

MELODIC INVERSION IN J. S. BACH'S KEYBOARD SUITES

by

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The use of melodic inversion in the second reprises of Bach's keyboard suites is commonly acknowledged. However, no published account gives a detailed explanation of the context-driven nature of such inversion. After discussing the general characteristics of inversion in the English Suites, French Suites, and Partitas, I develop a methodology that describes inverted subjects as transformations of the original subject using three criteria: (1) a scale-degree axis of inversion, (2) a diatonic or chromatic transposition level, and (3) a narrowly-defined but flexibly-applied list of modifications. The application of the method to the opening of each reprise in selected allemandes and courantes reveals salient aspects of Bach's treatment of inverted subjects. A complete analysis of the Allemande from the English Suite in G minor deepens our understanding of Bach's practice by showing how subjects are treated flexibly, and how they can be used in the service of larger goals across an entire piece.

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CHAPTER I

INTRODUCTION

The music of Johann Sebastian Bach has long been admired not only for its beauty but also for its rigorous principles of organization. The contrapuntal works of Bach, in particular, display a mastery of contrapuntal logic. Even in works not explicitly based on contrapuntal processes, Bach's contrapuntal skill remains evident. The keyboard suites would, at first, appear to be devoid of strict contrapuntal rigor. Upon closer examination, however, one finds that Bach was able to infuse contrapuntal elements into a large number of his keyboard suites—a practice that differed from many of his contemporaries—thereby demonstrating “the compatibility of *galant* dances with strict contrapuntal logic” (Schulenberg 2006, 298).¹ In the keyboard suites, imitative counterpoint can be found in virtually all of Bach's giges—which are clearly based on fugal principles—and in roughly half of the allemandes and courantes.²

¹ It is important to contextualize the term *galant*. For modern readers, the term usually refers to the pre-Classical style of the mid-seventeenth century better exemplified by J. S. Bach's sons than by the elder Bach himself. For Bach's contemporaries, however, the term *galant* implied “fashionability and an absence of counterpoint” (Schulenberg 2006, 38). Needless to say, Bach's *galant* works were far more adventurous harmonically and far more contrapuntal than those of his contemporaries.

² Imitative counterpoint can also be found in the introductory movements of the English Suites and Partitas, which typically include a fugal section. However, these introductory movements are not dances and are not in binary form.

Dance music occupies a significant place within Bach's total output.³ The most readily accessible, and arguably the most well-known, collections of keyboard suites are the English Suites (BWV 806–811), French Suites (BWV 812–817), and Partitas (BWV 825–830).⁴ These collections display Bach's unique mastery of binary dance forms and represent his most fully formed conception of the genre.

This thesis will investigate Bach's use of melodic inversion in the three main collections of keyboard suites. Melodic inversion of the subject typically occurs in three dance types: allemandes, courantes, and giges.⁵ An analytic methodology for discussing subject inversion will be developed and then applied to selected allemandes and courantes. There are two reasons for limiting the dance types to the allemande and courante. The first stems from a slight, yet distinct, difference in the contrapuntal conception of the gigue versus the allemande and courante. Most of the giges in the keyboard suites follow the principles of fugal exposition—subject on tonic, answer on dominant, bridge, subject on tonic—and present unaccompanied subjects at the start of

³ In addition to compositions specifically bearing dance titles, numerous other compositions employ stylized dance rhythms. For more on Bach's dance music see Little and Jenne 2001. Little and Jenne do not discuss allemandes in their work because "by Bach's time [allemandes] no longer reflected a particular dance form....[having] neither clear choreographic roots nor distinguishable recurring rhythmic patterns" (34).

⁴ Nine additional keyboard suites were never assembled into a collection: Suite in A minor (BWV 818/818a); Suite in E-flat major (BWV 819); Overture in F major (BWV 820); Suite in B-flat major (BWV 821); Suite in G minor (BWV 822); Suite in F major (BWV 823); *Overture nach französischer Art* in B minor (BWV 831); Suite in A major (BWV 832); *Praeludium et Partita del tuono terzo* in F major (BWV 833). For a complete listing of Bach's partitas and suites for solo keyboard and other instruments see Beach (2005, xv).

⁵ Melodic inversion is also present in the Air from the French Suite in E-flat major and the Capriccio from the Partita in C minor (the Capriccio is fugal and takes the place of the Gigue in this Partita). The introductory movements, which typically contain a fugal section, often contain melodic inversion of the fuge subject as well.

each reprise. Allemandes and courantes, on the other hand, begin with two successive statements of the subject on tonic, both of which are accompanied. The overall tonal plan and formal design is much freer in the allemandes and courantes. The second reason for studying the allemandes and courantes is that they have received far less attention regarding the use of inversion.

