be experienced.

The presentation of examples is sequenced according to increasing complexity of linguistic function among the sonorities comprising the excerpts. Even if this chronology does not correspond with that chosen by the teacher for presentation of tonal harmonies, it is suggested by this author that consideration of the linguistic structure in progressions of harmonies be included in the teacher's criteria for selecting a particular chronology for their presentation to the student.

The training procedure given for both preliminary and advanced studies will follow this general outline (some steps may be deleted or expanded in training procedures for specific examples according to the procedures required for acquisition of specific objectives that are the focuses of each individual example):

1. Objective (goal) is presented.
2. Sequence of meta-model sub-goals is presented along with training procedures respective to each sub-goal (each meta-model sub-goal is preceded by the same alphabetical letter used in Ex. 31 of Chapter III to represent each sub-goal).

A. Reception of stimulus - The example is performed (number of repetitions is left to the discretion of the teacher but should progressively diminish in number as completion of study for each type of objective is approached).

B. Individual syntactic units comprising stimulus - Triad(s) is(are) sung, using scale degree numbers or a solfège system, as arpeggiated harmonies, bottom to top, then top to bottom. In the case of progressions, triads are sung in sequence with the last pitch to be sung of one triad proceeding to the first pitch to be sung of the next triad (triads may also be sung top to bottom first, then bottom to top to connect melody notes of each triad). The phonetics or numbers used in singing the triads assist the student in making decisions of interval content in the triads. This information is used in Step (C).

C. Interpretation of pitch-group as conforming or not conforming to any class of triads - This interpretation depends on knowledge of and aural experience with triad-class possibilities manifested in this system of tonal music. Where no previous aural experience has taken place, steps (B) and (C) supply the experience. If this pitch-group qualifies for triad-class membership, the particular quality-class (major, minor, diminished or augmented) is discerned. Familiar patterns of chord formations containing a pitch (non-harmonic tone) that delays presentation of a triad-member are to be interpreted as such in this Step (C). For these formations, the resulting sonority is interpreted as a triad although contrapuntal information is not to be rejected by memory. It is considered by this author to be possible that a listener who is familiar, although informally, with this system of tonality may interpret a sonority such as a quartal chord (e.g., g, c, f#, without tonal resolution) as a non-triad in this system of tonality even in absence of the knowledge and/or skills to "test" the sonority for specific quality-class membership. In such cases, a tonal frame does assist interpretation; however this tonal frame is comprised of information far too general to deem such a frame as adequate for musicians or music students. Where knowledge of and aural experience with the qualities of triads present in this system of tonality have previously been obtained, the interpretation of a sonority as non-triad or triad, and interpretation of a triad as a member of some quality-class of triads, will be considered as one and the same step (sub-goal) in the meta-model. It is likely that the informed listener will interpret the quality-class of a triad to assess the sonority as triad or non-triad. If the pitch group is not a triad, different sub-goals would be needed to determine compatibility with another system of music. If the pitch group is a triad, proceed to sub-goal "D."

D. Triad is morphemic, non-morphemic, or morphemic extension - If the triad contains a lexeme, the triad is morphemic. If the triad does not contain a lexeme, the triad is non-morphemic and the meta-model is concluded, or the triad is a morphemic extension.

To determine whether or not the triad contains a lexeme, the following questions should be answered by the listener:

1. Does the triad contain any of the following scale degrees: 1, 2, 4, or 5? If "yes," proceed to question #2. If "no," proceed to question #3.

2. Does either scale degree 1, 2, 4, or 5 function as a contrapuntal goal, whether intermediate or terminal, to the previous lexeme? If "yes," this scale degree is the lexeme. Proceed to sub-goal "E." If "no," proceed to question #3.

