

DYNAMICS AND DISSONANCE: THE IMPLIED HARMONIC THEORY OF J. J. QUANTZ

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Abstract. Chapter 17, Section 6 of Quantz’s *Versuch einer Anweisung die Flöte traversiere zu spielen* (1752) includes a short original composition entitled “Affettuoso di molto.” This piece features an unprecedented variety of dynamic markings, alternating abruptly from loud to soft extremes and utilizing every intermediate gradation. Quantz’s discussion of this example provides an analytic context for the dynamic markings in the score: specific levels of relative amplitude are prescribed for particular classes of harmonic events, depending on their relative dissonance. Quantz’s categories anticipate Kirnberger’s distinction between essential and nonessential dissonance and closely coincide with even later conceptions as indicated by the various chords’ spans on the Oettingen–Riemann *Tonnetz* and on David Temperley’s “line of fifths.” The discovery of a striking degree of agreement between Quantz’s prescriptions for performance and more recent theoretical models offers a valuable perspective on eighteenth-century musical intuitions and suggests that today’s intuitions might not be very different.

KEYWORDS AND PHRASES: Quantz, *Versuch*, Affettuoso di molto, thoroughbass, dissonance, dynamics, Kirnberger, Temperley, line of fifths, *Tonnetz*.

1. DYNAMIC MARKINGS IN QUANTZ’S “AFFETTUOSO DI MOLTO”

THE *Versuch einer Anweisung die Flöte traversiere zu spielen* (1752) by Johann Joachim Quantz is one of a number of widely read treatises that codify many aspects of eighteenth-century performance practice.¹ Quantz’s *Versuch* in fact applies very broadly to the performance and interpretation of the music of his time; only a small fraction of its eighteen chapters applies strictly to flute play-

ing. Like similarly conceived publications by C. P. E. Bach, Leopold Mozart, and others, however, Quantz’s treatise engages questions of compositional practice only obliquely, from the perspective of the performing musician. The present study examines one facet of his performance directions—concerning the dynamic levels appropriate to various classes of dissonant harmonies—in light of more recent ideas about harmony. While Quantz’s *Versuch* might seem to share little in common with the trajectory of harmonic speculation in the eighteenth century (launched by Rameau’s *Traité de l’harmonie* of 1722), his instructions regarding dynamics suggest an implicit theoretical rationale. Although he may well have based his categorization of dis-

¹ The two most comparable and closely related treatises are by Mozart (1756) and Bach (1753–1762); other notable contributions include Tosi (1723), Geminiani (1751), and Türk (1789).

sonances on purely aural or intuitive judgments, speculative scrutiny supports his proposed categories and provides a new perspective on his conception of harmonic structure.

Chapter 17, Section 6 of Quantz's *Versuch* concerns the duties of the keyboardist in accompaniment and includes a short original composition entitled "Affettuoso di molto," reproduced in Example 1. This piece features an unprecedented variety of dynamic markings, alternating abruptly from loud to soft extremes and utilizing every intermediate gradation. The extreme density of dynamic markings is remarkable: most comparable pieces from the period were published without any dynamics whatsoever, and no other eighteenth-century treatise spells out performance prescriptions regarding dynamics as explicitly.² Quantz's dynamics are seemingly intended to document an ideal concept of dynamic shaping, and may also be taken as an indication of contemporary performance practice.³ Most suggestively, Quantz's discussion of this example provides an analytic context for the various dynamic markings included in the score: specific levels of relative amplitude are prescribed for particular classes of harmonic events.⁴ While it may not seem surprising that the tension associated with a dissonant chord might correspond to a louder dynamic indication, Quantz's specific insight was to distinguish precisely which dynamic gradations should apply to particular categories of dissonant chordal formations.

2. CATEGORIES OF CHORDAL DISSONANCE

As given in Figure 1, Quantz divides dissonances into three categories, marked with *mezzo forte*, *forte*, and *fortissimo*, respectively. His reference to these dissonant sonori-

ties is consistent with the thoroughbass tradition of reckoning a chord in terms of the intervals above the bass.⁵ While the *mezzo forte* category contains one triadic signature (namely "the major sixth with the minor third")⁶ and the *fortissimo* category includes the augmented sixth and the $\frac{7}{2}$ sonority, all three categories are largely comprised (in today's parlance) of incomplete seventh chords of various kinds. The degree of dissonance that Quantz ascribes to a chord depends not only on the numerals in the thoroughbass signature, but also the precise sonority indicated—not just the configuration of generic intervals, but the specific interval sizes as well.⁷ For instance, the third downbeat of the piece features "the second with the fourth"; this is a member of Quantz's mildest category of dissonance, and is thus marked *mezzo forte*. The following downbeat has the same thoroughbass figure of $\frac{4}{2}$, but features an augmented fourth rather than a perfect fourth, and thus receives a marking of *forte* (since Quantz's second category includes this figure).

Quantz's categories seem to agree with a conception of chord inversion inasmuch as each category features several examples of a single chord type that is represented in no other category.⁸ The *mezzo forte* category contains three signatures corresponding to minor-seventh chords in different positions ("the second with the fourth," "the fifth with the major sixth," and "the minor seventh with the minor third"), a chord type featured in no other category. In similar fashion, dominant-seventh chords appear only in the *forte* category, and diminished-seventh chords appear only in the *fortissimo* category. While Quantz explicitly cites all four inversional positions of the diminished-seventh chord, he mentions only two positions of the dominant-seventh chord, "the second with the augmented fourth" and "the diminished fifth with the minor sixth." Since Quantz has recommended a single dynamic level for all positions of other chord types, however, we can comfortably extrapolate a recommended dynamic level of *forte* for a dominant-seventh chord in any position.⁹

² For a useful survey, see Brown (1999, Chapter 3, "The Notation of Accents and Dynamics"). For an overview of all statements concerning dynamics in Quantz's *Versuch*, see Reilly (1971, 123–132).

³ The range of dynamic indications might seem to preclude the use of the harpsichord, since that instrument is not designed to convey fine gradations of dynamic shading. Indeed, Quantz endorses the use of the fortepiano as an instrument upon which the kinds of dynamic contrasts he seeks are more easily realized (Quantz 1752, Chapter 17, Section 6, §17). Quantz's employer, Frederick II, owned a number of fortepianos built by Gottfried Silbermann, one of which was met with Johann Sebastian Bach's enthusiastic approval in 1747 (Ripin 1980, 686). But Quantz maintains the viability of conveying the same kind of gradations on a harpsichord by strengthening or moderating the touch and by increasing or decreasing the number of pitches played in a chord (not only in the right hand but also possibly doubling the bass note an octave lower). Reilly (1974) reproduces and comments on a realization of this very piece by Quantz's contemporary John Casper Heck (1767?), in which the keyboard realization is appropriately thickened and thinned according to Quantz's dynamic markings. The realization is also given on pp. 373–376 of the second edition of Reilly's translation of Quantz (1752).