Previous Studies Addressing Bach's Use of Inversion

Many authors acknowledge the presence of melodic inversion in the second reprise of movements from J. S. Bach's keyboard suites.⁶ In most cases inversion is described as a general phenomenon. The following statements are typical of the level of detail used to describe Bach's use of inversion: "Often, Bach inverts the theme for the opening of the second section" (Parks 1984, 221); "In some instances, particularly in giges, the original idea appears inverted" (Beach 2005, 4). James McConkie (1950) specifically acknowledges the fact that "other dances utilize [inversion] to good advantage," and provides a list of dances containing inversion (91).⁷ Virtually none of these authors, however, give any analytic detail regarding inversion.

David Beach (2005) analyzes the Keyboard Suite in A minor (BWV 818a) and the French Suite in E major (BWV 817) and although the courante and gigue in each

⁶ See Beach 2005, Beck 1966, Lester 2001, McConkie 1950, Owen 1992, Parks 1984, Schulenberg 2006, and Wolff 1991.

⁷ The list of dances containing inversion is provided in footnotes (McConkie 1950, 90–92).

suite contain melodic inversion, Beach does not mention this.⁸ Richard Parks (1984) gives a minimal amount of analytic detail in his analysis of the Gigue from the French Suite in D minor noting that “the theme is inverted, and the initial skip is a fifth rather than a fourth” (226). He does not, however, explain why the inverted theme is modified.

Harold Owen (1992) comes closer to providing analytic detail regarding the use of inversion in giges. He begins his discussion like many authors: “Perhaps the most interesting feature of the polyphonic gigue is the way in which the subject is inverted in the second strain” (276). He then takes his discussion a step further to provide a more systematic description of Bach’s use of inversion. Owen notes that melodic inversion is most commonly a tonal inversion of the answer—with $\hat{5}$ serving as the axis of inversion—and provides four examples of gigue subjects, answers, and their inversions.⁹ Owen uses the term *tonal inversion* in much the same way the terms *tonal answer* and *real answer* are used in fugal analysis; a *tonal inversion* remains within the diatonic key while a *real inversion* preserves exact interval size. Unfortunately, Owen does not provide an example of *real inversion* or comment upon why a *tonal inversion* is necessary.

The most detailed study of the use of inversion in an individual movement from the keyboard suites is by Ulrich Siegele (1960). The article, “The Music-Theoretical

⁸ Beach’s discussion is primarily centered on the harmonic and voice-leading similarities between each of the individual movements.

⁹ The examples come from the French Suite in E-flat major, English Suite in G minor, English Suite in E minor, and Partita in E minor.

Teachings of a Bach Gigue,”¹⁰ deals exclusively with the Gigue from the English Suite in D minor and explores the effect of melodic inversion on the tonal relationships between the reprises.¹¹ One interesting aspect of Siegele’s study is the way in which he presents a hypothetical inversion—based on a single axis of inversion—and then compares this hypothetical inversion to the actual composition. In doing so he is able to comment upon possible reasons for deviating from this single axis of inversion (typically harmonic reasons).

Bach’s Use of Inversion

Inversion is a powerful compositional device in Bach’s music. In the broadest sense, melodic inversion can be used as a process of motivic development. A more systematic use of inversion occurs when entire themes are inverted. Inverted subject statements can be found in nine of the fugues from the *Well-Tempered Clavier*, and several of the canons from the *Musical Offering* are canons in inversion. In the *Art of Fugue* inversion is used in two different ways: inverted forms of the main theme appear as the subject of individual fugues, and both the inverted and uninverted forms of the theme are combined together in the same fugue. Fugue and canon, however, are compositional processes and are not dependent upon a specific formal design.

Inversion can be used in the second reprise of binary forms and “enhances the bipartite aspect of the design” (Parks 1984, 221). Bach’s use of melodic inversion in the

¹⁰ “Die musiktheoretische Lehre einer Bachschen Gigue”

¹¹ For an overview derived from Siegele’s more detailed analysis see Schulenberg (2006, 297–8).

second reprise of binary forms can be found in a number of different genres. The Preludes in E minor and A minor from Book Two of the *Well-Tempered Clavier* and the Invention in E major utilize melodic inversion at the outset of the second reprise. Bach uses melodic inversion in his binary keyboard suites more extensively.

