INTRODUCTION

Chord Function as a Problem

In this discussion "function" refers broadly to the relations that are assumed to be perceptible among chords organized around a pitch center. Chord function has its source in the simple diatonic chord relations that constitute the center of the diatonic model of functional harmony.[1] Chromaticism that is not decorative but structural has posed a challenge to this diatonic model. In the face of this challenge, the model has been modified and expanded so as to establish the functionality of certain chromatic chord relations. The expanded diatonic model has kept the meaning of function close to its source in pure diatonicism, and yet has permitted some non-diatonic chords to be assigned functions on a rational basis.[2]

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[1] Other conceptions of function are summarized in David Kopp, *Chromatic Transformations in Nineteenth-Century Music* (Cambridge: Cambridge University Press, 2002)*,* 5-8.

[2] A sense of the prevalent views of function relative to the diatonic-scale model can be had by consulting harmony textbooks in general use today. Cf. Edward Aldwell and Carl Schachter, *Harmony and Voice Leading,* 3d ed. (Orlando, Florida: Harcourt Brace Jovanovich Inc., 2003); Robert Gauldin, *Harmonic Practice in Tonal Music,* 2d ed. (New York: W.W. Norton and Company, Inc., 2004); Stefan Kostka and Dorothy Payne, *Tonal Harmony with an Introduction to Twentieth-Century Music,* 5th ed. (New York: McGraw-Hill, 2004); Steven G. Laitz, *The Complete Musician: An Integrated Approach to Tonal Theory, Analysis, and Listening* (New York: Oxford University Press, Inc., 2003); Joel Lester, *Harmony in Tonal Music Volume II: Chromatic Practices* (New York: Alfred A. Knopf, Inc., 1982); Robert W. Ottman, *Advanced Harmony Theory and Practice,* 5th ed. (Upper Saddle River, New Jersey: Prentice-Hall,

The diatonic model, which will be referred to as the diatonic-scale model, though it recognizes that a chord may have more than one function, depending upon its context, has given one function at a time to the chromatic chords that it addresses. Establishing a single functional identity for some chromatic chords is sometimes difficult. When chords are altered, they may come to resemble other chords that have other functions. For example, in the key of C, is an $F^{7\flat5}$ in root position a subdominant chord, or is it better treated enharmonically as a $B^{\varnothing7\sharp3}$ in second inversion, which is to say, is it an altered dominant chord? Identifying the diatonic origin of an altered chord may at times seem arbitrary. In some cases the ambiguity is such that the very value of functional assignments is called into question. Even so, chromatic chords may still be given functional assignments so long as they can be seen as modified diatonic chords.[3] Some chromatic chord relations, like the singly- and doubly-chromatic-mediant relations, have been especially difficult for the diatonic-scale model to address.[4] For instance, in the key of C$\sharp$ minor, what is the function of an Am chord in first

Inc., 2000); Miguel A. Roig-Francoli, *Harmony in Context* (New York: McGraw-Hill, 2003).

[3] It is revealing to observe the thought process of Arnold Schoenberg in *Structural Functions of Harmony* as he makes an effort to fit nineteenth-century chromatic harmony within the diatonic-scale system. The question marks that occur occasionally beneath his examples show that even he was not certain what to make of some chords in certain relations. See Arnold Schoenberg, *Structural Functions of Harmony,* ed. Leonard Stein, rev. ed. with corrections (New York: W. W. Norton and Co., 1969).

[4] Outside of a putative general harmonic model, David Kopp has offered an understanding of chromatic-mediant relations based upon common tones. See Kopp, *Chromatic Transformations*.

inversion in relation to the tonic in root position? Is it a predominant—an altered

♭VI (♭vi)? Or, does the enharmonic leading tone (C) in the bass, and ♭6̂ in the

upper parts, make it a dominant-functioning chord in this setting?

Problems such as these have been addressed primarily in two ways:

function has either been established upon a basis other than that of the diatonic

chord relations, or function as an attribute of chords has been relinquished in

certain cases. For example, Daniel Harrison has embraced the notion that chords

are functionally-mixed structures. This notion is a necessary consequence of his

giving scale degrees, rather than chords, the role of communicating function. He

dissolves "the customary bands between chord and harmonic function" in favor

of a view of chords as "confederations or assemblies of scale degrees."[5] This

atomized view of function leads him inevitably to conclude that even the simple

triads are functionally-mixed structures. Concerning the supertonic triad he

says:

> Although 4̂ and 6̂ give the triad a strong Subdominant flavor, the Dominant
> associate, 2̂, dilutes the otherwise pure Subdominantness. The strength of
> functional communication here depends greatly on doubling and voicing;
> versions of the chord that emphasize 6̂ and 4̂ at the expense of 2̂ will be
> heard to be more Subdominant than those in which this emphasis is
> reversed. Inversion is especially influential in determining functional
> strength . . .[6]

Harrison involves himself in complex analyses of chords by assessing factors

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[5] Daniel Harrison, *Harmonic Function in Chromatic Music: A Renewed Dualist Theory and an Account of Its Precedents* (Chicago: University of Chicago Press, 1994), 57.

[6] Ibid., 60.

like doubling and inversion by which the absolute functions communicated by the constituents of chords are modulated. Although he sets out general guidelines for assessing these factors, his determinations are context-dependent. Rather than providing a table of chords and their functions, he asserts scale degrees and their functions. What results then is an anatomical guide to chord function, but one in which the chordal body changes with its context. In Harrison's harmonic world, identifying chord function has become more complex, even for the simplest of chords.

In a similar vein, Kevin Swinden has recently put forward the idea that certain chords may have two functions simultaneously—'colliding' functions.[7] This idea of hybrid-function chords results from his attempt to determine function partly by investing certain scale degrees with specific functions, and partly by means of deductions from the topography of pitch classes on the *Tonnetz*. Despite the added complexity that hybrid functions might introduce into harmonic analysis, they are perhaps a way to skirt the problem of functional ambiguity by embracing it. Dual functions may be positively viewed as adding to the hermeneutic richness of some chromatic chord successions. Assuming this to be the case, what does hybridity mean for the diatonic-scale-model concept of function? Can function be extended from its diatonic source into chromatic environments and yet retain single identities? Or, is the problem of chromatic chord function more complex than it has heretofore appeared? Perhaps Harrison

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[7] Kevin J. Swinden, "When Functions Collide: Aspects of Plural Function in Chromatic Music," *Music Theory Spectrum* 27 (2005): 149-82.

and Swinden have provided new perspectives on the real issues involved. They

have come to grips with the problem of function in chromatic environments by a

more nuanced functional analysis. In this way, function as a useful concept has

been maintained though its meaning has been complicated.

Other approaches to the analysis of chromatic harmony have at times

relinquished function as an attribute. In instances where the diatonic-scale

model has not illuminated the harmonic meaning of some of the chromatic

passages in tonal music, recourse has been made to 'linear' explanations. In

effect, these approaches have replaced harmonic calculation with a kind that is

partly- or wholly-melodic. Daniel Harrison has expressed some dissatisfaction

with the results of the Schenkerian-based approaches:

> Current analytic approaches stemming from Schenker . . . seem to me
> basically inaccurate in their structural reports because they often do not
> know how to give precise soundings of the harmonic variety and innovation
> in late nineteenth-century music; tricky and pivotal harmonic spots are all
> too often finessed with curvaceous slurs and floating noteheads. I take this
> as a sign that the theory underlying the graph—the theory that motivates
> and governs the analysis—can only be unclear and unhelpful when dealing
> with this music.[8]

Theorists taking a Schenkerian approach have, in the face of a late-

nineteenth-century tonal repertory that seems at times analytically impenetrable,

retained a diatonic-scale model of harmonic theory and fortified it with a voice-

leading or contrapuntal approach. An analysis that views the music as composed

of 'levels'—a surface level and one or more deeper levels—has made a way for the

analyst to treat as non-functional successions those portions of pieces that do not

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[8] Harrison, *Harmonic Function,* ix.

conform to a harmonic analysis using the diatonic-scale model. These 'linear'

chord successions are often interpreted as surface details rather than structural

events, and are eliminated on the deeper graphical representations of passages.

Such interpretations often subordinate problematic chords and successions to the

functions of familiar chromatic or diatonic chords. In other words, chords that

are not rationalized by the diatonic-scale model have been subordinated to those

that are. Ironically, these problematic chords quite often constitute the most

interesting and characteristic portions of works, and may have important formal

roles. For lack of a model of chromatic harmony these linear analyses are not

constrained or regulated as to how some chromatic successions will be treated. If

these linear approaches dispense with the problem of function, they do so in a

way that is perhaps overly permissive and that prompts inspection of the

evenness of its results.

    Whether function is reestablished upon a basis other than that of the

diatonic scale, or whether it is relinquished in the absence of a harmonic model,

solutions to the problems of functional ambiguity and identity have inherent

limitations. It is doubtful that a single solution will suffice to powerfully and

unequivocally establish the harmonic meaning of chords in the innumerable

configurations in which they are found. For this reason, it is valuable to search

out a multiplicity of viewpoints that may be represented in complementary or

competing models. Investigating the richness of harmonic meaning and

enlarging its taxonomy may well require the analyst to coordinate several

compatible models. This thesis presents a model that complements the diatonic-scale model as well as others, and that may be coordinated with other models in the process of analysis.   The model advanced herein employs a cyclical structure based upon the octatonic collection to interpret tonal chromatic harmony.

The Octatonic Collection

My approach uses the three octatonic collections, arranged in a system (the hyper-octatonic system) or cycle, as a means of making functional assessments of tonal-chromatic chord successions. The existing research having to do with the octatonic collection may be divided into two broad categories: analytical studies of the way that the octatonic collection or scale has been used in music since the late-nineteenth century; and more speculative research that is concerned with the scalar or pitch-class set properties of the octatonic collection itself, and how it may be used with respect to the development of new theories.

In its earliest implementations the octatonic collection has been used in tonal environments, yet few of these could be considered overt octatonicism. They are instead usually the result of chromatic-sequential patterning.[9] Its use in the late-nineteenth and early-twentieth centuries in the fantastic scenarios of

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[9] As an example, see Schubert's *String Quartet in G Major,* D. 887, IV, mm. 654-79. For a discussion of this and similar examples, see Richard Taruskin, "Chernomor to Kashchei: Harmonic Sorcery; Or, Stravinsky's 'Angle,'" *Journal of the American Musicological Society* 38 (1985): 72-142; and Stephen Blum, "[Letter from Stephen Blum]," *Journal of the American Musicological Society* 39 (1986): 210-15.

Russian music, typified by the works of Rimsky-Korsakov, is well documented.[10]

It began to be used for its own special qualities by composers such as Liszt,

Scriabin, Bartók, Stravinsky, Debussy, Ravel, Albeniz, and many others, and in

non-tonal environments by composers such as Ross Lee Finney, and perhaps

most notably in the music of George Crumb.[11]

I am not concerned with those specific tonal works that are marked by

octatonicism, nor am I interested in the post-tonal usage of the octatonic

collection. Both of these uses, the tonal and post-tonal, prize the octatonic

collection for its parsimonious voice-leading potential, its symmetry and

interaction with other collections, and its characteristic sound qualities. My

model depends upon the structures that lie beneath, and make possible this

voice-leading potential. The octatonic relations that I describe in the model may

be seen, in part, as parsimonious relations of chord types within and between

groups (i.e., the four chords that share a type within each collection), though

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[10] See, for example, John Schuster-Craig, "From Sadko to The Golden Cockerel: The Development of Rimsky-Korsakov's Harmonic Language" (Paper presented at the Annual Meeting of the College Music Society, Kansas City, MO, September 2002).

[11] For discussions of octatonicism in Bartók, Stravinsky and Crumb, see: Elliott Antokoletz, Victoria Fischer, and Benjamin Suchoff, eds., *Bartók Perspectives: Man, Composer, and Ethnomusicologist* (New York: Oxford University Press, 2000); Richard Cohn, "Bartók's Octatonic Strategies: A Motivic Approach," *Journal of the American Musicological Society* 44 (1991): 262-300; Taruskin, "Chernomor to Kashchei," 72-142; Dmitri Tymoczko, "Stravinsky and the Octatonic: A Reconsideration," *Music Theory Spectrum* 24 (2002): 68-102; Pieter C. Van den Toorn and Dmitri Tymoczko, "Colloquy: Stravinsky and the Octatonic—The Sounds of Stravinsky," *Music Theory Spectrum* 25 (2003): 167-202; Richard Bass, "Models of Octatonic and Whole-Tone Interaction: George Crumb and His Predecessors," *Journal of Music Theory* 38 (1994): 155-86.

voice-leading parsimony is not a feature of the model. The model also depends

upon the symmetry of the collection. Both the voice-leading potential and

symmetry of the octatonic collection have been subjects of interest for the second

aforementioned area of research. Within this area, theorists have explored the

octatonic collection as one of a number of special pitch-class sets that are highly

symmetrical and can be associated with parsimonious structures like the

Tonnetz.[12] These structures are important because they have high degrees of

symmetry and are independent of tonal centers. With them it is possible to

develop theories and analytical tools by which to interpret the tertian structures

within tonally-indeterminate works of the late-nineteenth century, from a voice-

leading perspective. These explorations support the development of neo-

Riemannian theory:

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[12] See, for instance, Adrian P. Childs, "Moving Beyond Neo-Riemannian Triads: Exploring a Transformational Model for Seventh Chords," *Journal of Music Theory* 42 (1998): 181-93; David Clampitt, "Pairwise Well-Formed Scales: Structural and Transformational Properties" (Ph.D. diss., State University of New York, Buffalo, 1997); idem, "Alternative Interpretations of Some Measures from 'Parsifal,'" *Journal of Music Theory* 42 (1998): 321-34; Richard Cohn, "Maximally Smooth Cycles, Hexatonic Systems, and the Analysis of Late Romantic Triadic Progressions," *Music Analysis* 15 (1996): 9-40; idem, "Neo-Riemannian Operations, Parsimonious Trichords, and Their Tonnetz Representations," *Journal of Music Theory* 41 (1997): 1-66; idem, "Introduction to Neo-Riemannian Theory: A Survey and Historical Perspective," *Journal of Music Theory* 42 (1998): 167-80; idem, "As Wonderful as Star Clusters: Instruments for Gazing at Tonality in Schubert," *19th-Century Music* 22 (1999): 213-32; Jack Douthett and Peter Steinbach, "Parsimonious Graphs: A Study in Parsimony, Contextual Transformations, and Modes of Limited Transposition," *Journal of Music Theory* 42 (1998): 241-63; Edward Gollin, "Some Aspects of Three-Dimensional Tonnetze," *Journal of Music Theory* 42 (1998): 195-206; Brian Hyer, "Reimag(in)ing Riemann," *Journal of Music Theory* 39 (1995): 101-38.

Neo-Riemannian theory puts forth a group theoretic approach to Riemann's ideas, and contextual transformations that operate on consonant triads are fundamental to this theory. Three of these transformations, Parallel, Leittonwechsel, and Relative (the PLR family of contextual transformations), transform the modality of a consonant triad by inverting the triad about an axis that leaves two of its pitch classes fixed, and Cohn (1997) exploited this property to advance the concept of parsimony (law of the shortest way).[13]

My use of the octatonic differs from the approach being taken by these theorists in that I am not concerned with parsimonious transformations or the analysis of tonally-indeterminate works per se, but with tonal and potentially-tonal chord successions that are viewed harmonically and not from a voice-leading perspective. This is not to say that the work in this area does not shed light on my own. The various constructions of these theorists, like Douthett and Steinbach's 'OctaTowers,' 'OctaCycles,' 'Chicken-Wire Torus,' 'Power Towers,' and 'Pipeline,' incorporate most of the common triads and seventh chords of tonal music in non-diatonic orientations.[14] In so doing, they imply the potentials of the octatonic collection and its hyper-system to organize the view of tonal chromatic harmony in a way that is not possible for the diatonic-scale model.

Richard Bass has worked in both the analytical and speculative areas of octatonic research, and has investigated the use of hd[7] chords in late Romantic music from a transformational perspective.[15] His interest has been in how

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[13] Douthett and Steinbach, "Parsimonious Graphs," 242.

[14] Ibid., 246-59.

[15] Richard Bass, "Models of Octatonic and Whole-Tone Interaction," 155-86; idem, "Half-Diminished Functions and Transformations in Late Romantic Music," *Music Theory Spectrum* 23 (2001): 41-60.

parsimonious voice-leading transformations operate in conjunction with

harmonic functions. He has observed that:

> In late-Romantic practice, half-diminished chords are adaptable to a variety of extended harmonic functions, and they can also be organized into three groups of four members each, within which they are associated by minimal voice-leading distance. The total pitch content of each group expresses an octatonic collection, and in works where half-diminished chords appear with some regularity, there are two tendencies that can be observed with regard to their usage: first, the proximate grouping of members of the same system, and second, changes from one system to another across larger spans in some systematic way.[16]

I do not share his interest in voice-leading parsimony, but his observations

concerning the functional adaptability of hd⁷s, their proximate grouping, and

systematic changes from one 'system' (in his conception, the group of four hd⁷s

within a single collection) to another support the model that I am advancing here.

The objective of this thesis is to advance a limited model of functional

harmonic relations that I hope will add to the richness of the analytic reading of a

piece. Not intended to be a general theory of harmony, nor to supplant other

models in the analytic endeavor, it is put forward in the spirit of inquiry, in hopes

of answering the question: "what else can be said about this music?" It is

therefore a supplementary or auxiliary model that is not contingent upon the

diatonic scale or voice-leading conventions and has application across a range of

musical styles. Although differing from the diatonic-scale model, it is compatible

with it at many points. The model does not grant functional significance to

certain scale degrees as Harrison has done, nor is it Riemannian as is Harrison's

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[16] Bass, "Half-Diminished Functions," 41.

work, and to a lesser extent Swinden's work, but it may have connections to their theories and to the *Tonnetz*. My approach is dualist—not as a point of speculative departure, but as a consequence of the 'mapped-cycle' approach I take.