⁴ Quantz (1752, Chapter 17, Section 6, §14).

⁵ See Lester (1992, Chapter 3, "Thoroughbass Methods").

⁶ While for Quantz the instability of this sonority justifies a louder dynamic marking, earlier sources including Mattheson (1735) and Sorge (1743) include the diminished triad among the consonant chords. Kirnberger (1771–1779) also classifies the diminished triad as consonant but indicates that it is used only to connect to other chords.

⁷ On the distinction between generic and specific intervals, see Clough and Myerson (1985).

⁸ Several treatises published shortly after Rameau (1722), including Heinichen (1728) and Kellner (1732), advance notions of chordal inversion that are quite similar to Rameau's. On the emergence of this concept, see Lester (1992, especially Chapter 4), Lester (2002), and Christensen (2010).

⁹ Quantz in fact discusses "the minor seventh with the major third" in a slightly earlier section of prose (Quantz 1752, Chapter 17, Sec-

Affettuoso di molto

The score is divided into systems of two staves each. The first system (measures 1-5) starts with a trill on the first measure. The second system (measures 6-10) includes a trill on measure 10. The third system (measures 11-15) features a trill on measure 11. The fourth system (measures 16-20) includes a trill on measure 16. The fifth system (measures 21-25) includes trills on measures 21, 23, and 25. The sixth system (measures 26-30) includes a trill on measure 26. The seventh system (measures 31-35) includes trills on measures 31, 33, and 35. The eighth system (measures 36-40) includes a trill on measure 36. The ninth system (measures 41) includes a trill on measure 41.

Example 1. Joseph Joachim Quantz, “Affettuoso di molto” (from Versuch einer Anweisung die Flöte traversiere zu spielen).
Dynamic indications are assigned according to degree of dissonance.

I divide the dissonances into three classes, according to their effects and the manner in which they should be struck. The first I mark *Mezzo Forte*, the second *Forte*, and the third *Fortissimo*. In the first class, *Mezzo Forte*, may be reckoned:

The second with the fourth,
 The fifth with the major sixth,
 The major sixth with the minor third,
 The minor seventh with the minor third,
 The major seventh.

To the second class, *Forte*, belong:

The second with the augmented fourth,
 The diminished fifth with the minor sixth.

In the third class, *Fortissimo*, count:

The augmented second with the augmented fourth,
 The minor third with the augmented fourth,
 The diminished fifth with the major sixth,
 The augmented sixth,
 The diminished seventh,
 The major seventh with the second and fourth.

Figure 1. Passage quoted from Quantz, *Versuch*, Chapter 17, Section 6, §14 (translation by Edward R. Reilly).

3. A “REFINED SENSITIVITY”

All of these markings are subject to, in Quantz’s words, “good judgment and refined sensitivity of spirit.”¹⁰ As he explains, the given markings are conceived with reference to a general *mezzo piano* level; when an even softer dynamic indication prevails in the score, Quantz advises that dissonances should sound softer to a proportional degree. Several slight departures from his own dynamic prescriptions seem also to serve the aims of a “refined sensitivity,” rather than an unthinking literalism, in applying these dynamic guidelines. Quantz seeks to temper the starkest dynamic contrasts between adjacent chords, and thus to achieve “an imitation of the human voice, and of such instruments as are capable of swelling and diminishing the tone.”¹¹ For instance, he effects a *crescendo* toward the downbeat of m. 11, notating a *forte* marking at the end of m. 10 despite the lack of dissonance. Other points at which marked increases in volume are not warranted by the degree of dissonance (but rather by Quantz’s evident interest in building toward a louder dynamic marking to follow) are noted at the end of m. 14, the downbeat of m. 21, the second and third beats of m. 26, the first and second beats of m. 31, and the sec-

ond beat of m. 32. The same principle prompts a milder-than-expected dynamic marking for several strident dissonances that are flanked by softer sonorities. Instances include the diminished-seventh chord on the downbeat of m. 20 (marked only *forte* instead of *fortissimo*); the harmonies at the ends of mm. 33, 38, 40, and 41; and the penultimate downbeat.¹² Further, in apparent imitation of the decay of a sung tone, Quantz frequently permits the loudness of an extended dissonance to diminish over its span, as in mm. 7, 15, 21, 27, 29, and 37.¹³ These factors, taken together with Quantz’s statements regarding the imitation of the human voice, certainly suggest a less literal approach to the assignment of dynamic markings than might be assumed at first glance.

In his own *Versuch*, C. P. E. Bach—who served, like Quantz, in the longtime employ of Frederick II—expresses

tion 6, §13), so it is not an unrecognized signature. Although there is no signature in m. 29, the seventh above the bass is clearly implied throughout the measure by the melodic part.

¹⁰ Quantz (1752, Chapter 17, Section 6, §14).

¹¹ Ibid.

¹² The consistency of the metric placement of these muted dissonances in mm. 33–41 suggests one aspect of Quantz’s “good judgment and refined sensitivity of spirit,” namely a distaste for too great a dynamic accent in conflict with the metric structure.

¹³ The dynamic marking of *forte* in m. 29 is warranted by the interval of a seventh above the bass sounding in the melodic part (notwithstanding the absence of any thoroughbass figure in this measure) and the subsequent change to *piano* imitates the natural decay of a musical tone. The succession of *forte* and *piano* in m. 36 might also be mentioned; although the downbeat is not dissonant, the *forte* marking reinforces its chromatic character and underlines the cadential deception. Such a strategy is consistent with C. P. E. Bach’s admonitions to play deceptive progressions loudly and to emphasize all tones lying outside the key (Bach 1753–1762).

substantial antipathy toward the high degree of dynamic detail that Quantz prescribes. While Bach agrees that “in general it can be said that dissonances are played loudly and consonances softly,” he argues that “[i]t is not possible to describe the contexts appropriate to the *forte* or *piano* because for every case covered by even the best rule there will be an exception.”¹⁴ But Bach may have overlooked Quantz’s appeals to sensitivity and overstated the intended rigor of Quantz’s prescriptions. Quantz is clearly not interested in reforming notational practice towards a greater density of specified dynamics, nor does he seem to be attempting to establish a fundamentally new performance practice. In fact, his suggestion is to play the “Affettuoso” several times with the markings as given, but then to “repeat it with the same strength of tone throughout, and pay close attention both to the diversity of figures, and to their individual feeling.”¹⁵ Following this directive would have the effect of sensitizing performers to the fine distinctions between sonorities and their individual effects, and equipping them with the “good judgment” of which Quantz speaks. Rather than attempting to predetermine a performer’s decisions about dynamics in every case, Quantz seems to be aiming simply to recommend a link between dynamics and dissonance within his proposed hierarchy of harmonic stability. I believe the principal importance of this section lies in this hierarchy, rather than in the precision of the markings he employs.

