

How Melody Engenders Cadence in the Major-Mode Chorales of J.S. Bach

The 371 four-voice chorales harmonized by Johann Sebastian Bach have become paradigms of tonal part-writing in musical education. Despite the prodigious number of these exemplars left behind, Bach (as far as modern research has found) unfortunately produced no substantial instructional counterpart to explain his compositional methods for these models of harmony and voice-leading¹. Perhaps Bach was at a loss to put into words the mechanics of a writing style that had for him become fluent and facile after years of practice, or perhaps Bach was simply too busy composing timeless music. Whatever the reasons, the task has fallen on music theorists, for decades if not centuries, to attempt a pedagogical bridge between the monophonic hymnal melody and the polyphonic, fully-formed chorale.

The use of a melody as the starting point for this bridge contrasts with the typical compositional beginnings of a blank page since any given hymn tune naturally provides its own form, structure, key center, cadential points, melodic arc, etc. The automatic resolution of these issues for the music student creates a more controlled environment in which the student can focus on fewer compositional dilemmas. An effective instructional technique would thus arguably be one that initially controls this environment even further, limiting the decision-making process of the student to a small slice of the creative whole. As techniques are mastered, restrictions are slowly lifted, leading the student progressively towards compositional independence.

Bach's own approach to the harmonization of hymn tunes often followed a graduated method. In his teaching, Bach would first provide a bass line for each hymn melody, leaving his students to fill in the missing middle parts; only after these exercises were mastered would he allow his pupils to compose the bass part themselves.² Evidence also exists that this step-by-step system not only functioned as an instructional tool for Bach but also acted as a practical compositional technique in the writing of his own chorales. Bach, for example, would at least occasionally notate the entire bass line underneath the melody before adding the middle parts.³

¹ J.S. Bach's *Vorschriften und Grundsätze zum vierstimmigen Spielen des General-Bass oder Accompagnement* provides nowhere near the theoretical depth needed to act as an instructional balance to the breadth of his chorales.

² Hans T. David and Arthur Mendel, eds., *The Bach Reader: A Life of Johann Sebastian Bach in Letters and Documents* (1945; New York: W.W. Norton & Co., 1966), p. 279.

³ Robert L. Marshall, "How J. S. Bach Composed Four-Part Chorales," *Musical Quarterly* 56.2 (1970): 199-200.

The existence of the 69 chorale melodies with figured bass (sans complete harmonizations) further confirms the notion that Bach conceived of the bass line as a stand-alone support to the hymn melodies on the path towards four-part realizations, particularly as many of the figured bass lines from the 69 appear literally reproduced in the 371 chorales as underpinnings to fully fleshed-out arrangements.⁴

This division of a chorale's harmonization process into two distinct stages (figured bass and then inner voices) helps simplify the arrangement of chorales, but large conceptual gaps remain between each stage. For example, how does one progress from a naked melody to a free-flowing bass line characteristic of Bach, and how does one continue from this bass line to the finished four-voice product? To aid in understanding these open-ended questions, each stage in the writing process would ideally be further subdivided into even simpler and smaller parts, those parts themselves subdivided again, and so on, until a granular sequence of decision-making can be presented to the student. This paper attempts to scratch the surface of such a decision-making process by examining a single step in the larger staircase of choices faced by anyone when harmonizing a melody in the Bach style. Specifically, the step to be examined will be that of determining cadence.

The choice of what type of cadence to use at points of rest in a hymnal melody is possibly the initial and most basic phase of the harmonization process. Some musicians, however, may feel that discussions of cadence cannot be divorced from the four-part texture or the compositional process as a whole. Salzer and Schachter, in their well-respected pedagogical text *Counterpoint in Composition*, remark, "Unfortunately the student is often advised to determine the cadences first, only then 'filling in' the rest, as if the end of a phrase were not the consequence of what has gone on before and the preparation of what is to come."⁵ The logic and reasoning of this comment, however, seems to contradict its own stance. If cadence is "the consequence of what has gone on before," then must not this consequent goal have been a foreknown factor towards which the counterpoint and voice-leading work? For example, one does not start telling a story unless one first has a point in telling the story, a predetermined point towards which the story leads. Similarly, since any figured bass line dictates a unique cadence, the cadence itself must have been determined before the notes of the bass were put to paper or else the bass line

⁴ Albert Riemenschneider, commentary, *371 Harmonized Chorales and 69 Chorale Melodies with Figured Bass*, by Johann Sebastian Bach (New York: G Schirmer, Inc., 1941), p. 164.

⁵ Felix Salzer and Carl Schachter, *Counterpoint in Composition* (1969; New York: Columbia University Press, 1989), p. 269.

would lack direction, aimlessly wandering towards whatever cadence happened to be convenient at the next point of rest. Salzer and Schachter also mention cadence as "the preparation of what is to come," implying that one cannot prepare for what is to come by predetermining cadences. Yet cannot one prepare for what is to come in an essay by writing an outline? Similar to this structural outline, cadence choices must be made with the entire scope of the melody in mind. Finally, the authors' admonition of "filling in" goes directly against Bach's own pedagogical methods. Salzer and Schachter are referring to a filling in of the bass line between cadences as opposed to Bach's filling in of inner voices overtop this bass line, but the tone of the authors' statement casts aspersions on a process which was at least a valid learning tool if not a standard compositional method for Bach himself.

Despite being a potentially effective learning tool, the compartmentalization of the harmonization process through choice of cadence remains an only partially documented technique. A cursory look at understanding the cadential choices in Bach's chorales has been attempted by Malcolm Boyd in his book *Bach: Chorale Harmonization and Instrumental Counterpoint*. In his chapter on cadences, Boyd presents a summary of the incidence and frequency for certain cadence types, a summary reproduced in Table 1:

Table 1: Analysis of cadences in Bach's chorales as shown by Malcolm Boyd⁶

<i>Cadence</i>	<i>Root Position</i>	<i>Inverted</i>	<i>Total</i>	<i>Approx. Percent.</i>
Perfect (V-I)	1,241	211	1,452	73
Imperfect (?-V)	225	190	415	21
Plagal (IV-I)	30	14	44	2
Interrupted (V-VI)	33	0	33	1.5
Others	N/A	N/A	50	2.5

The problem with Boyd's analysis is that it implies a randomness to the art of composition, as if Bach were rolling dice when deciding which cadences to use. While a lack of total control must exist on some level, music theory has to assume that logical decisions, made for musical reasons, inform the choices good composers make when writing well-formed pieces of music. In his introduction, Boyd professes an attempt to elucidate not just what, for example, a procedure of

⁶ Malcolm Boyd, *Bach: Chorale Harmonizations and Instrumental Counterpoint* (1967; London: Kahn & Averill, 1999), p. 11.

Bach is, but "how often it occurs, in what contexts, and, if possible, why," thereby exhibiting Boyd's own desire to get at these musical reasons.⁷ While Boyd has shown in his summary how often certain cadences occur, he fails in the accompanying text to provide any explanation as to why or at least in what context those cadences are used (except for the case of Interrupted cadences which are so few as to be of relatively insignificant importance). Moreover, Boyd's nomenclature for different types of cadences makes the inherent vague quality of cadential terminology even worse by ignoring bass motion or the final tone in the soprano, concentrating solely on harmonic motion. Finally, by including Bach's major-mode, minor-mode, and modal chorales in one sweeping statistical generalization, Boyd has created an analysis of only marginal use to the student first approaching the harmonization of a hymn melody. Eliciting what Boyd attempts to reveal was therefore one inspiration behind the research for this paper.

As much as carefully analyzing the cadence points in Bach's chorales corresponds to a subdivision of the compositional process, the investigation of cadence itself must similarly be broken down into smaller parts. Minor-mode, major-mode, and modal hymns certainly share different harmonic goals and therefore require separate comparisons of cadence. Also, the difference in rhythmic emphasis between hymn tunes in 3/4 versus those in 4/4 may affect the choice of cadence. In an attempt to compare only "apples with apples," this paper looks only at cadences in the major-mode, common-time chorales of Bach. As hymns in a triple meter are relatively rare for Bach (representing only around ten-percent of the total), disregarding these melodies during this investigation seems a valid way to minimize comparing lines with potentially dissimilar features. Chorales in major keys were chosen specifically as an initial point of inquiry because "these tunes proceed to clear tonal goals, creating a sense of tonal direction and, more generally, conveying almost a palpable sense of purpose."⁸ Having clear tonal goals in the melodies should more easily show substitutions to these goals, hopefully making Bach's possible reasons for these substitutions more obvious.

Limiting this analysis to only the major-mode chorales allows a more focused study, but which hymns are included in this designation? While many hymnal melodies patently outline major key areas (*Ein' feste Burg ist unser Gott*, for example), some hymnal melodies have more questionable implications as to key. Particularly, many of the Mixolydian melodies veer close to

⁷ Boyd, p. 7.

⁸ Robert L. Marshall, *Luther, Bach, and the Early Reformation Chorale* (Atlanta: Pitts Theological Library, 1995), p. 6.

sounding like major-mode tunes and vice-versa. The melody of *Es ist das Heil uns kommen her/Sei Lob und Ehr' dem höchsten Gut*, for example, mostly transverses what appears to be a major-key and ends on $\hat{1}$; a lowered $\hat{7}$ appears in the first bar but is contradicted by four subsequent instances of a raised $\hat{7}$ throughout the rest of the hymn. The lowered $\hat{7}$ might then be considered an aberration in what is otherwise a major-mode melody. According to music theorists contemporary to Bach, however, this tune falls into the Mixolydian category.⁹ Conversely, the melody of *Ich dank' dir, lieber Herre*, which also includes a single instance of a lowered $\hat{7}$, does not appear in historical lists of modal tunes. The melody of *Ich dank' dir, lieber Herre* may therefore be construed as a major-mode melody with a temporary tonicization of the subdominant, similar as to how many major-mode melodies often temporarily tonicize the dominant or supertonic key areas. In general, I have relied on the available research summarized by Lori Anne Burns to differentiate modal versus tonal melodies, since a full investigation into these issues lies beyond the realm of this paper. A complete list of final choices can be found in the Appendix. I have potentially excluded an arguably tonal melody here or included an arguably modal melody there, but such debatable oversights should not significantly affect a global analysis of cadences. The overwhelming number of tunes in an obviously major key outweighs those exceptions, allowing a fairly clear view of general trends and reasoning in Bach's choices.