Harmonic Problems

I introduce here two examples that demonstrate the challenges posed by tonal chromatic harmony. They will be addressed by the octatonic metaphor in Chapter 3 along with other examples.[17] The chord succession shown in Figure 1 begins with the chromatic-mediant relation C♯m – Am.

Fig. 1. Liszt, *Années de Pèlerinage*,
"Il pensieroso," mm. 1-4

Miguel Roig-Francoli, in his commentary on this passage, observes that C♯m is established as the key at the end of the phrase. He maintains that "[t]he first

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[17] Though the model has been designed so as to be applicable to popular musical styles, and especially to American styles like blues and jazz, a demonstration of the model's breadth of stylistic application is beyond the scope of this thesis. The analyses have been confined to examples of nineteenth-century western-European art music.

two chords . . . are not related functionally within this key: The C♯m – Am triads do not belong to the same diatonic scale, and their relationship, i – vi, is not functional, but rather linear: The Am triad is a chromatic neighbor chord that prolongs i . . ."[18] He also says that "[b]ecause they do not belong to the same diatonic scale, and because, hence, they are not harmonically related according to the tenets of functional progression, chromatic third triads can suspend the sense of functional tonality momentarily."[19] Although Roig-Francoli does not say that the chromatic third triads in the Liszt example do suspend the sense of functional tonality, he raises the possibility. How is it that C♯m and Am, because they are not a part of a single diatonic scale, "suspend the sense of functional tonality," and under what circumstances? Would the sense of harmonic function be threatened by the same mediant relation if the phrase began in the key of E major, preceded by the tonic, as in Figure 2?

Fig. 2. "Il pensieroso," mm. 1-4, reframed
in the key of E major.

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[18] Roig-Francoli, *Harmony in Context*, 742.

[19] Ibid., 742.

Reframed in this way the passage becomes an unremarkable example of a modal borrowing of the subdominant and supertonic chords from the parallel minor, and a modulation to the key of the relative minor. An example such as this at least raises the question of whether chromatic third triads ought to be considered in terms of a diatonic scalar view, since C♯m and Am are no less chromatic third triads in E major than they are in C♯ minor. In neither case do they belong to the same diatonic scale. The chord relation vi – iv in the key of E major, and i – ♭vi in the key of C♯ minor are the same relation; the perceptual difference is of course due to the change in the key context. However, this relation rests upon diatonic scale degrees in both key contexts, and involves relatively minimal chromaticism. How is it that a single chord relation may be easily grasped in the key of E major and yet disorienting in the key of its relative minor? If non-diatonicism does not rule out function in E major, how does it rule out function in C♯ minor when these keys share so much?

These questions cannot be answered here because they involve matters of musical perception that go beyond the scope of this thesis. However, it can be said that it is plausible that some listeners hear the chord relation in question as a functional one. While not minimizing the perceptual difference between Liszt's original and my recasting, this comparison at least suggests that a simple one-to-one correlation between the diatonic scale and harmonic function is too narrow a basis for assigning the functions of even the most minimally-chromatic harmony.

Most of the chords in the passage shown in Figure 3 are not diatonic to the

key of D minor, the local tonic, or its parallel major. Most of them must be viewed as alterations to diatonic chords, if they are to be rationalized by a diatonic scale-based model. The only two chords that cannot be so rationalized are the D♭ and C♭ chords in mm. 9 and 10. For this reason, they pose a harmonic problem for analysts: how do these chords function in D minor, or do they function at all?

Fig. 3. Franck, *Symphony in D Minor*, I, mm. 6-12.

Joel Lester, in his commentary on this passage, regards the D♭ and C♭ chords as tonally distant from the key.[20] He concludes that they are "nonfunctional simultaneities," since function, for him, rests solely upon a diatonic-scale basis. Lester is prepared to view all the chords in the passage as functional except these two. His categorical solution to the non-diatonic D♭ and C♭ chords raises a problem of its own: how do non-functional chords avoid weakening the functional integrity of the whole passage? Is functional hearing

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[20] Lester, *Harmony in Tonal Music,* 232-35.

suspended after m. 8 and resumed at m. 11 with no effect upon the sense of the whole? Lester recognizes this problem when he says that the use of the D♭ and C♭ chords "clouds the harmonic syntax of the phrase."[21] Having concluded this, he accounts for their presence in the passage as foreshadowings of distant key relationships developed later in the symphony. Putting aside the matter of their harmonic syntax, the D♭ and C♭ chords have other kinds of syntax that suit the passage. These chords and the functional chords that surround them all rest upon a chromatically-descending bass line as a primary constructive element. The inspiration for this bass line seems to be the descending melody in mm. 6-8 which is inexactly imitated in the bass in mm. 8-11. The melody begins its descent in m. 6, stalls in m. 9, and then continues on down until m. 11. The whole passage is characterized by a general downward chromatic slide. The D♭ and C♭ chords are seamlessly woven into this contrapuntal fabric. Their constituent voices are consistent with the syntax of the counterpoint.

Analytically, the D♭ chord, more so than the C♭ chord, is the main hurdle to be overcome. Once the D♭ is introduced into the passage, the C♭ seems to follow naturally. The introduction of a non-diatonic D♭ chord into D minor is accomplished, in part, by pitch-class continuity. All the pitch classes of the D♭ chord in m. 9 have been sounded in the previous two measures. Indeed, it has been prepared by the downbeat of m. 7 where the bass and melody form a P5 on D♭. Franck has made a place for the tonally-distant D♭ chord in the key of D

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[21] Ibid., 234

minor with respect to the syntax of pitch-class. Seeing that the D$^\flat$ and C$^\flat$ chords are syntactically intertwined with the other chords in the passage, perhaps they may be seen as something other than non-functional links in an otherwise functional harmonic chain.

It seems generally plausible that if diatonic counterpoint as process may lead to functional harmony as product, then chromatic counterpoint may also lead to functional harmony, provided there exists a system of chromatic chord relations, analogous to the diatonic relations, upon which the harmony may be rationalized. For Lester, the harmonic problem posed by this passage is that all of its counterpoint is comprehensible but not all of its harmony. It is not the counterpoint that precipitates the problem, but the application of a diatonic model. Unavoidably, a chromatic model is required by chromatic music. A passage such as this might be better served by an approach that involves shifting between suitable interpretive models rather than shifting between harmonic categories like chord and simultaneity, or function and nonfunction.

Scope and Organization

The following chapters describe the octatonic metaphor, demonstrate how it is used in analysis, and summarize its advantages.

Chapter 2 begins by giving the purposes for which the octatonic model has been designed, followed by a brief introduction to cyclical models, the octatonic cycle, and its operation within a conceptual metaphor as a means to interpret

chromatic harmony. Next, a description is given of the special type of metaphor by which the model is applied. The following section lays the groundwork for the model by demonstrating how it is possible for a cognitive model based upon the octatonic cycle to interpret chromatic functional harmony by means of a metaphorical mapping. The model is then described in detail as to the chord types that it maps, how they are taxonomically grouped, and how they operate in progressions, retrogressions, and substitutions. Chord substitution is defined and its types and purposes are indicated. The independence of the model from the constraints of voice-leading conventions is discussed as well as the meaning of inversion in the model. Functional identification of inherently ambiguous functions by means of context is illustrated and hybrid functions are introduced. The degree of functional force that a chord in its relations may express is shown to be calculated by chord constitution as well as the contextual conditions in the music. In terms of the latter, the variability of substitutional function is shown to be deduced from a prototype theory that uses graded categories. Lastly, polysemy and hybrid chords are discussed in greater depth.

Chapter 3 provides examples of analytic applications of the model. The analyses include excerpts from Liszt's *Années de Pèlerinage*, "Il pensieroso," Franck's *Symphony in D Minor,* Wagner's *Siegried* and "Prelude" to *Tristan und Isolde*, and Chopin's *Prelude in E minor,* Op. 28, No. 4. These examples pose challenges to a diatonic-scale-based functional analysis. On the basis of such an analysis their complete functionality has been questioned by various interpreters.

Octatonic analyses of these examples are shown to provide completely-functional interpretations. The analyses demonstrate how the octatonic metaphor can rationalize certain instances of chromatic harmony as substitutional chord relations and as processes of incremental variation of functional force.

Chapter 4 will summarize the model, its advantages, and what its place may be within a larger metaphor that employs other cyclical models. The exploration of other models is beyond the scope of this thesis. Research on cyclical models structured upon other symmetrical collections besides the octatonic is ongoing. Preliminary findings suggest that they have the potential to work together with the octatonic model within an expanded metaphor that is suitable to interpret a greater variety of chromatic chord relations. Finally, a glossary of technical terms follows Chapter 4.

THE OCTATONIC METAPHOR

The Design Purpose

This chapter will describe a model of chromatic chord relations that is metaphorically mapped onto chord successions in order to provide functional interpretations. The model has been designed so as to exclude certain constraints that apply to specific styles of tonal harmony. The constraints are the voice-leading conventions, the functional meanings associated with diatonic scale degrees, and the privilege of diatonic tertian chords over non-diatonic ones. Without prior constraints the model acheives a wider scope of application wherein it adapts itself to the stylistic constraints of the music under analysis through the interactive-metaphorical process. This adaptation depends upon the perception of the interpreter. By adapting to changing environments the model achieves greater flexibility. Both the structure of the model and the metaphorical process are described in this chapter.

The following specific items informed the model: the expansion in the kinds of augmented sixth-type chords and their deployment in late nineteenth-century music; the chromatic mediants; the 'tritone substitute' and the general concept of chord substitution in jazz theory; modal dominants and the role of the Mm^7 and 'split-third' chords in popular styles. A non-voice-leading approach seemed appropriate in light of the numerous examples from various styles wherein the

leading tone does not ascend, but descends (as in blues changes and jazz progressions and in chromatic circle-of-fifths successions by Mm^{7}s), and wherein chords move by parallel motion. Chromatic mediants, roving chromaticism, interval cycles, chromatic sequences, and similar kinds of chromatic harmony, in more-or-less diatonic contexts, do not easily yield to a diatonic-scale-model view that attaches function to bass lines. The singly-chromatic, and doubly-chromatic, minor-third mediant relationships, on the other hand, reside comfortably in the octatonic collection. The singly-chromatic, and doubly-chromatic, major-third mediant relationships are also possible within the system, between collections, enabling the model to map onto them and to establish their functional relation, subject to contextual conditions. The octatonic metaphor recognizes and accommodates the privileged status of M, m, and Mm^7 chord types by means of the interactive metaphorical process.

A Cyclical Model

The octatonic model is one of a number of cyclical models that encompass the pitch classes of the equal-tempered octave by hyper-systems composed of symmetrical collections. Each model is an imaginary construct that contains one type of collection (e.g., octatonic, hexatonic, whole tone, etc.), and the collections are ordered in rotations. Some of the subsets of these collections are shared between models. Certain subsets can be specified as ideal forms, and rules can be established that govern their behavior within the system. In the octatonic

model, the ideal form is the fd⁷. It is the building block of the octatonic cycle and

serves other purposes in the operation of the model. The hyper-system of the

octatonic model, which I will simply refer to as a 'system,' is composed from the

three octatonic collections and is numerically symbolized as system 3(4). The

first number stands for the number of collections in the system. The second

number in parentheses stands for the number of equal divisions of the octave that

outlines the structure of the model's ideal form (the fd⁷). The collections will be

referred to as oct1, oct2, and oct3.[1] Figure 4 shows the two orderings of the

octatonic cycle. The progressive ordering is depicted as a clockwise rotation

Progressive   Retrogressive

Oct3   Oct1   Oct3   Oct1

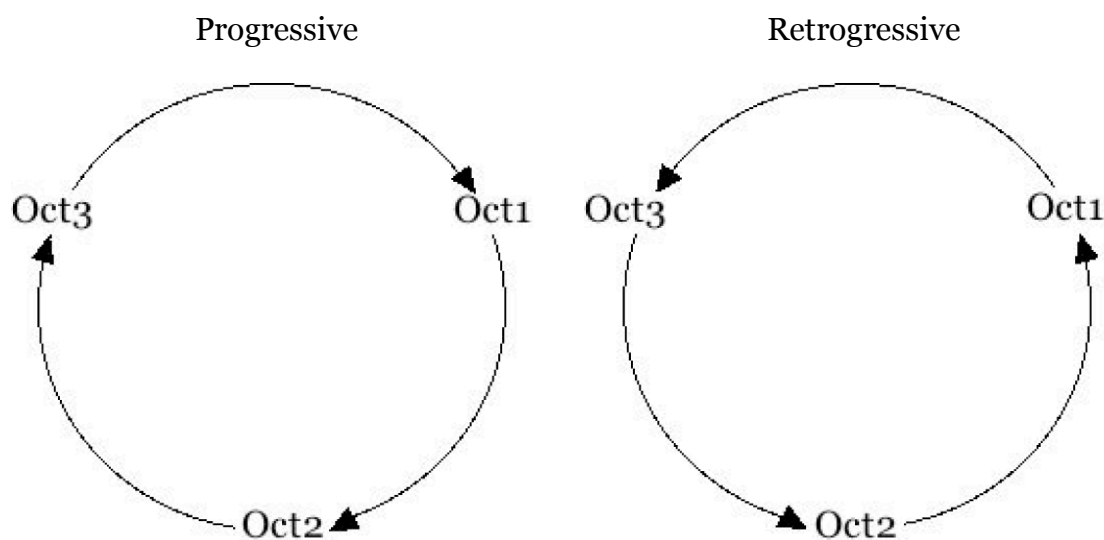Oct2   Oct2

Fig. 4. The progressive and retrogressive orderings
of the octatonic cycle

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[1] The labels for the octatonic collections are not yet standardized. The labels
for the collections used in this thesis are as follows: oct1 refers to the collection
that contains the pitches C and C♯; oct2 to the collection containing C and D; and
oct3 to the collection containing C♯ and D. This is the labeling system used in
Bass, "Models of Octatonic and Whole-Tone Interaction," 155-86.

through the collections; the retrogressive ordering is depicted as a counterclockwise rotation.

The potential value of imaginary models for the interpretation of harmony is assumed whenever the properties of the model can be predicated of some instances of harmony by means of a metaphorical mapping. Actual value is partially gauged by whether or not the interpretive results conform in some aspects, and may conform in others, to the perceptions of the interpreter. The octatonic model resides in the source domain of a conceptual metaphor. It is mapped onto music residing in the target domain. For the octatonic metaphor, the meaning that results from the mapping—the harmonic implication—is the metaphor as product. In what follows, the terms 'source domain,' 'target domain,' and 'product' will be used to refer to the parts of the metaphor.

The fundamental metaphorical process begins by viewing the octatonic collections as categories. Within the categories there are subsets whose forms are identical to those of the tertian chords typical of tonal music. These subsets are representatives of the categories. The categories in the model correlate to functions in a mapping. Since there are only three collections in the octatonic system, there are only three categories of function: tonic (**T**), subdominant (**S**), and dominant (**D**). Any chord that is mapped by a collection represents its category and holds the function that becomes associated with that category in a mapping. Each functional category is represented by multiple chords that express a range of function. Hence, representatives may be categorically, but not

effectively, equal. The three collections of the octatonic system symbolized in

Figure 4 above map onto the diatonic chords that have come to represent

functional categories in the **T – S – D – T** model (i.e., I, IV/ii, V/vii°).[2] The

model works outward from this diatonic center to establish functional relations

for all the chords in a fully-chromatic system. Chords that express more than a

single function—hybrids (addressed later in this chapter)—may be identified by

the model as well.

The product (the interpretive results) of the octatonic metaphor depends

upon the structure of the model and upon the special metaphorical process by

which it is applied. Hence, a description of the model will only make sense if the

metaphor is also described. For this reason, I will now discuss the special type of

metaphor in which the model is located.

Interactive Metaphors

For the many kinds of metaphor that have been identified there are many

degrees of metaphoricity expressed in terms of strength. In the simple

predicative metaphor (i.e., X is Y, where X is the principal subject and Y is the

secondary subject), some measure of similarity between the two subjects, or

domains, is assumed. The degree of metaphoricity is measured by the amount of

incongruity between them. According to Lynne Cameron, when the incongruity

is high between the two domains, then the metaphor that results from their

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[2] These Roman numerals are intended to represent all the diatonic major
and minor forms (e.g., i, iv, ii°, ii$^{\varnothing7}$, etc.)

association is considered strong.[3] The octatonic metaphor is strong because of

the significant disparity between the form and workings of the model and those

of real music. The incongruity of the model is useful because it is resolved in a

transfer of meaning from the domain of the model to that of the harmony.

The metaphor theory of Max Black is helpful for understanding the

cooperation of similarity and difference in metaphorical cross-domain transfers.

Black, a philosopher, put forward a theory of metaphor that he called the

"interaction view."[4] The principal subject of the metaphor is referred to as the

'target domain,' and the secondary subject as the 'source domain.' Whatever

collection of qualities that are in the source domain are mapped upon the target

domain in the making of a metaphorical statement. According to this view,

metaphor does not so much point out the similarities between the principal and

secondary subjects as it makes a set of implied assertions about the principal

subject. In interaction metaphors, it would be more illuminating to say that "the

metaphor creates the similarity than to say that it formulates some similarity

antecedently existing."[5] According to Black, this kind of metaphor organizes the

view of the principal subject by suppressing some details and emphasizing others.

Black describes this as an interaction view because "[t]he nature of the [principal

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[3] Lynne Cameron, "Identifying and Describing Metaphor in Spoken Discourse Data," in *Researching and Applying Metaphor,* ed. Lynne Cameron and Graham Low (Cambridge: Cambridge University Press, 1999), 105-32.

[4] Max Black, *Models and Metaphors: Studies in Language and Philosophy* (Ithaca: Cornell University Press, 1962), 25-47, 219-43.