Before proceeding any further, a distinction should be made between explicit and implicit inversion. An explicit inversion is clearly recognizable as a transformation of the original subject. An explicit inversion of a subject contains three basic characteristics: (1) it is the same length as the subject, (2) it contains the same—or nearly the same—rhythm, and (3) it is recognizable as a contour inversion of the original. The beginning of each half of the binary form—commonly called a reprise—can be compared to determine if explicit or implicit inversion is present. The Allemande from the Partita in G major is an example of explicit inversion (Example 1.1). By comparing the bracketed subject statements, we can see that the second-reprise subject meets all three of the above criteria for explicit inversion. An implicit inversion lacks the three characteristics listed above. The Allemande from the French Suite in B minor is an example of implicit inversion (Example 1.2). Although the first two pitches of the anacrusis suggest inversion—an ascending perfect fourth in the first reprise becomes a descending perfect fourth in the second reprise—the remainder of the subject lacks the above three criteria. This thesis will limit itself to subjects that are explicitly inverted. Explicit instances of melodic inversion in the second reprise of allemandes, courantes, and gigues from the three main collections of keyboard suites are summarized in Table 1.1.

first reprise

second reprise

Example 1.1. Explicit inversion; Allemande, Partita in G major

first reprise

second reprise

Example 1.2. Implicit inversion; Allemande, French Suite in B minor

	<i>Allemandes</i>	<i>Courantes</i>	<i>Gigues</i> ¹²
<i>Six English Suites</i>	4	3	4
<i>Six French Suites</i>	0	2	4
<i>Six Partitas</i>	1	2	2
<i>Total</i>	5 (28%)	7 (39%)	10 (56%)

Table 1.1. Number of dances containing explicit melodic inversion

Bach uses melodic inversion in his second reprises in a number of different ways. The most common use of inversion occurs when the inverted form of the subject remains in effect throughout the second reprise. In a few instances, Bach brings back the uninverted form of the subject, usually towards the end of the movement. For example, in the Allemande from the English Suite in G minor the uninverted form of the subject returns toward the end of the second reprise.

In addition to melodic inversion, contrapuntal inversion is also present in some of the dances. Contrapuntal inversion can be used at any point within the movement—in either reprise—and need not coincide with the use of melodic inversion. However, Bach is able to combine both types of inversion to good effect at the start of the second reprise.¹³ For example, in the Allemande from the English Suite in E minor, the opening subject is stated in the soprano at the beginning of the first reprise and in the bass at the beginning of the second reprise.

¹² This includes the Capriccio from the Partita in C minor. The capriccio takes the place of the gigue in this suite but resembles a gigue in that it contains a three-part fugal exposition in each reprise.

¹³ It should be noted that only the subject material is melodically inverted, not the accompaniment material. There is one exception; in the Allemande from the English Suite in F major both the subject and its accompaniment are melodically, as well as contrapuntally, inverted at the start of the second reprise. We will study this example in Chapter III.

We have just discussed some ways in which inversion is utilized; however, as Table 1.1 illustrates, inversion only occurs in at most half of the selected dance types. The fact that inversion is not used consistently raises two questions: Are there particular characteristics of a subject that make it more or less likely to be inverted? What makes a dance movement more or less likely to contain melodic inversion?

To answer to the first question is that the determining factor for subject inversion has little to do with the structure of the subject itself. While certain subjects might be more amenable to inversion than others, any subject can be melodically inverted.¹⁴ The answer to the second question requires looking at the way in which subjects are treated contrapuntally. There is one crucial common element in dances where inversion occurs—a clearly defined subject that is treated imitatively.¹⁵ A clearly defined subject has a clear beginning and ending point and expresses a complete tonic–dominant–tonic motion. Dances that contain a clearly defined subject treat it imitatively and usually invert the subject in the second reprise. A handful of dances containing a clearly defined subject that is treated imitatively do not contain inversion.¹⁶

The link between clearly defined subject, imitative counterpoint, and inversion is further strengthened if we look at Bach's dance suites for solo instruments (cello, violin,

¹⁴ Some subjects, once inverted, may have to be modified in some way in order to fit within a different tonal context. The way in which subjects can be modified after inversion will be taken up in Chapter II.

¹⁵ The Allemande from the English Suite in F major is one exception. It contains two clearly defined subjects. The first subject is inverted but is not imitated, while the second subject is both inverted and imitated.

¹⁶ See, for instance, the Courante, French Suite in G major; Allemande, Partita in C minor; Allemande, Partita in E minor.

flute, and lute). Clearly defined subjects are virtually nonexistent in these suites, and as a consequence imitation and inversion are generally not present. While imitative counterpoint is obviously not possible when writing for single-line instruments, melodic inversion could be used to good effect; however, this does not occur with any frequency. Melodic inversion in the dance suites is a practice that belongs almost exclusively to the suites for solo keyboard.