4. ESSENTIAL AND NONESSENTIAL DISSONANCE

Significantly, there is one class of dissonant sonorities for which Quantz prescribes no dynamic differentiation: he largely forgoes dynamic markings altogether for thoroughbass signatures denoting suspended dissonance.¹⁶ Indeed, the very first dissonant element in the piece, the 4–3 suspension in m. 2, receives no particular dynamic emphasis. This cannot be explained by the inevitability of the descending stepwise resolution—suggesting, perhaps, that the tension and release of the suspension would render any dynamic accent redundant—because most of the dissonant sonorities that Quantz considers for dynamic emphasis seem to require equally inevitable resolution. Even when two suspended dissonances sound together, as

on the downbeat of m. 8, Quantz indicates no reflection of this dissonance in the dynamic level. Another 4–3 suspension occurs in m. 10, and two more double suspensions are heard on successive downbeats in mm. 16 and 17, all without any form of dynamic contrast—indeed, in great contrast to the rest of the piece, which features such an unusual degree of dynamic markings.¹⁷

Quantz’s dynamic markings in the “Affettuoso” and his accompanying prose seem to reflect the distinction between what Johann Philipp Kirnberger later called “essential” and “nonessential” dissonance.¹⁸ Kirnberger differentiated between two types of suspended dissonance: those that resolve over the same chordal root and those that require a change of chordal root. A change in harmony is required to accommodate the resolution of an essential dissonance (in Kirnberger’s theory, a chordal seventh or ninth), whereas a nonessential dissonance is able to resolve over a harmony already present (that is, without any other voice motion). Quantz describes the aural effect of these downbeat suspensions in a very interesting way: he writes that the ninth, the ninth and fourth, the ninth and seventh, and the fifth and fourth “are not as perceptible to the ear” as the sonorities listed in Figure 1.¹⁹ This might seem a strange way to describe a nonessential dissonance: one might have thought that a nonessential dissonance would be *more* striking to the ear, by virtue of its utter incommensurability with the other sounding pitches. But Quantz hears what we may think of as chordal dissonance to be more striking than non-chordal dissonance. Commenting on exactly this comparison, he writes that “some of the dissonances have more effect, and so must be struck with greater force than the others.”²⁰ The notion of a dissonance’s effect may help us to understand the na-

¹⁴ Bach (1753–1762/1949, 163).

¹⁵ Quantz (1752, Chapter 17, Section 6, §14).

¹⁶ Elsewhere in his *Versuch*, Quantz does advocate the emphasis of a suspended dissonance, writing, for instance: “In ligatures or tied notes that consist of crotchets or minims, the volume of the tone may be allowed to swell, since the other parts have dissonances either above or below the latter half of such notes. Dissonances in general, in whatever part they are found, always require special emphasis” (Quantz 1752, Chapter 17, Section 7, §29).

¹⁷ The “Affettuoso” includes a number of 7–6 successions, including mm. 9, 15, 27, and 37, all of which receive some level of dynamic emphasis. As will be discussed shortly, the first of these is the hardest to hear as an essential dissonance, and Quantz’s *mezzo forte* marking seems to contradict the prevailing trend of dynamically unaccented suspensions. But the marking is consistent with Quantz’s prescriptions; not every instance of “the minor seventh with the minor third” will constitute an essential dissonance. On the other hand, even though his *mezzo forte* category includes “the second with the fourth,” a nonessential instance of this signature in m. 30 receives no dynamic marking.

¹⁸ Kirnberger (1771–1779). This distinction represented an important solution to a problematic aspect of Rameau’s harmonic theories, namely the notion of supposition. In order to explain all dissonance in terms of the components of seventh chords, Rameau developed the notion of “supposing” a new conceptual bass note below the given notes of a chord. A suspended dissonance may then be reconceived as a seventh above the new “supposed” bass, so that it follows the normative route of a chordal seventh as it resolves. See Christensen (1993, 123–129) and Lester (1992, 108–115).

¹⁹ Quantz (1752, Chapter 17, Section 6, §13).

²⁰ *Ibid.*

ture of the distinction Quantz is trying to draw here. A dissonance may either have an effect on surrounding parts, causing them to move in accommodation of the resolution of the dissonance, or it may have no effect in that the surrounding parts are not compelled to move as a condition of the resolution of the dissonance. This would seem to correspond closely to Kirnberger's view of the matter; Quantz's ideas arguably represent a fortuitous and far-sighted anticipation of Kirnberger's pivotal insight.

5. THEORETICAL PERSPECTIVES ON QUANTZ'S PRESCRIPTIONS

Given the striking parallels between Kirnberger's essential and nonessential dissonances and Quantz's initial classification of dissonances according to their "effect," it is natural to inquire as to the potential for further agreement between Quantz's work and later theoretical formulations. Stephen Hefling (1987) seeks a correlation between Quantz's dynamic indications in another Adagio movement from Chapter 14 of the *Versuch* and an analysis of its structure from a Schenkerian standpoint. Finding all members of a middleground octave line "set in clear relief" by Quantz's dynamics, Hefling concludes that "significant aspects of what Schenker conceptualized during the first third of this century were operative features of musical style 250 years ago, to which excellent musicians like Quantz responded in their performances."²¹ While Hefling's results are intriguing, his approach is perhaps better suited to the piece he examines than the "Affettuoso." Quantz wrote the Chapter 14 "Adagio" to illustrate the ideal dynamic shaping of an extensive vocabulary of embellishing figures, and Hefling's approach may have been prompted by a broader conception of embellishment as it relates to Schenker's theory of levels. In the context of the "Affettuoso," however, Quantz is primarily engaging the vertical dimension rather than the melodic dimension; his melody follows the figured bass quite doggedly, remaining in near rhythmic unison with the harmonic support throughout, and it is plainly his aim to highlight the changes in chord quality in this piece rather than aspects of contrapuntal nuance.²² Consequently, the remainder of this study will be devoted to seeking some concordance between Quantz's harmonic classification and more recent conceptions of harmony.