[5] Ibid., 37.

subject] helps to determine the character of the system to be applied . . ." and, though the purpose of the metaphor is to put the principal subject in a special light, the secondary subject is reflexively recast to some degree by the association.[6]

The power of an interactive metaphor is most keenly felt when it is not pressed too far. It should not be taken as a literal set of assertions about the principal subject. According to Black, "'explication,' or elaboration of the metaphor's grounds, if not regarded as an adequate cognitive substitute for the original, may be extremely valuable."[7] Because Black thinks it best to regard the principal and secondary subjects not as things, but as systems of things, one may take an interaction-metaphorical approach to harmonic systems. With the octatonic metaphor, the relations of the system in the source domain organize the relations of the harmony in the target domain.[8]

Metaphors that are specifically designed for application to systems may be considered theoretical models. Black's description of how analogue models are used in science has some application here: feeling the need for further understanding of the system of things in the target domain,

> We describe some entities . . . belonging to a relatively unproblematic, more familiar, or better-organized secondary domain. . . . Explicit or implicit rules

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[6] Ibid., 38-44.

[7] Ibid., 44-46.

[8] For a discussion of the organizing effect of cross-domain mappings upon the principal subject of a metaphor see: Lynne Cameron, *Metaphor in Educational Discourse* (London: Continuum, 2003), 6-18.

of correlation are available for translating statements about the secondary field into corresponding statements about the original field. . . . Inferences from the assumption made in the secondary field are translated by means of the rules of correlation and then independently checked against known or predicted data in the primary domain. . . . [T]he key to understanding the entire transaction is the identity of structure that in favorable cases permits assertions made about the secondary domain to yield insight into the original field of interest.[9]

The octatonic model is simply organized and easily scrutinized. It has a series of rules of correlation by which transfers are made. The nature of verification is different here than for the sciences, yet the possibility exists. As will be demonstrated, there is a sufficient amount of isomorphism between the octatonic model and the structures to which it is applied that useful results may be obtained.

Models help one "to notice what otherwise would be overlooked, to shift the relative emphasis attached to details—in short, to *see new connections*."[10] Metaphor, while not changing the field of interest itself, but permitting one to see it in a new way, may to some extent also change one's perception of it. This is possible because the metaphorical process extends beyond language into the realm of cognitive strategies. It is therefore feasible to apply a highly incongruent model of chord relations to chromatic harmony by means of an interaction metaphor. The model proposed in this thesis has the potential to illuminate new connections that will influence or reinforce how one hears chromatic harmony.

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[9] Black, *Models and Metaphors,* 230-31.

[10] Ibid., 237.

The imaginative processes that go into the making of metaphors should not

mislead one into thinking that metaphorical mappings do not play a crucial role

in the rational investigation of a subject:

> For we call a mode of investigation rational when it has a rationale, that is to say, when we can find reasons which justify what we do and that allow for articulate appraisal and criticism. The putative isomorphism between model and field of application provides such a rationale and yields such standards of critical judgment. We can determine the validity of a given model by checking the extent of its isomorphism with its intended application. In appraising models as good or bad, we need not rely on the sheerly pragmatic test of fruitfulness in discovery; we can, in principle at least, determine the "goodness" of their "fit."[11]

The Grounds of the Metaphor

In this section the similarity between structures in the model and some

fundamental harmonic successions will be pointed out as the rationale for the

design of the model. The model assumes equal temperament and enharmonic

pitch-equivalence.

The demonstration will begin by considering some of the bass patterns that

underlie diatonic functional harmonic progressions. These bass patterns, taken

from actual music, can be viewed as cycles that start from the **T**, move outward to

the other functions, and then return to where they began.[12] The cyclical view of

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[11] Ibid., 238.

[12] Functional cycles may be identified by their initial function, their order of motion, their length, and by any other qualities they may have. Cycles may be progressive or retrogressive, and they may be partial. A **T** cycle is one that begins with a **T** chord. The succession **T – S – D** forms a three-quarter, progressive **T** cycle.

these bass patterns is consistent with the **T – S – D – T** model of harmonic progression. The following demonstration will show that the bass patterns that support the **T – S – D – T** ordering of the primary tonal functions constitute pitch-class cycles that are mapped by the fd[7] cycle. This mapping capacity is significant because the fd[7] cycle is one half of the octatonic cycle. Figure 5 shows two simple successions in the diatonic major that exemplify the **T – S – D – T** model.

Fig. 5. Two examples of the **T – S – D – T** model.

The bass lines of these progressions, and others like them that conform to the **T – S – D – T** model, are cycles, and their cyclical nature may be more fully appreciated by a metaphorical mapping of the fd[7] cycle—a cycle made solely from the 'ideal form' of the model. Such a mapping follows the cognitive strategy stated above by Black concerning analogue models wherein "we describe some entities . . . belonging to a relatively unproblematic, more familiar, or better-organized secondary domain" in order to organize the view of the primary domain of interest.[13]

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[13] Black, *Models and Metaphors,* 230-31. See the discussion above, page 26.

Figure 6 shows the fd^7 cycle, which is made only of descending fd^{7}s. It is one of two possible orderings of fd^{7}s. The cycle may begin from any point as to pitch class, and it traverses the available pitch space of the octave before it returns to where it began. Only three fd^{7}s that differ by pitch-class content are possible before the cycle is closed. Each fd^7 is a position on the cycle. Any one of the three may initiate a cycle. The notable features are the form of the fd^7, the direction of motion, and the increment of motion—the m2.

Fig. 6. The fd^7 cycle.

Figure 7 juxtaposes the fd^7 cycle and the bass patterns shown in Figure 5. It can be seen from this figure that the pitch classes of the bass patterns in Figure 5 are present in the fd^7 cycle.
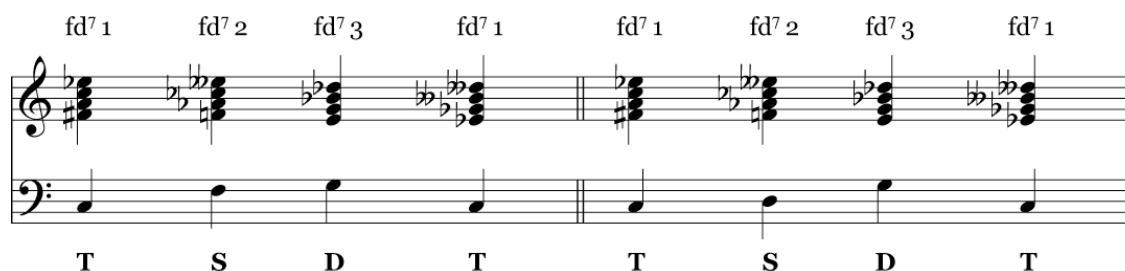

Fig. 7. The fd^7 cycle mapped onto two bass patterns that support
the **T − S − D − T** model of harmonic function.

The intervals between the pitches of the bass patterns are present in the potential voice leading within the cycle.[14] For this reason these patterns may be mapped by the fd^7 cycle. In fact, any bass patterns whose pitches move downward by m2, upward by M2, downward by M3, or upward by P4, and any of their inversions, can be mapped by the fd^7 cycle. These motions are characteristic of the octatonic model, and I will refer to them as 'directed intervals.' They are shown in Figure 8. The corresponding bass patterns in Figure 5 above use two of these directed intervals: the ascending P4 and ascending M2.

descending m2   ascending M2   descending M3   ascending P4

Fig. 8. The directed intervals that are mapped by the fd^7 cycle.

The fd^7 cycle maps onto certain bass patterns that occur frequently in tonal harmony. For example, the circle-of-fifths pattern shown in Figure 9, because it is a chain that is formed from one of the directed intervals of the model, may also be mapped by fd^7 cycles. In this mapping, the bass notes are imbedded in a rotation of fd^{7}s: fd^{7}1 – fd^{7}2 – fd^{7}3 – fd^{7}1 – fd^{7}2 – fd^{7}3 etc. In a complete circle of fifths, moving by P4s, there are four fd^7 cycles. The fact that this pattern can be

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[14] 'Voice leading' has a precise meaning in the octatonic model and is addressed in the section **Voice Leading and Inversion**, below, page 46.

mapped in this way is relevant to the model in view of the elevated status of the

perfect fifth as an interval of root motion in harmonic theory.

Fig. 9. The circle-of-fifths bass pattern mapped by fd^7 cycles.

The cyclicality of certain bass lines may not be immediately apparent until

they are mapped by fd^7 cycles. Furthermore, the number of smaller cycles

contained within a larger pattern may not be apparent until a mapping is made.

For instance, the bass line in Figure 10 might be seen as a single cycle because it

begins on C, moves outward to other pitches, and then returns to C. However, it

Fig. 10. Bass pattern mapped by two overlapping fd^7 cycles.

may also be regarded as a combination of overlapping cycles, or as a pattern that contains smaller cycles. It may be viewed as consisting of two overlapping **T** cycles (i.e., a complete or incomplete cycle that begins on **T**), if one supposes that it supports a chord succession like i – iv – V – i – ii° – V – i in C minor. Figure 10 shows that this bass line is mapped by two overlapping fd^7 cycles, which is also to say that it is mapped by a continual descent of fd^{7}s by the m2 directed interval. Since this bass line is mapped, its implicit harmonic cyclicality in C minor is subsumed by the fd^7 cycles.

Alternatively, instead of seeing the fd^7 cycles from the point of view of C minor, one may see the cycles in C minor from the point of view of the fd^7 cycles. The bass line may be regarded as one that implies overlapping harmonic cycles because it is one of many possible exercises of the potential voice-leading within two overlapping fd^7 harmonic cycles. In other words, the fd^7 cycle imputes cyclicality to the patterns onto which it may be mapped.

Thus far in the demonstration it may be seen that the potential usefulness of the fd^7 cycle for the interpretation of tonal harmony is owing to its capacity to map onto pitch patterns that are typical of tonal harmony, like the bass patterns in Figures 5, 9, and 10. All these patterns may support progressions that exemplify the **T – S – D – T** model. Since the fd^7 cycle is central to the structures of the octatonic cycle, its mapping capacity provides the initial rationale for the metaphor.

It can be seen from Figures 9 and 10 that a pattern in the bass does not have

to end where it began, in terms of pitch class, to imply a harmonic cycle, so long as its pitches represent an iteration of the fd[7] cycle. This is so because all the pitches of the bass line are equal as representatives insofar as they bear identical relations to their corresponding fd[7]s as a consequence of the symmetry of the fd[7]. The ideal ground of the cyclicality of this and other similar bass patterns is participation in the fd[7] cycle, which is to say, an exercise of the potential voice leading of the fd[7] cycle. Notice that the intervals of bass motion in Figure 10 are all the directed intervals identified in Figure 8.

The fd[7] cycle may be enhanced by the addition of adjacent fd[7]s so that all the pitch classes of chord successions, whose bass patterns are mapped by a single fd[7] cycle, will also be mapped. This addition generates the hyper-octatonic cycle, which may be referred to more simply as the octatonic cycle. The three octatonic collections that constitute the octatonic cycle are shown in Figure 11 in the progressive ordering of the cycle. Each collection is represented as a stack of thirds because the model will be mapping onto tertian chords; and it will be easier to visualize the mapping in this way.

Fig. 11. The octatonic cycle.

Each collection is a position on a potential cycle, and any position may initiate a cycle. It is important to note that the octatonic cycle is comprised of three identical collections that are constituted by the juxtaposition of two fd^7 cycles that descend by m2. The octatonic cycle, like the fd^7 cycle, is relatively unproblematic and better organized than the harmonic constructions onto which it will be applied. When this cycle in the source domain of the metaphor is mapped onto certain abstracted harmonic constructions in the target domain, then not only will the harmony be seen from this perspective to be implicitly cyclical, but any other properties attributed to the cycle may also be clarified in the harmony. Figure 12 shows the three collections that are positions on the progressive octatonic cycle. Next to each collection is a major triad that is mapped onto by the collection. The triads are the I, IV, and V in the key of C major. The ordering of the collections that constitutes the cycle maps onto the ordering of the primary functions in the **T – S – D – T** model.[15]
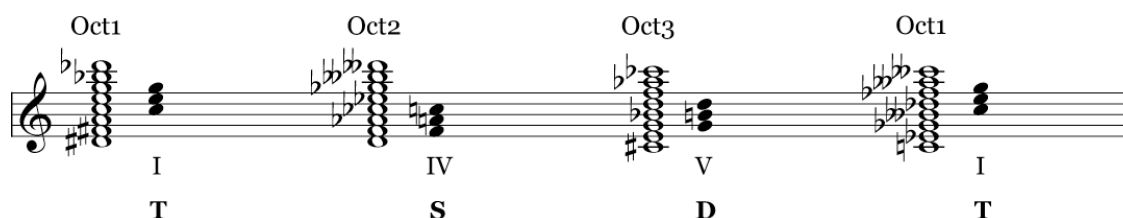
Fig. 12. The primary functions in the **T – S – D – T** model
mapped by the octatonic cycle.

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[15] There are other triads that are mapped by the positions on this cycle that are typical of the **T – S – D – T** model. For example, oct2 will also map onto ii and ii°. All the possibilities for each function will be discussed below.

To sum up the demonstration thus far, the implicit cyclicality of the patterned diatonic representatives discussed above has been asserted on the basis of a metaphorical mapping. The property of cyclicality that belongs to the model in the source domain is transferred to the diatonic constructions in the target domain. On the basis of this transfer I have asserted that pitch patterns that serve as bass lines do not have to form strict cycles in order to imply harmonic cycles. It is important to recall the distinction that was made at the beginning of the discussion of metaphor between the measure of similarity and that of difference or incongruity between the two subjects of a metaphor. The grounds of the model that have been identified thus far point out the similarities between bass lines and triadic progressions representative of the diatonic system and pitch-class cycles representative of the octatonic system. A mapping of the one onto the other reveals the similarities between the two. There is sufficient similarity between the two domains to furnish a rationale for going forward with an exploration of the differences that arise from the mapping, pursuant to the interaction view of metaphor. My ultimate goal with this metaphor is to expose other properties or qualities that are transferred in the mapping and to show what interaction there is between the two domains of the metaphor.

Already it may be seen that if a representative of the diatonic system can be mapped onto by a representative of the octatonic system, on account of sufficient similarity between the two domains, then the representatives of the diatonic system are also representatives of the octatonic system, and vice versa.

Accordingly, it may properly be said that the **T – S – D – T** model, whose origins

lay in the diatonic system, is also a model that represents the octatonic system.

Now that the ultimate rationale for the model has been posited, the elements of

the model will be described beginning with the chord representatives in the

octatonic collection.

Chord Types in the Octatonic Collection

The octatonic collection is suitable for use in the metaphor because it

contains many of the prevalent chord types of tonal music, and features the

tritone—the active agent in the dominant seventh and augmented sixth chords.

The common chord types mapped by the octatonic collection are the M, M$^{(6)}$,

Mm^7, Mm$^{7\flat9}$, Mm$^{7\flat5}$, m, m$^{(6)}$, mm^7, d, hd^7, and fd^7. All the chord types except for

the fd^7 are functionally grouped by type. Each of the types is represented at four

locations within a collection, except for the Mm$^{7\flat5}$ and the fd^7, which are each

represented twice, and the d is represented eight times—four in each fd^7. Each

collection contains a higher and lower fd^7 according to pitch class (e.g., D$^{\flat o7}$is the

higher fd^7 and C^{o7} is the lower fd^7 of oct1). The d chords constitute two groups

according to the fd^7 from which they are derived. The number of chord groups is

fewer than the number of types shown above because the fd^7 has no group, and

the model treats as equals those types that are inversions of other types: the hd^7

and the m$^{(6)}$, and the mm^7 and the M$^{(6)}$.[16] Inversional equivalence is the

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[16] The term 'group' is not meant to refer to the specific definition that it has
in algebraic group theory. The word is being used in its most general sense.

consequence of making representation a matter of pitch-class content rather than chord type. The grouped representatives overlap part of their pitch-class content except for the Mm$^{7\flat5}$ chords. The d triad is constituted of pitch classes from single fd^{7}s. All the other representatives are constituted of a mix of pitch classes from both fd^{7}s of a collection. The constitution of a chord refers to the particular proportion of pitch classes from the fd^{7}s of its collection. A chord's constitution is symbolized as x/y, where x is the number of pitch classes from the higher fd^7 of a collection, and y is the number of pitch classes from the lower fd^7. All the chords of a single type and their inversions have the same constitution.

The fd^{7}s are the source of the model's m3 chord relations. A comparison of all the chords of a single type that belong to one of the collections will show that they are separated from one another by that interval, with the exception of the fd^{7}s themselves, and the corresponding separation between the two groups of d chords.

For the common tertian chords, there are nine groups in any octatonic collection. They are the M, Mm^7, Mm$^{7\flat9}$, Mm$^{7\flat5}$, m, mm^7 (M$^{(6)}$), lower-d, higher-d, and hd^7 (m$^{(6)}$).[17] The fd^7 is a singular form with a privileged place in the octatonic model. The model will map onto fd^7 chords in the music and, under

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[17] The MM7 does not occur in the octatonic collection. The MM7 is discussed with respect to the hexatonic collection in the section **Other Cyclical Models**, Chapter 4, page 98). The lower-d group contains the four diminished triads of the lower fd^7 (e.g., C^{o7} in oct1); and the higher-d group contains those of the higher fd^7 (e.g., D$^{\flat o7}$ in oct1).

certain conditions, predicate of them the strongest potential force of motion.[18]

When a fd[7] chord, mapped by the higher fd[7] of its collection, progresses, it

functions very much like a progressive Mm[7]-type chord whose root lies a m2, M3,

P5, or m7 below that of the fd[7]. For instance, a G[o7] may function in place of an

E[♭7] as a **D** of A[♭]. Actually, the model regards the strongly progressive fd[7] as a

chord with its root omitted.[19] Its Mm[7]-type substitutes may be located by adding

the omitted root. In the case of the G[o7], it becomes an E[♭7♭9] by the addition of the

pitch E[♭] as its omitted root.[20] Moreover, some contexts may lead the interpreter

to conclude that d triads, fd[7]s, and hd[7]s have omitted or imaginary roots. For

example, the diatonic vii[o], functioning as a **D**, has an imaginary root of $\hat{5}$. By

contrast, the i[o] that is otherwise described as a common-tone embellishing chord

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[18] The functional force of chords is equivalent to their clarity of functional expression. The strongest functions are those that most clearly represent their categories and most clearly differentiate themselves from other functions. Force is developed in relations and depends upon factors that are internal and external to the chords involved.

