THE FUNDAMENTAL PARAMETERS OF TENSION AND RELEASE

by

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A Thesis Submitted in

Partial Fulfillment of the

Requirements for the Degree of

Master of Music in Jazz Studies

at

The University of the Arts

Philadelphia, Pennsylvania

April 2018

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1. Introduction

The conceptualization of musical structures as functions of tension and release is essential for the unhindered expression of the creative musician. The hierarchy of musical fluency is first built upon cognitive mastery of functional structures, followed by an intimate aural proficiency in abstraction and isolation, and finally an examination of relationships and patterns as functions of the meta-emotional parameters of tension and release. The creative musician should ultimately seek to transcend the constraint of conventional processes, in favor of a more direct connection between source and expression via the systematic understanding of tension and release.

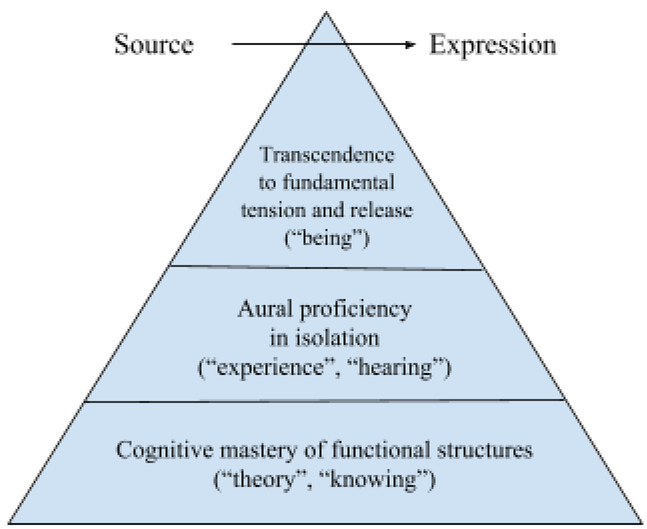

Figure 1. Basic structure of creative musical learning

The human connection with organized sound operates at the mercy of the basic and palpable effects of tension and release. The narrative, expressive quality of music is achieved through the control of tension and release, aided by the projection of extramusical factors. Tension and release exist as a binary, in symbiotic polarity. Tension manifests only after adequate and proper preparation. Release of that tension can be achieved only after that tension becomes a significant functional structure. Consistency, sequences, and patterns can create perceived order and manifest as musical expectations.

> The control of tension and release in music is achieved by the subversion of the listener's expectations. Musical expectations promulgate via natural acoustic principles, sociocultural conditioning, and repetition of distinct functional structures.

2. Harmony

2.1. Building on the studies of Allen Irvine McHose

Functional tonality exists not as an innate quality of human aesthetic perception, but is a sound and logically-manufactured system legitimized via psychological conditioning (saturation and repetition), and represents the compositional style of the Common Practice period. Some fundamental law of nature must be observed that describes the tendencies of tension and release of pitch class complexes (PCCs)[2].Many theorists have made such an effort to create a harmonic hierarchy throughout history with respect to "tonal" or "functional" harmonic palettes. Allen McHose presents one such example in his 1951 text "Basic principles of the technique of 18th- and 19th-century composition". McHose's observations manifest as root movement pathways toward an apparent single terminus (the "Key Center" or "Tonic") and are derived from mathematical surveys attempting to discover the nature of the thing through the average, or most popular tendencies. McHose observed "over five thousand successive chord progressions from complete compositions by Bach, Handel, Graun, and Telemann."Essentially, fifth-based root

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[1] McHose, Allen Irvine. *Basic Principles of the Technique of 18th and 19th Century Composition*, p. 133. Appleton-Century-Crofts, Inc., 1951. This figure is recreated exactly as seen in McHose's original text. Despite modern convention, capital roman numerals do not imply major quality chords.

[2] A pitch class complex is defined by Berry as a "pitch class, dyad class, chord class, or scale". Here, it can basically be understood in practical terms for improvisation, as a root and quality of a chord and the parent mode or parent scale it implies.

movement towards the tonic is a common trait of tonal music of the Common Practice period, with some equivalent substitutions that share similarly functional tones. This fifth-based root movement begins with the the chord of the mediant because further retrogression would result in cadentially equivalent substitutions to lower classifications. Progress from fourth classification chords through subsequently lower classification chords represents a “normal” progression: one in which harmonic tension is systematically relieved.

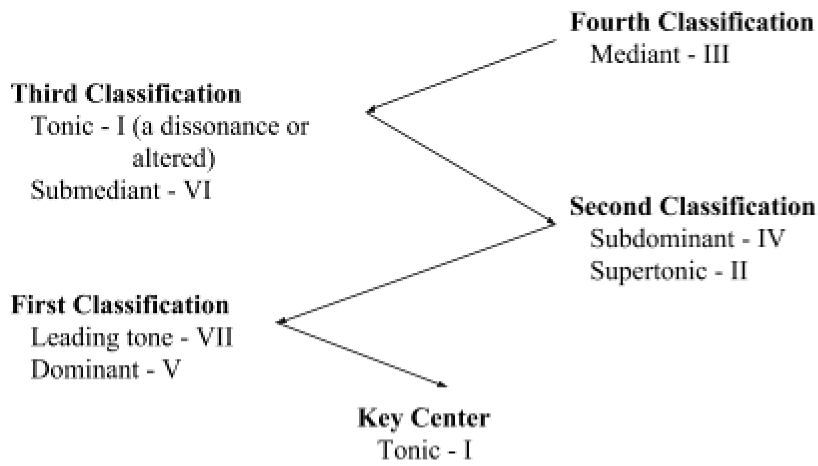

Figure 2. Schematic presented in original McHose text (p.133) [2]

N.B. on cadentially equivalent substitutions: a triad shall be equivalent (able to serve as a substitute for the primary triad of a given classification) in its cadential progress (ability to relieve harmonic tension in a progression) if it meets the following requirements:

1) Shares two tones in common with the primary triad
2) Acts as a vertical extension of the tertian harmony

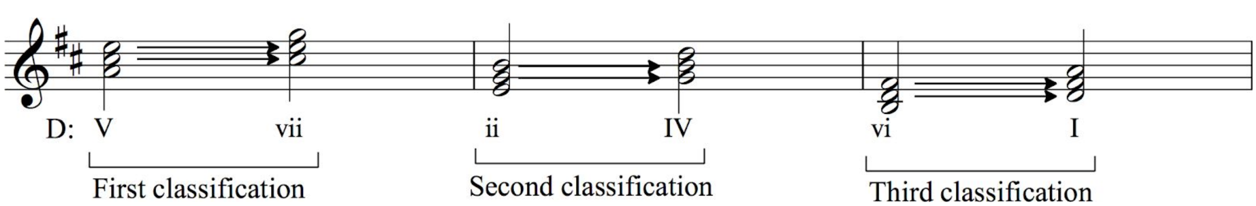

Figure 3. Cadentially equivalent substitutions

Modification of the original McHose schematic is necessary to account for:

1) The palpable effects of harmonic movements felt as tension and release

2) The equivalent but non-identical nature of cadentially equivalent substitutions