The desire to view general trends in the chorales should be emphasized, for trying to uncover all of the factors affecting Bach's decision-making process is inherently a historical and theoretical impossibility. Potentially, Bach wove extramusical considerations into the musical fabric, one example being the text of the hymns. According to Henry Drinker, "Bach does not emphasize particular words and phrases."¹⁰ Riemenschneider, however, points to the work of Schering, Schweitzer, and Pirro as evidence of the influence words had on Bach's particular setting of a chorale. Riemenschneider goes on to say that Bach's chorales "cannot be explained from a purely musical standpoint, and only the association of the text makes it possible to solve some of the strange chords and progressions."¹¹ The accuracy of either Drinker or Riemenschneider's position is not worth deliberation in the context of this paper, though, because an explanation of the "strange chords and progressions" can be only speculative since isolated

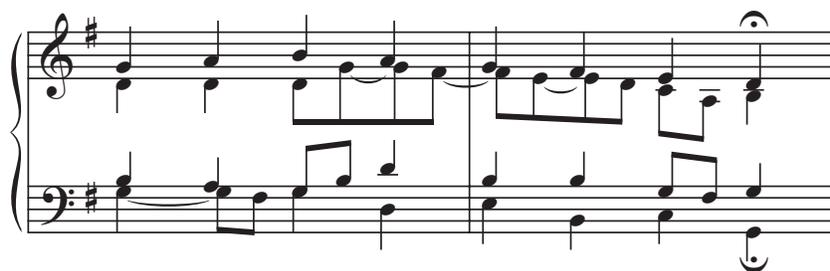
⁹ Lori Anne Burns, *Bach's Modal Chorales* (Stuyvesant, NY: Pendragon Press: 1995), pp. 219-223.

¹⁰ Henry S. Drinker, introduction, *The Bach Chorale Texts: with English Translations and Melodic Index* (New York: The Association of American Colleges, 1941), p. viii.

¹¹ Albert Riemenschneider, preface, p. viii.

and extreme cases do not provide enough examples to fully support any theory or large-scale analysis. Salzer and Schachter warn that "nothing could be more stifling to musical development than to restrict the student to the most typical, frequently encountered usages,"¹² a true enough statement if the student in question has mastered the typical, frequently encountered usages and can see how the exceptions play with or subvert expectation. For a student attempting to create a stylistically accurate version of the Bach chorales, however, a broad and deep understanding of the common practice writing in these arrangements better facilitates smooth and easy reproductions.

Lacking this comprehensive understanding of Bach's common practice writing can lead one to false assumptions about reasons behind the choice of harmonies at resting points. One example of an erroneous assumption can be found in *Counterpoint in Composition* where Salzer and Schachter present an "incorrect" harmonization of the first phrase from *Freu' dich sehr, o meine Seele* (reproduced in Example 1).



Example 1: Salzer and Schachter's "unconvincing" chorale harmonization¹³

The example phrase, according to the authors, is "not bad" as a stand-alone four-part setting in the style of Bach. Only when combined with its consequent phrase, which also cadences in G-major, do Salzer and Schachter find the example setting "unsatisfactory," reasoning that "there is not enough variety, not enough relief from the constant emphasis on tonic harmony."¹⁴ This statement implies that Bach avoids consecutive cadences on the same harmony, perhaps especially the tonic or opening harmony (given the context). The reality, however, is quite contrary to this outlook. A significant percentage of Bach's chorales—over 33% of the unique chorales in the major-mode—show two if not three or more cadences in a row on the tonic

¹² Salzer and Schachter, p. 305.

¹³ *Ibid.*, p. 294.

¹⁴ *Ibid.*, p. 295.

harmony. Chorales 86 and 323, for example, have five consecutive tonic cadences, while chorales 36, 84, and 97 as well as 65, 293, and 347 show consecutive opening tonic cadences supporting the same melodies. More importantly, however, is that nothing like the two bars in Salzer and Schachter's original example is ever found in Bach, considerations about the consequent two bars aside. Their example, therefore, does not even work as a stand-alone phrase, contrary to the authors' appraisal. As shall be shown, Bach almost always cadences underneath a $\hat{5}$ on a dominant chord and rarely cadences on anything but the dominant when the melody linearly descends $\hat{8}-\hat{7}-\hat{6}-\hat{5}$ in equal quarter-note values, never using a Plagal cadence on the tonic in this situation. A more global view of Bach's cadences as dependent on the melodic line thus provides more appropriate reasons for choosing cadences in our own chorale harmonizations.

Preliminary considerations:

Traditional music theory nomenclature provides a fair number of terms to describe types of cadences, e.g. Perfect Authentic, Imperfect Authentic, Plagal, Deceptive, etc. Each of these terms is defined through three separate qualities at the cadence:

- 1): Harmonic Resolution (i.e. tonic to dominant, subdominant to tonic, etc.)
- 2): Bass Motion (i.e. via leap to/from root positions or stepwise ascent/descent)
- 3): Final Tone in Soprano (i.e. the root of the chord or some other chordal tone)

Of these characteristics, the first determines most strongly the standard name for a cadence type. The second two characteristics are mostly useful only in differentiating a Perfect Authentic cadence from an Imperfect Authentic cadence, yet do these last two qualities not affect and thus aid in differentiating the character of other cadences as well? For example, a Phrygian cadence is merely a subtype of Half cadence where the harmonic motion is to the dominant of a minor chord with the bass descending by step. With the term Imperfect Authentic cadence, music theorists conflate distinct and unique cadential situations into one all-encompassing category, as dominant to tonic via root motion in the bass under a final $\hat{3}$ in the soprano is lumped together with a $\text{vii}^\circ - \text{I}$ progression via stepwise ascent in the bass under a final $\hat{1}$ in the soprano. These contrasting musical qualities for different types of Imperfect Authentic cadences unveil some of the descriptive limitations in our current musical language.

These overlapping functions of nomenclature contribute to a more confusing and difficult situation when attempting to categorize specific types of cadences in the chorales of Bach. Even

though the discussion of particular voicings at cadences during this initial compositional stage would be premature, more detail than merely the name of the final chord is required for any meaningful insight. Since melody is the only existing element when attempting to plan cadences, certainly a central concern is how the cadential melodic tones fit into these cadential harmonies. Also, to aid in progressing to the eventual next step of composing the entire bass line, knowledge of how these cadences are supported and approached by the bass in Bach's writing would be useful. Without trying to rewrite centuries of common practice terminology, I have instead created a slight modification to the usual naming system of chords at cadences. As the melody in the soprano voice is the only available clue to cadence, I have added the chordal tone in the soprano to the end of abbreviations for the cadence type. For example, a Half cadence in G-major with the fifth of the dominant chord in the soprano (i.e. A) is labeled H5. Moreover, to help identify the function of the cadence to the piece as a whole, I have included at the beginning of each label the key area of the cadence as it relates back to the hymn's tonic. In the previous example, let us assume the hymn melody is in C-major; therefore, the Half-cadence in G-major with the fifth in the soprano would be labeled V-H5 . Finally, for those cadences that resolve to an inversion of a chord instead of a root position chord, I have added a forward slash (appropriated from popular music notation) to represent the chord "over" a non-root bass note; for all intents and purposes, inversions can be presumed to be first inversion chords (the third in the bass) as this situation is the overwhelmingly typical one. In summary, my custom vocabulary serves as a compromise between requiring more detail from the traditional terminology while not desiring to obscure intelligibility for the average musician. Cadence abbreviations should be otherwise self-explanatory, but for the sake of clarity, I have included a reference in the Appendix.

Roman numeral based analysis is useful when discussing harmony because the function of the chord is divorced from the key in which the piece or progression happens to be. This non-key-specific grammar aids in seeing patterns and similarities across multiple works and genres. As harmony describes musical information in a vertical organization, counterpoint is the corollary that describes the horizontal framework. Usual methods of contrapuntal analysis, such as Schenkerian analysis, often do not separate the analysis itself from the key of the work under scrutiny. Pieces with identical contrapuntal motion but set in different keys generate non-identical graphical voice-leading analyses, thereby inhibiting the ease of seeing the identical patterns in voice-leading between works. In an effort to unlink the melodic line from key and

more clearly relate linear patterns across all of Bach's chorales, I have therefore transposed all of the major-mode hymns into C-major. All of the musical examples in the following pages are thus written in C-major, a contrapuntal normalization of the voice-leading into one common key. This global transposition should help in discussing melody and bass lines irrespective of key, much as Roman numeral analysis helps in discussing harmony and chord progressions irrespective of key.

To aid in gathering the most meaningful data possible from Bach's writing, I have included in my analysis those 69 hymn tunes with figured bass that are in the major-mode as well. The more examples of Bach's decision making made available, the more accurately and easily trends in his writing style can be seen. To numerically differentiate the hymns of the 371 four-voice chorales from the 69 with figured bass, I have added a plus (+) sign before the numerical designation of those with figured bass only, i.e. Hymns 141 and +35 are both *Seelen-Brautgam*.