3. The triad in question must contain scale degrees 3, 6, or 7. Does one of these scale degrees (one or two possibilities depending on how many are present; e.g., 3 and 6, 3 and 7), if any, function as contrapuntal goal, whether intermediate or terminal, to the previous lexeme? If "yes," this scale degree is the lexeme; proceed to "E." If "no," the triad is either non-morphic or a morphemic extension. Proceed to remaining procedures within sub-goal "D."

If the triad's root is at the interval of a fifth or third from the root of the immediately proceeding or following morphemic triad, the triad is a morphemic extension. The meta-model is concluded. In absence of the conditions just described, the triad is non-morphemic. The meta-model is concluded.

E. Lexeme is interpreted as either tonic, subdominant, or dominant function - Function is determined by referencing the tonal frame's fundamental structure, T → S → D → T.

F. Morphemic triad interpreted as either tonic, subdominant, or dominant function - Lexeme's function is also that of the morpheme.

Triads are interpreted as either diatonic or chromatic in procedures for sub-goal "C." Chromatic pitches are recognized in "B" and classified as triad members in "C." The sub-goal procedures following "C" are the same. In the case of a chromatic morphemic triad, it could be of either the borrowed or secondary-dominant chord type. This distinction is made in sub-goal "F."

If the triad is a secondary dominant, an additional tonal frame in which the temporary tonic is "T" would be referenced. However, this additional tonal frame would be included within the original tonal frame as discussed in Chapter II.

3. Repetitions of any sub-goal procedure in #2 as deemed appropriate by the teacher;

4. Special considerations (indigenous to each individual example); some may be interpolated within meta-model sub-goals where indicated in the procedures for each example.

Preliminary Training Procedures

The explication of preliminary training procedures (PTP's) and advanced training procedures (ATP's) constitutes the remainder of this chapter. For each individual "lesson," the example will be presented first, then the procedures. Each triad or progression that appears between double-bars constitutes a separate sound event to be presented to the students. Each sound event within the example will be studied individually, each providing a specific objective to be obtained by the student through the use of procedures that follow each example. Sound events should be separated by time and/or non-tonal musical "filler" to inhibit interplay of tonal relationships between the individual triads or progressions.

Example 32. Preliminary training procedure (PTP) #1.

1. Objective - Determine triad quality (major, minor, diminished, or augmented).

2. A, B, and C; since it is given that all these sonorities conform to a triad-class (a determination made in sub-goal "C"), that part of sub-goal "C" is therefore given.

3. Repetitions.

4. Special considerations - While singing the triads (sub-goal "B"), pauses could be implemented after each verticle interval to allow students to determine each interval's quality. This procedure would provide additional information for the students to accomplish the sub-goal (though in this example a terminal goal) "C."

Example 33. PTP #2.

1. Objective - Determine lexeme and function of each of the two triads (both are assumed to be independent morphemes).

2. A through F; since sonorities are assumed to be triads, that part of "C" is given. Since triads are assumed to be independent morphemes, parts of sub-goal "D" are given.

3. Repetitions.

4. Special considerations - These factors (and perhaps others chosen by the teacher) that are involved in the interpretation of function should be discussed:

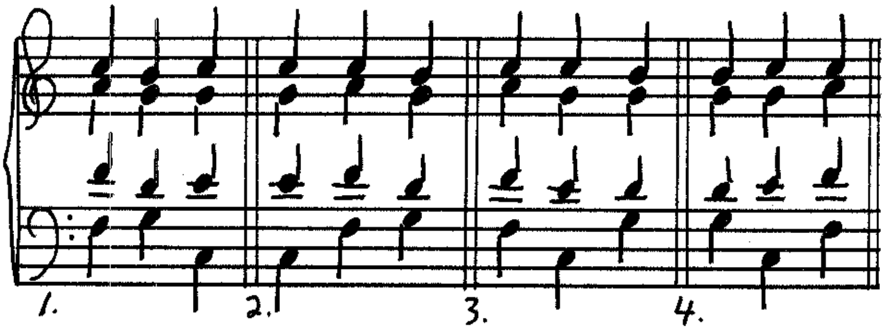
   1. Scale degrees comprising soprano line; different soprano positions should be examined and their tonal influences discussed.