3) The identification of normal, retrogressive, and elided pathways

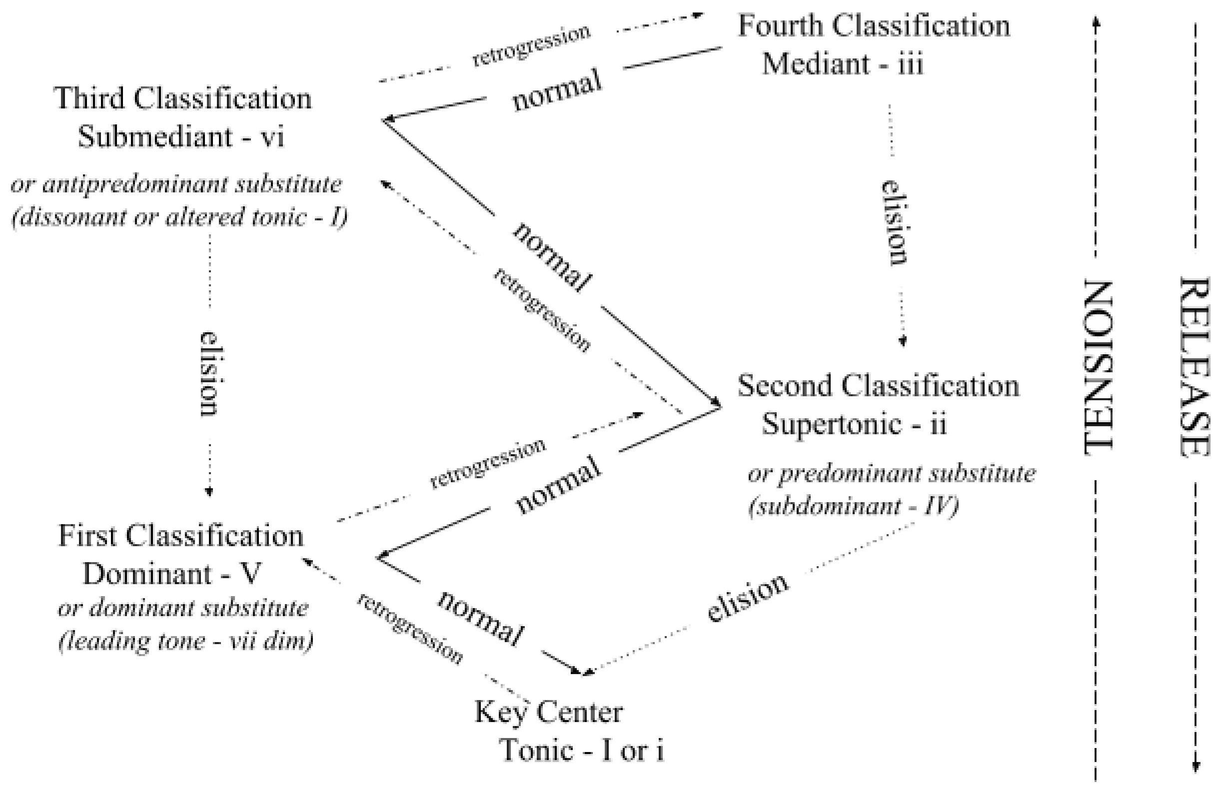

Figure 4. Modified McHose root movement schematic

2.2. Harmonic gravity and the tonic as "axis"

Allen McHose's chord classification provides supremely valuable insight as a retrospective analysis of tonal/functional harmony and as a guideline for reproducing music in the style of the Common Practice period. However, it is necessary to establish a method of conceptualizing cadential progress in tonal/functional and non-functional harmonic palettes that is practical for improvising complete works. This concept should be rooted in the ebb and flow of tension and release as a unifying musical force. One model that is intimately familiar to all is that of gravity. Gravity possesses the same intricate, reversible, polarizing quality as the ebb and flow of tension and release in music. There exists a parallel between the concept of gravitational potential energy (GPE) and the systematic release of tension present in harmonic progressions, as illustrated in Figure 5. An object (such as a ball) held at great height away from a massive body (such as the Earth) has a strong tendency towards that massive body and will fall quickly. That same object held less far away will still have a tendency towards the massive body, albeit not as strong, and will fall at a reduced rate. The most significant structure in tonal music (and this does not exclude music labeled "atonal", which might have a strong affinity for another identifiable structure) is that of the tonic. In tonal music, any given chord has a certain affinity (harmonic gravity) towards resolution to the tonic (release of tension). The harmonic gravity of one chord can be compared to that of another as manifestations of tension and release. Arrival at the tonic chord represents a complete release of tension, just as the ball falling to Earth ceases motion (and loses all potential energy) when it arrives at its closest possible proximity. However, arrival at the tonic does not serve to cease the piece of music. Instead, the tonic serves as an axis of sorts. The concept of the tonic as axis is not new. Ernst Levy began to hint at a polar quality about the tonic in his 1985 work *A Theory of Harmony*[3]. This assertion was extrapolated most notably by modern theorists Steve Coleman, Herbie Hancock, and Jacob Collier as "negative

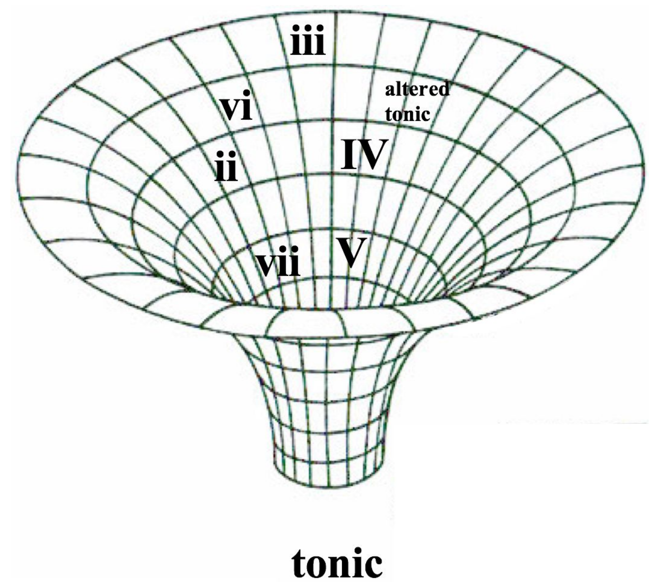

Figure 5. Harmonic tension and release visualized as gravitational potential energy

[3] Levy, Ernst. *A Theory of Harmony*. Edited by Siegmund Levarie, State University of New York Press, 1985.

harmony”, but had been identified as early as 1968 by Hugo Riemann as “harmonic dualism”[4]. Herein, a relationship is found between chords constructed via intervals above the tonic and those constructed via equivalent intervals below. The schematic in figure 6 illustrates this concept based on the fundamental C. The “positive” tonic is composed of tones to the right of C at the top, while the “negative” tonic is composed of those to the right. Underneath, can be found the positive and negative dominant, centered on G, and the positive and negative subdominant, centered on F. Secondary subdominants and secondary dominants (in positive and negative form) are found at the bottom of the schematic. From this visual representation, an axis of tension about the tonic can be seen.

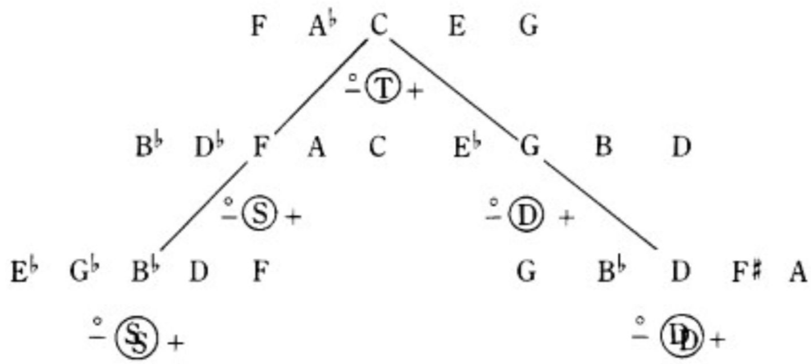

Figure 6. Polarity of tonality schematic[5] from original Levy text (p. 25)

Harmonic gravity in atonal music can manifest as an amalgamation of melodic tendencies, as is seen in Richard Wagner’s *Tristan und Isolde*. Wagner’s work, which borders on complete atonality, is an archetypal example of the interplay of tension and release. In the prelude to the opera (example 5), tense harmonies manifest not as members of a tonal hierarchy (as evidenced by the non-functional resolution of the *Tristan* chord), but rather as amalgamations of individual voices exploiting half-step contrary motion to create tension.

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[4] Riemann, Hugo. *Harmony Simplified or the Theory of the Tonal Functions of Chords: Translated from the German*. Augener Limited, 1977.

[5] Levy, Ernst. *A Theory of Harmony*, p. 25. Edited by Siegmund Levarie, State University of New York Press, 1985.

2.3. Analyzing John Coltrane's multi-tonic systems using the axis system

In his analysis of the music of Bela Bartok, Erno Lendvai developed a system of tonal principles that he observed: the axis system. This method involved the interrelation of all 24 potential triads in the major/minor system in terms of (1) their suitability as substitutions and (2) their distinct functions. Any given "pole" of an axis (for example, T1 or b) forms a "branch" with its "counterpole" (in this case, T3). All poles within an axis share a similar function (whether tonic, subdominant, or dominant), however "a much more sensitive relationship exists between the opposite poles of an axis - the counterpoles...than those situated next to each other"[7]. It is important to note that the major or minor quality of a chord built on the root of a given pole has no effect on its ability to substitute with its counterpole or other members of the axis.

One practical application of Lendvai's axis system is as a logical extension of Allen McHose's diatonic analysis into tonal-centric chromaticism. The axis system affords us a method of conceptualizing the interrelation of complex root movements within

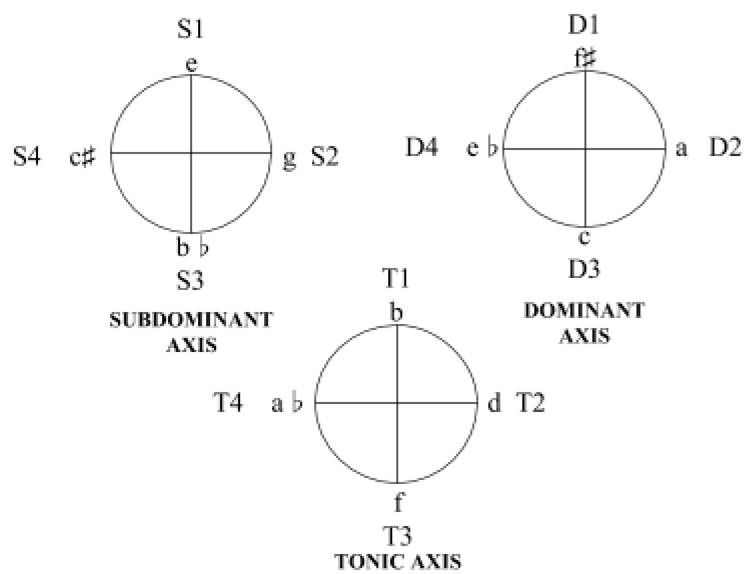
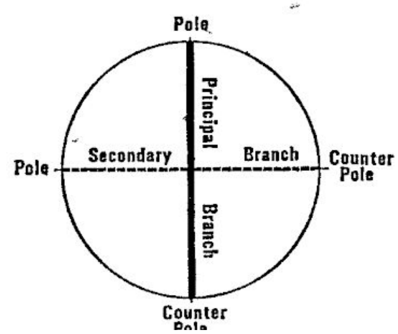
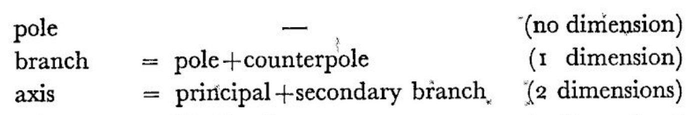