Basic Design of Bach's Allemandes and Courantes

The allemandes and courantes in Bach's keyboard suites share some common features in their treatment of the opening subject. While there is a good deal of variety, both dance types display the following basic characteristics:

- a clearly defined subject
- a three-voice texture in which voices can be freely added or subtracted
- in the first reprise, a subject and reply on the tonic
- in the second reprise, a subject on the dominant and a reply on a harmony other than the dominant (usually the tonic)

These basic characteristics are present whether or not the subject is inverted in the second reprise. It is important to note that while the subject and reply in the first reprise remain in the same tonal area (tonic) the subject and reply in the second reprise are in different tonal areas (dominant and some other area). Table 1.2 lists the tonal plan at the start of each reprise for selected allemandes and courantes. The tonal areas listed represent the

underlying harmonic areas of the subject, reply, and continuation. The continuation does not restate subject material.¹⁷

	<i>First Reprise</i>	<i>Second Reprise</i>
<i>Allemande, English Suite in A minor</i>	i-i-i	V ⁷ -I-V ⁷ /III
<i>Allemande, English Suite in E minor</i>	i-i-i	V-i-iv
<i>Courante, English Suite in F major</i>	I-I-I	V ⁷ -V ⁷ /IV-IV
<i>Courante, French Suite in D minor</i>	i-i-V	V-i-iv ⁶

Table 1.2. Opening tonal plans

As David Beach discusses in his detailed study of Bach's dance suites, varied repetition "contribute[s] significantly to the aural logic and compositional integrity of the work" (2005, 4). Beach convincingly shows that many dance-suite movements contain similar harmonic and voice-leading patterns, which provide unity to the suite as a whole. The role of thematic variation and repetition is especially important. Beach summarizes the important role of varied repetition in the dance suites,

where, with few exceptions, we find the opening material restated in varied form at the beginning of the second part. In all such cases the original material is transposed, either to the dominant or the relative major, and in some instances, particularly the gigue, the original idea appears inverted as well. Rarely is the transposition an exact replica. More frequently it is transformed in some way, yet with a recognizable link, perhaps in some instances only rhythmic, to the opening material. (Beach 2005, 4)

This thesis will focus on the use of melodic inversion as a specific instance of varied repetition in the keyboard suites. Chapter II will develop an analytic methodology capable of describing subject inversion in detail. The tools developed in this chapter will

¹⁷ Additional statements of the subject can occur later in the second reprise but this is not always the case. The number of additional subject statements, and the tonal areas in which they are stated, varies.

be applicable to both inverted and uninverted subjects that are varied in ways other than simple inversion and transposition. Chapter III will apply this analytic method to reveal salient aspects of Bach's treatment of inverted subjects in selected allemandes and courantes, and touch briefly on the method's ability to describe uninverted subjects and inverted accompaniments. Chapter IV will deepen our understanding of Bach's practice and show how subjects can be used in the service of larger goals across an entire piece: the Allemande from the English Suite in G minor. This allemande contains the most thoroughgoing use of subject material—both with and without inversion—in the allemandes and courantes. Chapter V will provide conclusions and suggest additional ways in which the analytic method could be applied. Some additional perspectives from which to view Bach's use of inversion will also be discussed.

CHAPTER II

METHODOLOGY

The purpose of the present methodology is to develop a set of tools for discussing inversion in tonal music, and more specifically, Bach's keyboard suites. The tools developed here are designed to be flexible and can account for a wide variety of approaches to subject inversion. While referencing an axis of inversion is certainly nothing new, a single-axis approach does not reveal the subtlety with which inversion is employed in the keyboard suites. Subject inversion does not necessarily remain constant throughout the second reprise. The uninverted form of the subject may return at a later point in the second reprise and segments of the subject may remain uninverted. Additionally, successive instances of uninverted subject statements may be varied in different ways. The present method is designed to account for each of these situations. In the broader sense, this method will account for any modification from single-axis inversion and will do so in a way that illuminates the compositional function of such modifications.

The proposed analytic method comprises two stages. First, a subject is inverted around a single diatonic axis and may be transposed after inversion. This first stage is referred to as an *unmodified inversion*. All pitches are in a one-to-one mapping around

the axis of inversion within a given diatonic collection. The second stage in the analytic method catalogs operations that are applied to segments of the unmodified inversion and results in a *modified inversion*. The segments to which these operations are applied can be as short as a single pitch, or can span a wider range of pitches.

This analytic method can serve two distinct purposes: describing actual subject inversions in Bach's keyboard suites, and creating candidate inversions for a given subject. The former purpose is analytical, the latter compositional. This thesis will frame the discussion in terms of the method's analytic potential.