It is useful to note that Quantz's three categories reinforce some important distinctions between types of

sonorities. First, it seems clear that most of the sonorities in his third class of dissonances, to be performed *fortissimo*, are more chromatic than those in the first two classes. While some of the thoroughbass descriptions within the first two classes could correspond to non-diatonic harmonies, all of them could describe at least one diatonic sonority within a given key. Other than "the major sixth with the minor third," all sonorities within the first two classes of dissonances correspond to diatonic seventh chords (i.e., dominant-seventh chords in the second class and other seventh chords in the first class). In contrast, five of the thoroughbass descriptions within the third class necessarily require a chromatic spelling; the only exception is "the major seventh with the second and fourth." All of those five—"the augmented sixth" and four other descriptions referring to diminished-seventh harmonies in various inversions—require at least one chromatic alteration in all keys (at least a raised leading tone in a minor key).

Second, it appears that Quantz's dynamic prescriptions reflect each sonority's rarity or redundancy within a given diatonic scale to some extent. While his list of dissonances does not, of course, include any major or minor triads, it does include one triad—namely, "the major sixth with the minor third," or a first-inversion diminished triad. The availability of six different major or minor triads within a given diatonic scale contrasts with the availability of only one diminished triad within a given scale, which is prescribed a *mezzo forte* dynamic level as opposed to a neutral (*mezzo piano*) dynamic level. Similarly, among sonorities in Quantz's list with four different notes, those with more than one representative within a given scale (minor-seventh chords and major-seventh chords) are prescribed only a *mezzo forte* dynamic level, whereas dominant sevenths (which have only one representative in a given scale) are to be performed *forte*, and diminished sevenths (which have no diatonic representatives) are to be performed *fortissimo*. There are also no representatives of "the augmented sixth" within a given diatonic scale, and augmented sixths are also to be performed *fortissimo*.

6. THE "LINE OF FIFTHS"

Such observations may partly satisfy our curiosity as to the basis for Quantz's distinctions, but they do not account for all of his decisions in a systematic way. In order to measure and compare the chromatic character of Quantz's dissonant chord types, Figure 2 plots each of them along a "line of fifths."²³ The note names running vertically at the

²¹ Hefling (1987, 217).

²² Moreover, the association between dynamic markings and harmonic support in the Chapter 14 "Adagio" is, at best, quite loose. I consider the "Adagio" in light of Quantz's dynamic prescriptions from his Chapter 17 in Jones (2009).

²³ Temperley (2000) provides a useful introduction to the line of fifths. He cites Regener (1974) and Pople (1996) as earlier sources for this idea.

	<i>mezzo forte</i>					<i>forte</i>		<i>fortissimo</i>						
Th.	4	M6	M6	m7	M7	A4	m6	A4	A4	M6	A6	d7	M7	
sig.:	2	5	m3	m3		2	d5	A2	m3	d5			4	
B#	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E#	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A#	-	-	-	-	-	-	-	-	-	-	O	-	-	-
D#	-	-	-	-	-	-	-	-	O	-	-	-	-	-
G#	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C#	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F#	-	-	-	-	-	O	-	-	O	O	-	-	-	-
B	-	-	-	-	O	-	-	-	-	-	-	-	-	O
E	-	●	-	-	●	-	-	-	-	-	-	●	-	-
A	●	O	O	-	-	●	-	-	●	●	O	-	-	-
D	O	-	-	-	-	O	-	-	-	-	-	-	-	O
G	-	O	-	●	●	-	-	-	-	-	-	-	-	-
C	O	O	O	O	O	-	O	O	-	O	O	O	O	O
F	O	-	-	-	-	-	-	-	-	-	-	-	-	O
Bb	-	-	-	O	-	-	-	-	-	-	-	-	-	-
Eb	-	-	O	O	-	-	●	-	-	O	●	-	●	-
Ab	-	-	-	-	-	-	O	-	-	-	-	-	-	-
Db	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gb	-	-	-	-	-	-	O	-	-	-	O	-	●	-
Cb	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fb	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bbb	-	-	-	-	-	-	-	-	-	-	-	-	O	-
Th.	4	M6	M6	m7	M7	A4	m6	A4	A4	M6	A6	d7	M7	
sig.:	2	5	m3	m3		2	d5	A2	m3	d5			4	
Span:	4	4	6	4	5	6	6	9	9	9	10	9	6	

Figure 2. Quantz's dissonant chords from Figure 1, transcribed onto the "line of fifths," with prescribed dynamic markings listed above and spans listed below. (O = denoted in thoroughbass signature; ● = implied thoroughbass signature).

far left of this figure are registrally undefined, but their enharmonic spelling is retained. (For this reason this series of note names will not yield a "circle of fifths," which requires the enharmonic reinterpretation of one element, but rather extends infinitely into multiple sharps in one direction and multiple flats in the other.) I have transcribed

every thoroughbass signature onto this table by taking the note C as an assumed bass note, shown in every chord with an open circle. The other open circles in each column represent intervals denoted by the thoroughbass signature, while the black dots represent likely additional chord members that are not mentioned explicitly in the typical thor-

oughbass abbreviations. Quantz’s first chord, “the second with the fourth,” is shown with open circles on C, D, and F, with an implied A as a black dot. The lone triadic signature is shown in the third chordal column from the left, with just the three open circles on C, Eb, and A (a major sixth and a minor third above the C). The fifth column from the left has two implied notes, an E and a G, to fill in the span from C, the given bass note, to B, the pitch denoted by the signature of a major seventh. Chords in the *forte* and *fortissimo* categories are similarly completed with the expected tones.