A final mention should be made as to the exact rhythmic position in which cadences occur for Bach in his common-time chorales. For the vast majority of hymn melodies, the fermata marking the point of cadence lands on the first or third beat of the measure; this scenario presents an obvious cadential point, and Bach typically handles such cadences straightforwardly. Less obvious is the choice of cadence when the fermata appears on beats two or four. When dealing with a fermata on a metrically weak beat, Bach attempts to make the phrasing conform whenever possible to the standard of cadencing on a strong beat. In Example 2 on the following page, we see how Bach deals with fermatas in metrically weak positions preceded by both a unison (Hymn 95) and a fall of a third (Hymn 128); in both instances, the actual cadence happens a beat prior to the fermata, thus preserving the sense of metric conformity. The exception to this practice is when the melody moves by step (Hymn 35), at which point Bach is forced to offset the cadence from its usual position of metrical strength to coincide with the fermata. When approaching the choice of cadence in a chorale melody, one should thus ensure that the harmonic goal is reached at a stylistically appropriate place in the measure.

95

128

35

CAD

CAD

CAD

CAD

CAD

Example 2: Rhythmic position of cadences when fermata is not on a strong beat

Overview of findings:

Table 2 on the following page summarizes the results of a large-scale accumulation of cadences from Bach's 371 + 69 chorales. The findings have been organized by final tone in the upper voice (left column) versus the cadence types and quantity (qty). The cadence types themselves have been broken down into a hierarchy of four categories based on frequency: Primary, Secondary, Tertiary, and Rare. Those cadences in the Primary category can be considered the regular, default, non-substitutive cadences implied by a melody pausing on a given final tone. The other cadences function as alternates, both for the sake of harmonic variety under certain conditions and as necessitated by specific characteristics in the melodic contour. Any type of cadence that occurs only once in the major-mode chorales of Bach is considered unique and thus not included in the data. These unique cadences, while possibly interesting on an artistic level, do not help the visualization of trends in Bach's writing and would only add confusion and statistical noise to the already dense results.

Table 2: Occurrence of cadences (by choice) in Bach's 371 + 69 major-mode chorales¹⁵

Upper Voice	PRIMARY		SECONDARY		TERTIARY		RARE	
	cadence	qty	cadence	qty	cadence	qty	cadence	qty
$\hat{1}$	I-PA	117	vi-IA3	30	IV-IA5	18	I-DE3	6
	I-IA1	12					I-PL1	2
$\hat{2}$	I-H5	102	ii-PA	23	V-IA5	7	\flat VII-IA3	2
$\hat{3}$	I-IA3	92	ii-H5	27	vi-PH1	11	vi-IA5	4
					vi-H1/	3	I-DE5	3
$\hat{4}$	IV-PA	7	ii-IA3	7				
	IV-IA1	2						
$\hat{5}$	V-PA	145	I-PL5(/)	13	iii-IA3	9	IV-H5(/)	3
	V-IA1	10					V-DE3	2
$\hat{6}$	vi-PA	18	IV-IA3	10	V-H5	3	vi-DE3	3
$\hat{7}$	V-IA3	40	vi-H5	20	I-H3	2		

The division of cadences into Primary, Secondary, Tertiary, and Rare represents a nascent effort to predict what type of cadence Bach would use given a specific tone in the upper voice at a point of rest in the melody. Already we have much more useful information than Boyd provides in his analysis of cadences since we can now specify exactly which cadence typically occurs underneath which melodic final tone. For example, with Boyd's results, we may be tempted to harmonize a melody ending on $\hat{2}$ with a Perfect Authentic cadence, when in fact, the more expected cadence is obviously a Half cadence in the tonic. Despite having more knowledge than can be gleaned from Boyd's cursory examination, we still require a more educated view of Bach's cadential choices. Table 2 may give us a more accurate statistical prediction, but a fair amount of "dice-rolling" still remains implied with this presentation alone. What we need to inspect is why or at least in what context Bach chooses each cadence, an effort that Boyd suggests but fails to deliver. For example, in what situations would Bach choose a Secondary cadence of vi-IA3 to support $\hat{1}$ instead of the Primary cadence of I-PA? A closer and

¹⁵ The final Perfect Authentic cadence on the tonic which ends each and every major-mode chorale by Bach (ignoring chorale 279) has not been included in these tabulations. This final chord is a "given" and thus does not represent a choice Bach has made. Therefore, the included chords in Table 2 show only instances where Bach has potentially made a specific decision of one chord over another.

more local look at the melodies and positions of the cadences within those melodies is therefore required to more fully understand and digest the data in Table 2.

Before delving into this detailed analysis of Bach's potential reasons for choosing Primary versus substitute cadences, we deserve to take a preliminary look at the results in Table 2 even though this look can speak only in general terms. Perhaps unsurprisingly, the most common cadences in Bach's chorales fall in the realm of tonic or dominant. Submediant and supertonic key areas also appear fairly often although certainly with less frequency than tonic or dominant. The most common cadential choices for these key areas are the Perfect Authentic cadence (PA), the Imperfect Authentic cadence with the third in the soprano (IA3), and the Half cadence with a fifth in the soprano (H5). I have included the Imperfect Authentic cadence with a root in the soprano (IA1) as a Primary cadence since, as shall be shown, the IA1 cadence seems more like a variation of the Perfect Authentic cadence than a fundamentally new brand of cadence. In general, Primary and Secondary cadences make up almost 90% of the cadential choices in the major-mode harmonizations of Bach, a statistic that is meant not to inspire a blind devotion to the use of Primary or Secondary cadences in chorale harmonizations, but is meant rather to show how these few main cadences organize the vast majority of Bach's tonal goals.

The results in Table 2 are remarkable not only for showing which cadences Bach most often selects, but also for revealing which cadences Bach tends to avoid. For example, the great infrequency of Half cadences with anything other than a fifth in the soprano is striking.¹⁶ The Phrygian cadence acts as the sole example of a pause on the dominant with a tone other than the fifth of the chord in the soprano, but this Phrygian cadence is only occasionally used, appearing almost always in the submediant. As Boyd points out in his analysis, Plagal and Deceptive cadences are rare. The mediant as a key area is also infrequent in Bach, probably appearing more often as a submediant of the locally tonicized dominant than as a true mediant. All of these observations, while allowing a peek into Bach's cadential preferences, should be digested with the knowledge that even though certain cadences are uncommon in the chorales, fairly consistent situations surround Bach's use of these more infrequent cadences as this paper will reveal.

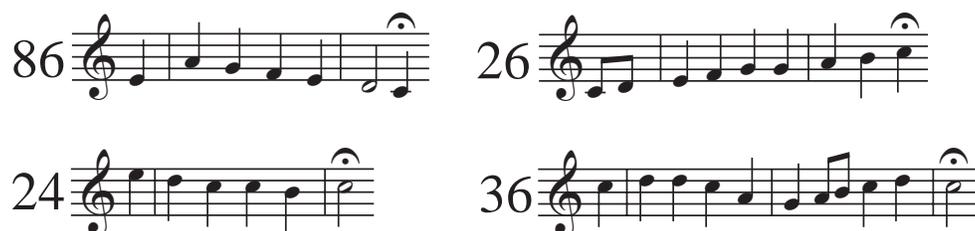
¹⁶ Half cadences in the submediant with a third in the soprano are not included in the above table because the upper voice is an altered scale tone (a raised fifth of the tonic's scale). The exclusion of non-scalar tones from Table 2 may be seen as a shortcoming, but since such tones represent a modulation, the tones themselves should be considered a transposition of the patterns in Table 2. A Half cadence on the subdominant invokes a shift to the minor key which involves a separate analysis of those minor key hymns.

A final note concerning Table 2: one obvious and strong limitation to such a generic organization of numerical data is that it does not take into consideration the position or order of each cadence with respect to the other cadences in the melody. Much as the final cadence in a major-mode hymn always demands a Perfect Authentic cadence on the tonic, other melodic positions show trends as to what type of cadence Bach prefers. In the following pages, a closer look at the melodic situations engendering specific cadences takes into serious consideration where in the melody each type of cadence typically occurs. As Salzer and Schachter write, "Most chorale phrases lend themselves to several valid interpretations; the student will benefit from comparing Bach's settings of repeated melodic phrases in a single chorale, and his different settings of complete chorale melodies."¹⁷ Such a comparison is exactly what has been completed in Table 4 of the Appendix. A distinction must be made, however, between the settings of repeated melodic phrases and different settings of the same chorale, for each is a different situation and requires a different handling of cadence.

Cadences on $\hat{1}$:

I-PA: If we include the final cadences of the major-mode hymns, the Perfect Authentic cadence on the tonic is by far the most common cadence in Bach's harmonizations. In every case, a linear rising or falling line that approaches the final tone by step prepares the I-PA. Sometimes this rising or falling line leads directly to the final tone (Hymns 86 and 26 in Example 3), and in other instances the line overshoots the goal by a single neighboring note (Hymns 24 and 36). The identification and differentiation of those melodic lines with overshoot is important, because while the direct linear rising and falling lines see substitutions with other types of cadences in Bach, the rising or falling lines with overshoot that pause on $\hat{1}$ always engender a Perfect Authentic cadence on the tonic. The student is thus left with only having to choose between Secondary, Tertiary, or Rare cadences when the melodic line approaches the final tone by step without overshoot.

¹⁷ Ibid., p. 275.



Example 3: Typical linear motions towards a Perfect Authentic cadence on the tonic

To aid in making this decision concerning possible substitute cadences, the position of the cadence in reference to the overall melodic line should be taken into consideration. The Perfect Authentic cadence on the tonic, for example, while obviously occurring at the end of a hymn, also usually appears as the last cadence before the double bar, as the first cadence of the hymn, or as the second cadence in the hymn. Also, the I-PA sometimes makes appearances within longer stretches of melody to reaffirm the tonality of the piece. In general, we may say that this cadence has the obvious function of establishing, asserting, and closing the tonal center of the hymn.