   2. Direction (ascending or descending) of the root movement by fifth as presented in the bass voice; tonal influences suggested by inversions should be heard and discussed.

   3. Actual performance of example possibly providing a long-short or short-long relative duration sequence or dynamic stress on one triad;

   Presence of factors 1, 2, 3, individually or collectively, may suggest tonal accentuation of one triad that, therefore, may be favored for interpretation as tonic function. As different possibilities of interpretation of function are examined, they should be sung by the students, using the appropriate scale numbers or solfège designations.

Example 34. PTP #3.



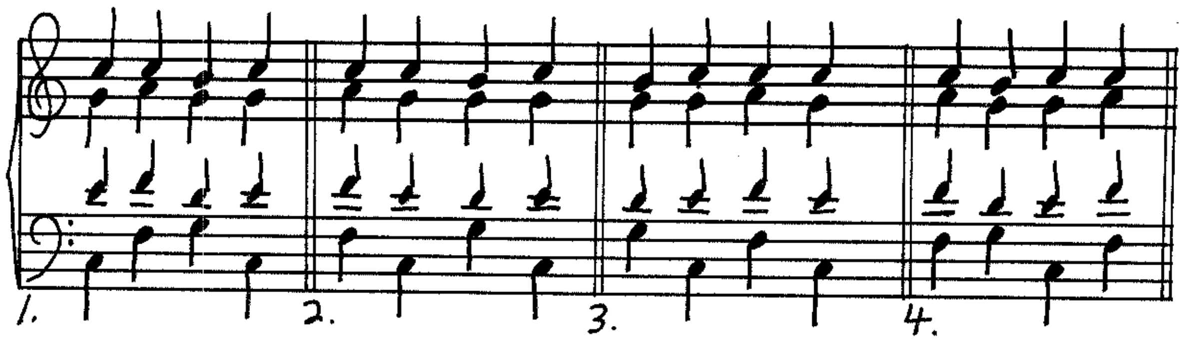
1. Objective - Determine lexeme and function of each of the three triads (all are assumed to be independent morphemes).

2. A through F; parts of "C" and "D" are given as in Ex. 33.

3. Repetitions.

4. Special considerations - Special considerations for Ex. 33 should be similarly examined. Full and half closures (respectively, sound event numbers 1 and 2) are discussed and experienced. The students should be made aware that numbers 3 and 4 do not contain the same "complete" closure formulae as does numbers 1 and 2. The students should practice adding such closure to numbers 3 and 4 by singing these additional triads as in sub-goal "B." Other subdominant and dominant function triads could be used to replace those in the given examples. Discussions on interpretation should follow.

Example 35. PTP #4.



1. Objective - Determine lexeme and function of each of the four triads (all are assumed to be independent morphemes).

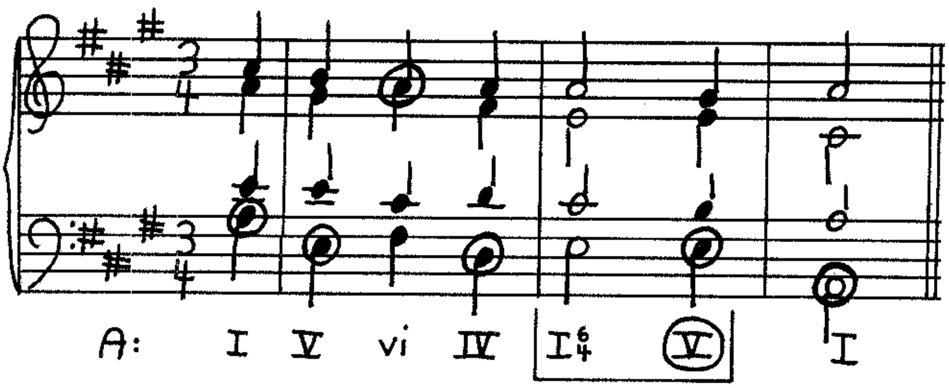
2. A through F; parts of "C" and "D" are given as in Ex. 33 and 34.