Figure 6. Erno Lendvai's axis system [6]

[6] The nomenclature surrounding the axes (T1, T2, T3, T4, S1, S2, S3, S4, D1, D2, D3, D4) is of this author's design and was not included in the original Lendvai text. Also, the directionality of the tones around the axis has been mirrored in a manner conducive with a logical numbering system, bearing no effect on the pole-counterpole relationship.
[7] Lendvai, Ernö. *Béla Bartók: an Analysis of His Music*, p. 4. Kahn & Averill, 1971. For a graphic depiction, see next page.

compositions involving multi-tonic systems, such as those of John Coltrane. Additionally, it affords a better model of analyzing roots moving equally in thirds as in fifths. In order to adapt Lendvai's axis system to the analysis of music within the jazz idiom, the S1 (prime subdominant) pole shall be the ii chord instead of the IV chord, due to the overwhelming prevalence of ii-V-I cadences. This modification will have no effect on the pole-counterpole relationship. Analysis of the following Coltrane compositions involving multi-tonic systems is included in Appendix A:



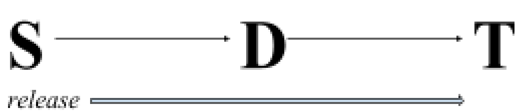


pole		—	(no dimension)
branch	=	pole+counterpole	(1 dimension)
axis	=	principal+secondary branch	(2 dimensions)

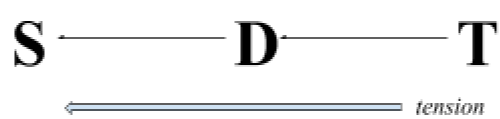
Figure 7. Axis system figure from original Lendvai text (p. 5)[8]

- *Giant Steps*
- *Countdown*
- *Central Park West*
- *Fifth House*
- *26-2*
- *Satellite*
- *Exotica*

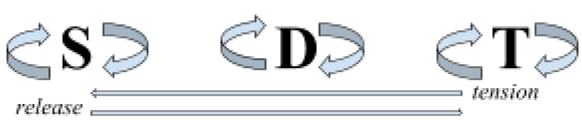
Rate of axis normal progression (Sx-Dy-Tz, not including solely Dx-Ty): 44/67 (65.7%)



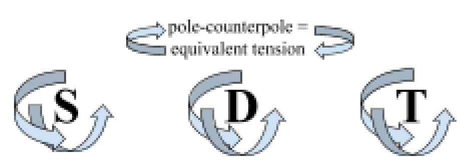
Rate of axis retrogression (Sx-Ty or Dx-Sy): 23/67 (34.3%)



Rate of axis repetition (Tx-Ty, Sx-Sy, or Dx-Dy): 91/265 (34.3%)



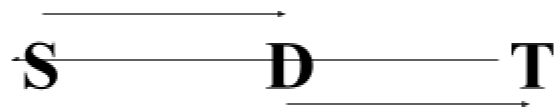
Rate of pole-counterpole motion: 13/265 (4.9%)



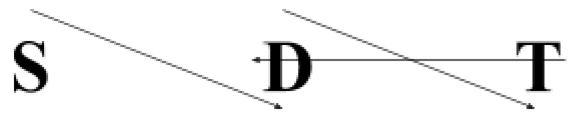
[8] Lendvai, Ernö. *Béla Bartók: an Analysis of His Music*, p. 5. Kahn & Averill, 1971.

Rate of distant pole-axis motion (Tx-Sy, Tx-Dy, Sx-Dy, etc.): 163/265 (61.5%)

Rate of identical pole-axis motion (Tx-Sx, Sx-Dx, Dx-Tx, etc.): 102/265 (38.5%)



Rate of cross-pole-counterpole motion (Tx-Sx+2, Dx-Tx+2, etc.): 13/265 (4.9%)



From this information, the hidden order behind multi-tonic systems and third-based root movement begins to become apparent. For instance, within Figure 6 (an illustration of the basic axis system concept), the three key centers of *Giant Steps* can be seen closely related in the center of the three axes. A similar affinity towards normal progressions is seen in axis system analysis of Coltrane's compositions as is in McHose's analysis of Bach, Handel, Graun, and Telemann (65.7% vs 79%, respectively)[9]. Additionally, axis repetition in Coltrane occurs about as frequently as repetition progressions in McHose's analyses (34.3% vs 10%, respectively)[10]. The relative frequency of pole-counterpole is not due to tritone substitutions (as could be expected), but rather is due to motion between a tonic and a supertonic of a key a major third[11] higher. Considering the fact that McHose's analyses occurred distant enough to allow for many layers of influence to codify the conventions of that compositional style, Coltrane's music is relatively young and, as this style develops, these compositional trends will solidify.

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[9] McHose, Allen Irvine. *Basic Principles of the Technique of 18th and 19th Century Composition*, p. 135. Appleton-Century-Crofts, Inc., 1951.

[10] Ibid.

[11] Key centers separated by major thirds are popular in the multi-tonic music of John Coltrane.The major third separates the octave into three equivalent pieces, allowing for symmetrical movement between the three keys and back to the original tonic.

Yet another application of the axis system is as a compositional/improvisational tool, rather than as an analytical method. The following relations between motion through the axis system and the palpable effects of tension and release might be useful:

- Normal progression through the axes serves to release tension.
- Retrogression serves to build tension.
- Pole-counterpole movement neither builds nor releases tension. This type of movement might be useful as a modulating tool or to add colorful harmonic variety within phrase without altering its natural ebb and flow.
- Normal progression through the axes that produces cadences other than ii-V-I or IV-V-I can produce similarly graded release of tension without utilizing such common progressions.
- The axes are internally symmetrical. Symmetrical transposition of motives or progressions can occur within or between the axes.

2.4. Dissonance

It is important to not only understand the tension and release possible with root movement (horizontal harmony), but also in vertical harmony. Throughout the history of Western music, the perception of dissonance has continually changed. Harmonies once perceived as dissonant become comfortable with exposure and repetition and are later perceived as consonant. Schoenberg proposes a linear progression of the “emancipation of dissonance” in his 1926 essay

"Opinion or Insight?"[12]. Under this assumption, the trajectory of the human ear is towards the eventual acceptance of atonality as consonance. Nevertheless, the simplest place to begin is with the triad of tertian construction.

2.4.1. The tertian triad

"The triad is consonant.
All other chords are dissonant.
The triad may be used as a dissonance.
Other chords - maybe all of them - may be used as consonances."[13]

In the context of tonal music, the overwhelmingly predominant form of vertical harmony is the triad of tertian construction with extensions also of tertian construction[14]. In this tonal context, as a result of musical conditioning through the codification of harmony in the Common Practice period and via repetition[15], the tonic triad possesses the least vertical tension and remains the center of harmonic gravity. Allen Irvine McHose's studies of 18th- and 19th-century harmonic practice confirmed that the tonic triad appears more often in the literature of prolific Common Practice period composers than any other single triad[16], therefore the tensional stability of the tonic triad may result from repetition creating an aural familiarity. Nevertheless, the question remains of whether the major and minor tonic are equivalent in that regard. Ernst Levy presents

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[12] Schoenberg, Arnold. 1926 essay "Opinion or Insight?". *Style and Idea: Selected Writings of Arnold Schoenberg*, p.258–64. Edited by Leonard Stein, with translations by Leo Black. New York: St. Martins Press; London: Faber & Faber. ISBN 0-520-05294-3. 1975.
[13] Levy, Ernst. *A Theory of Harmony*, p. 39. Edited by Siegmund Levarie, State University of New York Press, 1985. It turns out this is false.
[14] It is important to note that although quartal voicings are in popular use, the underlying harmonic theory conceptualizes triads constructed in thirds as the primary structure with extensions in thirds as a secondary structure. A quartal *chord* is entirely different than a quartal *voicing*.
[15] The nature of tonality as we have come to understand it remains a debated and controversial topic. This statement is not supported by strong evidence because that topic is not the focus of this work. An opposing viewpoint suggests that the nature of Common Practice tonality lies within the overtone series, a naturally occurring phenomenon.
[16] McHose, Allen Irvine. *Basic Principles of the Technique of 18th and 19th Century Composition*, p. 135. Appleton-Century-Crofts, Inc., 1951.

two theories: (1) that the polarity theorist will regard both the major and minor as "perfect and equivalent consonances" or (2) that the turbidity theorist will regard the minor triad "as a modified, 'turbid' form of the major triad; and the minor third, characteristic of the minor triad, as a contracted major third"[17]. Considering the disregard for the overtone theory as nature of tonality (wherein the major triad is constructed early on in the series, a natural phenomenon, see [15]), there exists little convincing evidence to suggest that the major and minor forms of tonic are not of equal and equivalent tensional stability in tonal context. As seen in 2.2, the concept of negative harmony/harmonic dualism puts both forms of the tonic on equal footing, as "mirrors" of each other, and are therefore tensionally equivalent.