If the “effects” of the chords in Quantz’s *mezzo forte* category are indeed milder than those in the *forte* and *fortissimo* categories, then one might expect some agreement with a measure of the distance spanned by these chords on the line of fifths. The measure of a chord’s span on the line of fifths is not a purely acoustic measurement, but also an indication of its stability or instability in a tonal context. (A dominant-seventh chord, for instance, will have a lesser span than a German augmented-sixth chord, since the spelling of the latter chord involves a set of more widely divergent note names.) In fact, the span of a chord on the line of fifths corresponds closely to Quantz’s categorization of the sonority. Indeed, an examination of the spans of each chord, given below the figure, shows a predictable “slope” from the spans of four fifths in the *mezzo forte* category to the spans of nine and ten fifths in the *fortissimo* category. The greatest anomaly in this regard is the very last sonority, the $\frac{7}{2}$, which spans only six fifths (and is the only *fortissimo* dissonance that can be spelled diatonically). This chord’s disturbance of the overall pattern of increasing spans can perhaps be explained by the character of the chord itself, which might normally be conceived as the result of nonessential rather than essential dissonance.²⁴

In addition to the overall increase in chord spans, Quantz’s categorization of dissonant chord types is also supported by shared aspects of internal chord structure. As has already been noted, each category contains multiple representatives of the same chord type, which can be seen clearly in the figure. In the *mezzo forte* category, the second with the fourth, the major sixth and fifth, and the minor seventh and minor third (all inversions of the minor-seventh chord type) are characterized by a remarkably compact configuration of tones along the line of fifths. The other two chords in this category feature significant “family resemblances” to this compact chord type: the major sixth and minor third shares two embedded minor thirds, and the chord of the major seventh shares two major thirds and two fifths. The intervallic consistency of

the other two categories is also easily observed, with two chords of identical type in the *forte* category and four out of six of the *fortissimo* chords also identical in configuration. (Even though the four distinct signatures corresponding to diminished-seventh chords are all enharmonically equivalent, the differences in their spelling are reflected in Figure 2.) The other two signatures in the *fortissimo* category share particular intervallic components in common with the diminished-seventh chord: the chord of the augmented sixth shares an embedded tritone, and the $\frac{7}{2}$ sonority shares an embedded diminished triad.

7. A TWO-DIMENSIONAL MODEL OF CHORDAL SPREAD

Although the increasing fifth spans of these dissonances coincide with Quantz’s dynamic prescriptions to an intriguing degree, a different mode of measurement may reflect his categorical divisions yet more clearly. Figure 3 invokes the *Tonnetz*, which juxtaposes multiple interval cycles in a two-dimensional grid.²⁵ As can be seen, cycles of minor thirds run along one diagonal axis, while cycles of major thirds run along an opposing diagonal and cycles of perfect fourths or fifths run along the horizontal axis. Since major and minor triads are comprised of these three interval types, we find triadic configurations provided by every closest threesome of notes, arranged in equilateral triangles. Using equilateral triangles instead of right-angle triangles ensures that any note is minimally distant from six other notes with which it could sound consonant—minor and major thirds or sixths above and below, and perfect fourths or fifths above and below.²⁶

Figure 4 charts all the dissonances in each of Quantz’s three categories, maintaining the directions of the three *Tonnetz* axes. The recurrence of six particular geometric configurations is of interest. The minor-seventh chords implied by three of the figures in Quantz’s *mezzo forte* category are represented on the *Tonnetz* by the same rhomboid shape (designated SHAPE 1), as is the major seventh chord C, E, G, B that Quantz includes in the same category. This shared configuration further supports Quantz’s grouping of these two chord types in the same category of dissonance; from this perspective they represent not just two chord types of roughly similar dissonance but each

²⁴ The final model to be explored in this study will provide an assessment of the $\frac{7}{2}$ sonority that is more faithful to its categorization within Quantz’s *fortissimo* category.

²⁵ Cohn (2012) provides a useful introduction to the *Tonnetz*, as do several of his earlier articles.

²⁶ On the (more typical) right-angle-triangle *Tonnetz*, a diagonal in one direction spans a perfect fifth while a diagonal in the other direction spans a semitone. Because the equilateral-triangle *Tonnetz* allows all “triadic” intervals (interval-classes 3, 4, and 5) to huddle together more closely than “non-triadic” intervals (interval-classes 1, 2, and 6), its geometry best suits the present purposes.