3. Repetitions.

4. Special considerations - Special considerations for Ex. 33 should be similarly examined. Closures for sound event numbers 3 and 4 should be supplied (sung) by the students. Different subdominant and dominant functioning triads could be used to replace those in the given examples as in Ex. 34.

Advanced Training Procedures

Example 36. Advanced Training Procedure (ATP) #1, simplified version (sv) - Bach chorale, Als der gütige Gott, mm. 1-2; Bach chorale, Nun lob', mein Seel', den Herren, mm. 34-37.



1. Objective - Determine lexeme and function of each triad and determine each triad to be either an independent morpheme or a morphemic extension.

2. A through F; parts of "C" and "D" are given. However, for these examples, it is not given whether the triads are independent morphemes or morphemic extensions. Corresponding procedures of sub-goal "D" must be implemented by the student to make this determination.

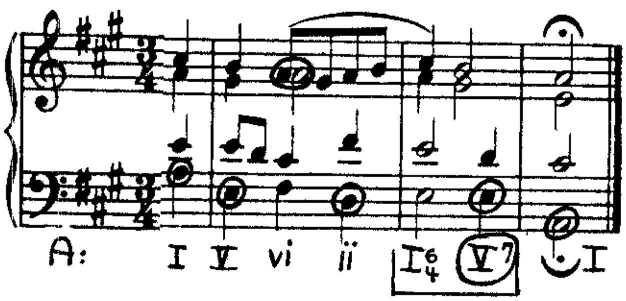
3. Repetitions - Among repetitions could be those that parse each sound event into two sections. An example of such a parse for number 1 is as follows: I vi V - I V I. An example of a parse for number 2 is: I V vi IV - I^6_4 V I. The meta-model sub-goals could be used to examine separately each parsed unit first, then the entire sound event.

4. Special considerations - The vi triad, serving as a different function in each sound event, should be focused in the examination of both these sound events. The anticipation (extension) I^6_4 should also receive special attention.

   Since this is the students' first experience in determining a triad as either an independent morpheme or a morphemic extension, this procedure in sub-goal "D" should be isolated in practice.

   Special considerations for Ex. 33 should be similarly examined.

Example 36 continued. ATP #1, excerpt.



1. Objective - Same as for simplified version (sv).

2. Same as for sv.

3. Same as for sv.

4. Special considerations - Same as in sv, however, it may not be necessary to play the excerpt using different bass and soprano positions as this is performed in the procedures for the sv. Contextual differences between the sv and the excerpt should be examined as well as any differences experienced in determining sub-goals that may be attributed to contextual difference.

Example 37. ATP #2, excerpt (no sv for this ATP) - Bach chorale, Nun lob', mein Seel', den Herren, mm. 1-4.

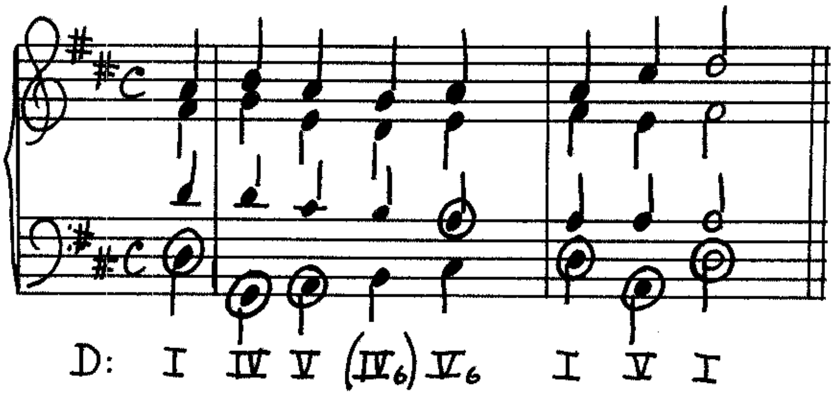
1. Objective - Determine lexeme and function of each triad and determine each triad to be either an independent morpheme or morphemic extension.