This leaves in question the status of the two other forms of tertian-constructed triad: the diminished triad and the augmented triad. Indeed, the accepted dissonant harmonic intervals in Common Practice composition are: minor second, major seventh, and the tritone (*diabolus in musica*). However, it is important to recognize that *dissonance* and *tension* are not synonymous. Extremely dissonant intervals can be contained in a final tonic chord that represents a total release of tension, as can consonant intervals exist within a tense chord. The polarizing factor is context. Nevertheless, the diminished triad remains relatively tense as: (1) an extension of the dominant (possessing a high degree of harmonic gravity), and as (2) it contains the turbulent interval of the tritone. Contrarily, the diminished triad and its extension, the fully diminished seventh chord, are symmetrical in nature at the level of the octave and enharmonic to three other functional chords. This calls into question its harmonic tension, considering the lack of singular release/resolution. As was seen comparing *dissonance* and *tension*, it is important to see here that

[17] Levy, Ernst. *A Theory of Harmony*, p. 13. Edited by Siegmund Levarie, State University of New York Press, 1985.

ambiguity and *tension* are also not synonymous. Therefore, the ambiguity of resolution of a symmetrical chord such as the fully diminished seventh chord does affect the amount of tension only depending on the aural context. The augmented triad is much more difficult to classify in terms of tension and release. The augmented triad varies from the diminished triad due to its conspicuous absence in construction from the major/natural minor modes, which obscures classification based on tonal convention. The augmented triad is symmetrical at the level of the octave without extension to the seventh, which (as discussed before) creates an ambiguity of resolution with its enharmonics. The augmented triad appears naturally in the harmonic minor mode, where it possesses a tensionally-weak dominant characteristic due to the decrease in half-step resolutions, and also via passing tones in line cliches (a static harmony with chromatic movement of an outer voice). However, the resolution of the augmented triad as extension of the dominant towards a major tonic, as opposed to minor tonic, is supported by the half-step resolution nature of tension. Here, 4 and ♯2 collapse inward toward the third via contrary half-step motion[18], a significant release of tension.

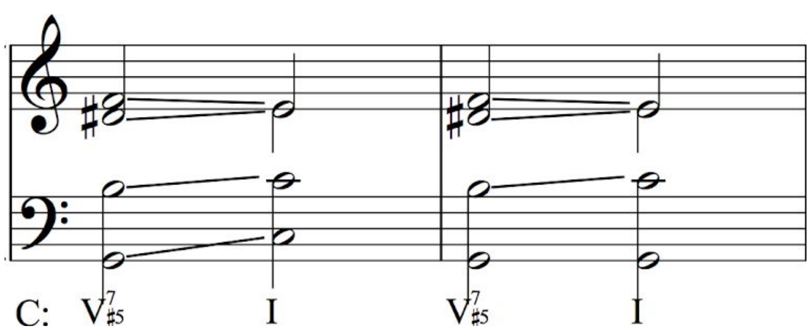

Figure 7. Resolution of augmented dominant chords to a major tonic

2.4.2. Extensions of the tertian triad

A codification of Schoenberg's "emancipation of dissonance" is the transition from the major/minor tonal system towards a lydian-dorian tonal system. This transition was catalyzed by

[18] A departure from traditional voice leading resulting in the omission of either the doubled root or the fifth.

the investigation of new and more colorful tonal palettes in jazz and modal music. Whereas the lydian and dorian modes would result in dissonances and harmonic motion previously considered unprepared or outside of the Common Practice convention, their codification as art music and popular music intermingled in the American melting pot served to redefine certain dissonances as consonances. This concept was elucidated by composer and jazz theory pioneer George Russell in his 1953 text *Lydian Chromatic Concept of Tonal Organization*.

Extensions of the tertian triad manifest differently (in most cases, although exceptions are abundant) in jazz music than they do in European art music and that of Common Practice convention. Although rarer in baroque and earlier music of the Common Practice period, extensions of the triad did appear as releases of tension. See example 2, beat 3, where the subdominant triad is extended to a major seventh without implying dissonant tension and example 3, beat 1 in each complete measure, where the minor tonic is extended to the natural seventh, a seemingly tense dissonance. Under the tonal organization of of the major/minor system, extensions of major triads were functional up to the ninth (figure 8a), however the diatonic eleventh chord (figure 8b) created an internal discrepancy of consonance between the tritone formed by the major seventh and natural eleventh against the root and third. Therefore, this chord ceased to function in a logical manner of tension and release. Likewise, extensions of the minor triad were functional up to the eleventh (figure 8d), but ran into a similar internal discrepancy with addition of a thirteenth (figure 8e). The lydian-dorian concept affords internally consistent extension of the major and minor triads to encompass all seven scale tones simultaneously (figures 8c and 8f).

N.B. Throughout the lydian-dorian concept, the primary modal relationship is similar to major and relative minor (lydian and relative dorian). Therefore, as structures applicable to the tonal major mode are intervallically equivalent or similar in the relative minor, as is the case with the lydian mode and the relative dorian.

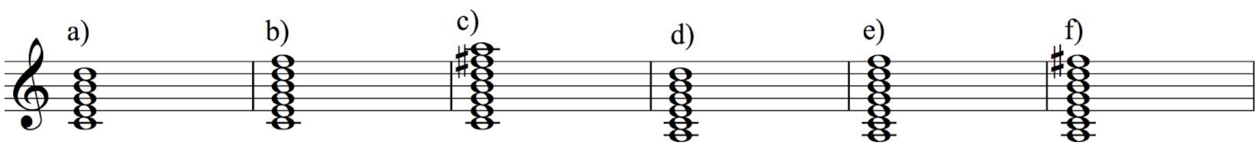

Figure 8. Tertian extensions in the major/minor diatonic system vs. lydian-dorian system

At first glance, it seems that the tritones present in the diatonic major eleventh chord and diatonic minor thirteenth chord were defeated but subsequently replaced by a tritone between the root and ♯11 or third and thirteenth (respectively). However, a higher order exists to the lydian tonic implicit in its construction by contiguous fifths. Considering its supremely low position in the overtone series (representing musical Nature and Truth) and prevailing historic presence as the most basic unit of harmony, the fifth remains ultimately consonant. The stacked fifth construction of the lydian scale (figure 9a) and distance between root and ♯11 within this stacked configuration create a consonant unity independent of the seemingly turbulent nature of the tritone.

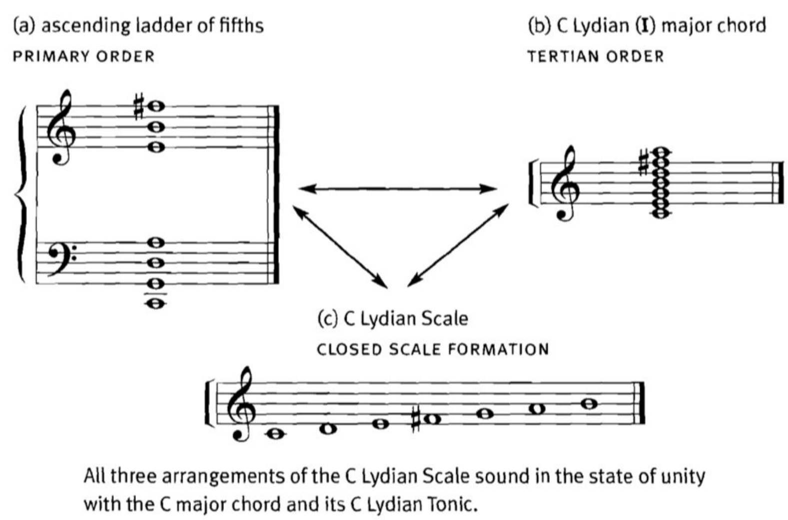

Figure 9. Original George Russell schematic of Unity of the C Lydian Scale[19]

[19] Russell, George. *Lydian Chromatic Concept of Tonal Organization*, p. 2. Concept Pub. Co., 1953.

2.5. Quartal/quintal harmony

With the growing popularity and codification of quartal *voicings* after the influence of McCoy Tyner's innovation, why then is there such little concern for the advancement of quartal (or its reciprocal, quintal) *harmony*? Surely, a codified system of quartal harmony could result in boundless new conceptions of tension and release. If, indeed, the overtone series serves as a natural framework for the genesis of harmony, the supremely low position of the intervals of fourth and fifth (lower than third) should result in harmonic structures more resonant with nature. Innovative composers have made efforts towards this realization: Wagner's *Tristan* comes close to a functional system for quartal structures (example 1). However, just as many, many layers of influence over a great length of time were required to progress from the inception of Western harmony to the logical, ordered system of Common Practice harmonic conventions, time and repetition are required towards a similar end for quartal harmony. Therefore, included in Appendix D are guidelines for a systematic method of quartal *voicings* and their inversions in an attempt to facilitate their ubiquity.