I-IA1: The Imperfect Authentic cadence with the root in the soprano represents a single, distinct variation on the usual Perfect Authentic cadence. Specifically, this variation is limited to a linearly descending bass line to $\hat{1}$ occurring underneath a directly rising linear melodic line to $\hat{1}$ (without overshoot). The two situations that arise are shown in Example 4, the sole difference between the two being the rate of melodic ascent. The I-IA1 only appears supporting this $\hat{6}-\hat{7}-\hat{8}$ rising line in contrary motion and is almost always found as the first or second cadence of the hymn¹⁸.



Example 4: A direct rising linear melodic line to $\hat{1}$ engendering a bass descent to the tonic.

¹⁸ See Hymns 24, 40, 46/344, 84, 147, 152, 183, 212, and 280 for examples

Perhaps surprisingly, other I-IA1 cadences are not found in Bach. For example, the bass lines in Example 5 (of my own composition) are never found in Bach's harmonizations. Despite adhering to the Fuxian rules of counterpoint, these linearly ascending bass lines are never seen supporting the falling melodic line to $\hat{\text{I}}$ at a cadence. This discovery strengthens the theory that Bach used specific patterns and formulas with specific types of variation and substitution to plan his cadences and figured bass lines instead of completely relying on generic rules of counterpoint as students are often left to do.

Example 5: Imperfect Authentic cadences foreign to the chorales of Bach

vi-IA3 : Three distinct melodic situations contribute to the possibility of an Imperfect Authentic cadence on the submediant supporting $\hat{\text{I}}$:

1) The melody falls by a third or fifth before the final tone: This first criterion is shown in Example 6 where the melodic fall of a third has contributed to a vi-IA3 cadence. Notice that in Hymn 52, a passing tone appears between the next-to-last and last structural notes. Passing tones such as this can typically be ignored when analyzing melodic lines for cadences. Certainly, one would be incorrect to view the passage in Hymn 52 as a stepwise linear descent to $\hat{\text{I}}$ since Bach never treats it as such. As the harmonic motion in Bach's chorales moves almost exclusively in quarter note motion, the harmonic motion implied by the melody conforms to this same standard. With this melodic fall of a third, the Perfect Authentic cadence is in fact no longer the Primary cadence since it never occurs in such a situation. Table 2 thus sometimes categorizes Primary cadences for certain melodic lines as Secondary or Tertiary cadences, an inherent limitation of the table format which needs to be bolstered through these more detailed explanations.

Example 6: Melodic falls of a third

2) The cadence occurs as the penultimate cadence of the piece: Penultimate cadences are possibly the most common situation for Bach to use a substitute cadence for the Primary cadence. As the chorales in this investigation are major-mode hymns, this substitute cadence is often a move towards a minor key area, possibly for the sake of tonal variety. Hymns 317 and 264 provide examples of penultimate submediant substitutions for a descending melodic line, although one should note that these melodies descend $\hat{4}-\hat{2}-\hat{1}$; the direct $\hat{3}-\hat{2}-\hat{1}$ descent is never seen supported by $\hat{\text{VI}}-\text{IA}3$.

3) Linear stepwise motion ascends to $\hat{1}$: While the descending melodic line to $\hat{1}$ sometimes supports a $\hat{\text{VI}}-\text{IA}3$ cadence at penultimate cadences only, the ascending melodic line to $\hat{1}$ (see Example 4) supports a $\hat{\text{VI}}-\text{IA}3$ cadence at first, second, and middle cadences along with penultimate cadences. In essence, the ascending linear line sees many more substitutive and alternative cadences at various points in the hymn than its descending corollary.

IV-IA5: Bach's use of an Imperfect Authentic cadence mostly occurs after a fall of a third or fifth in the melody. In a sense, **IV-IA5** and $\hat{\text{VI}}-\text{IA}3$ can be seen as interchangeable alternates to these melodic leaps. One should note that with the melodic leap of a third (from $\hat{3}$ to $\hat{1}$) cadencing on the subdominant, the leading tone in the soprano falls a third instead of resolving upward. This motion may be unintuitive to the student taught always to resolve leading tones by step, but this leap from a leading tone occurs fairly often in Bach, necessitated by the voice-leading of a four-voice texture.

Also similar to the $\hat{\text{VI}}-\text{IA}3$ cadence, **IV-IA5** sometimes appears as a penultimate substitution for the Perfect cadence (see Hymns 144/318), but such instances are rare. Of course, a cadence on the subdominant cannot support an ascending melodic line to $\hat{1}$ because of the Lydian implications, so it is never used in this situation. The only other instance of the **IV-IA5** occurs as a support to melody with a static tone at the cadence (see Example 7).



Example 7: A cadence with no melodic fall or rise (unison cadence)

I-DE3: The Deceptive cadence is rare in Bach. When the **I-DE3** does occur, it mirrors the function of $\hat{\text{VI}}-\text{IA}3$, often providing a quick move to the minor as the penultimate cadence of

the piece. Unlike $\hat{\text{VI}}\text{-IA3}$, the Deceptive cadence is seen supporting the direct $\hat{\text{3}}\text{-}\hat{\text{2}}\text{-}\hat{\text{1}}$ descending line.

I-PL1: The two instances of Plagal cadences under $\hat{\text{1}}$ act as alternates to IV-IA5 when (as in Example 7) the melody consists of a unison at the cadence.

Cadences on $\hat{\text{2}}$:

I-H5: The Half cadence resting on the dominant of the tonic is the most common support for melodic lines ending on $\hat{\text{2}}$. To help identify cases where **I-H5** cadences are used, recognition of the harmonic outline of the melody in the bars preceding the cadence needs to be made. For instance, the measure prior to the cadential bar in Hymn 44 of Example 8 emphasizes tones of the tonic chord on the strong beats, whereas the parallel bar in Hymn 311 outlines a supertonic chord. Both situations see Bach using Half cadences in the tonic to support the final tone, but when the melody in the pre-cadential bars outlines the tonic chord on the strong beats (as in Hymn 44), the choice of a **I-H5** is guaranteed. The proliferation of Half cadences on the tonic at various positions in the melody also provides evidence of the **I-H5** cadence as a Primary cadence for Bach in most situations. Only when the melody of the measures preceding the cadential bar harmonically outlines a non-tonic tonality are substitutions to this Primary cadence usually seen in Bach's major-mode arrangements.



typically occurs whenever Bach chooses the \hat{ii} -PA cadence. A consideration of both the local melodic contour and the global position of that contour with respect to the rest of the hymn are thus required to fully appreciate when this substitute cadence is most appropriate to Bach's style.

V-IA5: Similar to how **IV-IA5** supported a cadence with no rise or fall of the melodic line before the final tone of $\hat{1}$ (see Example 7), an Imperfect Authentic cadence on the dominant typically appears under a cadence on $\hat{2}$ preceded by a unison as shown in Example 9. Basically, the pattern has been transposed up a step to follow the upward move of the resting tone. This cadence can be seen as a Primary cadence for unison melodic endings, only once ever appearing as a substitute cadence in a penultimate cadence position (Hymn 148).



Example 9: Unison cadence on $\hat{2}$

\flat VII-IA3: The two instances of a cadence on \flat VII (the subtonic) imply a mixture of the Mixolydian mode into major-mode chorales. Without doing a full analysis of how cadences are engendered in Mixolydian chorales, these two examples do not provide enough information on which to base any trends in usage. However, we can peek into the possibilities if we notice that the subtonic cadence beginning Hymn 327 harmonizes a melodic fall of a third, the only such fall to $\hat{2}$ in the major-mode chorales.

Cadences on $\hat{3}$:

I-IA3: While the term Imperfect Authentic cadence defines a motion from dominant or diminished seventh chord to tonic, all types of bass motion are included under this term's umbrella. In order to ease a student's transition from making decisions about cadence to writing figured bass lines for the chorale melodies, the various types and frequency of Imperfect Authentic cadences in Bach deserve mention. For example, the Imperfect Authentic cadence on $\hat{3}$ that has the bass move by leap from $\hat{5}$ to $\hat{1}$ is by far the most common. This direct root-to-root cadence accounts for about half of all **I-IA3** cadences, occurring underneath linear descending lines to $\hat{3}$, ascending lines to $\hat{3}$, as well as melodic leaps from $\hat{5}$ to $\hat{3}$. The high incidence of this root motion Imperfect Authentic cadence should not be surprising considering Bach's partiality

to Perfect Authentic cadences. In a sense, the \hat{I} -IA3 cadence with root motion appears as a close derivative of the \hat{I} -PA cadence.

Similar to how the \hat{I} -IA1 cadence was a variation on the more common \hat{I} -PA cadence, those \hat{I} -IA3 cadences with linear motion in the bass can be seen as variations of the more common root-to-root motion \hat{I} -IA3 cadences. Linear bass motion for \hat{I} -IA3 cadences can be divided into two simple categories, contrary motion and parallel motion. We can further subdivide these two categories into typical cases where the melody falls by step to $\hat{3}$ and cases where the melody rises by step to $\hat{3}$, giving us the four basic situations shown in Example 10.

The image displays four musical examples, labeled 50, 258, 224, and 124, each consisting of a treble and bass staff. Example 50 shows a rising bass line. Example 258 shows a falling bass line. Example 224 shows a rising bass line. Example 124 shows a falling bass line.