2. A through F; additional comments are the same as those for Ex. 36, sv.

3. Repetitions - One suggestion of a parse for this example is: I vi iii IV - V^4_2 I_6 ii_6 V I.

4. Special considerations - The extension, vi - iii, should receive special attention as should the corresponding procedures in sub-goal "D." Special considerations of Ex. 33 can be implemented since the excerpt in Ex. 37 is contextually simpler than the other excerpts examined.

Example 38. ATP #3, sv.



1. Objectives - Determine each triad to be morphemic or non-morphemic. Determine lexemes and their function for morphemic triads.

2. A through F; only part of "C" is given. All other sub-goals must be obtained by the student.

3. Repetitions - A suggested parse is: I IV V (IV_6) V_6 - I V I. Parses treated as in Ex. 36, sv.

4. Special considerations - The non-morphemic (IV_6) and procedures in "D" for determining such information (morphemic or non-morphemic) are emphasized in this example. Special considerations for Ex. 33 can be implemented, however, care must be exercised in rewriting the IV → V → IV_6 → V_6 progression. Changes in bass and/or soprano position made in the progression could jeopardize stylistic compatibility as the original bass line is typical for such occurrences of linear sonorities.

Example 38 continued. ATP #3, excerpt - Bach chorale, <u>Eins ist not! ach Herr, dies Eine</u>, mm. 7-8.

1. Objectives - Same as sv.

2. Same as sv.

3. Same as sv.

4. Special considerations - The non-morphemic triad (IV_6) and corresponding procedures for such morphemic/non-morphemic determinations in sub-goal "D" should be isolated in practice. As discussed in Chapter II, an alternate analysis of the passage in this example suggests the V of the first full measure as the non-morphemic triad. This alternate interpretation should be examined with the students. Differences in contexts in the sv and the excerpt should always be discussed.

Example 39. ATP #4, sv.

1. Objective - Same as Ex. 38; although each of these triads is morphemic, the student has now been exposed to the procedures for making such determinations; therefore, the student should continue to evaluate each triad using the procedures in sub-goal "D," without this information being "given" information.

2. A through F; only sub-goal "C," in part, is given. This is the students' first opportunity to evaluate and interpret chromatic units. Therefore, emphasis should be placed on singing these chromatic pitches in sub-goal "B."

3. Repetitions - No parsing suggested.

4. Special considerations - Different bass and/or soprano positions can be investigated, however, the focal point of this example and procedure is the bVI, a borrowed chord with tonic function.

Example 39, continued. ATP #4, excerpt - Bach chorale, Vater unser in Himmelreich, mm. 9-10.

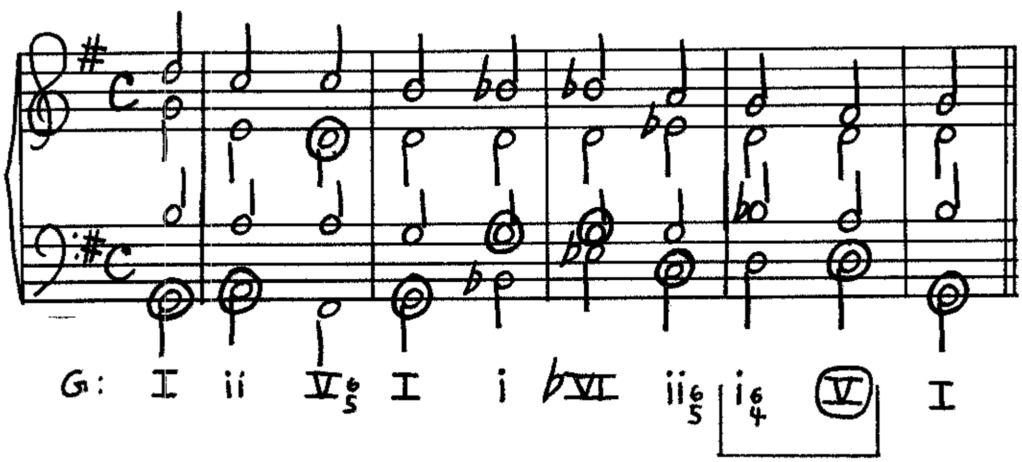
1. Objective - Same as sv.