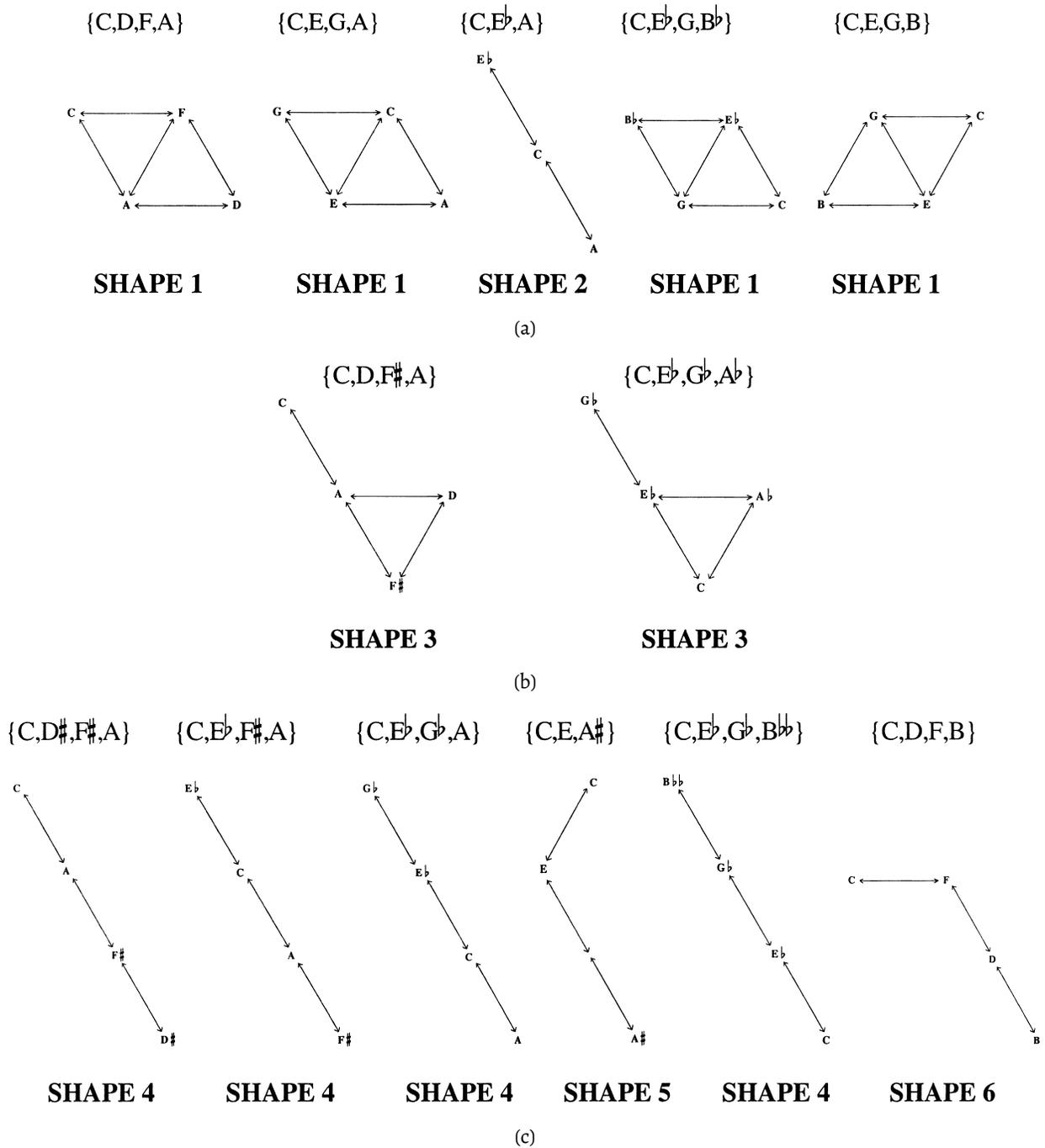


Figure 4. Dissonances in Quantz's three categories, as represented on the Tonnetz. (Pitch-class sets are those given in Figure 2.) Six basic shapes are indicated. (a) Quantz's mezzo forte category. (b) Quantz's forte category. (c) Quantz's fortissimo category.

Figure 6a) range only from 0.667 to 0.683. The “spread” of each dominant-seventh sonority in his *forte* category (shown in Figure 6b) is 0.762—somewhat greater. Finally, the “spreads” of the chords in his *fortissimo* category (shown in Figure 6c) are greater still—ranging from 0.946 for the $\frac{7}{2}$ sonority (SHAPE 6) to a cool 1.000 for a diminished seventh

(SHAPE 4) to an even more diffuse 1.086 for an Italian sixth (SHAPE 5).²⁸ Since these values are derived from calculat-

²⁸ While SHAPE 5 and SHAPE 6 resemble each other, SHAPE 5 is “missing” a note from a fairly central location, so the average distance from the notes of SHAPE 5 to their imaginary central point

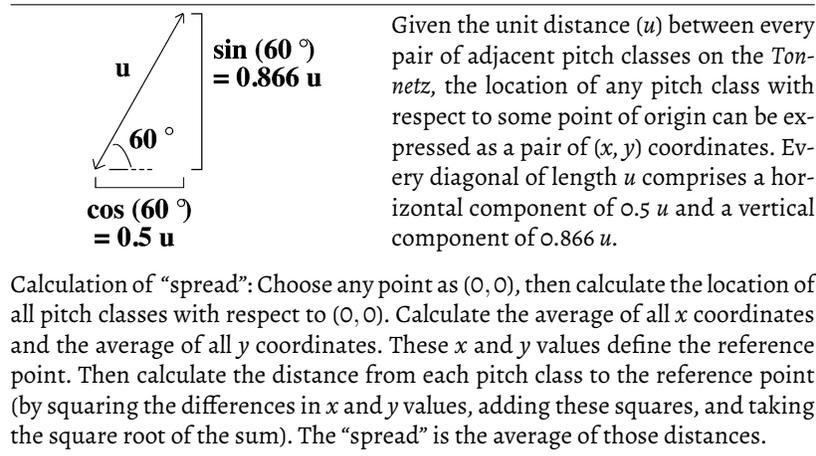


Figure 5. Calculating the “spread” of each of six shapes on the *Tonnetz*.

ing (and averaging) geometric distances rather than counting interval sizes in steps or semitones, they may not seem closely related to the aural experience of the sonorities in question, but comparing two such values does indeed align well with the aural comparison of the sonorities with which they are associated. Further, all of the values exceed the “spread” of a major or minor triad; major and minor triads are rendered as “1-unit” equilateral triangles on the *Tonnetz*, and achieve a spread of only 0.577. In turn, any consonant dyad (interval-class 3, 4, or 5) would be represented on the *Tonnetz* by just two adjacent points, with a “spread” of 0.5 (less than but quite close to the “spread” value for a complete major or minor triad). The “spread” values for these consonances provide a baseline range against which to compare the higher values corresponding to Quantz’s three categories of dissonances.

Unlike the line of fifths, the *Tonnetz* offers a model whereby all of Quantz’s dissonances are systematically distinguished into categories that align exactly with Quantz’s own prescriptions. This includes the $\frac{7}{4}$ sonority, which the line of fifths failed to affiliate with Quantz’s other *fortissimo* dissonances; the *Tonnetz* assigns a slightly lower “spread” value to the $\frac{7}{4}$ sonority (SHAPE 6) than to the other two dissonances in Quantz’s *fortissimo* category (SHAPES 4 and 5). All three, however, are more spread out on the *Tonnetz* than Quantz’s other dissonances, the “spread” values of which fall clearly into two categories echoing Quantz’s own. Ranking these sonorities on the basis of their “spread” values affords a refinement of Quantz’s categories of dissonance, so that the Italian sixth can be recognized among all of Quantz’s *fortissimo* sonorities as perhaps the most

deserving of dynamic accent, followed by the other chromatic sonorities, followed then by the diatonic $\frac{7}{4}$ sonority. Similarly, the “spread” values of Quantz’s *mezzo forte* dissonances suggest that the diminished triad (SHAPE 2) should be performed slightly less stridently than the various inversions of seventh chords that appear as SHAPE 1.

9. CONSIDERATION OF OTHER TYPES OF SONORITIES

In addition to sonorities specifically referenced by Quantz, we might speculate as to the likely dynamic level for other dissonances based on their “spread” values. The augmented triad, which J. S. Bach deployed as the very first harmonic verticality in his Cantata “Ach Gott, vom Himmel sieh darein” (BWV 2) from 1724, would appear on the *Tonnetz* as a rotation of SHAPE 2 (running along the interval-class 4 axis rather than the interval-class 3 axis) and would thus share the same “spread” value as the diminished triad. Although the rarity of the augmented triad in eighteenth-century compositions might suggest a dynamic marking louder than *mezzo forte*, it is interesting to consider that all triads (even augmented triads) correspond to lower “spread” values than any seventh chords or other dissonant sonorities, which perhaps aligns with the experience of triads in general as opposed to seventh chords. As another example, the $\frac{5}{4}$ sonority that John Clough studied in the context of Mozart’s Symphony in C major, K. 551, movement 1, can result from manipulating either SHAPE 4 or SHAPE 6, but its most compact form on the *Tonnetz* resembles a “Z” with obtuse angles.²⁹ This configuration achieves a “spread” of 0.911, slightly less than the three SHAPES in

is greater than the average distance from the notes of SHAPE 6 to their central point.