[19] For a full explanation and illustrations of the theory of omitted roots see Arnold Schoenberg, *Harmonielehre,* 3d ed., rev. (Vienna: Universal Edition, 1922); English trans. by Roy E. Carter (Los Angeles: University of California Press, 1978), 192-201; idem, *Structural Functions of Harmony,* rev. ed., ed. Leonard Stein (New York: W. W. Norton and Co., 1969), 16, 17, 35-36, 44, 50, 64.

[20] If, following Schoenberg's logic, d and fd[7] chords may be considered Mm[7] and Mm[7♭9] chords with omitted roots, it may be possible to apply the same logic to other triad types. For instance, an E[♭] major chord may be considered to be a Cmm[7] with an omitted root. Both chords in this system represent the same category with differing degrees of progressive force. However, this important difference should be noted: the diminished-type chords require one to consider whether or not they have an omitted root, in order to establish their membership within a collection. There is no requirement for chords like the E[♭] major and Cmm[7] that are located only in a single collection.

when it alternates with I has a real root. Except for ds, fd[7]s, and hd[7]s with omitted roots, all types of tertian chords have real roots.

The Mm[7] is perhaps the most featured chord type of the octatonic model because it has been such a staple among musical styles, and its usages have gone the furthest to suggest the form of the model. Since the model is structured around the ideal form of the fd[7], and since the Mm[7] is quite similar to the fd[7], it lies near the center of the model. The Mm[7] is seen as a form that may have varying functions and degrees of force depending upon its relations and the specifics of its context. It may take all three categories of function and may move forward, backward, or reach outward to other representatives within and between groups.[21]

In principle, any chord type, as a categorical representative, can assume any function in the product of the metaphor. M and m triads with or without 7s, 9s, etc. may be the most stable points of harmonic arrival, but there are other possibilities. The quality of action of a chord type, when it assumes each of these functions, varies depending upon its constitution and the context in which it acts.

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[21] The following is an example of a chromatic wedge pattern in which Mm[7]s (under the brackets) prolong representation of oct1. The pattern presents all the representatives of the Mm[7] group in oct1.

In a strictly diatonic context some chord types are peculiar to certain scale degrees (e.g., the Mm^{7}on $\hat{5}$, the hd^7 on $\hat{2}$ or $\hat{7}$, etc.).[22] In chromatic music, where they have been used on other scale degrees, they point toward the full implementation of their possibilities. The octatonic metaphor formalizes some of these possibilities.

Progression, Retrogression, and Substitution

Any two chords that may be mapped by the octatonic model are categorically related in only three possible ways: they are in a progressive, retrogressive, or substitutive relation. Other conditions aside, if both chords belong to the same collection, they are substitutively-related, regardless of their order; if they belong to different collections they are either progressively- or retrogressively-related, depending upon their order of presentation.

A harmonic succession that is subject to an octatonic mapping will be progressive when its chords follow the ordering of the **T – S – D – T** model (i.e. **S** after **T**, **D** after **S**, **T** after **D**). The progressive ordering follows the clockwise rotation of octatonic collections shown in Figure 4 above. A harmonic succession that is subject to an octatonic mapping will be retrogressive when its chords follow the ordering of the **T – D – S – T** model. The retrogressive ordering follows the counterclockwise rotation of octatonic collections shown in Figure 4.

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[22] Popular styles will use the Mm^7 to represent all three functional categories within a key, whereas the Classical style, for example, preferred this type as a **D** representative.

Categorical equality in the model translates into the ability of one chord to act as a 'substitute' for another in the product of the metaphor.[23] For example, $D^{\flat 7}$ and G^7 both belong to oct3. Hence, $D^{\flat 7}$ may substitute for G^7 as a **D** function in the key of C. A substitution expresses the same functional identity as the substituted chord with a different degree of functional force. One chord may substitute for another when both share a root. A substitute with a different root than that of the chord for which it is a substitute is identified by a suffix indicating the interval between the root of the original function and that of the substitute.

In a section of music, the original **T** has its root on the pitch center; the original **S** has its root on the pitch class a P4 above or P5 below the pitch center; and the original **D** has its root on the pitch class a P5 above or P4 below the pitch center. A substitute whose root is a m3 above (M6 below) that of the original is a sub3 (i.e., 3 semitones above); one whose root is a tritone (6 semitones) from that of the original is a sub6, and one whose root is a m3 below (M6 or 9 semitones above) that of the original is a sub9. For example, in the key of C, if G is the original **D**, indicated as V, the tritone substitute, $D^{\flat}$, is indicated as Vsub6. Substitution as an operation of the model takes place within a collection when one chord shifts to another within the same group or within

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[23] Late-19th-century and early-20th-century composers, as well as jazz improvisers, substitute one chord for another within progressions when they share pitches. The substitution provides variety without changing the harmonic function, although the degree of perceptual clarity may vary. For instance, a V^7 chord may be replaced with a $^{\flat}II^{\flat 7}$. The tritone shared between them makes the substitution acceptable.

another group. Shifts between groups—group-shifts—may involve a change in chord constitution.[24] Shifts within groups—group member-shifts—do not.

Substitutions have a number of purposes depending upon whether they are used simultaneously or successively. As replacements in successions or as extensions of chords, their primary purposes are to add variety to the harmony and to increase the motion forces toward other functions. When they are used successively, their purpose may be to change the mood of the harmony, to be pivot chords in modulations or to facilitate modulatory processes, to avoid cadences, or to prolong a function (especially in complete m3-interval cycles within a group).[25]

The various groups within each collection have been identified, and the distinction has been made between the two kinds of group shifts in order to clarify the structures within the collections. Both kinds of shifts may fulfill any of the purposes listed above, and in certain cases their effect is the same.[26] Substitutions that are used to extend chords may do any of the following: add the m3 if the chord has a M3 (tantamount to making a 'split-third' or adding a $\sharp$9),

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[24] Chord 'type' is not synonymous with chord 'constitution.' As an example, M$^{(6)}$ and mm7 chords are different types, but have the same constitution in the model.

[25] No attempt is made here to define all the possible purposes of substitutions or to limit the meanings that they may have within the octatonic metaphor.

[26] As an example, a C7 chord that group-shifts to a Cm chord may have the same combined effect as a C chord that group-member shifts to an E$\flat$ chord.

and vice versa (tantamount to adding a $^\flat$11); add the $^\flat$5 (or $^\sharp$11) if the chord has a P5, and vice versa; add the m^7; add the m^9 (or $^\flat$9); or add the M^6 (or 13).

Because there is a m3 relation between members within a group and also between members of different groups within a single collection, the minor-third chromatic-mediant relationships are substitutional.[27] Such relations often suggest that the two project a single function. The major-third chromatic-mediant relations exist between collections as progressions or retrogressions.

The functional relations among chords arising from an octatonic mapping can be demonstrated with major triads. Traversing the octave on C by m3s will result in four nodes located at C, E$^\flat$, G$^\flat$, and A. Major triads whose roots are on the four nodes belong to one category in the model (oct1). These triads are representatives of the category and make up a group. Notice that the nodes together constitute a fd^7 chord. Since the octatonic system contains three fd^{7}s, there will be two other sets of nodes, and two other groups of major triads. The nodes corresponding to oct2 in the model are B, D, F, A$^\flat$, and those corresponding to oct3 are D$^\flat$, E, G, B$^\flat$. In the key of C, a C chord is an original **T** and the three other major triads in the group that contains the C (i.e., E$^\flat$, G$^\flat$, and A) are its substitutes. Consequently, the F chord is an original **S** and the three other major triads in the group that contains the F (i.e., A$^\flat$, B, and D) are its substitutes, and the G is an original **D** and the three other major triads in the group that contains the G (i.e., B$^\flat$, D$^\flat$, and E) are its substitutes.

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[27] For instance, much blues music juxtaposes major triads a m3 apart on the tonic and on the dominant functions.

The Chromatic Chord Map

The model produces a network of chromatic chord relations among the common chord types of tonal music. Figure 13 shows the relations of the three functions in the progressive ordering. The upper-case Roman numerals stand for all the possible chord types and their pitch levels as they are referenced to the
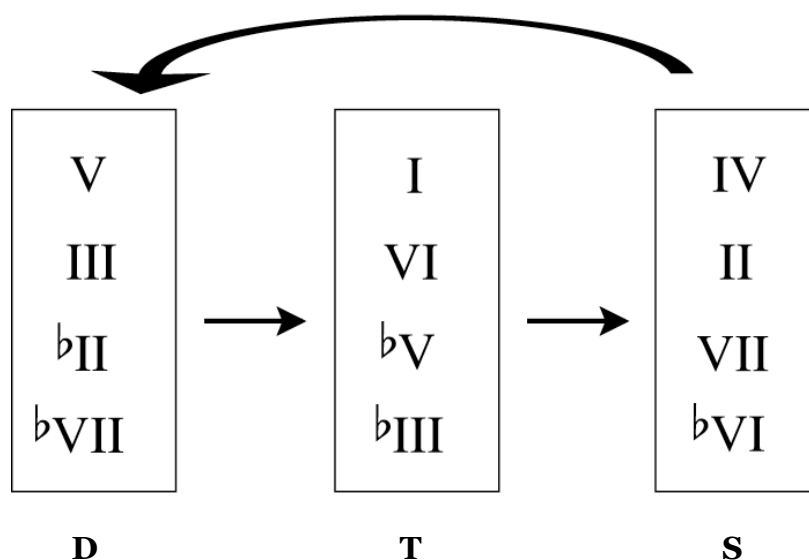

Fig. 13. The Chromatic Chord Map
with Roman numerals.

pitch level of the tonic. All twelve pitch levels are mapped out in terms of the three functional categories. Figure 14 shows a specific map where the tonic is rooted on C. The boxes from left to right hold the roots, real or imagined, of chords belonging to oct3, oct1, and oct2. All the chords (represented by their roots) within a box may substitute for each other. The intervals between roots in

successive boxes are the directed intervals of the model. The cyclicality of chord

successions that conform to the **T – S – D – T** model is symbolized by the

circular course of the arrows on the map. Beginning in the center, the tonic

chord types are rooted on C, A, G$\flat$, and E$\flat$, and all progress toward the

subdominant chord types that are rooted on F, D, B, and A$\flat$, which all progress

toward the dominant chord types on the left that are rooted on G, E, D$\flat$, and B$\flat$,

which all progress back toward the tonic chord types.
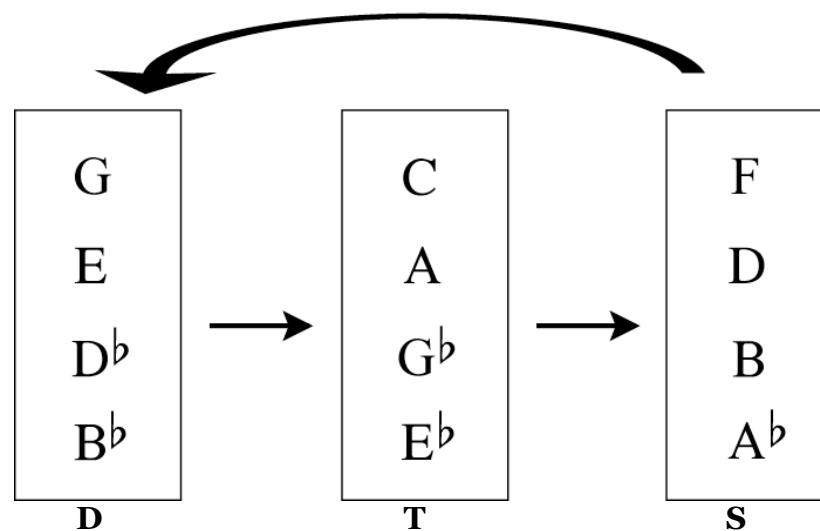
Fig. 14. The Chromatic Chord Map
on C.

Voice-Leading and Inversion

Dispensing with the voice-leading conventions is a precondition for a

chromatic model of harmony. The conventions do not constrain chromatic

music, and consonance and dissonance do not regulate harmonic succession.[28]
As Harrison observes "[…] voice leading in chromatic music is not the colleague
of harmony that it is in earlier music but rather its servant since it does not
control the choice, progression, or resolution of chords."[29] The octatonic model
simplifies the view of chords by grouping them according to type.   Chord usage—
the particular orientation of a chord with respect to its musical setting—bears
upon interpretation as a contextual element that interacts with the model in the
metaphorical process. Two chords of the same type are grouped in the model
even though one does not conform to certain scale and voice-leading conventions
and the other does. For instance, in the key of C, a $B^{\flat 7}$ chord may be a **D** (V^7sub3)
even though it has no leading tone. In the model dominantness is not
conditioned upon the presence of the leading tone or its natural tendency to
resolve upward.

Two chords are grouped even though they have been differentiated in other
theories according to the characteristic voice-leading associated with them.
Hence, the Gr^{+6} and Fr^{+6} chords are present in the model in the guise of their
enharmonic equivalents: the Mm^7 and the $Mm^{7\flat 5}$. The 'regular' and 'irregular'

---

[28] Much of the literature for the piano idiomatically loosens the restrictions
upon voicing and spacing for the sake of practicality with no loss of harmonic
effectiveness. It is not necessary to rationalize this looser harmonic practice so
that it conforms to the standards. Its effectiveness is taken as a fact that the
model recognizes. The guitar, more so even than the piano, depends upon
harmonic parallelisms and practices that violate the rules of proper voice-leading
and part-writing. Such voice-leading characteristics are especially prevalent in
popular styles.

[29] Harrison, *Harmonic Function,* 124.

uses of augmented sixth chords correspond to the Mm^7 and the $Mm^{7\flat5}$ operating

in progressions, retrogressions, or substitutions.

The model does not consider scales (though the metaphor does), and hence

does not recognize functions assigned to certain scale degrees moving in specific

ways. The application of the model uses the idea of 'voices' as an expedient.

Voices are used to show the characteristic directed intervals between chords, but

are not meant to imply that the model takes a voice-leading approach to

harmony. When chords move by the directed intervals of the model they may

break the conventional rules of voice leading. Consistency in the number of

voices between chords is not relevant to the model. Voices that are present in one

chord may be absent in the next. Chords with five pitch classes may be followed

by chords with three. The type of motion between voices is not a consideration.

The voices in a chord may all move in parallel motion to the following chord, or

they may cross. The two Mm^7s shown in Figure 15 a) are in a progressive relation

because their counterparts in the model are representatives of octatonic

categories in the progressive ordering, as shown in Figure 15 b). The motion

between the Mm^7s shown in Figure 15 a) is parallel motion upward by a P4.[30] The

motion upward by P4 is one of the characteristic progressive directed intervals of

the octatonic model. Whether chords move in root position or inversion makes

no difference. Inversion has no effect upon the functional identity of common

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[30] Incorporating parallel motion by any of the directed intervals is an advantage of the model because chords that move this way are typical of popular styles like blues and jazz.

chords because it does not alter their pitch-class content. However, pitch-class content alone may not determine the function of some chords. A chord that is identical to one of the common chord types, judging by pitch-class content alone, may instead be a hybrid chord. A common chord and a pitch-class-equivalent hybrid chord have different functions. Hybrid chords may appear as inversions of common chord types, and are only distinguishable by context. Hybrids are discussed in greater detail at the end of this chapter.
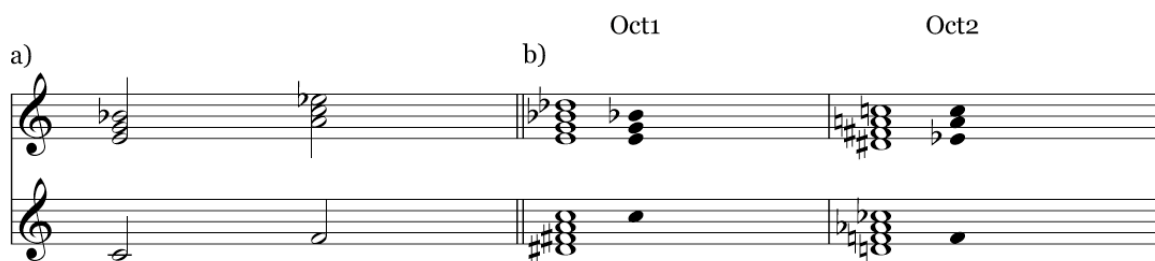
Fig. 15. Mm^{7}s in progressive ordering: a) C^7 – F^7;
b) distribution of pitch classes by higher and
lower fd^{7}s in progressive ordering.

Identification of Function by Context

Owing to the ambiguities of functional meaning that chromatic chords may have, and the inherent simplicity of the model, context becomes critical in calculating the functional force of chord relations, and in certain cases, in determining the functional identities of chords themselves. Diminished-type chords frequently require extra attention to contextual details. The polysemy of diminished-type chords is limited only by a sensitive execution of the interactive

process. An example will make this point clearer. As a condition for appreciating

the example, it should first be understood that the octatonic model does not

recognize the voice-leading tendency of the 'leading tone' as a harmonic function.

The pitch class in the model that maps onto the leading tone in the music, in

those representatives in which it occurs, does not move upward to the pitch class

that maps onto $\hat{1}$. There is a sufficient number of cases in the literature wherein $\hat{7}$

in **D** chords moves downward by step to suggest that its harmonic function is not

contingent upon upward voice leading to $\hat{1}$. This observation is not meant to

suggest that the interpreter will ignore the voice leading in the music; but that a

leading tone will be judged not to contribute to progressive functional force by

virtue of its upward movement. Consequently, its presence in a chord type that

often holds a **D** function does not mean that it must have that function. The

model accounts for the possibility that any diminished-type chord that contains $\hat{7}$

may have an **S** function that is identified based upon significant contextual

factors that lead away from a **D** interpretation.