2. Same as sv.

3. Same as sv.

4. Special considerations - Differences in contexts of sv and of the excerpt should be discussed. Formal category information contained in the chromatic bVI should be compared to that of a diatonic vi, both serving in the same notional category (tonic function). A diatonic version incorporating vi should be played and differences in possible resolutions sung and discussed. (The b6 scale degree may have a stronger tendency to resolve to scale degree 5 than would diatonic scale degree 6.)

Example 40. ATP #5, sv.



1. Objective - Same as Ex. 39.

2. Same as Ex. 39.

3. Repetitions - A suggested parse is: I ii V^6_5 I - i_6 bVI $ii^{\circ 6}_{5}$ i^6_4 V I.

4. Special considerations - Special considerations of Ex. 33 can be implemented. All triads that are chromatic triads are "borrowed." Borrowed chords are the focus of this example. Borrowed chords provide more specified anticipation of resolution (formal category information) than their diatonic counterparts. Therefore, diatonic versions should be examined and comparisons discussed with the students.

Example 40, continued. ATP #5, excerpt - Brahms, Rhapsodie #2, Op. 79, mm. 57-61.

1. Objective - Same as Ex. 39.

2. Same as Ex. 39.

3. Repetitions - No parsing suggested.

4. Special considerations - Same as sv except without different bass/soprano position versions; differences in contexts of sv and of the excerpt should be examined. The repeated melodic movement of scale degree 5 to 1 in the third measure should be noted because this may influence the interpretation of this bVI triad as tonic function.

Example 41. ATP #6, sv.

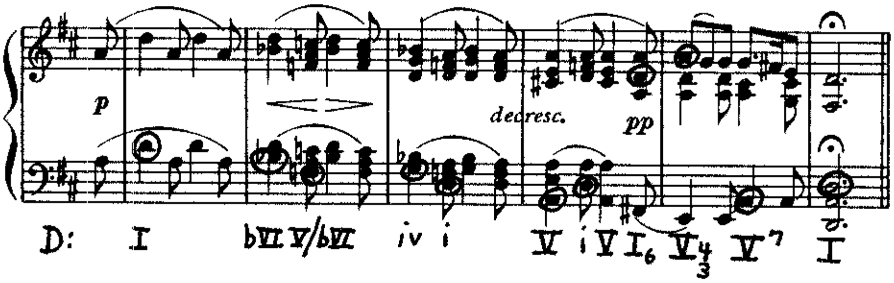
1. Objective - Same as Ex. 39.

2. Same as Ex. 39.

3. Repetitions - A suggested parse is: (measures 1 through 3) - (remaining measures).

4. Same as Ex. 40; the student should notice that the bIII functions as dominant to bVI. This represents a temporary tonal frame (T → D → T) within the original tonal frame of D major.

Example 41, continued. ATP #6, excerpt - Schubert, Jagers Liebeslied, Op. 96, No. 2, mm. 1-6.



1. Objective - Same as sv.

2. Same as Ex. 39.

3. Same as sv.

4. Same as sv except without different bass/soprano position versions; differences in context of sv and of the excerpt should be discussed.