3. Rhythm

3.1. Meter and expectations of tension and release

Just as the division of a string results in a system of pitches that can be interrelated into a hierarchy of tensional significance, so does the division of time. However, the study of rhythmic tension and release is indelible from other parameters and functional structures: "To study rhythm is to study all of music. Rhythm both organizes, and is itself organized by, all the elements which create and shape musical processes"[20]. Meter presents a basic structural unit of hierarchy for rhythm. The conception of meter manifests differently in the brain than simply a pattern of distinct beats or a divisible temporal interval. Meter processing "recruits a set of mechanisms involved in more cognitive and abstract representations than does processing pattern or tempo"[21]. The significance of meter in a study of tension and release is as an adhesive structure of comprehension. Nonetheless, other significant sub-parameters are capable of analysis as manifestations of tension and release (see figure 10) but are not as practical for spontaneous conception.

Fig. 3-1. The concept of rhythm as a generic class of structural factors.

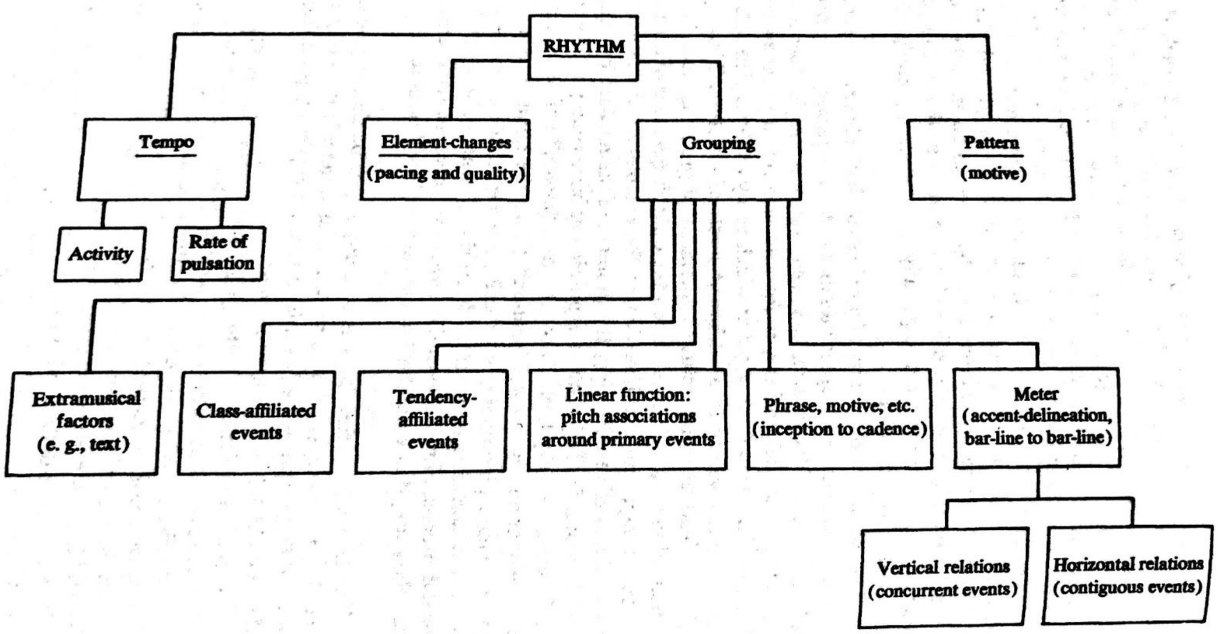

Figure 10. Wallace Berry schematic of set of structural factors manifesting rhythm[22]

[20] Grosvenor W. Cooper and Leonard B. Meyer, *The Rhythmic Structure of Music*, p. 1. The University of Chicago. 1960.
[21] Thaut, Michael, et al. "Human Brain Basis of Musical Rhythm Perception: Common and Distinct Neural Substrates for Meter, Tempo, and Pattern." *Brain Sciences*, vol. 4, no. 2, 17 June 2014, pp. 428–452., doi:10.3390/brainsci4020428.
[22] Berry, Wallace. *Structural Functions in Music*, p. 304. Dover, 1987.

3.2. Patterns

One common underlying mechanism in the control of rhythmic tension and release is the use of repetition and the establishment of, and departure from, pattern. Establishing a rhythmic cell unsupported by previous expectations of subdivision or meter serves to increase tension. Breaking that newly established pattern of expectations in any way, whether via retrogression or movement to another unit altogether, releases that prepared tension.

The second Miles Davis Quintet was a supremely innovative group of musicians with a developed improvisational vocabulary and rhythmic conception. Herbie Hancock plays a solo extremely well-grounded in the creation of rhythmic tension and release over an arrangement of the standard *All of You*. In mm. 68-74 (beginning at 09:56 of audio recording) of the below transcription, Hancock sets up a pattern outlining rising diatonic triads in thirds over two groups of three eighth note triplets. Although the rhythmic cell repeats at the level of one beat, the melodic sequence occurs over two beats. Tension is created via three devices working together: (1) a repeated rhythmic cell that is (2) contrasting to previous rhythmic expectations (primarily swung eighth notes) with (3) an angled (rising) melodic contour. The first deviation from this pattern occurs at m. 75, where the phrase continues to rise, albeit without adhering to the previous melodic sequence. As a result of the continuation of the melodic contour and high register, this deviation does not release the tension but rather serves to heighten it. Finally, at m. 77, tension is released due to (1) a change in the primary subdivision of phrasing (eighth note triplets to sixteenth notes), (2) a change in direction of the melodic contour (now descending), and (3) the long duration (quarter note) creating space and ending the phrase at its lower apex on a strong downbeat.

Figure 11. Excerpt 1 from Herbie Hancock piano solo on *All of You* (Columbia, 1964)

Similar circumstances achieve similar results as the solo continues. After the release of tension in the last phrase, expectations are reset in mm. 78-79 to a relatively flat melodic contour in fast duple subdivision. At m. 80 (10:15 of the audio recording) of the transcription, Herbie again creates tension with the use of (1) a repeated rhythmic cell (here, alternating diatonic melodic thirds phrased in groups of two eighth note triplets) that is (2) contrasting to previous rhythmic expectations with (3) an angled (again, rising) melodic contour. The overwhelming influence of the quarter note triplet becoming a primary beat structure is reinforced in m. 83, as Herbie plays a linear phrase in contrary motion. At m. 84, tension is released by (1) a change in the primary subdivision of phrasing and (2) a change in direction of the melodic contour. However, unlike the drastic transition between triple and duple subdivision in the above example, this transition is more nuanced by maintaining the eighth note triplets but now phrasing in groups of four. The effect of this is perception of the half-note triplet as a primary beat structure, which allows for further release of tension in m. 88, where the final subversion of expectations occurs: space after density.

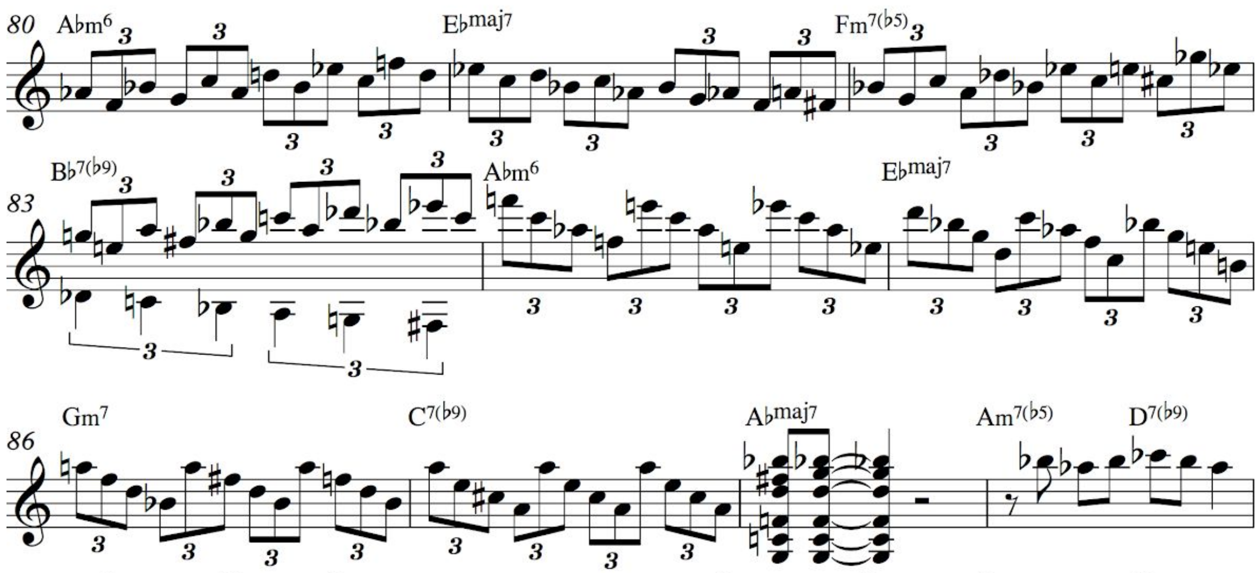

Figure 12. Excerpt 2 from Herbie Hancock piano solo on *All of You* (Columbia, 1964)

Creation and subversion of expectations via rhythmic pattern devices	
Increasing tension	*Releasing tension*
Repetition of a rhythmic cell	Changing the primary subdivision of phrasing[23]
Contrast to previous rhythmic expectations	Space after density
Angled melodic contour	Change in direction or angle of melodic contour

[23] As seen in the analysis of figure 12, changing the primary subdivision of phrasing can be more nuanced than changing just the primary subdivision. Groupings can impact perception of a superimposed beat structure without the alteration of subdivision.