While many inverted subjects share common features, there is no single preferred way to generate the inversion of a subject. A variety of harmonic, melodic, and voice-leading constraints affect the way a subject can be inverted. Additionally, stylistic conventions specific to Bach's allemandes and courantes affect the way in which subjects are inverted. The purpose of the present methodology is to describe Bach's inverted subjects rather than prescribe a preferred method for generating inverted subjects. No such method could account for the diversity of strategies employed in Bach's inverted subjects. In other words, each subject and its inversion are unique. Common features present in subjects and their inversions will be noted as they arise.

Terminology

The term inversion has a variety of meanings. Webster's dictionary defines it as "a reversal in position, order, or relationship" (Gove 1981, 1189). In music, three common uses of the term inversion relate to pitch: interval inversion, melodic inversion,

and chord inversion.¹ These three terms are so commonplace that one seldom pauses to consider the precise meaning of the term inversion and the abstract conceptual model underlying each type of inversion. Two types of inversion—interval inversion and melodic inversion—involve reflection about an axis.² In the case of interval inversion the axis is normally assumed to be the octave. In the case of melodic inversion the axis can be any pitch. Contrapuntal inversion is related to interval inversion but an entire contrapuntal line is inverted rather than a single pitch. Contrapuntal inversion is often referenced by the interval at which it occurs.

When discussing chord inversion—and more specifically triads and seventh chords—reflection of two elements about an axis is no longer present. When the term inversion is applied to chords it indicates a reversal of position; that is, which note of the chord is situated in the bottom position. As many as four elements are present in a chord and any one of them can take any position within the vertical stack. While this is certainly consistent with the generic, non-music-specific definition of inversion, it is interesting to note how the abstract conceptual model of chord inversion differs from other uses of the term inversion in music.³

A few additional commonplace terms should be clarified as they relate to the present thesis and are illustrated in Example 2.1. All of the keyboard suites are in binary

¹ To cite but one of many concise definitions of these three terms see the entry for “Inversion” in the *New Grove Dictionary* by William Drabkin (2001).

² The term inversion has also been used to describe reflection about an axis in the visual arts. See Kim 1981.

³ I am not suggesting that we develop a new term for chord inversion, but rather that we simply take note of the different ways in which the term inversion is applied to musical elements.

form. The term *first reprise* refers to the first repeated section and the term *second reprise* refers to the second repeated section. A *subject* is a clearly defined thematic unit that is treated imitatively. The subjects in allemandes and courantes are similar to fugue subjects in construction and presentation; however, unlike fugue subjects the subjects in allemandes and courantes are accompanied. Subjects in allemandes and courantes are typically one measure in length and contain a complete tonic–dominant–tonic motion. A *reply* is an imitation of the subject. I have chosen the term *reply*, rather than *answer*, to avoid the connotations associated with the term *answer* in fugal analysis. Whereas an *answer* in a fugue always enters on the dominant, a *first-reprise reply* in an allemande or courante always enters on the tonic. A *second-reprise reply* can be understood in one of two ways: a *reply to the inversion*, or an *inversion of the reply*. A discussion of the distinction between these two terms for a *second-reprise reply* will be carried out in Chapter III. For now, it will suffice to say that the *second-reprise reply* in Example 2.1 is *a reply to the inversion*.

The image shows two staves of musical notation for a piece in D minor. The first staff is labeled 'first reprise' and contains a 'subject' in the treble clef and a 'reply' in the bass clef. The second staff is labeled 'second reprise' and contains an 'inverted subject' in the treble clef and a 'reply to the inversion' in the bass clef. Brackets and labels identify these sections.

Example 2.1. Courante, French Suite in D minor

Modeling Pitch Inversion in Tonal Music

Before generating a subject inversion we should clarify some properties of pitch inversion in tonal music. Inversion could be graphically represented in a variety of different ways.⁴ For the purposes of illustrating these different methods of representation I will use a C-major scale inverted around $\hat{1}$. The most basic approach is to simply write the diatonic scale and its inversion in musical notation (Figure 2.1a).⁵ While this approach works fine, it is beholden to a specific diatonic scale.

⁴ The following discussion draws heavily on Berry 2002. While our purposes differ—Berry is concerned with modeling a species-like approach to tonal mirror counterpoint—the general concept is the same. That is, developing a graphical representation of diatonic inversion for efficient analytical or compositional reference.

⁵ This example reproduces Figure 8 from Berry (2002, 19).