    In Figure 16 the chords marked with an x are equivalent as to their

pitch classes, but differ in other respects.[31] In light of their local contexts, and the

larger contexts in which they might occur, their functional interpretations may

differ. The model itself is concerned with pitch class and is indifferent not only to

pitch spelling, but also to chord spacing, register, and orientation. It does not

contain the information necessary to judge whether a diminished-type chord in

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    [31] The Roman numeral symbols in Figure 16 do not indicate inversion but
chord type only.

real music—a chord that shares its diminished component with two octatonic collections in the model—does or does not belong to a particular functional category. For a case such as this, the information required to make a functional designation emerges in the metaphorical process.

Fig. 16. The polysemy of the hd⁷
as **D** and **S** functions.

It is reasonable to conclude from this minimal context that the marked chords have different roots. The first chord has an omitted root, which is to say that its root may be supposed to be on D. It is interpreted as a **D** that stands in a progressive relation to the G chord that follows it. The chord is a representative of oct2, except for one of its pitch classes—the A♯—which does not occur in oct2. Since this chord contains a pitch class outside of oct2, it is a hybrid. By comparison with the Mm⁷, having consitution 3/1, it is a somewhat weakened dominant function with constitution 3/1$_h$ (i.e., 3 pitch classes from oct2 and 1 hybrid pitch class).[32] The second marked chord has its root on C and is a

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[32] If this hybrid chord is viewed in terms of its omitted root (D), it can be seen that the A♯ would be well accounted for as the 5th of an augmented triad component. Augmented triads do not represent the octatonic collection, but they

representative of oct1. It is an octatonic **S** that stands in a retrogressive relation

to the G chord that follows it. It is a potentially strong retrogressive function with

constitution 3/1 that transfers most of its functional force to the succeeding

chord.[33] By knowing their pitch classes, their vertical disbursement, their

immediate context, what roots they are likely to have, and any other relevant

conditions, the model is enabled to predict the functional identities and strengths

of polysemic chords.[34]

Degrees of Function by Constitution and by Context

In the metaphor, function is expressed in a range that involves two kinds of

functional measures. One is by constitution; the other is by context. The general

functional ranking, based upon constitution, is the objective stipulation of the

model. The specific rank, that is, the positioning of a chord within its group and

category, is subject to the interpreter's sense of the chord's role in the music.[35]

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do represent the hexatonic collection. In the hexatonic model, the D$^+$ is a strong
progressive chord by constitution such that its resolution to a G chord is
considered a strong progressive relation. Considering it here only from an
octatonic standpoint, it is a weakened **D** function.

[33] The less-than-maximum transfer of retrogressive functional force follows,
in part, from the stipulation that M chords are more forceful as objects of
progression than as objects of retrogression.

[34] For a detailed discussion of polysemic chords and hybrid chords, and in
particular the hd[7], see the section **Polysemy and Hybrid Chords**, below, page
62.

[35] The model uses graded categories in which chords have a centrality
gradient. A chord's proximity to the prototype of its category turns upon the idea
that ". . . members (or subcategories) which are clearly within the category

As previously defined, constitution is the proportion of pitch classes from the fd[7]s of a chord's category. A chord's proportional resemblance to the two ideal forms (fd[7]s) within its category has been made the measure of its potential functional force to progress or retrogress. The more a chord is like the higher-fd[7] of its collection, the greater its potential force in progression and the smaller in retrogression. Conversely, the more a chord is like the lower-fd[7] of its collection, the greater its potential force in retrogression and the smaller in progression.[36]

A chord may be reconstituted so as to have a heightened directedness toward other functions. The directedness of a C chord as **T** is heightened when it becomes a C[7]. Its constitution changes from a 2/1 proportion to 3/1. In this regard it equates to a V[7]/IV in the diatonic-scale model. Likewise, the **S** can have a heightened directedness toward the **D**, and the **D** toward the **T**. All of the functions may be retrogressively heightened as well. An increase (or decrease) in the progressive or retrogressive potential of a chord takes place when its constitution changes, which is also to say that it shifts from the group of which it is a member to another group within the category it represents.

The tertian tetrachords that represent the octatonic collection may have the proportions 4/0, 3/1, 2/2, 1/3, and 0/4, where the first number indicates the quantity of pitch classes of the higher fd[7] and the second number indicates the

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boundaries may still be more or less central." George Lakoff, *Women, Fire, and Dangerous Things* (Chicago: University of Chicago Press, 1987), 12.

[36] Chapter 3 provides musical examples wherein the degrees of functional force by constitution are discussed.

quantity of pitch classes of the lower fd^7. The upper fd^7 has the constitution 4/0;

the Mm^7 has 3/1; the Mm$^{7\flat5}$, M$^{(6)}$, and mm^7 have 2/2; the hd^7 and m$^{(6)}$ have 1/3;

and the lower fd^7 has 0/4. The maximum progressive potential is assigned to

4/0; less to 3/1; an equal measure of progressive and retrogressive potential to

2/2; increasing retrogressive potential to 1/3; and maximum retrogressive

potential to 0/4. The potential force of a chord by constitution is actualized

subject to the constitution of the chords surrounding it. The functional force of a

chord, as the clarity of its functional expression, is not contained within the chord

itself, but is developed in its relations.

In the model, roots, real or imagined, do not contribute to progressive force

because the pitch classes of roots belong to the lower-fd^7 of a category. This rule

holds true even for the Mm^7 chord type. Neither the root of a Mm^7 representative

nor that of any of the substitutes within its group contributes to the progressive

force that is predicated of the chords onto which they map. Since the chords in

the Mm^7 group all have the same constitution, their potential progressive forces

are equal. Their different roots make no difference to the calculation of their

constitutional forces. Owing to the dualism of the model, just as the roots of

chords do not contribute to their potential progressive force (while their P5s, if

present, do), so too the roots of chords will contribute to their potential

retrogressive force (and their P5s, if present, will not).

For example, Figure 17 shows two chord relations. The first is a

progressive relation and the other is a retrogressive relation according to the

ordering of the octatonic collections that they represent. The solid notes indicate

those pitch classes that are not considered to contribute to the motion forces of

the functions. The root of the G^7 belongs to the lower-fd^7 of oct3 and

consequently is considered not to contribute to its progressive force towards C.

The P5 of the Fm$^{(6)}$ belongs to the higher-fd^7 of oct2 and thus is considered not to
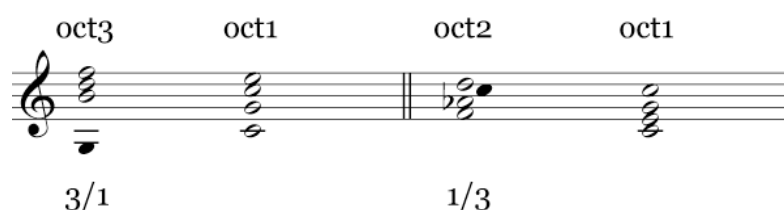
contribute to its retrogressive force towards C.

Fig. 17. Constitution of progressive
and retrogressive functions.

A general ranking of chord types according to constitution is shown in

Figure 18.[37] In music that sets the major and minor triads at the center of

functional categories, there is a balance of constitutional forces across the range

of chord types. The major triad and those chord types further to its side of the

range (those with major thirds above their roots, whether their roots are present

or omitted) are optimized for progression; the minor triad and those chord types

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[37] These constitutional designations are approximations that are modulated
by other contextual factors and are subject to biasing by prototype effects (e.g.,
the abstract scale of relative strengths and weaknesses, based upon chord
constitution, may be shifted one way or the other in actual contexts). See the
discussion of contextual functional force, below, page 58.

further to its side of the range (those with minor thirds above their roots) are
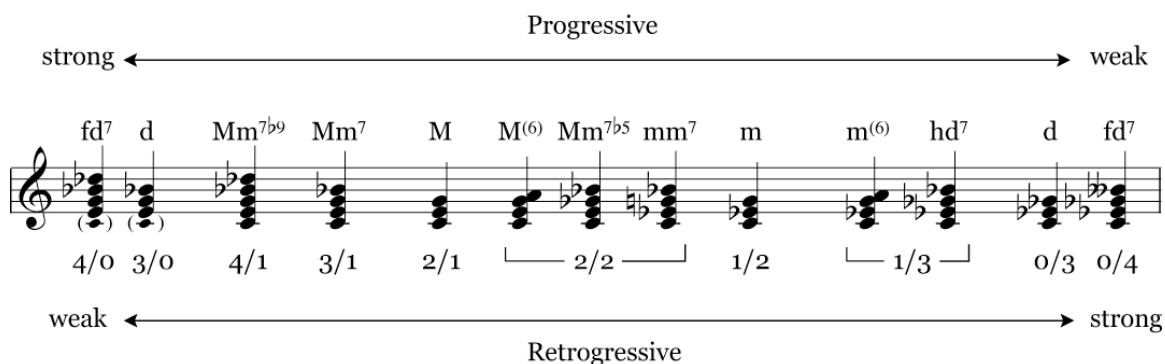
optimized for retrogression.

Fig. 18. General ranking of chord types
according to constitution.

The constitutions of the common chord types may be conceptualized in

terms of the graphical representation of the octatonic cycle shown in Figure 19.

The octatonic collections are depicted as the three laterals of a triangle. The

points of the triangle where the laterals meet depict the overlapping fd^{7}s of each

collection. The midpoint of the range shown in Figure 18 above corresponds to

the midpoint of the oct1 lateral where the Mm$^{7\flat5}$ (CEG$^\flat$B$^\flat$) represents chords with

constitution 2/2. The chords located to the left and right of the midpoint in

Figure 18 above are located above and below the midpoint of the oct1 lateral in

Figure 19. These chords are represented by the Mm^7 (CEGB$^\flat$) and the hd^7

(CE$^\flat$G$^\flat$B$^\flat$) respectively. Chords with a greater portion of pitch classes from the

higher fd^7 of oct1 (D$^\flat$EGB$^\flat$) are optimized for progression; those with a greater

portion of pitch classes from the lower fd^7 (CE$^\flat$G$^\flat$A) are optimized for
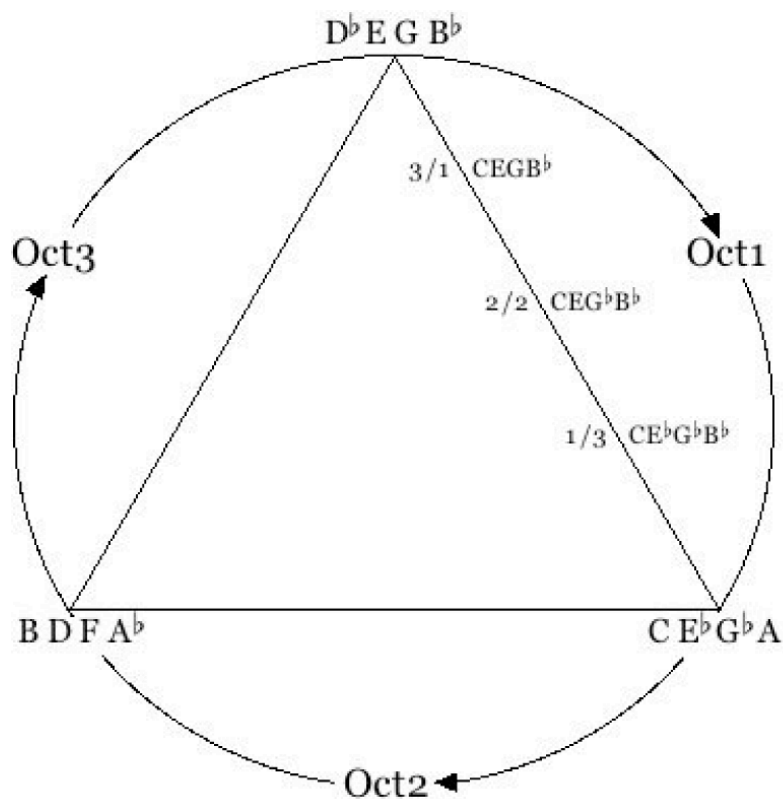
retrogression.

Fig. 19. The Octatonic Cycle with constitutional
indications in oct1

The calculation of the functional force of a chord relation is an

approximation, and is made relative to a scale that runs from very-weak to very-

strong. The force of a chord relation is the sum of the forces of each chord. In a

chord relation, the leading chord is the subject of the relation; the lagging chord

is the object of the relation. A chord's potential progressive or retrogressive force is the same whether it is the subject or object of a relation, and its functional force is potential because it may be unrealized. The realization of a chord's functional potential depends upon the constitution of the chord that leads or follows it.

For example, consider a C^7 chord as a representative of oct1, and an F^7 and an F^{o7} as representatives of oct2. These chords have the constitutions 3/1, 3/1, and 0/4 respectively. The C^7 is progressively strong in potential because three of its four pitch classes belong to the higher-fd^7 of oct1. The F^7 is progressively strong in oct2 for the same reason. The F^{o7}, however, is progressively weak in potential because all four of its pitch classes belong to the lower-fd^7 of oct2.

As the sum of their forces, the progressive relation $C^7 - F^7$ is strong in the octatonic model because both of its chords have 3/1 constitutions.[38] By contrast, the progressive relation $C^7 - F^{o7}$ is weak in the octatonic model because the F^{o7} has the constitution 0/4. Thus, C^7, as the subject of a chord relation, realizes less of its progressive potential when it acts upon a progressively-weak object like F^{o7} than when it acts upon a progressively-strong object like F^7.

The potential functional force of a chord is not only actualized by its relations but is modulated by other contextual considerations. Consider the

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[38] The strength of this relation may be conceptualized in another way if one considers that the progressive relation $C^7 - F^7$ is very near in terms of pitch-class content to the ideal progressive relation $D^{\flat o7} - C^{o7}$ that occurs in the fd^7 cycle. For tetrachords, this ideal relation is the strongest possible progressive relation that can occur in the octatonic system. Since the progression $C^7 - F^7$ is very near to the ideal progression, it must be very near to it in functional force.

$Mm^{7\flat 5}$ and $M^{(6)}$ chord types. They have the same constitution—2/2. Accordingly, the forces of both chords are equal in the model. But, it is not likely that both chords would be regarded equally, in a musical context, with respect to certain of their qualities (e.g., the $Mm^{7\flat 5}$ is more dissonant than the $M^{(6)}$) that may have a bearing upon their functional interpretations. For instance, as tonic functions, the two chords would not likely be regarded as equals. In most styles, the $Mm^{7\flat 5}$ would be considered unstable, and not a likely candidate for a tonic function. By contrast, the $M^{(6)}$ and its inversion the mm^7 frequently serve as tonics in popular music.[39] The definition of a forceful function relies ultimately upon the sense of the interpreter. If pitch change is privileged over continuity as a measure of contextual functional force, then a comparison of the relations $C^{7\flat 5}$ – B and $C^{(6)}$ – B might deem the latter to be somewhat more forceful. If dissonance (interval dissonance) is privileged over consonance as a measure, then the first is more forceful. If scalar unity is privileged over scalar diversity (melodic dissonance) as a measure, in the key of diatonic B major, then the first is more forceful.

Considerations like these require the distinction to be made between variations in functional force due to constitution and those due to actual conditions in the music. In the abstract, the model treats all members of a group as equals—they are undifferentiated, and potentially they are functional equals.

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[39] The Mm^7 is a chord type that is subject to significant reinterpretation across styles. The Mm^7 is not always felt to be a dissonant chord that requires resolution. In some contexts it may function as a tonic (e.g., blues and jazz). In these contexts its functional force will likely be perceived differently than when it is reserved for special functions like the dissonant V^7 or Gr^{+6}.

For instance, according to the groupings in the model, $B^{\flat 7}$ and G^7 may substitute for each other. Each as a **D** may be related to a C triad as a **T**. They and the other Mm^7s in their group have the same constitution and are all potentially strong progressive **D**s in relation to C as **T**. Consequently, no one of them is privileged as a **D** outside a context. Functional force calculated by constitution is a property of the model, regardless of context. Contextual functional force is a property of the metaphor, arising from the interaction of the two domains.

The model has been left open with respect to the meanings of certain of its features so that they may emerge in the interactive process. A chord in the music that seems to be the most prominent expression of its functional category, or in some sense the best example of its function, is the prototype. The prototype sets a standard or reference for its function within a musical setting. When the model is applied, one of the members becomes identified as the central representative or prototype of its category on the basis of shared pitch-class content with the prototypical chord in the music. The other members of its group and the members of other groups within the same category become its substitutes, and are positioned within the category according to their degree of similarity to the prototype with respect to its most salient features. What is equated in the model is differentiated in the mapping. The prototypical function may not be an original function. A prototypical **D**, for example, may be the Vsub3 rather than the V (e.g., G may be the prototypical **D** of Am).

Resuming the demonstration in C major of the functional relations among

chords that arise in a mapping, let it be assumed that the original **D** is the prototype. In relation to the original **T** and the major scale context, the members of the Mm^7 group that includes the V^7 will be differentiated primarily by the presence or absence of the operative tritone. The tritone on diatonic $\hat{7}$ and $\hat{4}$ has held such a privileged place in tonal harmony that it will likely be one of the differentiating factors among Mm^7 group members functioning as **D**s. In C major, only the V^7 and the V^{7}sub6 (D$^{\flat 7}$) contain the operative tritone; the V^{7}sub3 (B$^{\flat 7}$) and V^{7}sub9 (E^7) do not. These latter two **D**s contain a tritone, and this tritone moves by the characteristic directed intervals of the model, but the interval relationship of their tritone to the pitch classes of the original **T** and its scale differs from that of the other dominants. In this setting, G^7 is the prototypical **D** and D$^{\flat 7}$ has greater proximity to the prototype than B$^{\flat 7}$ or E^7.