Example 42. ATP #7, sv.

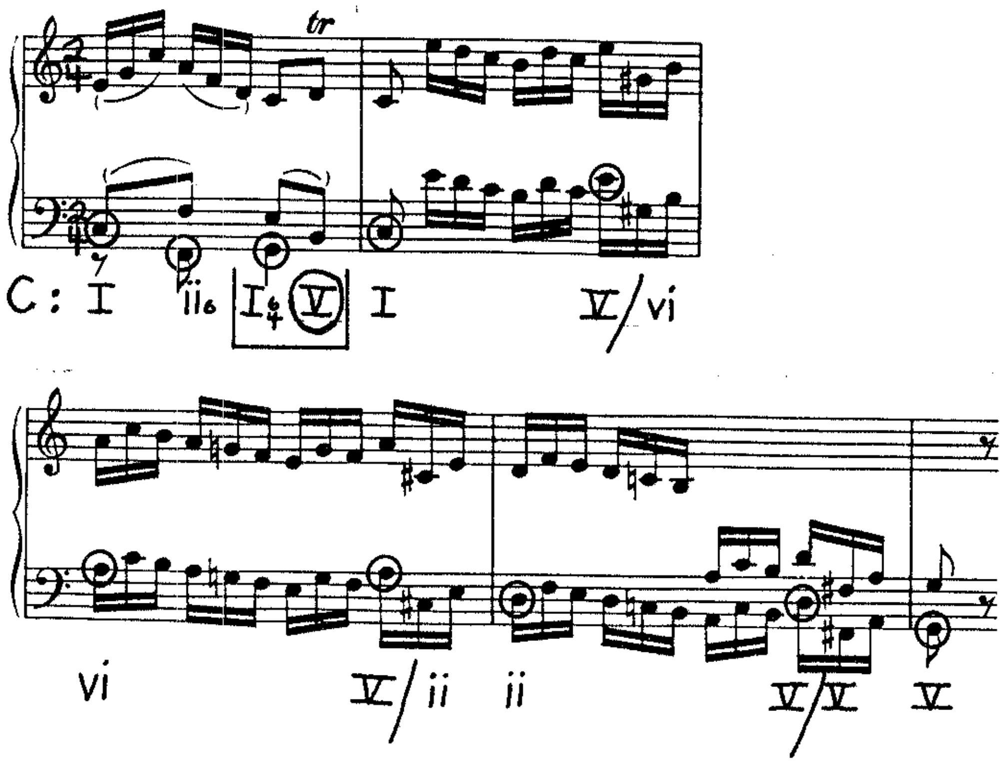
1. Objective - Same as Ex. 39.

2. A through F; only "C," in part, is given. In this example, secondary dominants (that are not also borrowed chords) are introduced. Emphasis should be placed on singing these chromatic chords in sub-goal "B."

3. Repetitions - No parsing suggested.

4. Special considerations - Special considerations for Ex. 33 can be implemented. Notional categories of secondary dominant chords are different from that of their unaltered, diatonic counterparts. These differences should be examined by comparing a diatonic version of this example (to be derived by the teacher) to the original one. It should also be emphasized that, like borrowed chords, secondary dominants provide more specific anticipation of resolution when compared to their unaltered, diatonic counterparts, though not changing the formal category of the diatonic counterpart.

Example 42, continued. ATP #7, excerpt - Mozart, Piano Sonata K.309, Rondeau, mm. 206-210.



1. Same as sv.

2. Same as sv.

3. Same as sv.

4. Special considerations - Same as sv except without different bass/soprano position versions; differences in contexts of the sv and of the excerpt should be examined. Harmonies in the

excerpt are arpeggiated; this technique of composition should be explored. It should be noted that in absence of the V/vi, the following measure could be interpreted as having subdominant function (arpeggiated IV) for the first three beats.