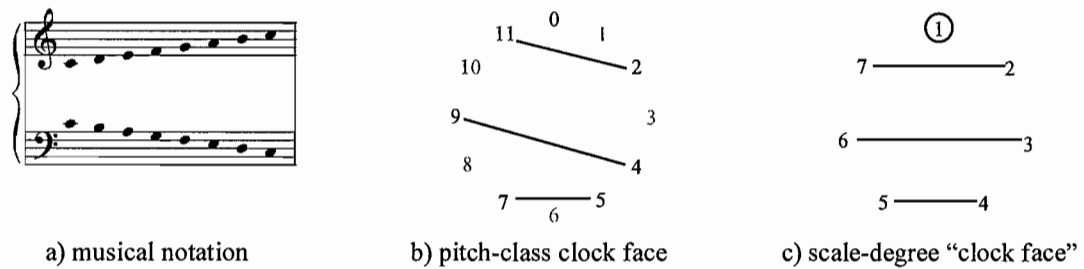


Figure 2.1. Possible models of inversion

While the pitch-class clock face is well suited to representing non-tonal music, it does not easily transfer to the tonal realm. A diatonic tonal inversion could technically be represented in such a model. However, it does not prove to be user friendly because in order to remain within the prevailing diatonic collection some of the pitch-classes represented on the clock face have to be omitted (Figure 2.1b). Like the musical-notation model, the clock-face model is also restricted to the pitches of a specific diatonic scale.

Since the goal is to model inversion in tonal music, each scale degree of the diatonic collection is normally associated with at least one of the three primary triads (I, IV, V). When scale degrees are understood as representatives of these triads those scale degrees contain harmonic implications with the tonal system itself, irrespective of a given key. In order to generalize the relationships between scale degrees a graphical model based on scale degrees rather than pitches will be more useful. The clock-face model can be adapted to better accommodate a diatonic collection by using integers 1–7 to represent scale degrees (Figure 2.1c).

A slightly different graphical model of scale-degree inversion is shown in Figure 2.2 and is original to the present thesis.⁶ I will refer to these models as *rainbow diagrams*. This model uses integers 1–7 to represent the scale degrees of any diatonic scale. The encircled scale degree represents the axis of inversion and is placed in the center. The curved lines connect the one-to-one mappings around the axis of inversion (the axis of inversion is self-mapping—it inverts onto itself). Each pair of scale degrees—including the self-mapping axis of inversion—sum to create the same index number (mod. 7).⁷ The goal of this model is to provide a quick graphical or mathematical way to find the inversional partner of any scale degree around a particular axis of inversion. Rather than using the index number to identify the axis of inversion—as is commonly the case in set theory—I will use the scale-degree axis itself. For example, I1 specifies $\hat{1}$ as the axis of inversion; I3 specifies $\hat{3}$ as the axis of inversion, and so forth.

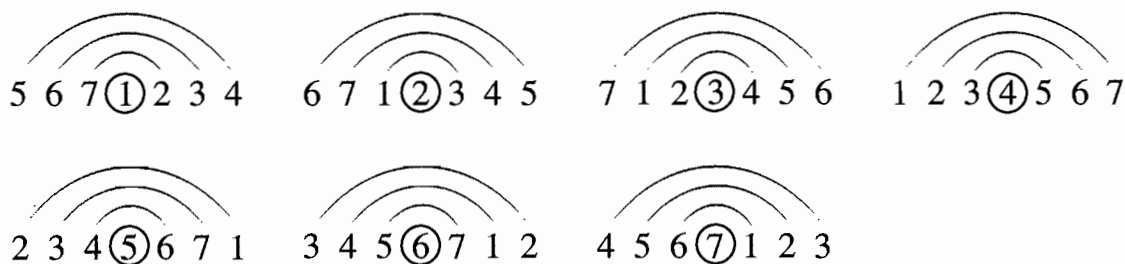


Figure 2.2. Rainbow diagrams

⁶ Cf. Figure 9 from Berry (2002, 21). Berry uses two concentric circles and places the axis of inversion in the center. The outer circle and inner circle pair inversionally related scale degrees.

⁷ With $\hat{1}$ as the axis the index number is 2; with $\hat{3}$ as the axis the index number is 6, and so forth. I follow Berry by using integers 1–7 rather than 0–6 in order to preserve scale-degree identity.

One advantage of the rainbow diagrams in Figure 2.2 is that they convey an important piece of information more clearly than the others—the registral position of the scale degrees related by inversion. The inversions I am interested in modeling occur in pitch space and therefore register matters. These diagrams convey a sense of register by placing the axis of inversion in the center and the inversionally related scale degrees on opposite sides of the axis. For example, with $\hat{1}$ as the axis of inversion $\hat{2}$ is *above* the axis and inverts to $\hat{7}$ *below* the axis. These diagrams are somewhat economical in that they only represent the mappings of the seven distinct pitches of the diatonic scale. They can, however, be extended indefinitely in either direction as illustrated in Figure 2.3.