From this demonstration it may be concluded that there is a range of function for these Mm^{7}s that is subject to at least one feature that is external to the model and defined by the context. The number and kinds of such salient features are left unspecified in the octatonic metaphor. Any and all elements that may in some way contribute to the sense of chord function are potential factors in the determination of contextual functional force. The roots of chords, while not contributing to their potential progressive force, may be a significant factor in the calculation of contextual progressive force. Alternately, the P5s of chords, while not contributing to their potential retrogressive force, may be a significant factor in the calculation of contextual retrogressive force.

Polysemy and Hybrid Chords

This thesis takes as an assumption that chords may have multiple meanings and thus some degree of functional ambiguity. The multiple functional meaning of chords, or polysemy, appears to increase as chromaticism increases. Chromatic harmony will then be expected to exhibit a high degree of polysemy. Any cyclical model committed to a single mapping structure like the octatonic collection, if it is to be reasonably flexible, will inevitably adjust itself to the polysemy of chords and suggest a strategy for their appropriate analysis. Like the models of Harrison and Swinden, a model that makes a set of functional commitments that may be resolved down to the sub-chordal level will in certain cases have to engage in component analysis as the sum of separate interacting forces.

From the perspective of the metaphor, an acute harmonic analysis of music with a significant degree of chromatic variety will show the harmony to be a complex of interactions among singular and hybrid octatonic functions as well as non-octatonic functions. The octatonic metaphor facilitates the reduction of harmonic complexity resulting, in part, from functional ambiguity. The identification of multiple functional meanings in the application of the model is carried out by an interactive analysis. The interaction of the model and the music involves functional predications from the former and functional expressions from the latter. The incongruity between the two is resolved in a metaphorical transfer of functional meanings from the model to the harmony. By accounting for hybrid

chords and other polysemic chords in the metaphorical process the model

provides a way to calculate their functional forces without encumbering itself

with extra categories or exceptional cases.

Polysemic chords may be separated into classes. First, there is a class of

chords that are inherently polysemic. These chords are not hybrids. In the

model, d and fd^7 chords are polysemic by constitution because every one of them

is shared between two octatonic collections. The most prevalent uses of d and fd^7

chords are two: those that contain their roots (e.g., ii° as an **S** and i°, i°^{7} as a **T**)

and those that have imaginary roots at some interval below their apparent root

(e.g., vii°, vii°^{7} as **D**s). The conditions in the music suggest whether a d or fd^7

chord has a real or imagined root, and to which collection, and hence function, it

belongs.

There is a second class of polysemic chords whose polysemy, from the

perspective of the model, is engendered. These chords are hybrids. The hybrid

meaning of a chord in this class emerges when conditions suggest that it

primarily expresses a function other than that which is associated with the single

collection that contains its total pitch-class content. It is also possible that a

chord in this class will not exhibit primary and secondary functions, but a more

or less equipoised combination of two functions. Any type of chord including

major and minor triads may be a hybrid. For example, in the key of C, the

common-practice cadential 6/4 is commonly identified not as a second inversion

C major triad, that is, not based upon its pitch-class content, but as a G with a

double suspension, because of the controlling presence of $\hat{5}$ in the bass. From an

octatonic perspective, if this 6/4 is a dominant, then it must be a hybrid. The

possibility of hybrid chords requires the model to identify the functional

components within these chords. In this example, at least one of the pitches of

the hybrid (C) is exceptional to oct3, which is the dominant collection in the key

of C. In the model, hybrids are weakened functions by definition. The hybrid

dominant in this example would act weakly upon the tonic were it to proceed

directly to it.

Chords like the hd[7] that have at least one diminished triad component and a

non-diminished component are routinely hybridized. The hd[7] presents some

unique challenges to functional identification that may be clarified by comparing

it to the Mm[7].[40] By constitution, the hd[7] acts oppositely to the Mm[7]. The Mm[7] is

progressively strong and retrogressively weak in potential; the hd[7] is

progressively weak and retrogressively strong in potential. The two chords are

the mirror inversions of one another, and both are very near in pitch-class

content to the fd[7]. The important difference between the two is that the hd[7] is

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[40] The typical uses of the hd[7] are these: first, as a rooted progressive function; second, as a rooted retrogressive function; and third, as a rootless, primarily-progressive hybrid function. All three functions of the octatonic model can be expressed by the hd[7] in these typical uses. For example, in the key of C, the hd[7] is typically used as follows: First, as a rooted progressive **D** as in the relation G[ø7] – C. This relation has the same form as the ii[ø7] – V relation in the key of F. The other **D**s in the G[ø7] group in relation to C are B[bø7] – C, D[bø7] – C, and E[ø7] – C. Second, as a rooted retrogressive **S** as in the relation D[ø7] – C (ii[ø7] or iv[(6)] – I). The other group possibilities are F[ø7] – C, A[bø7] – C, and B[ø7] – C. Third, as a rootless, primarily-progressive hybrid **D** as in the relation G[9] r.o. – C. This relation has the same form as the vii[ø7] – I in the same key. The other group possibilities are B[b9] r.o. – C, D[b9] r.o. – C, and E[9] r.o. – C.

susceptible to functional redefinition when it is inverted, and the Mm^7 much less

so, if at all. This difference seems to be due to the interval order of the Mm^7.

Under ideal conditions, the major triad at the base of the Mm^7 keeps it from

sounding like another chord type even when its diminished triad component is

positioned lowest in the chord. The hd^7, on the other hand, can be made to sound

more diminished in some versions and more minor in others, notwithstanding its

characteristic sound in both.

In addition to the effects of inversion, the presence of the operative tritone

in the hd^7 accounts in large measure for its use as a hybrid **D**. This point may be

elaborated upon by returning to the example of the Mm^7 as it is contextually

interpreted. As was previously indicated, the V^7 is commonly the prototypical

progressive **D** in tonal harmony. Less prototypical, but near to it is the V^7sub6.

The commonality between these two **D**s, aside from chord type, is that they both

contain the operative tritone. The other two substitutions in the Mm^7 group do

not contain this tritone. This fact alone frequently positions these latter two **D**s

further from the V^7 than the V^7sub6. As a result, within pieces where the V^7 is

prototypical, the presence or absence of the operative tritone in a **D** is a

significant determinant of its proximity to the prototype, that is, of its degree of

progressive **D** expression.

Similarly, within pieces where the V^7 (or vii^{o7}) is the prototypical progressive

D, the presence or absence of the operative tritone in a substitute for the $ii^{ø7}$

($iv^{(6)}$)—the prototypical progressive **S** hd^7—is a significant determinant of its

degree of progressive **S** expression. In other words, under certain conditions, hd^{7}s that contain the operative tritone seem less like **S**s than those that do not. The ii^{ø7}sub3 (iv$^{(6)}$sub3 or $^\flat$vi$^{(6)}$) and ii^{ø7}sub9 (ii$^{(6)}$) contain the operative tritone of the V^7. For this reason they may occur as primarily-**D**s, that is, as hybrids. A closer examination of the ii^{ø7}sub9 will demonstrate the logic of the model on this point.

The ii^{ø7}sub9 is identical in pitch-class content to the ii$^{(6)}$ and the vii^{ø7}. The vii^{ø7} is located in the **S** category by constitution. However, its similarity to the V^7 and the presence of the operative tritone within it will in some cases suggest that it is a weakened progressive **D**. A component analysis may divide the vii^{ø7} into a **D** vii^{o} (i.e., Mm^7 r.o.) and an **S** ii$^{(6)}$. The three pitch classes that are shared between the components belong to the fd^7 that is shared between the **D** and **S** collections. By constitution, the vii^{o} is a progressively-strong **D** and the ii$^{(6)}$ is a progressively-weak **S**. When the vii^{ø7} is followed by I/i or one of its substitutes, especially I/isub6, absent other mitigating factors, the potential functional force of its **D** component is released in a strongly-coupled progression that overshadows the relatively weak force of the **S** component. As a hybrid, the primarily-**D** vii^{ø7} is progressively weaker than the V^7 due to the presence of a component belonging to the **S** collection. It is equivalent to a V^9 r.o.

A third class of polysemy results when the total pitch-class content of a chord does not reside in any single octatonic collection. These chords are combinations of functions that are divisible into components belonging to two or,

conceivably, even three collections. Those cases such as we find in Beethoven where a **D** chord is set over $\hat{1}$ at a cadence and settles out to a non-hybrid **T** would require a component analysis. In these cases, the resultant hybrid would be a combination of **T** and **D** where the latter is weakened and subordinated to the former. Appoggiatura chords and chords set above pedal points may belong to this third class of polysemic chords.[41]

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[41] Another class of hybrid chords includes those chords that may be separated into octatonic and non-octatonic chord types. For instance, the V^{+7} may be separated into two components: an incomplete Mm^7 plus an augmented triad. Hybrids that involve components from different systems are not addressed by the octatonic model.

3

ANALYSES

This chapter will demonstrate how the octatonic metaphor is implemented in analysis and will highlight some of its advantages. The musical examples that follow would be generally regarded as unquestionably tonal and functional in their entirety were it not the case that some portion of these examples cannot easily be made to conform to the diatonic-scale model, and this model is widely viewed as the precondition for harmonic function. I will begin with the Liszt and Franck examples that were presented in Chapter 1. These examples demonstrate that the octatonic model does not require a shift between a harmonic view and a linear view of chord successions. Such a shift is not required because the model grants function to a number of chromatic chord relations that are not incorporated into the diatonic-scale model.

Liszt, *Années de Pèlerinage*, "Il pensieroso," mm. 1-4

Figure 20 shows the opening four bars of Liszt's "Il pensieroso" from *Années de Pèlerinage*. The chord succession in this excerpt is C$\sharp$m – Am – F$\sharp^{\varnothing 7}$ – G$\sharp^{7\flat 9}$ – C$\sharp$ (without a third). As noted in Chapter 1, Roig-Francoli has implied that functional tonality may be momentarily suspended in the C$\sharp$m – Am relation. In his view these chords have a linear relation, but no meaningful harmonic relation in the tonality. He views the Am chord as a prolongation of the original **T**.

Fig. 20. Liszt, *Années de Pèlerinage*,
"Il pensieroso," mm. 1-4

If one may sense C♯m and Am to be functionally related in the key of E

major, as was suggested in Chapter 1, it raises the possibility that they may be so

sensed in other keys. If functional tonality depends upon perception, and since

the perceptions of any and all listeners is not known, it must be granted then that

someone may plausibly hear the Liszt excerpt as functional. The octatonic model,

as a conceptual system, is advanced here as one that is suited to the plausible

perceptions of chromatic relations such as this one by Liszt. The octatonic model

is able to provide a functional assessment of this chord succession that is simpler

than one that relies on a partly-functional and partly-linear explanation.

Figure 21 a) gives the chord succession i – iv – ii$^{\varnothing7}$ – V$^{7\flat9}$ – i in the key of C♯

minor. This succession is diatonic and conforms to the **T – S – D – T** model of

functional relations with a prolongation of the **S** function. In Figure 21 b) the

same succession is presented, except that the iv and ii$^{\varnothing7}$ chords have been

replaced by their octatonic sub3 substitutions. The resulting succession is the

same one that Liszt used in the passage under discussion. The sub3 substitutions

give rise to the C♯m – Am chromatic-mediant relation of Liszt's excerpt. If it can

be reasoned that the sub3 substitutions are functional, then this chromatic-

mediant relation is functional.

Fig. 21. a) the diatonic **T – S – D – T** functional model;
b) the harmonic succession in "Il pensieroso," mm. 1-4,
viewed as a substitutional modification
of a diatonic succession.

Liszt's chord succession may be mapped onto by the progressive ordering of

the three octatonic collections, in this case, beginning with oct3: oct3-oct1-oct2-

oct3. The functions that are transferred to the octatonic categories in a mapping

are shared by all representatives of those categories. Since the iv and ii$^{\varnothing7}$ chords

shown in Figure 21 a) are functional in their relation to the chords surrounding

them, and the sub3 substitutes shown in Figure 21 b) belong to the same

functional category in the octatonic model as do the iv and ii$^{\varnothing7}$, the model

attributes **S** to the ivsub3 and ii$^{\varnothing7}$sub3 chords. If they are functional, then every

relation within Liszt's chord succession—including the C$\sharp$m – Am relation—is

functional on an octatonic basis.

Franck, *Symphony in D Minor,* I, mm. 6-12.

The passage shown in Figure 22 is an elaborated progression from the

original **T** in m. 6 to the original **D** in m. 12. Its length could have been

abbreviated had Franck chosen to stop at m. 8, where the V^7 appears for the first

time in the movement. At this juncture he might have returned to the original **T**.

Instead, he takes a detour in m. 9 that re-approaches the original **D** in m. 12.

As described in Chapter 1, the detour is initiated by the D$^\flat$ and C$^\flat$ chords

that Lester views as nonfunctional simultaneities. Lester notes that the D$^\flat$ and C$^\flat$

chords are in second inversion, and that "neither behaves as second-inversion

chords usually do," but he does not offer any suggestions as to what might be

their harmonic syntactical rationale in the passage.[1] Perhaps the fact that the V^7

chord in m. 8 is an enharmonic Gr^{+6} of the D$^\flat$ chord in m. 9 explains why the D$^\flat$

is in a cadential inversion. It might be reasonable to say that the approach to the

D$^\flat$ chord is a functional one because it mimics the approach to the original **D** in

that key. What needs to be understood is whether the departure from the D$^\flat$

chord is also functional. Besides extending the passage, the second inversion

chords serve the purpose of keeping the harmony moving along toward the

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[1] Lester, *Harmony in Tonal Music,* 233.

ultimate goal—the V[7] in m. 12. As a compositional constructive element, Franck

has composed a bass line that descends primarily by m2s in mm. 7-11. Harmony

that rests upon such a bass line as this is often a good candidate for an octatonic

mapping because the descending m2 is one of the directed intervals of the model.

It has already been shown how the movement of octatonic collections by

descending m2s maps onto the circle of fifths. The circle of fifths may be

Fig. 22. Franck, *Symphony in D Minor,* I, mm. 6-12.

symbolized in terms of the three primary diatonic functions and their substitutes

in this way: V-I-IV—Vsub3-Isub3-IVsub3—Vsub6-Isub6-IVsub6—Vsub9-Isub9-

IVsub9—V. When a chord succession follows the circle of fifths, part or all of this

pattern of substitutes will be present. It has been shown that harmony that

conforms to the **T – S – D – T** model constitutes a portion of this circle, or

maintains its ordering on a substitutional basis. The properties that obtain for a

portion of the full cycle are extended to the rest of the cycle. If this three-category

model is functional, then the entire cycle is functional; and any pattern of

harmony that may be mapped by this cycle (complete or incomplete) as it is

subsumed in the octatonic cycle is therefore functional on that basis. Figure 23

shows a possible reduction and functional analysis of the passage.[2]

Fig. 23. Functional analysis of *Symphony in D Minor*,
I, mm. 6-12.

The top row of Roman numerals conforms to a diatonic-scale model of

labeling. It is given for purposes of comparison only. A symbol like the V^7/V is

not an ideal labeling for its category of function within the octatonic model

because it may be misleading. It may suggest a **D** rather than an intense form of

the **S**. The second row shows the symbols of the octatonic model. The Roman

numerals in the second row simplify the view of the harmony in functional terms

and clarify the cyclical quality of the passage. They indicate 1) the functional

category to which the chord belongs; 2) the interval relation to the prototype of

the category, where the prototype is the original **T**, original **S**, and original **D**; and

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[2] In my reduction I did not interpret the longer notes in m. 7 as non-chord
tones. My selection privileges duration. It makes no difference to the functional
identifications, since all the pitch classes in m. 7 belong to oct3.

3) the chord type. They do not show chord inversion. The third row shows the octatonic collections that map onto the chords above. The piggy-backed collection labels separated by a horizontal line indicate a hybrid function. The fourth row shows arrows that indicate the direction of harmonic motion. The right-going arrows symbolize progression. The double-vertical line segments between symbols indicate that the chord to which they refer has two functions.

The first cycle is a full **T** cycle (**T** – **S** – **D** – **T**) that is completed at m. 9 where the **T** is represented by a hybrid Isub6—the apparent $D^\flat$ 6/4 chord—a chord whose root is actually on $A^\flat$. The relation of the V^7 in m. 8 to the $D^\flat$ chord in m. 9 takes the same form as that of an enharmonic Gr^{+6} to its cadential I 6/4 in the key of $D^\flat$. Since a hybrid **T**sub6 is not the original **T**, the presumptive goal of the passage, the progression continues onward. Mm. 9-10 form a pattern of relations, m. 10 being a transposition downward by a M2 of m. 9. If the $D^\flat$ chord is viewed not as a hybrid Isub6 but as a IVsub6, then, judging by their roots (real and omitted) in mm. 9-10, these chords form a pattern of movements by the ascending P4 directed interval. According to this interpretation of the $D^\flat$ chord Franck has extended the passage by shifting to another part of the circle of fifths: IVsub6—Vsub9-Isub9-IVsub9.

It is possible, in light of the foregoing interpretations of the $D^\flat$ chord, that the chord relation of which the $D^\flat$ is the object of motion (in mm. 8-9) and the relation of which it is the subject of motion (in m. 9) are overlapping relations wherein the $D^\flat$ chord holds different functions: a **T** in relation to the preceding

V^7 in m. 8, and a **S** in relation to the following $V^{7\flat9}$ sub9 (ro) in m. 9. The

hypothetical dual-functionality of the $D^\flat$ chord in this context may in some

measure explain Lester's reaction to it as a non-functional simultaneity.

The $C^\flat$ chord in m. 10 is another **T** substitute—a Isub9. As in the instance of

the $D^\flat$ chord, since $C^\flat$ is not the original **T** (the presumptive goal of the passage),

the progression logically continues. The second cycle is a three-quarter **T** cycle

moving from the **T**sub9 through four successive substitutional **S**s to the original

D in mm. 10-12. This cycle is completed by the return of the original **T** in the

measure that follows this passage in m. 13 (not shown). Notice in m. 11 that the

composer shifts from a IVsub9 to a IVsub3—the Gr^{+6}—in order to approach the

V^7 by the same bass motion that he used in m. 8, which is the characteristic bass

interval motion of the passage. Franck is, in this sense, 'picking up' in m. 12

'where he left off' in m. 8.