3.2.1. Superimposition

In regards to the method of creating tension by repetition of a rhythmic cell contrasting with previous expectations, the superimposition of asymmetrical beat structures is an innovative tool worth investigating further. There are essentially two pathways towards this goal: (1) metric superimposition and (2) asymmetrical phrasing ("groupings"). Fluency with these devices in an improvisational context is assisted by understanding their aural perception. Since metric superimposition and asymmetrical phrasing facilitate the overlaying of a secondary beat structure, they must be understood in relation to both secondary and primary meter/beat structure. One method of accomplishing this is to feel the repetitions of the rhythmic cell as a primary structure. However, the use of these rhythmic cells to build tension is useless if the release/resolution of that tension is not understood. Therefore, Appendix C presents a limited compendium of such cells for use in improvisation or composition, along with their primary and secondary beat perception and resolution to beat one of the primary meter[24]. The ubiquity of these rhythmic cells in improvisational vocabulary and composition of Western music is not yet achieved. However, just as Schoenberg remarked on the "emancipation of the dissonance", so too will odd meters and superimposition of asymmetrical beat structures become more comfortable and fluid within the sociocultural climate of modern music.

3.2.2. Polyrhythm

In general, polyrhythm presents as an interesting facet of the control of tension and release. Based on the recently aforementioned information, it would be a logical conclusion to assume

---

[24] As seen in the analysis of figure 11, rhythmic resolution of the cell does not *have* to occur on beat one of the primary meter. Rather, a clear reference to a strong beat structure in the primary meter can be perceived as a release of tension, when combined with other factors.

that increasing rhythmic density, superimposition of secondary beat structures, and proximity but not reference to primary beat structures would manifest as an increase of tension. However, often the perception is to the contrary. Many percussive African and Afro-Latin and Indian Carnatic musical styles involve the layering of complex rhythms with (what Western listeners perceive to be) obscure reference to the primary or common beat structure without an increase in tension. Tension and release in these styles often is achieved by the manipulation of other structures or is perceived differently than in the Western music tradition and warrants further investigation.

Steve Coleman's composition, *Rhythm People*, is a complex and polyrhythmic work exemplifying the counterintuitive effect of rhythmic density on tension and release. A transcription of the first 1m 34s of the audio recording (the 28-measure primary form of the composition) is presented in example 5. The first seven measures present the melody alone, then each player plays their interlocking rhythmic cell together over that same form, first without melody and then with melody during the third repeat. Despite the entrance of the band at the second repeat of the first seven measures creating a complex polyrhythmic and contrapuntal texture, the effect is a lack of palpable increase in musical tension. This is likely due, in part, to the ambiguous texture of the solo melody, which does not firmly establish an expectations that could be subverted. If anything, the metrical structure of that section becomes *more* clear (as opposed to less) with the entrance of the complex polyrhythmic texture, however this is not perceived as a *release* of tension because that tension was never *prepared*.

3.3. Harmonic rhythm

The subversion of expectations of harmonic rhythm serves as another point of controlling tension and release. As is the case with any manifestation of tension, some consistency in harmonic rhythm must be established to prepare an expectation. Often, a distinct change in harmonic rhythm manifests as the delineation of the form of a popular song without a palpable change in tension, i.e. the bridge on an American Songbook standard. However, pedal points are a structure that alters the perception of harmonic rhythm by artificially creating static bass motion, and thus serve to increase tension until a return to the previous harmonic rhythm.

4. Melody

4.1. Intervals and pattern

A spectrum of consonance versus dissonance exists with regards to melodic intervals within the octave. Paul Hindemith codified such a spectrum in his manual "The Craft of Musical Composition", reproduced below:

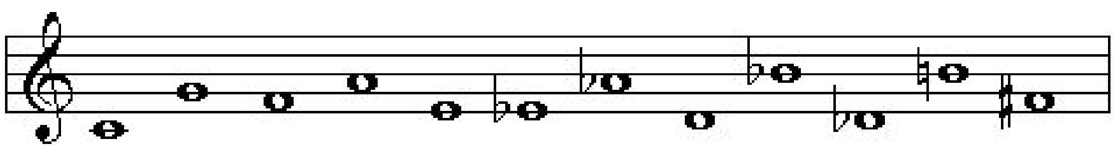

Figure 13. Hindemith consonance spectrum (1945)[25]

Each tone is related to C and is ranked from most consonant on the left to most dissonant on the right. There is no polar distinction between what is consonant or dissonant, but rather all twelve tones can be compared against each other and against the fundamental C in varying degrees. The aural nature of this spectrum appears to be equally in part derived from the overtone series as well as half-step proximity to chord tones. However, many other factors play a role in the perception of tension and release in melodies, such as major/minor/modal context and the manipulation of expectations via such structures as sequence and pattern. While relative

[25] Hindemith, Paul. *The Craft of Musical Composition* . London, Scoth, 1945.

consonance and dissonance does shape the amount of perceived tension at any point in a given melody, control of expectations (and thus tension) in a melody is primarily achieved by the use of pattern.

4.2. Superimposition

Melodies superimposing distant modes serve to create tension. The most familiar application of this concept is the improvisational device known as "sidestepping" or "playing outside". Sidestepping involves the superimposition of a close harmony or progression to create tension and is usually resolved by half-step to emphasize the tense relationship. For instance, using the e-flat dorian scale to compose a melody over a d-minor tonality would serve to create tension and resolving via an a-flat to a-natural would satisfactorily release that tension. Similarly, a series of harmonies superimposed can serve to heighten tension even further due to the additive effect of internal resolutions secondary to the primary superimposition. An example of this would be to play a stock ii-V phrase in d-flat major over a d-minor tonality. Generally, closer proximity of the superimposed melody to the primary tonality results in greater tension.

4.3. Contour

Melodic contour can have a great effect on the amount of perceived tension in a musical composition. A melody's ability to create and release tension is - again - based on the manipulation of expectations. However, just as the study of rhythmic tension and release was somewhat indelible with the greater context, so is the case with melodic contour. Stasis versus broad contour is one spectrum that can be useful for creating and releasing tension. In Chopin's *Prelude No. 4 in E Minor* (example 6), a static melodic contour builds tension in the first eight measures with the aid of half-step proximity to the axis tone b-natural. This tension is released when the melodic span suddenly broadens in m. 9 until a return to the original motive in m. 13 begins to re-build tension. Finally, a broadening of melodic span and registral apex release tension at mm. 16-17. In addition to creating tension with broad versus static melodic contour, changing directionality of linear melodies can be used to subvert the listener's expectations. This was seen in the analysis of example 5 in section 3.2: Patterns.

5. Application

While the information contained in this text concerning tension and release is widely applicable in both improvisational and compositional contexts, the primary goal is to provide a uniquely comprehensible framework for the creative outlet of large, extended piano improvisations/spontaneous compositions, such as those performed by Keith Jarrett and others. These through-improvised concerts, when done supremely thoughtfully, represent the ultimate synthesis of musical skill via the avenues of theoretical knowledge, aural intimacy, technical skill at the instrument, and musical expressive capacity. The parameters of tension and release are uniquely <u>fundamental</u> to the expressive quality of music. In addition, conceptualization of palpable tension and release as functional and concrete musical structures can serve as a method for comprehending the multi-layered tasks associated with meaningful and significant large-scale improvisation.

6. Summary

Tension and release are the fundamental parameters of expressive perception in music.
Tension and release are controlled by the subversion of expectations.
The management of expectations is achieved via exposure in patterns.
Innovation is paramount and can manifest as modification of once-codified concepts or as re-framing of larger structures.

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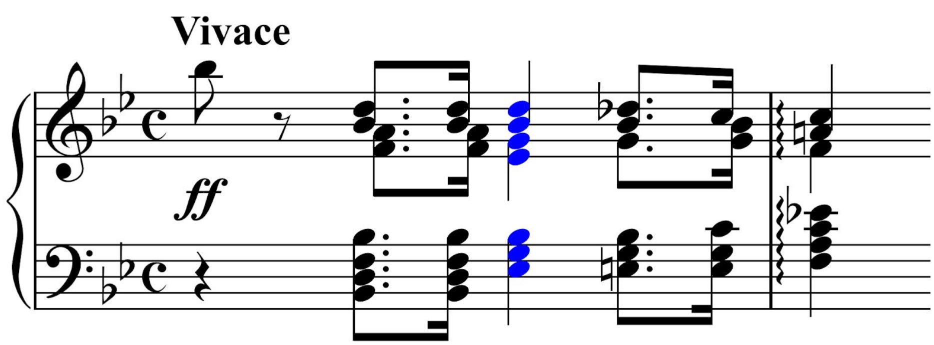
The music of Keith Jarrett, JS Bach, Miles Davis, John Coltrane, Herbie Hancock, Brad Mehldau, Bill Evans, Richard Wagner, Bela Bartok, and Steve Coleman.