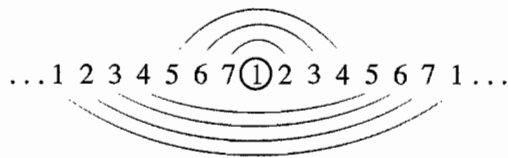


Figure 2.3. Extended rainbow diagram

Conventions and Nomenclature

As previously mentioned, one advantage of the present analytic method is its ability to describe modifications applied to both inverted and uninverted subjects. The following discussions center primarily on the description of inverted subjects; however,

the reader should bear in mind that the method can be applied to uninverted subjects as well.⁸

In order to accurately describe an inverted subject in terms of the subject from which it is derived, three pieces of information are required: (1) the axis of inversion, (2) the transposition level, and (3) a list of operations that modify specific segments of pitches. Inversion is carried out in pitch space and produces a contour inversion of the original. Inversion is carried out among abstract scale degrees within the prevailing diatonic collection and is irrespective of any embellishing accidentals outside of the collection that are applied to the subject.⁹ (Some special issues involving accidentals in the minor mode will be taken up shortly.) Inversion will be indicated as I_x where x is a diatonic scale-degree axis of inversion.¹⁰ The integers 1–7 represent these scale degrees. Example 2.2 shows a subject to which the inversion operation I_3 has been applied (the rainbow diagram is reproduced here for convenience).

The image shows two musical staves in 3/8 time, F major. The top staff is labeled 'subject' and has the following notes: F4, A4, B4, G4, F4, E4, D4, C4. Above the notes are scale degrees: 1, 2, 3, 2, 1, 7, 6, 5. The bottom staff is labeled 'I3' and has the following notes: C4, D4, E4, F4, G4, A4, B4, C5. Above the notes are scale degrees: 5, 6, 7, 1, 2, 3, 4, 5. To the right of the staves is a rainbow diagram consisting of three arcs. Below the arcs are the numbers 7, 1, 2, 3, 4, 5, 6. The number 3 is circled, indicating the axis of inversion.

Example 2.2. Inversion; Courante, English Suite in F major

⁸ The method's potential for describing uninverted subjects will be taken up briefly in Chapter III and more extensively in Chapter IV.

⁹ Other collections are certainly possible but will not be discussed in this thesis.

¹⁰ Inversion is assumed to operate on the entire subject. The possibility of inverting only a portion of the subject—and the nomenclature involved in doing so—will be explored in Chapter III.

Two types of transposition are possible: diatonic and chromatic. Both types of transposition are assumed to be in the upward direction unless the level of transposition is preceded by a minus sign. A diatonic transposition—like inversion—is among abstract scale degrees and remains within the prevailing diatonic collection. Diatonic transposition will be indicated as T_Dx where x is the number of diatonic steps above the starting pitch level. The integers 0–6 will be used to specify the transposition level, with 0 indicating the identity operation. Example 2.3a shows a subject to which the transposition operation T_D4 has been applied.¹¹ A chromatic transposition transposes each pitch a specified number of half steps, irrespective of the prevailing diatonic collection. A chromatic transposition therefore results in a temporary change of collection. Chromatic transposition will be indicated as T_Cx where x is the number of half steps above the starting pitch. The integers 0–11 will be used to specify the transposition level, with 0 indicating the identity operation. Example 2.3b shows a subject to which the transposition operation T_C5 has been applied, resulting in a change to the B-flat-major collection.

¹¹ A more traditional description of this transposition would be transposition up a perfect fifth. The need for labeling transposition levels as 0–6 (as opposed to the slightly more intuitive 1–7 that would correspond to interval size) arises from the desire to keep the identity operation consistent between diatonic and chromatic transposition.

subject

a) T_{D4} stays within F-major collection

b) T_{c5} changes to B-flat-major collection

The image shows three staves of music in 3/4 time, F major. The top staff is the 'subject'. The middle staff, labeled 'a) T_{D4} ', shows the subject transposed up a fourth diatonically, staying within the F-major collection. The bottom staff, labeled 'b) T_{c5} ', shows the subject transposed up a fifth chromatically, changing to the B-flat-major collection.