There is a parallel functional pattern in mm. 6-8 and 10-12: there are six

chords in each three-measure span that hold the functional category pattern I-IV-

IV-IV-IV-V. Franck does not prolong the **D** category in this passage, but prolongs

that of the **S**. All the **S** chords in this passage belong to a single category—oct3.

Since only motion between categories constitutes functional progression or

retrogression, these chords do not move harmonically; rather, they shift within

and between the groups of a single category. Shifts of this kind will have meaning

in terms of the ebb and flow of functional forces. For instance, the **S**s in mm. 6-8

are mostly weaker forces on a relative scale of functional force; whereas those in

mm. 10-12 are all stronger. An examination of the constitutions of the **S**s in this passage will clarify their relative forces. According to the model, when a number of chords belongs to a single collection, those chords with more pitch classes from the higher-fd^{7}than from the lower-fd^7 of their collection will have more potential functional force in progression than those chords that do not. For oct3, the higher-fd^7 has the pitch classes C$^\flat$/B-D-F-A$^\flat$/G$^\sharp$; and the lower-fd^7 has the pitch classes B$^\flat$-D$^\flat$/C$^\sharp$-F$^\flat$/E-G. The proportion of pitch classes from the higher- and lower-fd^7 in the four **S** chords in mm. 6-8 are these: 2/1, 1/3, 3/1, 1/3. If it is assumed that the 3/1 proportion is the standard of measure or reference level for a strong progressive function in this passage, the same proportion as a Mm^7, then this series of **S**s is generally weaker than the reference level. The proportions in the four **S** chords in mm. 10-12 are 4/0, 3/1, 3/1, 3/1 respectively. They are all either as potent as the reference level, or surpass it.

As a result, my interpretation of the functional logic of this passage indicates that the relative degree of drive toward the original **D** that was developed in the first approach in mm. 6-8 is increased in the second approach. In this way the passage continues to build toward its culmination, even though the original **D**— the harmonic goal—has already been sounded. From a compositional perspective, the passage would have been effectively flat and uninteresting without the increase in force. Franck clarifies the musical logic of the harmony by correlating the increase in functional force with the increase in dynamics at the end of the passage. This interpretation sees the group shifts not only as the

result of a compositional technique that generates harmony by a linear process, but as occasions for expressing chromatic variety or 'color.' They are also harmonic events that serve a larger formal purpose, enabling an appreciation of the harmonic depth of the music, and the significance of the composer's achievement.

As indicated in Chapter 1, the Franck example was chosen for analysis because of the analytical problems posed by two of its chords—the D$^\flat$ and the C$^\flat$. While both pose a challenge to interpretation, the first is by far the greater of the two. The functional logic of the harmony as I have described it in the preceding paragraph hinges upon the D$^\flat$ chord in m. 9 which, I would argue, effects the most interesting moment in the example, and is the means by which the passage is functionally extended. The unexpected harmonic swerve precipitated by the introduction of a D$^\flat$ chord in a D minor key context is given even greater emphasis by the melodic silence that follows the V^7 in m. 8. Since it is preceded by the original **D**, a listener would likely anticipate a return of the original **T** at m. 9. But, what follows is not the original **T**, but a substitute that is all the more unsettling because it is a hybrid. Furthermore, the D$^\flat$ chord, as we have indicated, may be heard in this passage as a dual function being first a **T** object then a **S** subject of harmonic motion. It is the singular harmonic hurdle to be overcome in this remarkable example, and it poses a challenge to the diatonic-scale model and to functional hearing.

Referring to the D$^\flat$ and C$^\flat$ chords, Lester asks "[b]ut what is the motivation

for including these 6/4 chords? Why are they present if their use clouds the

harmonic syntax of the phrase? These 6/4 simultaneities are present to

incorporate references to distantly related keys."[3] Whether or not this was the

composer's sole or even primary purpose in extending the passage, it does not, of

itself, obviate the need for an accounting of the harmonic logic of the passage. It

is my contention that all of the chords in this passage by Franck are functional,

and they are all functional on a single basis. Ironically, Lester's analysis demotes

arguably the most distinctive harmonic features of the passage—the $D^\flat$ and $C^\flat$

6/4 chords—by relegating them to a nonfunctional category. Not only does the

view of these chords presented here put them on the same functional footing as

the others that surround them, but it seems to do more justice to them as they

operate musically in ways that are every bit as satisfying, and, I would argue,

effective as their neighbors.

Wagner, *Siegfried,* Act I, Scene I, mm. 324-31

Figure 24 shows an excerpt from Richard Wagner's *Siegfried.* The excerpt is

in the key of G, and entails a movement from the original **D** to the original **T**. Its

chromaticism presents a challenge to a functional analysis. The $E^{\flat 7}$ chord, or

enharmonic Gr^{+6}, in m. 325 would be unproblematic if it were followed by a D

chord; but instead it leads to a C chord. Likewise, the $B^{\emptyset 7}$ chord in m. 327, were it

to lead to a C chord, would offer no problem. Instead, it leads to the enharmonic

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[3] Lester, *Harmony in Tonal Music,* 234.

Fr^{+6} of the V/V in m. 328. Other curiosities are the minor **D** in m. 329, and the

unusual chord in m. 330—a chord that contains five of the six notes of the whole

tone scale (including the E in the voice). Are the orderings of these chords non-

functional? What elements in the passage might make possible a functional

hearing?

Fig. 24. Wagner, *Siegfried,* Act I, Scene I, mm. 324-31.

The measures that precede this excerpt (mm. 319-323 not shown) prolong

the **D** in the key of G. The vocal melody in this excerpt (mm. 324-30) projects a

D pitch center in each of its phrases. Judging by the vocal melody alone, if these

measures prolong the **D**, it is a minor **D**, and as such will constitute a weakened

approach to the **T**. The central question to be answered is whether or not the

tonal implication of the melody is supported by the harmony. Despite its

chromaticism, a functional interpretation of this passage is possible. It is

amenable to an octatonic mapping of functions that support the melody's D

centricity and reinforce a **D**-prolongation interpretation of mm. 324-30. In these

measures the composer has used a melodic wedge pattern to generate chromatic

successions that connect the original **D** to the original **T**. Figure 25 shows the

lines of the wedge. There are actually two separate wedges that correlate to the

two four-measure vocal phrases. The dual line of notes in the treble staff of

Figure 25 move by different intervals. The upper part of the line ascends in m2s

in mm. 324-27, leaps upward an augmented 2nd, and then continues by m2 for

the remaining measures. The lower part moves in a manner that suggests a

diatonic scale—perhaps D natural minor—excepting the F♯ in the penultimate

measure of the excerpt.

Fig. 25. Lines of the wedge pattern in excerpt
from *Siegfried,* Act I, Scene I, mm. 324-31.

Wagner uses six different chord types over eight chords. The chords that

share a type are the major triads on V, IV, and I in mm. 324, 326, and 331

respectively. There are two retrogressive relations in mm. 324-25 and 328-29, as

indicated by the dashed arrows in Figure 24 above, two substitutional relations—

one on IV in mm. 325-26 and one on V in mm. 329-30, and three progressive

relations indicated by the solid arrows in mm. 326-27 and 330-31. The first four

chords are such that the V and the IV are each followed by a form of their

respective **D**s. The D chord in m. 324 is followed by its tritone-substitute **D**, (i.e.,

E^{b7}), and the C chord is followed by its diatonic $vii^{\varnothing7}$ (i.e., $B^{\varnothing7}$). However, I do not

treat the $B^{\varnothing7}$ as a **D** of C in the analysis, but as a progressively-weakened form of

the V (equating to a $Dm^{(6)}$). The $B^{\varnothing7}$ chord forms progressive relations with the

preceding C chord and the following E^{7b5} chord.

The E^{7b5} (Fr^{+6}) chord in m. 328 has been labeled as a I^{7b5}sub9 because it

represents oct3—the collection associated with the **T** in this excerpt. According

to the octatonic scheme of functional relations, any function, including the **T**,

may be expressed by any chord type that represents its category. The E^{7b5} chord

is not a stable **T** like the G in m. 331, but a **T** that is on the move.[4] The conjoining

of $B^{\varnothing7}$ and E^{7b5} in mm. 327-28, equating to $ii^{\varnothing7} - V^{7b5}$ in Am, reinforces the sense

that the descending line in the bass is heading toward a root-position V/V (A)

chord. The subsequent v chord in second inversion in m. 329 sounds cadential in

this respect, being preceded by a Fr^{+6} chord (E^{7b5}). The vocal melody, because it

suggests D minor, reinforces the sense of an impending V of D minor.

The chord in m. 330 (including the pitch E in the voice) is a hybrid chord.

Because this chord has components from two different octatonic collections it

mixes the two functions associated with those collections. Its hybridity is

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[4] It is similar to the harmonic 'comma' in jazz, where the original **T** is reached, but it is not the end of the harmonic motion; rather, it points in another direction.

indicated in Figure 24 above by the label showing oct2 above oct3 separated by a line. The two components of the hybrid chord are a D$^{\flat 5}$ chord plus an E$^{7\flat 5}$ chord (the same chord that appears in m. 328). This hybrid chord is equivalent to two augmented sixth chords mixed together: the interval formed by the pitches B$^{\flat}$ and A$^{\flat}$ (an enharmonic G$^{\sharp}$) is the augmented sixth interval of a Fr^{+6} that targets the root of the V/V chord that never arrives; and the augmented sixth interval formed by the pitches A$^{\flat}$ and F$^{\sharp}$ belongs to an incomplete Fr^{+6} (without 3rd) that targets the root of the following I chord. Mm. 330-31 in Figure 26 show the voice leading that might have been directed toward the V/V.

Fig. 26. Lines of the wedge pattern with altered ending
in excerpt from *Siegfried,* Act I, Scene I, mm. 324-31.

Figure 27 shows an alternate ending where, instead of G, the excerpt ends on A^7— the V^7/V. That this resolution sounds plausible in context is an indication of the dual functionality of the hybrid chord, and an effect of the preceding D centricity wherein the augmented sixth chords targeted the V/V.

These are the chords in this excerpt followed by their constitutional proportions and the pitch classes that correspond to the proportions in parentheses: D (2/1: A, F$^{\sharp}$/D); E$^{\flat 7}$ (3/1: B$^{\flat}$, D$^{\flat}$, G/E$^{\flat}$); C (2/1: E, G/C); B$^{\varnothing 7}$ (1/3:

A/B, D, F); E$^{7\flat5}$ (2/2: D, G$^\sharp$/B$^\flat$, E); Dm (1/2: A/D, F); D $^{\flat5}$ + E$^{7\flat5}$ (1/2 + 2/2: F$^\sharp$/A$^\flat$, D + A$^\flat$, D/B$^\flat$, E); G (2/1: B, [D]/G).

Fig. 27. Excerpt from *Siegfried,* Act I,
with altered ending.

The relation D − E$^{\flat7}$ in mm. 324-25 is a weak retrogression because the D

chord is moderately weak as the subject of retrogression, having constitution 2/1,

and the E$^{\flat7}$ is weak as the object of retrogression, having constitution 3/1. The

relation E$^{\flat7}$ − C in mm. 325-26 is a substitution that decreases the potential

progressive force from strong to moderately strong as the constitution changes

from 3/1 to 2/1. The relation C − B$^{\varnothing7}$ in mm. 326-327 is a moderately weak

progression because the C is moderately strong as the subject of progression,

having constitution 2/1, and the B$^{\varnothing7}$ is weak as the object of progression, having

constitution 1/3. The relation B$^{\varnothing7}$ − E$^{7\flat5}$ in mm. 327-28 is a weak progression

because the B$^{\varnothing7}$ is weak as the subject of progression, having constitution 1/3, and

the E$^{7\flat5}$ is neutral as the object of progression, having constitution 2/2. The

relation E$^{7\flat5}$ − Dm in mm. 328-29 is a moderately strong retrogression because

the E$^{7\flat5}$ chord is neutral as the subject of retrogression, having constitution 2/2,

and the Dm is moderately strong as the object of retrogression having

constitution 1/2.

The relation Dm – (D$^{\flat 5}$ + E$^{7\flat 5}$) in mm. 329-30 is a substitution that

maintains a moderately weak potential progressive force as the constitution

changes from 1/2 to (1/2 + 2/2). The D$^{\flat 5}$ + E$^{7\flat 5}$ hybrid chord in m. 330 has **D**

and **T** components. Because it is in part a prolongation of the preceding original

D in m. 329, and is followed by the original **T**, it has been interpreted as a

primarily-**D** hybrid chord. The D$^{\flat 5}$ (F$\sharp$/A$^\flat$, D) component is moderately weak as

the subject of progression having the constitution 1/2. Furthermore, its **D** force

is diluted by the **T** force of the E$^{7\flat 5}$ component. As a result, judging by the sum of

its components, this hybrid chord is weak as the subject of progression.[5] The G

chord is moderately strong as the object of progression having constitution 2/1.[6]

Consequently, the relation (D$^{\flat 5}$ + E$^{7\flat 5}$) – G in mm. 330-31 is a moderately-weak

progression. Although the hybrid chord contains two tritones (the two that form

the E$^{7\flat 5}$ chord), neither of them is the operative tritone in the key of G. Hence,

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[5] As an alternate interpretation, the B$^\flat$ pitch class may be interpreted both
as an octatonic and non-octatonic element within this hybrid chord. As such, the
B$^\flat$ is not only the $^\flat$5 of the E$^{7\flat 5}$ component (an octatonic pitch class), but also the
augmented 5th of a D+$^{(\flat 5)}$ component (a hexatonic pitch class). From this
perspective, the D+$^{(\flat 5)}$ chord, the **D** component of the hybrid chord, is a hybrid
chord itself, and is divisible into two subcomponents: an octatonic D$^{\flat 5}$ (F$\sharp$/A$^\flat$,
D), with constitution 1/2, and a hexatonic D+ (B$^\flat$, D, F$\sharp$). The M+ is a potentially
strong progressive chord type in the hexatonic model, having constitution 3/0.
The D+ chord as a hexatonic **D** adds to the progressive force of the hybrid D+$^{(\flat 5)}$.
A description of the hexatonic model is beyond the scope of this thesis.

[6] Even though the G chord in m. 331 does not contain a P5, its presence is
felt by the anticipated D pitch class in the preceding measure.

the hybrid chord is not strengthened as a **D** by the operative tritone's prototype effect.

In conclusion, this passage is explicable as a functional **D**-prolongation that is composed of a mixture of stable and unstable elements. Harmonically, it is for the most part unstable because it is composed of mostly weak chord relations within a completely chromatic environment, and no complete, contiguous progressive or retrogressive cycle occurs within its measures. The weakness of its chord relations could not be other than intentional on the composer's part, since he could have easily strengthened the force of the relations using the same wedge pattern. The harmony was designed to be unstable in the midst of the succession, between V and I. Otherwise, the hybrid chord, as the peak of instability, is incongruous. The general instability in mm. 324-29 is a preparation for that of the hybrid. The coherence of this passage depends heavily upon the directional logic of its melodic wedge pattern, its rhythmic regularity, and metrical squareness. The expression of prolonged **D** in mm. 324-30 of the excerpt would be uncertain were it not for the clear D-centricity of its melody and the fact that it begins and ends with a **D**. The tonal implication of the melody is given only weak functional support by the harmony.

Wagner, *Tristan und Isolde*, "Prelude," mm. 1-3

The opening to Wagner's Prelude to *Tristan und Isolde* is a clear example of the graduation of functional force in progressive relations. The first chord in m. 2

of Figure 28 is labeled as a B $^{\flat5(6)}$ in order to clarify its relation to the following

chords. It is identical in form to the hd^7 and in function to an augmented sixth

chord.[7]   It differs from the common types of augmented sixths because it has no

Fig. 28. Wagner, *Tristan und Isolde,* "Prelude,"
mm. 1-3.

operative tritone—at least until the last eighth note of the measure. Without a

tritone it is a weak form of the augmented sixth. Despite its prominence as the

chord that sets the dramatic tone for the 'Prelude,' the B $^{\flat5(6)}$ along with the B$^{7\flat5}$

chord are harmonically subordinated to the V^7 as the goal of the phrase. The

chords in m. 2 are **S**s. Based upon its constitution, the B $^{\flat5(6)}$ chord is a weak

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[7] Following Gauldin's remarks concerning this passage, "[t]he opening two chords . . . represent one of the most famous and frequently analyzed progressions in the history of music." (Gauldin, *Harmonic Practice in Tonal Music,* 687). The 'Tristan chord' has been interpreted primarily in three ways: as a Fr^{+6} wherein the G♯ is an upward appoggiatura (e.g., Kostka and Payne, *Tonal Harmony,* 448-49), as a hd^7 (e.g., Gauldin, *Harmonic Practice in Tonal Music,* 687-88), and as a non-functional simultaneity (e.g., Lester, *Harmony in Tonal Music,* 235-37).

progressive **S** because it has a 1/3 proportion of pitch classes from the higher- and lower-fd^7 of oct2. The B$^{\flat 5(6)}$ is strengthened at the end of the bar by its transformation into a Fr^{+6}, or as I have it, a B$^{7\flat 5}$. B$^{7\flat 5}$ has a constitution 2/2 which makes it somewhat stronger in progression than B$^{\flat 5(6)}$. In addition, the B$^{7\flat 5}$ contains the operative tritone, and this qualifies it as a suitably-forceful progressive **S**.[8]

The functional change to E$^{7\flat 5}$ in m. 3 entails no change in potential progressive force, since its constitution is the same as that of the preceding B$^{7\flat 5}$ chord. The E$^{7\flat 5}$ is transformed into an E^7 chord. Since Mm^7 chords have a 3/1 constitution, this gives the E^7 the greatest potential progressive functional force thus far. In light of the Am key context, it is the prototypical **D**, and thereby achieves unequaled **D** force in potential. However, this force is mitigated somewhat by the tonal uncertainty that Wagner has engineered into the phrase. The i chord is only suggested at the beginning of the phrase, and does not follow the V^7 chord at the end. The ii$^{\flat 5(6)}$ chord receives the greatest emphasis by reason of metrical placement and texture change. Incongruously, the weakest function receives the greatest emphasis. As a harmonic cycle, these measures constitute, at best, an implied three-quarter **T** cycle in which only the **S** and **D** are explicitly present. Taking into account these factors, the progression, while functional, is harmonically ambiguous.