²⁹ See Clough (1979, 52–56).

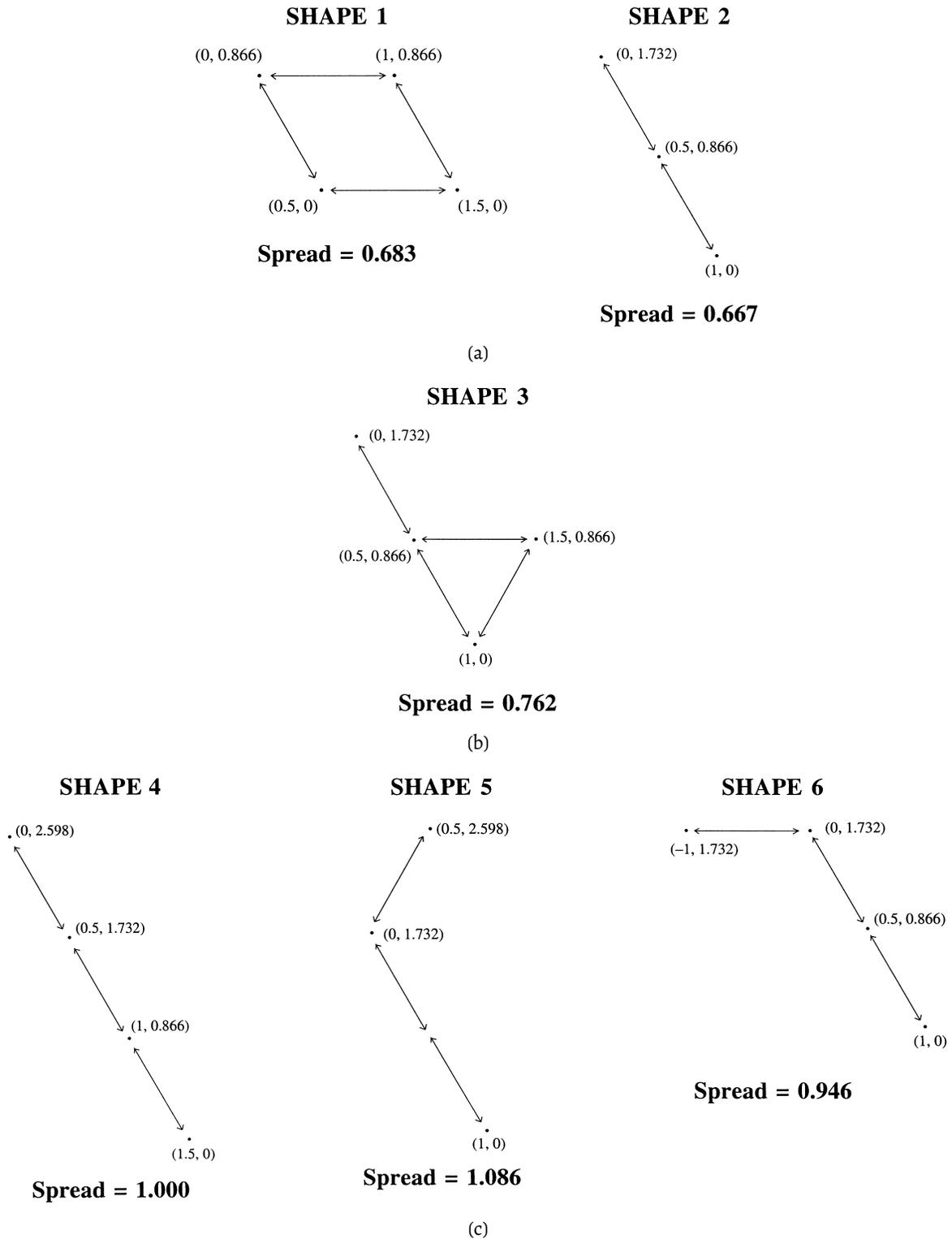


Figure 6. (a) Spread of SHAPE 1 and SHAPE 2 (Quantz's mezzo forte category). (b) Spread of SHAPE 3 (Quantz's forte category). (c) Spread of SHAPE 4, SHAPE 5, and SHAPE 6 (Quantz's fortissimo category).

Quantz's *fortissimo* category, but its closeness to 0.946 (the "spread" of SHAPE 6) agrees with the aural similarity of the $\frac{5}{4}$ and $\frac{7}{4}$ sonorities and suggests its classification as a *fortissimo* rather than a *forte* sonority.

In many other cases, rotating one of the six SHAPES on the *Tonnetz* results in a sonority that is either completely unused in the eighteenth century or best understood as a nonessential dissonance. Turning SHAPE 1 on its "end"—for example, C, Eb, E, G in Figure 3(b)—produces set-class (0347), which would certainly provide a more startling effect than anything in Quantz's *forte* and *fortissimo* categories. Obviously this approach should not be used to populate Quantz's categories with sonorities that had no place in his musical language, just because their "spread" values fall within the same range as those for Quantz's sonorities. Instead, we are now equipped to understand Quantz's claims concerning his own harmonic vocabulary in ways that would have been impossible without exploring his ideas from new points of view. While the didactic mode of Quantz's original presentation served to formalize performance traditions of his day very clearly and specifically, it did not offer any insight into the basis for the distinctions that he drew. The discovery of a striking degree of agreement between Quantz's prescriptions for performance and much more recent theoretical models offers us a valuable perspective on eighteenth-century musical intuitions and suggests that today's intuitions might not be very different.³⁰