Example 10: Contrary and parallel motion Imperfect Authentic cadences on $\hat{3}$ in tonic

Despite the contrapuntal viability of each example in the figure above, the case shown in Hymn 50 sees much greater use than all of the others combined. Interestingly, this rising bass to $\hat{1}$ is the exact type of bass line that Bach eschewed in his \hat{I} -IA1 cadences. Both directly rising and directly falling parallel motion bass lines for \hat{I} -IA3 cadences exhibit just one instance of usage each in the major-mode hymns (the sole occurrences being in Hymns 224 and 124 as shown above). Most probably, Bach typically avoids parallel linear bass motion at these cadences due to the consequent difficulty in arranging the inner voices. The case of the directly descending bass line in contrary motion to a rising melodic line, while seeming like strong counterpoint, also sees only a single usage in the major-mode hymns (again, the sole case being shown above in Hymn 258). Bach does use a slight variation in Hymns 135 and +33 where the bass descends with overshoot against a rising stepwise line to $\hat{3}$, but these two extra examples do not alter the tide of tendency. In general, Bach uses a rising stepwise bass motion underneath a falling stepwise melodic motion for non-root-to-root cadences under $\hat{3}$, the exact opposite trend for non-

root-to-root cadences under $\hat{1}$ where the most common situation is a descending stepwise bass motion underneath an ascending melodic motion.

\hat{ii} -H5: A variety of melodic lines ending on $\hat{3}$ see instances of Half cadences on the supertonic. Mostly, these lines descend by step to the final tone, with or without overshoot. A more important determinant when deciding to use a \hat{ii} -H5 cadence appears to be the position of the cadence within the entire line. Especially, \hat{ii} -H5 cadences are used often to harmonize the repeat of a melodic fragment that appeared earlier in the hymn melody (see Hymns 5/309, 52, 125, 311, and 50/63/103/etc.). As well, Half cadences in the supertonic commonly appear as penultimate cadence choices, another example of Bach's pattern to often move to a minor flavored chord before the final close (see Hymns 20/250/273, 24, 125, 135, 157, 165, and 311). Other instances of the \hat{ii} -H5 cadence show obvious examples of its use in a substitutive function, as in Hymns 61 and 299 where Bach uses \hat{I} -IA3 in two other harmonizations of the same melody (83/160 and 152/348 respectively). In no major-mode harmonization is \hat{ii} -H5 used in the first two cadences of the hymn, adding further weight to the Secondary nature of this cadence beyond merely its frequency.

\hat{vi} -PH1 & \hat{vi} -H1/: A Phrygian and Half cadence share the same basic harmonic motion, pausing on the dominant under the fermata. The main difference is how this dominant tonality is approached in the bass. I have included \hat{vi} -PH1 & \hat{vi} -H1/ together because the bass line for the Half cadence in inversion can take on a similar contour to that of the Phrygian bass line, both linearly descending to the final goal as shown in Example 11. What one does not find in Bach's major-mode chorales is an ascent in the bass to a Half cadence under $\hat{3}$. Such a line could have been facilitated by contrary motion of the bass to a root chord in Hymn 63 or via a linear rise to pause on a first inversion chord in Hymn 67. The lack of rising bass lines to affect a Half cadence with the root of the chord in the soprano strongly implies that Bach only descends by step in these cases, the Phrygian cadence being the most obvious choice.

The image contains two musical examples, 63 and 67, each shown in a grand staff (treble and bass clefs). Example 63 illustrates a Phrygian cadence. The bass line descends linearly from G4 to F#4, ending on a half note with a fermata. The treble line ascends from G4 to A4, also ending on a half note with a fermata. Example 67 illustrates a Half cadence. The bass line descends linearly from G4 to F4, ending on a half note with a fermata. The treble line ascends from G4 to A4, ending on a half note with a fermata.

Example 11: Half and Phrygian cadences in the submediant

vi-IA5: The few instances of an Imperfect Authentic cadence on the submediant display no specific patterns of use. The sole example of a unison cadence on $\hat{3}$ in Hymn 124, however, sees the use of a vi-IA5 close, implying that this cadence might be Bach's Primary cadence for such a melodic situation.

I-DE5: Similar to the Deceptive cadence in the tonic underneath $\hat{1}$, the Deceptive cadence in the tonic underneath $\hat{3}$ is rare and only sees instances of use supporting a descending line. Use as the penultimate cadence (Hymn 60) or due to a repeat of a melodic fragment (Hymn 278) show positional dependency within the overall melodic line.

Cadences on $\hat{4}$:

A final tone of $\hat{4}$ at a point of rest is rare in the Bach's major-mode harmonizations. When confronted with a final $\hat{4}$, Bach always treats the phrase as a modulation to the subdominant, transposing the patterns and techniques used to cadence on $\hat{1}$ up a fourth. Therefore, despite having few examples out of which to extract trends in Bach's cadential choices, we already have a solid library of cadences for $\hat{1}$ on which to lean.

IV-PA: The Perfect Authentic cadence, much as in the case of cadences on $\hat{1}$, is the most common solution for Bach when approaching a $\hat{4}$ at a fermata. In all cases, the melody ascends or descends via stepwise motion to the final tone.

IV-IA1: The two examples of an Imperfect Authentic cadence on the subdominant in Hymns 77/118 further confirm the theory of pattern transposition since both show a linear rising melodic line to the final tone with a stepwise descent to the root in the bass, just as this figure was shown on the tonic in Example 4. The lack of descending melodic lines to $\hat{4}$ with a linear ascent in the bass (as in Example 5) should therefore be unsurprising.

ii-IA3: The move to the supertonic with a final tone of $\hat{4}$ parallels the vi-IA3 cadence on $\hat{1}$ and is thus the result of similar melodic environments. A melodic fall of a third (Hymn 139), a penultimate cadence (Hymns 32/330), or a linear ascent (Hymns 77/118) contribute to the situations which engender an Imperfect Authentic cadence on the supertonic, similar as to how an Imperfect Authentic cadence was engendered on the submediant a fourth below.

Cadences on $\hat{5}$:

V-PA: The Perfect Authentic cadence on the dominant enjoys a high frequency of usage. Excluding a hymn's final cadence on the tonic, the most predictable cadence in Bach's

writing is the \hat{V} -PA cadence. A full close on the dominant appears underneath a wide variety of melodic lines ending on $\hat{5}$, all of which approach this cadential tone by step from above or below. The \hat{V} -PA cadence appears in various melodic positions as well, acting as first cadence, second cadence, last cadence before the double-bar, first cadence after the double-bar, penultimate cadence, and so on. Both factors lend credence to the notion that this cadence is Bach's default and Primary choice when approaching a close on $\hat{5}$ via step. Obviously, a raised $\hat{4}$ is required in all situations where the melody ascends to $\hat{5}$ in order to properly affect this move to the dominant; the existence of a natural $\hat{4}$ in the melody just prior to the cadential $\hat{5}$ would clearly imply another type of cadence. As shall be shown, most of the cadential tendencies and substitutions for the dominant under $\hat{5}$ are transpositions of cadential patterns from cadences on the tonic under $\hat{1}$, similar to how these basic patterns are transposed for subdominant cadences under $\hat{4}$.

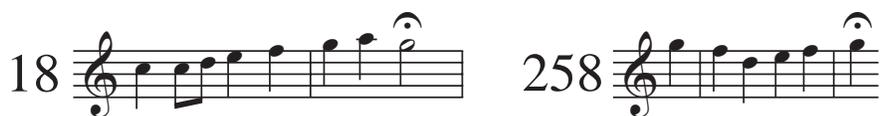
\hat{V} -IA1: Just as \hat{I} -IA1 can be seen as a variation of \hat{I} -PA, \hat{V} -IA1 acts as a variation to \hat{V} -PA and follows the same cadential trends. The Imperfect Authentic cadence on the dominant supporting $\hat{5}$ in the soprano almost always occurs with a descending bass line acting in contrary motion to a linearly ascending melodic line to the final tone (see Example 12). This case mirrors the typical case for \hat{I} -IA1. Similarly, no evidence in Bach's major-mode chorales can be found of a \hat{V} -IA1 cadence where the melody descends to the final tone with the bass line ascending to the root of the dominant, as shown for the corollary case of the tonic in Example 5.

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Example 12: Typical \hat{V} -IA1 cadence with melodic ascent and descending bass

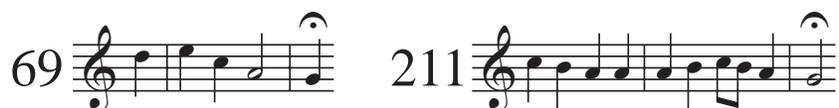
\hat{I} -PL5(/): The Plagal cadence on the tonic most often arises out of an upper neighbor note to $\hat{5}$ as shown in Hymn 18 from Example 13. Most often, this upper neighbor note is approached from below by either stepwise motion or leap (see Hymns 323, 58/107/277, 32/330, +46), deriving from an overshoot of the melodic line. In the two cases where Bach uses a Plagal cadence in first inversion (\hat{I} -PL5/), the cadential tone is still approached from below but without the upper neighboring note and overshoot (see Hymn 258 below and Hymn +51), thereby

lending weight to the requirement of the $\hat{6}$ directly preceding the $\hat{5}$ for a root position I-PL5 cadence.



Example 13: Plagal cadences on $\hat{5}$ approached from below with and without overshoot

Bach also uses Plagal cadences in a few instances of approaches to $\hat{5}$ from above, but these cases exhibit special limitations. The two cases are shown in Example 14. Notice that both melodic lines approach the pre-cadential tone after a structural tone a third above. In other words, the basic melodic line descends $\hat{8}-\hat{6}-\hat{5}$. The eighth-note $\hat{7}$ in Hymn 211 is merely a passing note and has no structural importance. These observations harken back to the Salzer and Schachter phrase in Example 1 where the authors used a Plagal cadence under a structural $\hat{8}-\hat{7}-\hat{6}-\hat{5}$ descent, a use of cadence never found in Bach's writing. Viewing both the ascending and descending lines which engender a Plagal cadence on $\hat{5}$ in Bach, we should notice that the structural tone before the pre-cadential tone always lies in the tonic's harmony.