Conclusion

The pedagogy presented in this chapter demonstrates how syntactic information may be implemented in the study of tonal harmony and in the acquisition of listening skills. Linguistic oriented pedagogical procedures such as those explicated in Chapter IV and those implied in preceding chapters can be used at various stages in the student's musical studies. These procedures can be used in the sequence demonstrated by this author or in other sequences, depending on the needs of the teacher.

This paper has examined only the most fundamental types of chords and chord progressions. Seventh chords, as well as ninth, eleventh, and thirteenth chords can be examined by using the same basic syntactic concepts presented in this paper. Less common chord progressions and progressions exhibiting "extended tonality" (e.g., Wagner, Mahler) can be studied by using these linguistic techniques. The concept of "statements of tonality," presented in Chapter II, can be helpful in discussing the comprehension of chromatic units that recur in a musical work. This concept suggests a possible reason why a recurrence of a particular chromatic unit may seem less "chromatic" (non-diatonic) than it did within its initial "statement." The chromatic unit has already been received into memory and, therefore, its recurrence does not represent something "new" that the listener has not previously heard; i.e., the chromatic unit is now in the tonal frame along with other material subordinate to the fundamental T → S → D → T frame progression. Each chord, chord progression, and "statement" that occurs in the course of a composition adds information to the tonal frame which, in turn, influences comprehension of all subsequent musical events.

Since linguistic competence enables a person to obtain knowledge for use in human problem solving, its scope of application is virtually limitless. It is considered by this author to be feasible that any cognitive activity, whether aesthetic or non-aesthetic in nature, can be linguistically examined. Paradigms of music other than harmony can be similarly investigated. Comprehension of both melody and rhythm can be the focus of other linguistic studies just as harmony is the focus for this paper. Musical notation itself can be examined by implementing information presented in Chapter I (fundamental linguistic structure) in an analysis of musical symbol systems. It is this author's opinion that comprehension of these and other musical pardigms is manifested through linguistic competence.

BIBLIOGRAPHY

Arieti, Silvano. Creativity: The Magic Synthesis. New York: Basic Books, Inc., Pub., 1976.

Coker, Wilson. Music and Meaning. New York: The Free Press, 1972.

De Vito, Joseph A. Language: Concepts and Processes. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1973.

Forte, Allen. The Structure of Atonal Music. New Haven, Conn.: Yale University Press, 1973.

Goodman, Nelson. Language of Art. Indianapolis: Bobbs-Merrill Co., Inc., 1968.

Hodges, John, and Mary E. Whitten. Harbrace College Handbook. New York: Harcourt, Brace, Jovanovich, Inc., 1972.

Howard, V. A. "On Representational Music," NOUS VI/1 (March 1972), 41-53.

Jackendoff, Ray, and Fred Lerdahl. "Generative Music Theory and Its Relation to Psychology," Journal of Music Theory XXV/1 (Spring 1981), 45-90.

Kant, Immanuel. Critique of Pure Reason. New York: Anchor Books, 1966.

Langer, Susanne K. Philosophy in a New Key. New York: New American Library (Mentor Books), 1948.

Lehisto, Ilse. Suprasegmentals. Cambridge: The M.I.T. Press, 1970.

Miall, David S. "Metaphor as a Thought-Process," Journal of Aesthetics and Art Criticism XXXVIII/1 (Fall 1979).

Moulton, Janice, and George M. Robinson. The Organization of Language. New York: Cambridge University Press, 1981.

Newell, Allen, and Herbert A. Simon. Human Problem Solving. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972.

Nichols, Robert Shelton. Francois-Joseph Fetís and the Theory of Tonalité. Ph.D. dissertation, University of Michigan, 1971.

Ottman, Robert. Elementary Harmony. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970.

______________. Advanced Harmony. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972.

Sowa, J. F. Conceptual Structures. IBM Systems Research Institute. Menlo Park, CA: Addison-Wesley Pub. Co., 1984.