REFERENCES

- Bach, Carl Emanuel Philipp. 1753–1762. *Versuch über die wahre Art das Clavier zu spielen*. Berlin: Christian Friedrich Henning (Part 1) and Berlin: George Ludewig Winter (Part 2). Translated as *Essay on the True Art of Playing Keyboard Instruments*, edited by William J. Mitchell (New York: W. W. Norton, 1949).
- Brown, Clive. 1999. *Classical and Romantic Performing Practice 1750–1900*. Oxford: Oxford University Press.
- Christensen, Thomas. 1993. *Rameau and Musical Thought in the Enlightenment*. Cambridge: Cambridge University Press.
- . 2010. "Thorough Bass as Music Theory." In *Partimento and Continuo Playing in Theory and Practice*, edited by Dirk Moelants, 9–41. Leuven: Leuven University Press.
- Clough, John. 1979. "Aspects of Diatonic Sets." *Journal of Music Theory* 23 (1): 45–61.
- Clough, John, and Gerald Myerson. 1985. "Variety and Multiplicity in Diatonic Systems." *Journal of Music Theory* 29 (2): 249–270.
- Cohn, Richard. 2012. *Audacious Euphony: Chromaticism and the Triad's Second Nature*. Oxford: Oxford University Press.
- Geminiani, Francesco. 1751. *The Art of Playing on the Violin*. London: Facsimile ed. (London: Travis and Emery, 2009).
- Heck, John Casper. 1767(?). *The Art of Playing Thorough Bass*. London: John Welcker.
- Hefling, Stephen E. 1987. "'Of the Manner of Playing the Adagio': Structural Levels and Performance Practice in Quantz's *Versuch*." *Journal of Music Theory* 31 (2): 205–223.
- Heinichen, Johann David. 1728. *Der Generalbass in der Composition*. Dresden: Facsimile ed. (Hildesheim: Georg Olms, 1969). Translated as *Thorough-Bass Accompaniment According to Johann David Heinichen*, with commentary by George J. Buelow (Lincoln: University of Nebraska Press, 1986).
- Jones, Evan. 2009. "Two Facets of Eighteenth-Century Performance Practice: A Dialogue Between Melodic and Harmonic Dynamic Prescriptions in Quantz's *Versuch*." In *Performance Practice: Issues and Approaches*, edited by Timothy D. Watkins, 227–244. Ann Arbor: Steglein.
- Kellner, David. 1732. *Treulicher Unterricht im General-Bass*. Hamburg: Johann Christoph Kissner. Facsimile ed. (Hildesheim: Georg Olms, 1979; Laaber: Laaber-Verlag, 1980).
- Kirnberger, Johann Philipp. 1771–1779. *Die Kunst des reinen Satzes in der Musik*. Berlin. Translated as *The Art of Strict Musical Composition* by David Beach and Jürgen Thym, with an introduction by David Beach (New Haven: Yale University Press, 1982).
- Lester, Joel. 1992. *Compositional Theory in the Eighteenth Century*. Cambridge, MA: Harvard University Press.
- . 2002. "Rameau and eighteenth-century harmonic theory." In *The Cambridge History of Western Music Theory*, edited by Thomas Christensen, 753–777. Cambridge: Cambridge University Press.
- Marpurg, Friedrich Wilhelm. 1760–1764. *Kritische Briefe über die Tonkunst*, 3 vols. Berlin: Friedrich Wilhelm Birnstiel.
- Mattheson, Johann. 1735. *Kleine General-Bass-Schule*. Hamburg: Johann Christoph Kissner. Facsimile ed. (Laaber: Laaber-Verlag, 1980).
- Mozart, Leopold. 1756. *Versuch einer gründlichen Violinschule*, Augsburg: Johann Jakob Lotter. Facsimile ed. (Kassel: Bärenreiter, 1995). Translated as *A Treatise on the Fun-*

³⁰ This article is dedicated to the memory of my friend and colleague Karyl Louwenaar, with whom I shared many memorable musical experiences, including a performance of Quantz's "Affettuoso" in 2004. Other performers who have assisted me in performances of the "Affettuoso" include Jan Angus, Charles Brewer, Norman Carey, Jeffrey Cohan, John Glennon, Robert Kelley, Tamara Phillips, and John Rush. I would also like to thank Christel Thielmann for drawing my attention to Quantz's ideas about dynamics (during a coaching session twenty years ago) and the Florida State University Council on Research and Creativity for supporting this project.

- damental Principles of Violin Playing* by Editha Knocker, with a preface by Alfred Einstein (Oxford: Oxford University Press, 1948), 2nd rev. ed. (Oxford: Oxford University Press, 1951).
- Pople, Anthony. 1996. "Editorial: On Coincidental Collections." *Music Analysis* 15 (1): 1–7.
- Quantz, Johann Joachim. 1752. *Versuch einer Anweisung die Flöte traversiere zu spielen*. Berlin: Johann Friedrich Voss. Translated as *On Playing the Flute*, with notes and an introduction by Edward R. Reilly (London: Faber and Faber, 1996; New York: The Free Press, 1966), 2nd ed. (London: Faber and Faber, 1985), reissue of 2nd ed. (London: Faber and Faber, 2001; Boston: Northeastern University Press, 2001).
- Rameau, Jean-Philippe. 1722. *Traité de l'harmonie*. Paris: Jean-Baptiste-Christophe Ballard. Translated as *Treatise on Harmony*, with notes and an introduction by Philip Gossett (New York: Dover, 1971).
- Regener, Eric. 1974. "On Allen Forte's Theory of Chords." *Perspectives of New Music* 13 (1): 191–212.
- Reilly, Edward R. 1971. *Quantz and His Versuch: Three Studies*. Vol. 5 of *American Musicological Society Studies and Documents*. New York: Galaxy Music.
- . 1974. "A Realization by J.C. Heck." In *Notations and Editions: A Book in Honor of Louise Cuyler*, edited by Edith Borroff, 154–162. Dubuque: William C. Brown.
- Ripin, Edwin M. 1980. "Pianoforte." In *The New Grove Dictionary of Music and Musicians*, Vol. 14, edited by Stanley Sadie. London: Macmillan.
- Sorge, Georg Andreas. 1745. *Vorgemach der musikalischen Composition*. Lobenstein. Translated by Allyn Dixon Reilly in "Georg Andreas Sorge's 'Vorgemach der musikalischen Composition': A Translation and Commentary" (Ph.D. dissertation, Northwestern University, 1980), Chapter 11.
- Temperley, David. 2000. "The Line of Fifths." *Music Analysis* 19 (3): 289–319.
- Tosi, Pier Francesco. 1723. *Opinioni de' cantoni antichi, e moderni*. Bologna: Lelio Dalla Volpe. Translated as *Observations on the Florid Song* by John Ernest Galliard (London: J. Wilcox, 1743). Translated as *Anleitung zur Singkunst*, with commentary by Johann Friedrich Agricola (Berlin: George Ludewig Winter, 1757). Agricola 1757 edited and translated as *Introduction to the Art of Singing by Johann Friedrich Agricola* by Julianne C. Baird (Cambridge: Cambridge University Press, 1995).
- Türk, Daniel Gottlob. 1789. *Klavierschule*. Leipzig: Schwickert; Halle: Hemmerde und Schwetschke. Facsimile, edited by Erwin R. Jacobi (Kassel: Bärenreiter, 1962).