Example 14: Structurally similar approaches to $\hat{5}$ from above

iii-IA3: The Imperfect Authentic cadence in the mediant on $\hat{5}$ parallels the case of the Imperfect Authentic cadence in the submediant on $\hat{1}$, following all three guidelines for \hat{V} -IA3 cadences. Because of this parallel, these mediant cadences may be seen as submediant cadences in the key of the dominant, i.e. \hat{vi}/\hat{V} , not as true cadences in the mediant. As proof, the three melodic characteristics that engender \hat{V} -IA3 have corollaries in \hat{iii} -IA3 cadences on $\hat{5}$:

- 1) Fall of a third (Hymns 24 and 140)
- 2) Penultimate cadence (Hymns 201/306 and 140)
- 3) Linear ascending line (Hymns 201/306 and 223)

Notice that some melodic lines share more than one determining characteristic, the multiple factors combining to help imply this cadence instead of the Primary cadence on the dominant. Additionally, in Hymns 58/107/277 and 223, we see the use of \hat{iii} -IA3 in the repeat of a melodic

fragment, a situation which was not revealed in the use of $\hat{\text{VI}}\text{-IA3}$ cadences but which may possibly be viable considering the parallel nature of these two cadences.

IV-H5(/): With only a few Half cadences in the subdominant for Bach's major-mode chorales, we do not have enough information to make valid generalizations except that usage is rare. The instance of use at a penultimate cadence (Hymn +68) makes sense given Bach's tendency for substitutions at that melodic position. The use of a IV-H5/ cadence as the first cadence for both Hymns 61 and 83 is harmonically interesting, but again appears more like a substitute for the typical dominant cadence which Bach uses in Hymn 106.

V-DE3: Bach's use of the Deceptive cadence in the dominant, unsurprisingly, mirrors his use of the Deceptive cadence in the tonic. Linear descending lines, both with (Hymns 235/319) and without (Hymn 348) overshoot are found. Hymn 348 sees the Deceptive cadence used in its typical penultimate melodic position, whereas Hymns 235/319 finds the cadence in a third-to-last melodic position (pen-penultimate?). Despite not adhering strictly to the use of Deceptive cadences as the second-to-last cadence, Bach still shows a predilection for keeping these cadences very much near the end of the hymn, particularly considering the relatively long lengths of Hymns 235/319.

Cadences on $\hat{6}$:

A melodic pause on $\hat{6}$ is uncommon in Bach's major-mode hymns, almost as infrequent as a pause on $\hat{4}$. The relative rarity of this cadential tone in the soprano makes large-scale trends also difficult to determine. Since a pause on $\hat{6}$ can often imply a move to the relative minor, a full understanding of cadences on $\hat{6}$ may be impossible without knowing more about Bach's preferences for cadences in his minor-mode harmonizations.

$\hat{\text{VI}}\text{-PA}$: One can possibly conceive of the Perfect Authentic cadence on the submediant under $\hat{6}$ as potentially parallel to the Perfect Authentic cadence on the supertonic under $\hat{2}$, viewing $\hat{\text{VI}}\text{-PA}$ more as a $\hat{\text{ii}}/\text{V}\text{-PA}$. However, unlike the case with $\hat{\text{iii}}\text{-IA3}$, the submediant has a strong tonal center of its own in the major-mode due to the submediant's function as the relative minor. Therefore, the guidelines that may have held true for $\hat{\text{ii}}\text{-PA}$ are not necessarily valid for this situation. Specifically, the Perfect Authentic cadence on the submediant does not seem to require an outline of the submediant harmony in the bar preceding the cadence. The $\hat{\text{VI}}\text{-PA}$ does seem to occur mostly near the ends of hymns, although this tendency is probably as

much a result of the tendency for the $\hat{6}$ tone itself to appear near the end of a hymn as it is a result of any preference by Bach.

IV-IA3: In melodies that rise to $\hat{6}$ without passing through a raised $\hat{5}$, choosing the Primary cadence of \hat{V} -PA becomes impossible due to the lack of a proper leading tone. Similarly, melodies that descend to $\hat{6}$ while passing through a lowered $\hat{7}$ also obviate the possibility for a Perfect Authentic cadence on the submediant. Bach's cadence of choice in these situations is an Imperfect Authentic close on the subdominant, as shown in Example 15.



Example 15: Melodic lines causing Imperfect Authentic cadences on the subdominant

V-H5: Since the \hat{I} -H5 cadence is by far the most common cadence for pauses on $\hat{2}$, we may expect similarly that \hat{V} -H5 cadences would be by far the most common with pauses on $\hat{6}$. Quite the opposite is true, with only a scant three examples of Half cadences on the dominant existing in the major-mode chorales (Hymns 317, 156/308, and +46). Again, the role of the submediant as relative minor has created a stronger tonal area on which to cadence for these melodic lines ending on $\hat{6}$, trumping Bach's potential use of the \hat{V} -H5.

\hat{v} i-DE3: As is common with other Deceptive cadences, the three \hat{V} i-DE3 cadences all occur underneath a linearly descending melody via stepwise motion, allowing the bass line to move in contrary motion. Two of the three examples of Deceptive cadences in the submediant also appear in the traditional melodic position of penultimate cadence (Hymns 169 and 303).

Cadences on $\hat{7}$:

V-IA3: Cadences on $\hat{7}$ can be viewed as cadences on $\hat{3}$ transposed from the tonic to the dominant. Realizing this relationship, we see many of the same patterns emerge as did in the case of melodies pausing on $\hat{3}$. For example, with this Primary cadential situation of \hat{V} -IA3, a similarity to \hat{I} -IA3 cadences can be drawn. In the case of \hat{I} -IA3, we focused on different motions in the bass as it approached the cadence. Since \hat{V} -IA3 cadences appear at various melodic positions throughout the hymn melodies, a brief look at standard bass motions also seems warranted.

As with **I-IA3** cadences, root-to-root bass motion at **V-IA3** cadences occurs more often than ascending or descending linear motion. Also, the rising linear bass line underneath a falling stepwise melodic line is also rather common (Hymn 189 in Example 16). Unlike the case with **I-IA3**, however, a greater use of the stepwise bass descent to the final root is found in the major-mode chorales. Hymn 85 below shows one example, but a fair number of others exists (117, 275, 277, 355, etc.). Few melodic lines actually rise by step to pause on $\hat{7}$, so not enough cases exist to draw worthwhile conclusions, although those cases that do exist see bass motion via root-to-root, similar to how Bach preferred root-to-root motion with a rising line to $\hat{3}$ in **I-IA3** cadences.

Example 16: Ascending and descending linear bass motion supporting **V-IA3**

vi-H5: Like the Half cadence in the supertonic for the case of $\hat{3}$, the Half cadence in the submediant for the case of $\hat{7}$ acts mostly as a substitute for the Primary cadence. Hymns 117, 175, and 58/277 show clear examples of melodic points at which Bach uses **vi-H5** where he otherwise chooses a **V-IA3** cadence at the same fermata in harmonizations of the same melody. Almost all of the lines that engender the **vi-H5** cadence have a falling motion, but as with many other cases, this tendency is mostly due to the lack of rising lines to $\hat{7}$ throughout any of the major-mode chorales. As with **ii-H5** cadences, **vi-H5** often occurs near the end of an arrangement, as the penultimate cadence, or supporting a repeat of a melodic fragment.

I-H3: The rarity of any Half cadence in Bach's major-mode chorales with the third of the chord (leading tone) in the soprano finds an exception in Hymns +2 and +8. No instances can be found in the 371 chorales themselves.

Conclusions:

After sifting through the various cases and situations in which Bach seems to prefer one cadence to another, we begin to notice some general trends. First, we see how most cadential patterns derive from the core of **I-PA**, **I-H5**, **I-IA3** cadences. Usage tendencies for other final

tones are often merely transpositions of these three cadences into another key. With this information, we can simplify the cadence incidences as shown in Table 2 to a more abstracted organization as shown in Table 3. In Table 3, only PA, H5, and IA3 cadences are included for each key area. These key areas are ordered from left to right by their general frequency in relation to other key areas. Not unsurprisingly, most of the cadences from Table 2 that see a fair amount of frequency are included in the streamlined version of Table 3.

Table 3: Idealized use of cadences in Bach-style chorale harmonizations

Upper Voice	Tonic cadences	Dominant cadences	Submediant cadences	Supertonic cadences	Subdominant cadences
$\hat{1}$	I-PA		$\dot{\text{vi}}$ -IA3		
$\hat{2}$	I-H5			$\ddot{\text{ii}}$ -PA	
$\hat{3}$	I-IA3			$\ddot{\text{ii}}$ -H5	
$\hat{4}$				$\ddot{\text{ii}}$ -IA3	IV-PA
$\hat{5}$		V-PA			IV-H5
$\hat{6}$		(V-H5) ¹⁹	$\dot{\text{vi}}$ -PA		IV-IA3
$\hat{7}$		V-IA3	$\dot{\text{vi}}$ -H5		

What Table 3 does not show are the possible reasons for Bach to substitute one chord for another. Often, as we have seen, these substitutions result from the position of the cadence with respect to the complete melodic hymn line as a whole. Typically, these substitutions occur as the penultimate cadence of the hymn but also see common use as the first cadence after a double-bar or as a substitute harmony for the repeat of a melodic fragment. Another consideration that affects cadence choice involves the implied harmony in the pre-cadential bars. When the melody does not outline a tonic harmony prior to the cadence, Bach will often choose to use a Secondary or Tertiary cadence to support the final tone. Finally, we must also consider how this final tone is approached (via leap or step) when deciding on appropriate cadences. Non-stepwise motion to the note underneath the fermata traditionally implies a closing chord other than the Primary cadence. Additional important melodic factors for determining cadence may possibly remain hidden, of course, which only further study can reveal.

¹⁹ I have included parentheses around this Half cadence in the dominant since, oddly, it does not enjoy the expected frequency of use in Bach's harmonizations as compared to the other chords in the table.