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[8] The presence of the operative tritone is a salient feature with respect to the calculation of contextual functional force. In other words, this **S** is suitably-forceful by reason of its proximity to the presumptive prototype of its function (i.e., V^7/V).

An octatonic interpretation of this excerpt shows that Wagner has gradually increased the functional force of the seventh chords in mm. 2-3 as they progress from the **S** to the **D**, according to the functional-identity and -force predications of the octatonic metaphor. A corollary to this conclusion is that the *leitmotif* in the topmost voice of mm. 2-3 takes on a harmonically functional purpose in addition to its other purposes.

Chopin, *Prelude in E minor,* Op. 28, No. 4

Chopin's *Prelude in E minor,* Op. 28, No. 4, shown in Figure 29, exemplifies chromatic succession wherein the compositional vehicle is a steady, mostly-semitonal descent of the harmony by one or two voices at a time. The piece is tonal and has a functional interpretation.[9] The piece divides into two parts, mm. 1-12 and 13-25. The first part is repeated and varied in the second part. The broad harmonic outline is quite simple. The harmony of the first part begins on the original **T** and moves to a half cadence on the **D**; and that of the second part begins on the original **T** and ends with an authentic cadence on that function. Figure 29 shows my identification of the chords, the octatonic collections, and the arrows indicating progression and retrogression. In order to simplify the view of the harmony as much as possible all the chords have been labeled in terms of the

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[9] For other views of this piece based upon the diatonic-scale model, see: Gauldin, *Harmonic Practice,* 714-17; Roig-Francoli, *Harmony in Context,* 808-11; and Carl Schachter, "The Prelude in E minor, Op. 28, No. 4: Autograph Sources and Interpretation," in *Chopin Studies 2,* ed. John Rink and Jim Samson (Cambridge: Cambridge University Press, 1994), 161-82.

Fig. 29. Chopin, *Prelude in E minor,*
Op. 28, No. 4

Fig. 29. Chopin, *Prelude in E minor,*
Op. 28, No. 4 (cont.)

three primary diatonic functions I, IV, and V. The labels do not indicate

inversions. Some chords have omitted roots (ro). Pitches that do not belong to

the octatonic collection to which a chord has been associated are identified by

parentheses. They are viewed as 'collective dissonances.' In this piece, most of

these dissonances play no significant part in harmonic function; those that do are

indicated by an asterisk on the row of collections.

There are five complete **T** cycles in this piece, two in the first half and three

in the second. The second cycle of the first half ends at m. 13 where the first cycle

of the second half begins. Since the two parts of the piece are of equal size, the

2:3 ratio of cycles between the parts indicates an increase in the rate of functional

motion in the second half. The number of complete cycles would be equal were it

not for the E and Em chords in m. 22. Though they appear in cadential inversion,

they have not been regarded as hybrid **D**s. They do not evoke a strong

expectation of a conversion to the original **D**. The Em 6/4 chord is a **T** and

forms a progressive relation with the following IV^{7}sub3 in m. 23. Chopin delays

the final strong cadence by a deceptive arrival on the IVsub3 in m. 21. Mm. 21-23

form a separate cycle that may be said to emphasize the **S** one last time in the

piece. Though embedded in this **S** cycle, the identity of the **T** is felt when it is

touched in passing on the way to the IV^{7}sub3.

The ratio of **T** cycles is only one indicator of the increased rate of functional

motion in the second half of the piece. The repeat of mm. 1-4 is attenuated in

mm. 13-15. In addition, Chopin repeats the descent from G$_3$ to B$_2$ ($\hat{5}$) in the bass

in mm. 13-17, but covers the same ground in less than half the time as in the first half (mm. 1-9). These changes account for some of the added intensity in the second half. In the first half, Chopin spends two-thirds of the time making the descent and one-third of the time prolonging the arrival on the **D**. In the second half, those proportions are reversed. The earlier arrival on the **D** and its prolongation in mm. 17-24 are a counterbalance to the functional emphases of the first half (assuming that the **S** cycle in mm. 21-23 takes part in the prolongation).

What is most interesting about the cycles is their quality and the means by which they are constructed. A comparison of the arrows indicating progression and retrogression will show that most of the harmonic motion in this piece is progressive. What characterizes the piece is that the motion is mostly a weak kind of progression. Chopin systematically weakens each function that has a potential to progress strongly through incremental pitch changes. The pitches of a chord are replaced with those belonging to the chord that follows, but happen one or two pitches at a time. This harmonic process occurs in two-thirds of the piece. The process results in constitutional changes that indicate a trend of motion from stronger to weaker progressive functions.

For example, in mm. 2-4 the changes to the **D**, beginning half way through m. 2, transform the **D** from a V^7 chord to a $V^{7\flat9}$ (ro) to a $V^{7\flat5}$ to a $V^{\varnothing7}$ to a $V^{o7\flat9}$ (ro). The constitutional proportions 3/1, 4/0, 2/2, 1/3, and 1/3 indicate the trend in functional force over these measures. As a result of Chopin's compositional

process, the precise point of functional changeover is determined as much by rhythm and meter as it is by pitch content. For instance, in another context the **D** $B^{o7\flat 9}$ (ro) at the end of m. 3 might be taken for a **T** $E^{7\flat 9\flat 13}$ (ro). The weak links between functional articulations precipitate the drifting harmonic character of the piece. The places where this process is not used have a stronger functional character, as in the oscillation between iv and V chords in mm. 10-12 and 18-20, and in the strongest progression of the piece (and its shortest cycle) in m. 16 beat 4 to m. 18 beat 2. From the interpretive point of view that sees functional successions as cycles of various kinds, the harmonic process that Chopin used in this piece is tantamount to a technique of cyclical variation, whereby cycles are extended in time by a series of functional-force decrements.

I have in certain places pushed the limits on chord labeling for this piece only to make the point that it may be viewed as a simple functional scheme in terms of the octatonic metaphor. None of the unfamiliar chord types like the $V^{7\flat 5\flat 9}$ (ro) function any differently when they are identified using their traditional symbols. The $V^{7\flat 5\flat 9}$ (ro) in m. 14 is an enharmonic Gr^{+6} that dominates the I^7, tantamount to a V^7/iv, in m. 15 that in turn dominates the iv in m. 16.

It is worth noting that 11 of the 25 measures of this piece are occupied by the **S**, or functions that are subordinated to the **S**. Compare this number to the roughly 9 measures that are occupied by the **D**. Chopin maintains a parity between these two functions that enhances the harmonic diversity of the piece, as well as its balance, and helps to account for some of its harmonic complexity.

Finally, it should again be emphasized that this analysis has not necessitated a shift from a functional harmonic approach to a linear one simply because of the composer's constructive technique. Furthermore, no chord in this brief piece is denied function, and the analysis yields a logical result. The lack of strong progressions and the kind of key-confirming formulas that mark the Classical style are intentionally avoided in much of the piece. It does not follow, however, that function has thereby been eliminated from certain of its parts.[10]

"The technique of art is to make objects 'unfamiliar,' to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged."[11] If Chopin has made things more difficult for the listener in this piece, he has in so doing made things more difficult for the theorist. It is hoped that the model advanced here will provide added means to engage some of those difficulties.

Each of the musical examples that have been analyzed in this chapter consists of a part or the whole of a tonal piece. Each example begins and ends on either the original **T** or **D**. What has been the central question is whether or not certain chords in these examples are to be regarded as harmonies, simultaneities, or linear phenomena, and whether or not certain chromatic syntactical relations

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[10] See Gauldin's comments in his "Summary of Chromatic Voice Leading" for this piece in Gauldin, *Harmonic Practice,* 716, as well as Schachter's conclusions in the section "Harmonic and Contrapuntal Structure" in Schachter, "The Prelude in E minor," 171-78.

[11] Victor Shklovsky, "Art as Technique," in *Russian Formalist Criticism: Four Essays,* ed. Lee Lemon and Marion Reis (Lincoln: University of Nebraska Press, 1965), 12.

that arise from the mixture of diatonic and non-diatonic chords can be placed in a conceptual framework that permits them to be understood as functional relations. When examples such as these have been interpreted by a diatonic-scale model they have often resulted in analyses wherein the harmony is regarded to some extent as an aggregate of functional and non-functional chord relations. Harmony viewed in this way often imposes a diatonic-scale hierarchy upon chromatic music wherein some chords are categorically subordinated to others. The octatonic metaphor establishes a primacy of **T**, **S** and **D**, not in terms of certain scale degrees, but as functional categories wherein hierarchies are understood as prototypical functions that emerge from the music. A chromatic model of functional harmonic relations is not only advantageous but also necessary if the chromatic chord relations of tonal music are to be adequately rationalized. The octatonic model, implemented within a conceptual metaphor, has provided one possible accounting for the chromatic harmony within the previous examples.

4

CONCLUSION

The Octatonic Model

I have offered a model of functional harmonic relations based upon a metaphorical mapping of the hyper-octatonic system—the cyclical ordering of the three octatonic collections. I have asserted that the **T – S – D – T** paradigm of tonal harmony is a cycle and that this cycle may be mapped onto by the progressive ordering of the octatonic system, which is itself a cycle. That system, as a generalized model, becomes the means of organizing the view of the implicit functional relations of chromatic chord successions as they progress, retrogress, and extend. The model stipulates three functional categories—**T**, **S**, and **D**—that any chord type belonging to the octatonic collection may represent. Chords within a single collection stand in a substitutional relationship to one another.

The model is applied by means of an interaction metaphor, wherein the context of the music determines when and what functional predications will be made. It does not define rules of contextual interpretation or application. These matters are left to the analyst's judgment. Its predications do not depend upon voice leading conventions, or the diatonic-scale model, but upon pitch-class content and ordering. The model is capable of mapping onto chromatic chord successions because it is not structured around, or dependent upon, any diatonic scale, or chord roots, or any chord type. In addition to making functional-

category identifications, the model assigns degrees of function to chords based upon their constitution.

Advantages of the Model

The model permits a functional status to be conferred upon chords that have been frequently interpreted as non-functional entities as they have been viewed from the perspectives of other models. The model accounts for many chord relations that have been frequently used, as well as those that are more rare. It is compatible with other models at many points, especially the diatonic-scale model. It makes functional predications of some chord relations that equate to those made by the diatonic-scale model (e.g., the ♭II dominant—the jazz musician's "tritone substitute" of the dominant; the augmented sixth chord as a pre-dominant and dominant function; and the vi as a substitute for I in deceptive cadences and elsewhere).

The model supports the privileged **T – S – D – T** cycle, and also acknowledges the **T – D – S – T** pattern, or retrogressive cycle, that has held an important position in popular music. The model thereby confers a theoretically-equal status upon chord successions that are typical of both spheres. The model points out some of the connections that exist between styles wherein chromatic harmony plays an important role. The simplicity of the model with respect to its understanding and implementation is perhaps its principal advantage.

Other Cyclical Models

It has been asserted in this thesis that no single model is sufficient to account for the potentially infinite meanings of complex tonal harmony. Every model has its limitations, and therefore multiple models are required. The octatonic model is designed to apply to only one set of chord relations; other models apply to other sets. It is possible that the astounding variety of tonal harmony that exists within and across musical styles may be conceptually organized by a model of greater generality that coordinates a small number of intersecting cyclical models, among which is the octatonic model. From this perspective, the various components of the harmony, classified according to the particular model to which they belong, could be isolated, and their properties could be calculated. A theoretical basis could be laid that would provide greater tangibility to the perceptual nuances of harmonic character.

A hexatonic model might be valuable for those musical contexts in which chords related by M3 seem to act as substitutions for one another; where strong progressive motion is implied by chords of a single type that move upward by m2; and where there is a prevalence of augmented triads, MM[7] chords, and other chords that belong to the hexatonic collection. The research done by Richard Cohn strongly suggests the mapping potential of the hextonic collection for chromatic harmony.[1] I posit that a hyper-hexatonic model can be fashioned that will organize the view of many problematic chord successions, permit functional

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[1] Cohn, "Maximally Smooth Cycles," 9-40.

predications to be made, and bring to light heretofore unseen features of the harmony.

Though separate cyclical models apply to separate sets of chord relations, there is some significant overlap between the sets that permits them to operate together. For instance, the hexatonic model has a set of predications that overlaps that of the octatonic model on the I, IV and V chords. M and m chords belong to both collections. Chromatic-mediant cycles that use M3s and m3s are possible within both models, but their meaning differs. In the octatonic model, chords functionally substitute for one another at the interval of a m3; in the hexatonic model, they do so at the interval of a M3. A M3 cycle typically prolongs a function in the octatonic model and typically moves through the functions in the hexatonic model. The hexatonic model differs from the octatonic as to the functions it assigns to chords like the $^\flat$II, $^\flat$III, iii, $^\flat$VI, and vi. For example, the $^\flat$II is a hexatonic **S**; the octatonic model identifies it as a **D**.

The octatonic and hexatonic models together identify most of the possible functions of chords that are widely thought to express more than one function. According to the research that has been done thus far, these two models complement each other as two primary subsystems within a larger model of chromatic chord relations that recognizes the multiple meanings that chords may have.

GLOSSARY

Constitution: The proportion of pitch classes that a chord contains from the higher- and lower-fd^{7}s of its octatonic collection (see: Higher-fd^7 and Lower-fd^7). Constitution is used to determine the magnitude of a chord's potential functional force as the subject or object of motion (see also: Potential Functional Force, Subject of Motion, and Object of Motion). See thesis: ch. 2, pp. 38, 52.

Function: The relations among chords organized around a pitch center that are assumed to be perceptible. Relations are expressed in terms of categorical identity and strength. The categorical identities are tonic (**T**), subdominant (**S**), and dominant (**D**). The strength of a relation is the difference between its chords. The strength of relations is expressed in terms of motion forces (see also: Functional Force).

Functional Force: The strength of functional expression. There are two kinds of functional force: constitutional and contextual (see also: Constitutional Functional Force, and Contextual Functional Force). See thesis: ch. 2, pp. 23, 52.

Constitutional Functional Force: A calculation of potential functional force based upon a chord's constitution (see: Constitution). This is a general calculation of force that is not contingent upon context. It is potential because it may not be realized in a musical context. The more a chord is like the higher-fd^7 of its collection, the greater its potential force in progression and the smaller in retrogression. Conversely, the more a chord is like the lower-fd^7 of its collection, the greater its potential force in retrogression and the smaller in progression (e.g., a C^7 has more potential functional force in a progression and less in a retrogression than a Cm$^{(6)}$). Constitutional functional force may be modulated by context (see also: Contextual Functional Force). See thesis: ch. 2, pp. 40, 52.

Contextual Functional Force: The functional force of a chord that arises in a mapping based upon its proximity to the prototypical chord of its functional category (see: Prototype). It is a specific determination of force and is contingent upon contextual factors. See thesis: ch. 2, pp. 40, 52.

Group: The chords in an octatonic collection that share a chord type (e.g. C^7, E$^{\flat 7}$, G$^{\flat 7}$, and A^7 in oct1). See thesis: ch. 2, p. 37.

Higher-fd^7: The fd^7 that is positioned a m2 above the other in an octatonic collection (e.g., the higher-fd^7 of oct1 is the D$^{\flat o7}$). (see also: Lower-fd^7). See thesis: ch. 2, p. 37.

Ideal Form: The fd^7, the building block of the octatonic collection
and the octatonic cycle, is the source of the substitutional intervals, namely,
m3rds, tritones, and M6ths. Chords whose roots are separated by these
intervals are functional substitutes for one another. See thesis: ch. 2, p. 21.

Lower-fd^7: The fd^7 that is positioned a m2 below the other in an
octatonic collection (e.g., the lower-fd^7 of oct1 is the C^{o7}). (see also:
Higher-fd^7). See thesis: ch. 2, p. 37.

Object of Motion: The lagging chord in a relation. (see also: Subject of Motion).
See thesis: ch. 2, p. 57.

Operative Tritone: In one chord of a relation, the tritone whose lower pitch
class is a m2 below the root of the other chord. (e.g., the tritone B-F
in a G^7 chord is the operative tritone in relation to a C chord). See thesis:
ch. 2, p. 61.

Original **D**: A chord whose root is a P5 above or P4 below the pitch center.
See thesis: ch. 2, p. 42.

Original **S**: A chord whose root is a P4 above or P5 below the pitch center.
See thesis: ch. 2, p. 42.

Original **T**: A chord whose root is the pitch center. See thesis: ch. 2, p. 42.

Progression: A succession of chords that conforms to the ordering of the
octatonic collections as oct1 — oct2 — oct3 — oct1 — oct2 — oct3 — etc.
(e.g., C – F – G – Am – Dm – G – etc.).

Prototype: The chord that expresses most clearly the function associated
with its octatonic category relative to certain features established in the
musical setting (e.g., V^7 may be the prototypical **D** relative to the diatonic
scale and the operative tritone). See thesis: ch. 2, p. 60.

Retrogression: A succession of chords that conforms to the ordering of the
octatonic collections as oct3 — oct2 — oct1 — oct3 — oct2 — oct1 — etc.
(e.g., G – F – C – G – Dm – Am – etc.)

Subject of Motion: The leading chord in a relation. (see also: Object of Motion).
See thesis: ch. 2, p. 57.

Substitution: Replacing a chord with another of the same function. Two
chords that share a root may substitute for each other (e.g., a Cm chord is a
substitute for a C chord). A chord whose root is a m3, d5, or a M6 from the

root of an original function is a substitute for that function (e.g., in the key of C, the E$\flat$, G$\flat$, and A chords are substitutes for the C chord). See thesis: ch. 2, p. 41.

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