Appendix A. Musical examples

Example 1: Prelude from *Tristan und Isolde* by Richard Wagner (piano reduction)

Example 2: *Prelude in B Flat Major*, Well-Tempered Clavier Book 1 by J.S. Bach



Example 3: St. Matthew Passion by J.S. Bach

Example 4: Full transcription (Ian Sadock) of Herbie Hancock piano solo on *All of You* from Miles Davis' "The Complete Concert 1964: My Funny Valentine + Four & More" (Columbia, 1964)


36 Bb7(b9) Abm6 Ebmaj7 Abm7
40 Db7 Gm7 Gbo7 Fm7
44 Bb7 Ebmaj7 D7 Gm7(b5)/Db C7(b9) Fm7
straight ♪s
48 Bb7 Abm6
50 Ebmaj7 Fm7(b5) Bb7(b9) Abm6
53 Ebmaj7 Gm7 C7(b9) Abmaj7 Am7(b5) D7(b9) late
58 Gm7 Db9 C7 Fm7 C7 Fm7 Bb7 Eb6
63 Abm6 Ebmaj7 Fm7(b5)
67 Bb7(b9) Abm6 Ebmaj7
70 Abm7 Db7 Gm7

73 G♭o7 Fm7 B♭7
76 E♭maj7 D7 Gm7(♭5)/D♭ C7(♭9)
8va
78 Fm7 B♭7
80 A♭m6 E♭maj7 Fm7(♭5)
83 B♭7(♭9) A♭m6 E♭maj7
86 Gm7 C7(♭9) A♭maj7 Am7(♭5) D7(♭9)
90 Gm7 D♭9 C7 Fm7 C7 Fm7 B♭7
94 E♭6 Fm7 B♭7 E♭
lay far back
bs and dr straight ♪ vamp
pno still swings
99 Cm7 Fm7 B♭7 E♭


4
103 Cm7 Fm7 B♭7 E♭ Cm7
nearly simultaneous
108 Fm7 B♭7 E♭ Cm7
112 Fm7 B♭7
114
117
120
123 8va
127
130 8va
134 (8)


(8)
3
5
138
141

Example 5: *Rhythm People* transcription (Ian Sadock) by Steve Coleman


3
Alto Sax.
Dr.
Gtr.
Bass
Synth.


4
Alto Sax.
Dr.
(4)
(3)
Gtr.
(4)
(3)
Bass
(4)
(3)
Synth.
(4)
(3)


5
Alto Sax.
Dr.
Gtr.
Bass
(3)
(3)
Synth.
(3)
(3)
6
Alto Sax.
Dr.
Gtr.
Bass
Synth.


7
3x
Alto Sax.
3x
Dr.
3x
Gtr.
3x
Bass
3x
Synth.
9
Alto Sax.
Dr.
Gtr.
Bass
Synth.


11
Alto Sax.
Dr.
Gtr.
Bass
Synth.
(4)
(3)


12
Alto Sax.
Dr.
Gtr.
Bass
Synth.
(3)

Example 6: Prelude in E Minor, Frederic Chopin

Appendix B. Modified axis analyses of John Coltrane's multi-tonic systems

Giant Steps (E♭)

B maj 7	D 7	G maj 7	B♭ 7	E♭ maj 7		A min 7	D 7
S3	S4	D4	D1	T1		T3	S4
G maj 7	B♭ 7	E♭ maj 7	F♯ 7	B maj 7		F min 7	B♭ 7
D4	D1	T1	T2	S3		S1	D1
E♭ maj 7		A min 7	D 7	G maj 7		C♯ min 7	F♯ 7
T1		T3	S4	D4		D2	T2
B maj 7		F min 7	B♭ 7	E♭ maj 7		C♯ min 7	F♯ 7
S3		S1	D1	T1		D2	T2

Axis normal motion: 5/6 (83.3%)
Axis retrogression: 1/6 (16.7%)
Axis repetition: 9/26 (34.6%)

Pole-counterpole: 5/26 (19.2%)
Distant axis-pole motion: 15/26 (57.7%)
Identical axis-pole motion: 11/26 (42.3%)
Cross-pole-counterpole: 0/26 (0%)

Countdown (D)

E min 7	F 7	B♭maj 7	D♭ 7	G♭ maj 7	A 7	D maj 7	
S1	T2	S3	S4	D4	D1	T1	
D min 7	E♭ 7	A♭ maj 7	B 7	E maj 7	G 7	C maj 7	
T1	D3	T3	T4	S1	S2	D2	
C min 7	D♭ 7	G♭ maj 7	A 7	D maj 7	F 7	B♭maj 7	
D2	S4	D4	D1	T1	T2	S3	
E min 7		F 7		B♭maj 7		E♭ 7	
S1		T2		S3		D3	

Axis normal motion: 2/7 (28.6%)
Axis retrogression: 5/7 (71.4%)
Axis repetition: 9/25 (36%)

Pole-counterpole: 1/25 (4%)
Distant axis-pole motion: 18/25 (72%)
Identical axis-pole motion: 7/25 (28%)
Cross-pole-counterpole: 3/25 (12%)

Central Park West (B)

B maj7		E min 7	A 7	D maj 7		B♭ min 7	E♭ 7
T1		S2	D2	T2		S4	D4
A♭maj 7		G min 7	C 7	F maj 7		C♯ min 7	F♯ 7
T4		S3	D3	T3		S1	D1
B maj7		E min 7	A 7	D maj 7		C♯ min 7	F♯ 7
T1		S2	D2	T2		S1	D1
B maj 7				C♯ min 7 / B			
T1				T1			
B maj 7				C♯ min 7 / B		C♯ min 7	F♯ 7
T1				T1		S1	D1

Axis normal motion: 7/7 (100%)
Axis retrogression: 0/7 (0%)
Axis repetition: 3/24 (12.5%)

Pole-counterpole: 0/24 (0%)
Distant axis-pole motion: 9/24 (37.5%)
Identical axis-pole motion: 15/24 (62.5%)
Cross-pole-counterpole: 2/24 (8.3%)

Fifth House (C)

C pedal (16 mm.)							
T1							
C min 7	D♭7	G♭	A 7	D	F 7♭9	B♭	
T1	D3	T3	T4	S1	S2	D2	
E♭ min 7		A♭ 7		D min 7		G 7	
T2		S3		S1		D1	
C pedal (8 mm.)							
T1							

Axis normal motion: 2/3 (66.7%)
Axis retrogression: 1/3 (33.3%)

Pole-counterpole: 1/13 (7.7%)
Distant axis-pole motion: 7/13 (53.8%)

Axis repetition: 5/13 (38.5%)

Identical axis-pole motion: 6/13 (46.1%)
Cross-pole-counterpole: 1/13 (7.7%)

26-2 (F)

F 6/9	A♭ 13	D♭maj 9	E 9	A maj 7	C 13	C min 7	F 13♭9
T1	T2	S3	S4	D4	D1	D1	T1
B♭ maj 7	D♭13	G♭ maj 7	A 13♭9	D min 9	G 13	G min 7	C 13♭9
S2	S3	D3	D4	T4	S1	S1	D1
F 6/9	A♭ 13	D♭maj 9	E 9	A maj 7	C 13	C min 7	F 13♭9
T1	T2	S3	S4	D4	D1	D1	T1
B♭maj 7	A♭ 9	D♭maj 9	E 13	A maj 7	C 13	F maj 9	D♭min 9
S2	T2	S3	S4	D4	D1	T1	S3
C min 9		E min 11	A 13	D maj 7	F 7 ♯5	B♭maj 7	E min 6/9
D1		S4	D4	T4	T1	S2	S4
E♭min 6/9	E♭min 7	A♭ 13 sus	A♭ 13 ♭9	D♭maj 7		G min 9	C9
D2	D2	T2	T2	S3		S1	D1
F maj 9	A♭ 13	D♭maj 7	E 13	A maj 7	C 13	C min 9	F 7♭9
T1	T2	S3	S4	D4	D1	D1	T1
B♭ maj 9	A♭ 13	D♭maj 7	E 13	A maj 7	C 13	F maj 9	C 13♭9
S2	T2	S3	S4	D4	D1	T1	D1

Axis normal motion: 10/14 (71.4%)
Axis retrogression: 4/14 (28.6%)
Axis repetition: 24/62 (38.7%)

Pole-counterpole: 1/62 (1.6%)
Distant axis-pole motion: 41/62 (66.1%)
Identical axis-pole motion: 21/62 (33.9%)
Cross-pole-counterpole: 3/62 (4.8%)

Satellite (G)