Also not included in the data of Table 3 are the specific types of bass lines which create these cadences, important information needed to transition from this knowledge concerning cadences to composing figured bass lines for these hymn melodies. As has been previously shown, Bach almost always prefers contrary motion at the cadence point between outer voices when not using the standard root-to-root bass motion. More specifically, Bach has a tendency to place a linear descending bass line against a rising line in the soprano when the root of the chord is the final tone in the upper voice. Conversely, Bach tends to place a linear ascending bass line against a falling line in the soprano when the third of the chord is the final tone in the upper voice. Interestingly, Bach rarely if ever reverses these trends, i.e. Bach eschews using stepwise bass lines when the upper voice falls to end on the root of a chord or rises to end on the third of a chord.

Musicologists often speak of the endless variety, bottomless compositional depth, and “inexhaustible wealth of harmony”²⁰ in Bach's chorale writing. Exhortations such as these imply to any student attempting chorale harmonization in the style of Bach that a central concern of the arrangement process must be devising a wide assortment of chords and counterpoint to support the hymn melodies. While Bach does employ a fair number of variations in his chorale harmonizations, he shows a consistent approach to his arrangements, a consistency following predictable and repeatable patterns that can be clearly seen when we compare cadence choices across a broad number of hymns.

This relative consistency in Bach's choice of cadence should be taken not as a strict blueprint on which to rely when arranging chorale melodies but rather as a starting baseline from which variation can arise. The knowledge of which situations most often engender these variations helps guide the harmonization process, but the process must ultimately create an organic whole in the form of an artistically balanced composition. The factors which contribute to this sense of artistic balance extend far beyond merely the choice of cadence, thereby arguing not only for a further exploration of cadence choices in other modes but also for an attempt towards the complete unraveling of each thread in the process of chorale arranging. A complete unraveling of the composition process, however, may very well be inherently impossible given the fundamentally human nature of composition. Moreover, creating a set of discrete stages in

²⁰ Philipp Spitta, *Johann Sebastian Bach: His Work and Influence on the Music of Germany, 1685-1750*, Trans. Clara Bell and J. A. Fuller-Maitland (New York: Dover Publications, Inc., 1951), vol. 3, p. 133.

the harmonization process attempts to separate factors that are potentially inseparably intertwined during the actual practice of composition. As long as this element of mystery in the real-world art of arrangement and composition exists, we should keep in mind that investigations such as this one explicate not rules but merely guidelines.

Appendix

Abbreviations for Cadence types:

PA: Perfect Authentic

IA: Imperfect Authentic

H: Half

PH: Phrygian

PL: Plagal

DE: Deceptive

(suffix) /: Inversion (first-inversion)

Table 3: Some examples of full abbreviations with a melody in C-major

Abbrev.	Pause Chord	Harmonic Motion	Bass Motion	Upper voice
IV-PA	F-major	dominant-tonic	via roots	F
v̇i-H5/	E-major (bass G \sharp)	pause on dominant	unspecified	B
v̇i-PL5	A-minor	subdominant-tonic	via roots	E
I-DE3	A-minor	dominant-submediant	via step	C
iii-IA3	E-minor	dominant (or VII $^{\circ}$)-tonic	unspecified	G
v̇i-PH1	E-major	pause on dominant	via step down	A

Table 4 on the following page presents all the data on cadences in Bach's 371 chorales plus the 69 hymn tunes with figured bass. The chorales have been organized by melody in order of decreasing incidence. For example, the first group of nine chorales shows all of Bach's cadence choices on the tune *O Welt, ich muß dich lassen*. This tune appears in Bach under various titles (*O Welt, sieh hier dein Leben; Nun ruhen alle Wälder; In allen meinen Thaten*),²¹ but since the melodic lines in each instance are the same, the hymns have been grouped together to elucidate how consistent Bach is in his choice of cadence. For four-part harmonizations that are identical (Hymns 64 and 256, for example), I have included only cadences for the first harmonization in my calculations. An asterisk (*) denotes the exclusion of these duplicate arrangements in Table 4.

²¹ *The Lutheran Hymnal* (St. Louis: Concordia Pub. House, 1941).

Table 4: List of major-mode chorales and associated cadences in Bach's 371 + 69

No.	Cad1	Cad2	Cad3	Cad4	Cad5	Cad6	Cad7	Cad8	Cad9	Cad10	Cad11
50	I-IA3	V-IA3	I-H5	ii-H5	V-IA3	I-PA					
63	vi-H1/	iii-IA5	I-H5	ii-H5	V-IA3	I-PA					
103	I-IA3	V-IA5	I-H5	ii-H5	V-IA3	I-PA					
117	I-IA3	V-IA3	I-H5	ii-H5	vi-H5	I-PA					
275	I-IA3	V-IA3	I-H5	ii-H5	V-IA3	I-PA					
289	I-IA3	V-IA3	I-H5	ii-H5	V-IA3	I-PA					
355	I-IA3	V-IA3	I-H5	ii-H5	V-IA3	I-PA					
363	vi-H1/	V-IA3	I-H5	ii-H5	V-IA3	I-PA					
366	I-IA3	V-IA3	I-H5	I-IA3	V-IA3	I-PA					
29	V-PA	I-PA	I-IA3	I-H5	IV-IA5	I-PA					
64	V-PA	I-PA	I-IA3	I-H5	vi-IA3	I-PA					
67	V-PA	I-PA	vi-PH1	I-H5	vi-IA3	I-PA					
76	V-PA	I-PA	ii-PH5	I-H5	vi-IA3	I-PA					
254	V-PA	I-PA	ii-H5	I-H5	vi-IA3	I-PA					
256	#64	*	*	*	*	*					
282	#254	*	*	*	*	*					
95	I-H5	I-PA	ii-PA	IV-PA	I-H5	I-PA					
121	I-H5	I-PA	ii-PA	IV-PA	I-H5	I-PA					
233	I-H5	I-PA	ii-PA	IV-PA	I-H5	I-PA					
350	I-H5	I-PA	ii-PA	IV-PA	I-H5	I-PA					
365	#233	*	*	*	*	*					
85	IV-IA3	I-PA	I-IA3	V-PA	IV-IA3	V-IA3	I-DE3	I-PA			
255	IV-IA3	I-IA3	I-IA3	V-PA	IV-IA3	V-IA3	vi-IA3	I-PA			
291	IV-IA3	I-PA	I-IA3	V-PA	IV-IA3	V-IA3	vi-IA3	I-PA			
312	IV-IA3	I-PA	I-IA3	V-PA	IV-IA3	V-IA3	vi-IA3	I-PA			
125	I-IA3	I-PA	ii-PA	ii-H5	I-PA						
249	vi-PH1	I-PA	ii-PA	vi-PH1	I-PA						
313	I-IA3	I-PA	ii-PA	vi-PH1	I-PA						
326	#125	*	*	vi-IA5	I-PA						
353	#313	*	*	*	*						
86	V-PA	V-PA	I-PA	I-IA3	I-IA3	I-PA	I-PA				
195	#86	*	*	*	*	*	*				
278	V-PA	V-PA	I-PA	I-IA3	I-DE5	I-PA	I-PA				
305	#86	*	*	*	*	*	*				
323	I-PL5	V-PA	I-PA	I-IA3	I-IA3	I-PA	I-PA				
20	V-PA	I-PA	V-PA	I-PA	V-PA	ii-H5	I-PA				
250	V-PA	I-PA	V-PA	I-PA	V-PA	ii-H5	I-PA				
273	V-PA	I-PA	V-PA	I-IA1	V-PA	ii-H5	I-PA				
58	I-PL5	iii-IA3	I-PA	V-IA3	vi-H5	I-PA	V-PA	vi-H5	vi-IA3	I-PA	
107	I-PL5	iii-IA3	I-PA	V-IA3	V-IA3	I-PA	V-PA	vi-H5	I-PA	I-PA	
277	I-PL5	iii-IA3	I-PA	V-IA3	vi-H5	I-PA	V-PA	vi-H5	vi-IA3	I-PA	
2	V-PA	V-PA	---	---	I-H5	ii-PA	I-H5	I-PA			
272	V-PA	V-PA	---	---	I-H5	ii-PA	I-H5	I-PA			
341	V-PA	V-PA	V-PA	V-PA	I-H5	ii-PA	I-H5	I-PA			
61	IV-H5/	I-PA	vi-H5	I-IA3	ii-H5	V-PA	I-H5	I-PA			
83	IV-H5/	I-PA	vi-H5	vi-H1/	I-IA3	V-PA	ii-PA	I-PA			
106	V-PA	I-PA	vi-H5	I-IA3	I-IA3	V-PA	I-H5	I-PA			

No.	Cad1	Cad2	Cad3	Cad4	Cad5	Cad6	Cad7	Cad8	Cad9	Cad10	Cad11
54	I-IA3	V-PA	I-H5	vi-H3	I-PA						
276	I-IA3	V-PA	I-H5/	ii-H ^o 5	I-PA						
342	I-IA3	V-PA	I-H5	vi-PH3	I-PA						
152	I-IA1	V-PA	I-IA3	I-PA	V-PA	I-PA					
299	I-PA	V-PA	ii-H5	I-PA	vi-IA3	I-PA					
348	I-PA	V-PA	I-IA3	I-PA	V-DE3	I-PA					
36	I-PA	I-PA	vi-IA3	IV-IA5	V-PA	I-PA					
84	I-PA	I-IA1	vi-IA3	IV-IA5	V-PA	I-PA					
97	I-PA	I-PA	vi-IA3	IV-IA5	V-PA	I-PA					
65	I-IA3	I-PA	I-H5	vi-IA3	V-PA	I-PA					
293	I-IA3	I-PA	I-H5	IV-IA5	V-PA	I-PA					
347	I-IA3	I-PA	I-H5	IV-IA5	V-PA	I-PA					
52	vi-IA3	I-IA3	IV-IA5	ii-H5	vi-IA3	V-PA	I-PA				
322	IV-IA5	I-IA3	vi-IA3	I-IA3	IV-IA5	V-PA	I-PA				
351	IV-IA5	vi-PL5	vi-IA3	I-IA3	IV-IA5	V-PA	I-PA				
144	vi-PH1	I-PA	vi-PA	IV-IA5	I-PA						
317	I-IA3	I-PA	V-H5	vi-IA3	I-PA						
318	#144	*	*	*	*						
40	V-PA	I-IA1	V-PA	I-H5	V-IA5	I-PA					
279	V-PA	vi-IA3	V-PA	I-H5	bVII-IA3	I-long					
260	I-IA3	I-PA	I-H5	vi-PH1	I-PA						
362	I-IA3	I-PA	I-H5	vi-PH1	I-PA						
101	vi-DE3	I-PA	I-H5	vi-PA	I-PA						
303	vi-PA	I-PA	I-H5	vi-DE3	I-PA						
77	I-PA	V-PA	I-H5	ii-IA3	IV-IA1	I-PA					
118	I-PA	V-PA	I-H5	ii-IA3	IV-IA1	I-PA					
252	I-H5	I-PA	IV-IA5	I-PA	IV-IA5	I-PL1	I-IA3				
327	bVII-IA3	I-PA	vi-IA3	I-PA	I-PA	I-IA3	ii-PA	vi-H5/	I-PA		
175	vi-H5	I-PA	vi-PA	I-PA							
338	V-IA3	I-PA	vi-PA	I-PA							
43	I-H5	V-PA	vi-H3	V-PA	vi-PA	I-PA					
+61	I-H5	V-PA	vi-H3	V-PA	vi-PA	I-PA					
44	I-H5	V-PA	I-H5	I-PA							
310	I-H5	V-PA	I-H5	I-PA							
32	I-PL5	I-PA	I-H5	V-PA	ii-IA3	I-PA					
330	I-PL5	I-PA	I-H5	V-PA	ii-IA3	I-PA					
26	I-PA	I-H5	I-PA	ii-PA	I-PA						
274	vi-IA3	I-H5	I-PA	ii-PA	I-PA						
315	I-IA3	I-PA	---	---	I-IA3	V-PA	IV-IA3	I-PA			
337	I-IA3	I-PA	I-IA3	I-PA	I-IA3	V-PA	IV-IA3	I-PA			
141	I-H5	I-PA	I-H5	vi-H5	I-H5	I-PA					
+35	I-H5	I-PA	I-H5	vi-H5	I-H5	I-PA					
24	I-IA1	I-PA	iii-IA3	V-PA	ii-H5	I-PA					
108	vi-IA3	I-PA	V-IA3	V-PA	ii-H5-min	I-PA					
46	I-IA1	I-IA3	V-PA	I-PA							
344	I-PA	vi-IA5	V-PA	I-PA							
68	I-PA	I-H5	V-PA	I-PA							
247	I-PA	I-H5	V-PA	I-PA							
148	IV-PA	I-PA	V-IA5	I-PA							
177	#148	*	*	*							

No.	Cad1	Cad2	Cad3	Cad4	Cad5	Cad6	Cad7	Cad8	Cad9	Cad10	Cad11
156	V-H5	V-PA	I-H5	I-PA							
308	#156	*	*	*							
5	I-IA3	I-PA	I-PA	V-PA	ii-H5	ii-PA	V-PA	I-PA			
309	#5	*	*	*	*	*	*	*			
9	V-PA	I-PA	ii-PA	vi-PA	V-IA5	I-PA					
361	#9	*	*	*	*	*					
131	I-H5	I-PA	V-IA3	I-PA							
328	#131	*	*	*							
201	iii-IA3	V-PA	I-PA	IV-H3	V-PA	vi-IA5	I-H5	iii-IA3	I-PA		
306	#201	*	*	*	*	*	*	*	*		
235	I-PA	V-PA	V-PA	I-IA3	V-PA	I-PA	I-DE3	V-DE3	V-PA	I-PA	
319	#235	*	*	*	*	*	*	*	*	*	
6	I-IA3	I-IA3	V-PA	I-PA							
14	I-IA3	I-PA	IV-IA5	vi-IA3	V-PA	I-IA3	I-PA				
18	V-PA	V-PA	I-PA	V-PA	I-PL5	I-PA					
22	I-IA3	I-PA	V-PA	V-PA	I-H5	I-PA					
27	IV-IA5	I-PA	V-PA	I-IA3	I-PA						
35	V-PA	I-PA	I-H5	I-PA							
38	I-IA3	I-PA	I-IA3	II#-IA3	V-PA	I-PA					
42	I-IA3	I-IA3	vi-H5	I-PA							
60	I-IA3	vi-PA	V-PA	V-IA3	I-DE5	I-PA					
69	I-H5	V-PA	I-PA	V-PA	vi-PH1	V-IA1	I-PA	V-PA	I-PA	I-PL5	I-PA
124	vi-IA5	I-IA3	I-PA	V-IA5	vi-H5	I-PA					
128	I-IA3	V-IA3	V-PA	I-IA3	V-IA3	I-PA					
135	V-IA3	I-PA	vi-PH1	V-PA	ii-H5	I-PA	I-IA3	I-PA			
136	V-IA1	I-PA	V-PA	I-PA							
137	I-IA3	V-IA5	I-PA	I-H5	vi-H5	vi-PA	I-PA	I-H5	I-H5	I-PA	
139	IV-PA	ii-IA3	I-H5	I-PA	IV-DE3	ii-IA3	I-H5/	I-PA			
140	I-H5	V-IA3	vi-H5	V-IA3	iii-IA3	I-PA					
147	I-IA1	V-PA	I-H5	I-IA3	V-PA	I-PA					
151	I-IA3	I-PA	vi-H5	I-PA							
153	I-IA3	I-PA	V-PA	vi-PA	V-IA1	I-PA					
157	V-PA	I-PA	ii-H5	I-PA							
158	I-PA	I-PA	V-IA1	I-PA	V-PA	I-PA	V-PA	I-PA			
159	I-PA	I-PA	I-H5	I-H5	I-PA						
165	V-PA	I-PA	V-PA	ii-H5	I-PA						
169	V-IA1	I-PA	ii-H5	V-PA	I-H5	V-IA1	vi-DE3	I-PA			
179	V-PA	V-PA	I-PA	I-DE3	I-PA	I-IA3	vi-IA3	I-DE3	I-PA		
183	I-PA	I-IA1	V-PA	I-DE3	I-PA						
189	V-IA3	V-IA1	ii-PA	I-PA							
211	I-PL5	vi-H5	vi-IA3	V-IA3	V-IA3	V-DE5	I-PA				
212	I-IA1	V-PA	I-IA3	I-PA	V-PA	vi-IA3	I-PA				
223	V-IA1	I-PA	V-PA	vi-IA3	ii-H5	I-IA1	ii-H5	iii-IA3	V-PA	I-PA	
224	I-IA3	V-PA	I-H5	I-PA							
239	I-PL1	V-PA	I-IA5	I-PA	V-PA	I-IA5	I-PA				
246	I-IA3	V-PA	ii-PA	ii-H5	IV-PA	I-PA					
258	I-IA3	I-IA3	I-H5	I-PA	I-H5	ii-H5	I-PL5/	I-PA			
264	V-IA5	I-PA	II#-IA5	V-PA	I-H5/	vi-IA3	I-PA				
268	I-IA3	I-PA	vi-PA	V-PA	IV-IA5	ii-PA	IV-IA5	V-PA	I-H5	I-PA	
280	I-IA1	I-PA	vi-IA3	I-PA							
284	I-IA1	vi-PH1	V-PA	iii-IA3	I-H5	V-PA					
311	I-IA3	I-PA	I-H5	V-PA	ii-H5	I-PA					

No.	Cad1	Cad2	Cad3	Cad4	Cad5	Cad6	Cad7	Cad8	Cad9	Cad10	Cad11
+2	I-H3	I-H5	V-IA3	I-IA3	I-PA						
+6	I-IA3	V-PA	I-IA3	vi-PA	I-PA	iii-PA	vi-H3	I-PA			
+8	I-PA	I-H5	V-PA	ii-H3	ii-PA	I-H3	I-PA				
+9	I-PA	V-PA	I-H5	V-PA	I-H5	I-PA					
+11	I-IA3	V-PA	vi-PA	V-PL5	I-PA						
+30	I-PA	vi-H5	VI#-IA3	I-H5	ii-PA	I-PA					
+31	I-H5	V-PA	vi-PA	ii-IA3	V-IA3	I-PA					
+33	I-IA3	V-PA	I-IA3	vi-PA	I-IA3	I-PA					
+34	I-PA	V-PA	ii-PA	I-PA							
+42	I-H5	I-H5	V-PA	V-IA3	I-PA						
+46	I-PL5	I-PA	V-H5/	V-PA	I-IA3	vi-PA	I-IA5/	I-PA			
+51	I-PL5/	I-H5	I-IA3	V-PA	I-H5/	vi-PH1	I-H5	I-PL5/	I-PA		
+52	V-IA1	I-PA	ii-PA	I-PA							
+57	I-IA3	I-IA3	V-PA	IV-hold	V-IA3	I-DE3	I-PA				
+58	I-IA3	I-H5	V-PA	I-IA3	I-H5	V-PA	I-IA3	I-PA			
+60	I-H5	I-PA	V-PA	I-DE5	I-PA	V-IA1	II#-IA3	I-PA			
+66	I-H5	V-PA	vi-H3	vi-H5	vi-PA	V-IA3	I-PA				
+68	I-H1/	I-H5	ii-H1/	IV-H5	I-PA						

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