G maj 7	B♭ 7	E♭maj 7	G♭7	B maj 7	D 7	G min 7	C 7
T1	T2	S3	S4	D4	D1	T1	S2
F maj 7	A♭ 7	D♭maj 7	E 7	A maj 7	C 7	F min 7	B♭ 7
D2	D3	T3	T4	S4	S2	D2	T2
E♭maj 7		A min 7	D 7	G min 7		A min 7	D 7
S3		S1	D1	T1		S1	D1
G maj 7		F min 7	B♭ 7	E♭maj 7	G♭7	B maj 7	D 7
T1		D2	T2	S3	S4	D4	D1
G maj 7	B♭ 7	E♭maj 7	G♭7	B maj 7	D 7	G min 7	C 7
T1	T2	S3	S4	D4	D1	T1	S2
F maj 7	A♭ 7	D♭maj 7	E 7	A maj 7	C 7	F min 7	B♭ 7
D2	D3	T3	T4	S1	S2	D2	T2
E♭maj 7		A min 7	D 7	G maj 7		C min 7	F 7
S3		S1	D1	T1		S2	D2
D pedal							
D1							
D pedal							
D1							

Axis normal motion: 11/12 (91.7%)
Axis retrogression: 1/12 (8.3%)
Axis repetition: 17/52 (32.7%)

Pole-counterpole: 3/52 (5.8%)
Distant axis-pole motion: 28/52 (53.8%)
Identical axis-pole motion: 24/52 (46.1%)
Cross-pole-counterpole: 0/52 (0%)

Exotica (C)

: E/G				G 7			
D1				D1			
E 7	E♭ 7	A♭ maj 7	B 7	E	G 7	A♭ min 7	D♭ 7
D1	T2	S3	S4	D4	D1	S3	D3
E/G				G 7			
D1				D1			
C	E♭ 7 / B♭	A♭	B7 / F♯	E	D min 11	D min 7	G 7 :
T1	T2	S3	T3	D4	S1	S1	D1 :
E min 7	A 7	E min 7	A 7	D	C 7	F 7	B 7
D4	T4	D4	T4	S1	T1	S2	S4
B♭ 7	A 7	D maj 7		D min 7		G 7	
D2	T3	S1		S1		D1	
D min		G 7		C	B♭ 7	E♭ 7	G♭ 7
S1		D1		T1	D2	T2	T3
B 7	D7	D min 7	G 7	D.C.			
S4	S1	S1	D1				

Axis normal motion: 7/18 (38.9%)
Axis retrogression: 11/18 (61.1%)
Axis repetition: 24/63 (38.1%)

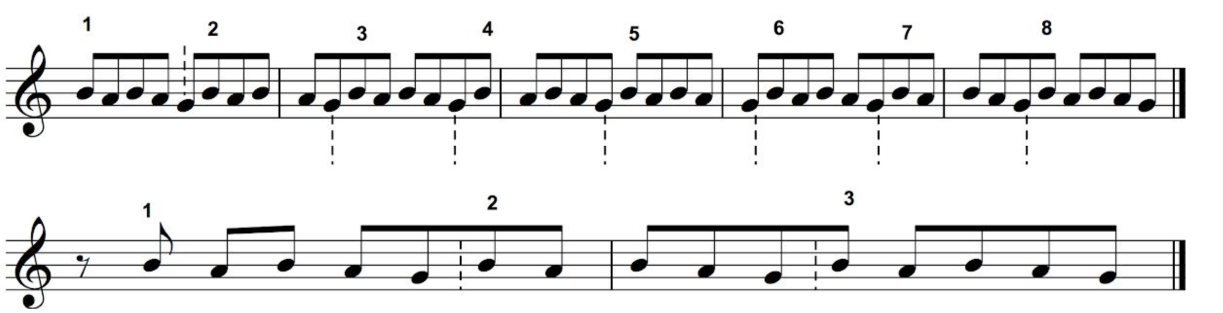
Pole-counterpole: 2/63 (3.2%)
Distant axis-pole motion: 45/63 (71.4%)
Identical axis-pole motion: 18/63 (38.6%)
Cross-pole-counterpole: 4/63 (6.3%)

Appendix C. Limited compendium of asymmetrical groupings and metric superimpositions for use as rhythmic cells


Metric Juxtapositions
3.

Subdivision Groupings **5**

4.

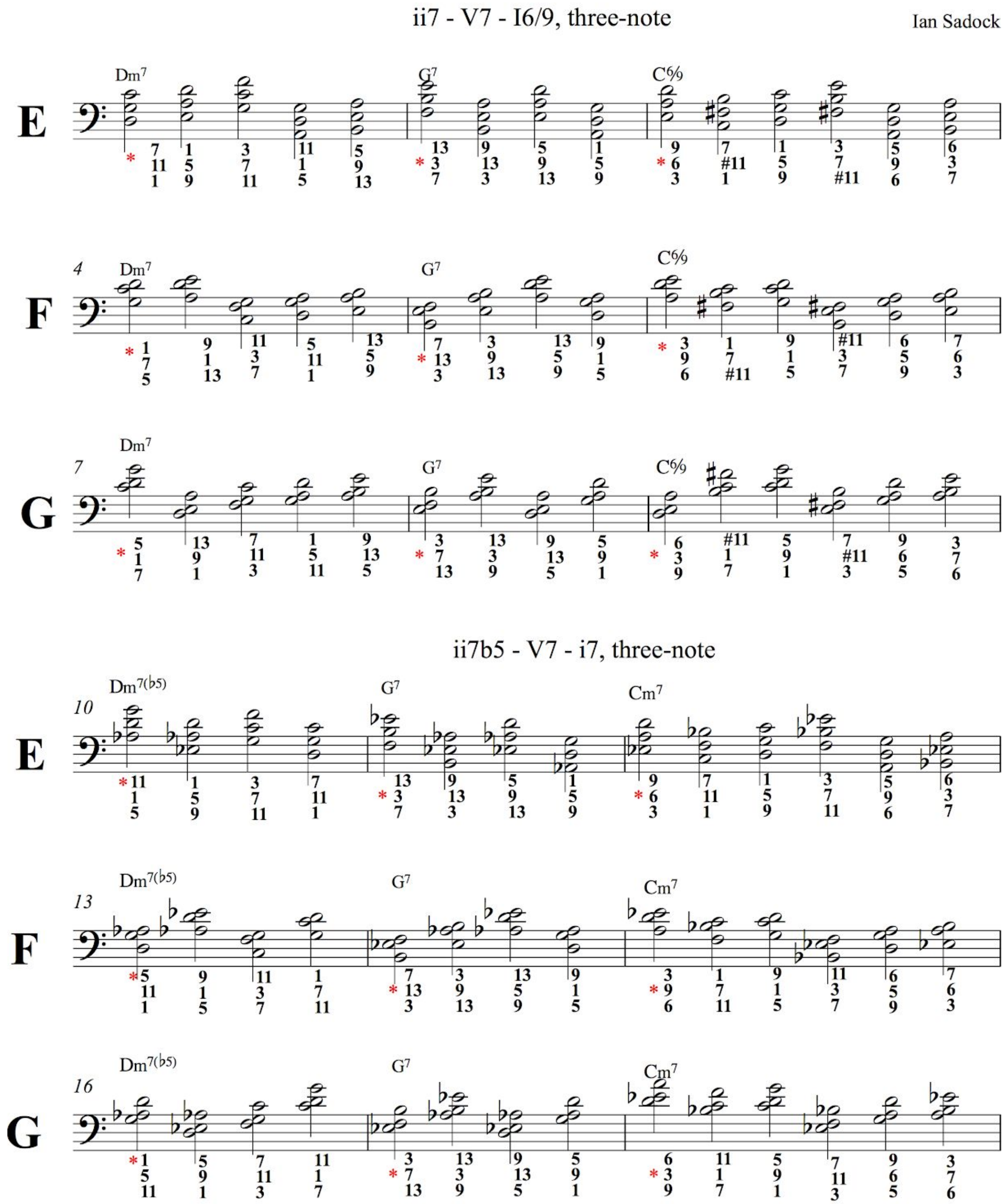


5.


1 2 3 4 5 6
1 2 3 4 5 6 7 8 9
1 2 3 4
1 2 3 4 5 6 7
1 2
1 2 3 4 5
1 2 3 4 5 6 7
8 9 10
11 12 13 14 15 16


6.
7
7.

Appendix D. Quartal ii-V-I voicing guidelines



Guidelines:

1. **Range**: depending on style/texture/intensity, the acceptable range in which to play these voicings is variable. Ideally, they should be kept within the prime comping range of (E below middle C) - (A above middle C). However, there is much greater freedom in comparison to tertian voicings due to the "open" resonance of the perfect fourth interval. The absolute lower limit to prevent muddiness could be considered the bottom of the bass clef staff.

2. **Variation**: any of the variations within the E, F, and G forms can be used as the ear permits and is encouraged over long spans of static harmony such as is found in modal tunes. Uncharacteristic (as a result of pre-mature tensions/resolutions such as scale degree 7 on ii7 or scale degree 1 on V7) variations not listed above are welcome to be used as brief and un-accented passing chords.

3. Asterisks (*) designate the most *functional* variation of each of the E, F, and G forms.