Example 2.3. Diatonic and chromatic transposition; Courante, English Suite in F major

Inversion and transposition will be used in conjunction to describe an unmodified inversion. Example 2.4 combines the operations $I3$ and T_{D4} and applies them to the same subject used in the previous two examples.¹²

subject

$I3, T_{D4}$

The image shows two staves of music in 3/4 time, F major. The top staff is the 'subject'. The bottom staff, labeled ' $I3, T_{D4}$ ', shows the subject inverted (I3) and then transposed up a fourth diatonically (T_{D4}), resulting in an unmodified inversion.

Example 2.4. Unmodified inversion; Courante, English Suite in F major

Thus far, our discussion of inversion and diatonic transposition has been understood as operating among abstract scale degrees irrespective of traditional “real” or “tonal” designations (chromatic transposition is excluded from the present discussion).

¹² Different combinations of axis of inversion and transposition level can sometimes specify the same unmodified inversion. For instance, applying the operation $I5, T_{D0}$, to the subject could also generate the unmodified inversion shown in Example 2.4. The interested reader can refer back to the rainbow diagrams in Figure 2.2 to verify this.

Accidentals are applied to these scale degrees according to the prevailing major or minor key. While the major mode presents no special problems regarding the application of these accidentals, in the minor mode $\hat{6}$ and $\hat{7}$ are variable and must be treated contextually. It is not possible to generate a set of rules that will cover every possible case whereby these scale degrees should be raised or lowered; however, a few general preference rules can account for most cases. (In the discussion that follows, “raised” and “lowered” are represented by the signs \sharp and \flat , respectively.) The first preference rule addresses neighbor tones: when $\hat{6}$ is an upper neighbor, prefer $\flat\hat{6}$; when $\hat{7}$ is a lower neighbor, prefer $\sharp\hat{7}$. The second preference rule addresses melodic motion: when there is a complete ascending scalar passage, $\hat{5}-\hat{6}-\hat{7}-\hat{1}$, prefer $\sharp\hat{6}$ and $\sharp\hat{7}$; when there is a complete descending scalar passage, $\hat{1}-\hat{7}-\hat{6}-\hat{5}$, prefer $\flat\hat{6}$ and $\flat\hat{7}$. Outside of these two general preferences other situations arise that must be treated on a case-by-case basis.¹³ Example 2.5 illustrates the application of these preference rules to $\hat{6}$ and $\hat{7}$ in an inverted subject.

The image shows two staves of musical notation. The top staff is labeled 'subject' and contains a melodic line in treble clef. The bottom staff is labeled '13' and contains a similar melodic line. In the bottom staff, the sixth scale degree is marked with a flat symbol ($\flat\hat{6}$) and is labeled 'upper neighbor' below it. The seventh scale degree is marked with a sharp symbol ($\sharp\hat{7}$) and is labeled 'lower neighbor' below it.

Example 2.5. Context-driven treatment of $\hat{6}$ and $\hat{7}$; Allemande, English Suite in A minor

¹³ Another common use of $\sharp\hat{6}$ and $\sharp\hat{7}$ occurs in the context of dominant harmony even if the melodic motion is descending. Schoenberg, in *Structural Functions of Harmony*, notes that “J. S. Bach frequently uses the [raised] sixth and seventh tones when descending for melodic reasons” (Schoenberg 1969, 10, n. 1).

After inverting the subject around a particular scale-degree axis, and transposing it a certain number of diatonic or chromatic steps, the resultant inversion can be modified. These modifications will be detailed in the next section and are often a direct response to a particular harmonic, melodic, or voice-leading implication. The modifications applied to the inversion are carried out on specific segments of pitches. In order to properly reference these pitches, each pitch of a given subject will be assigned an order position.¹⁴ The anacrusis is labeled 0, the downbeat is labeled 1, and the remaining pitches follow with integers in ascending order. Example 2.6 illustrates the application of order positions to a subject. The conventions of the analytic method are summarized in Table 2.1.



Example 2.6. Order positions; Allemande, English Suite in E minor

¹⁴ As is the case with fugue subjects, it is often difficult to determine the precise ending of a subject. This is not a crucial issue, however, and intuition should serve as a general guide. For an interesting discussion of the challenges posed by determining the precise ending of a subject see Renwick (1995, 21–4).

<i>Parameter</i>	<i>Description</i>	<i>Nomenclature</i>
Collection	always diatonic	M = major key m = minor key
$\hat{6}$ and $\hat{7}$ in minor mode	always treated contextually	n/a
Inversion	always among abstract scale degrees within the collection	I _x where <i>x</i> is a diatonic scale degree (1–7)
Diatonic Transposition	transposition by step within the diatonic collection	T _D <i>x</i> where <i>x</i> is the number of diatonic steps above the starting pitch level (0–6)
Chromatic Transposition	transposition by half step, irrespective of the diatonic collection; results in a temporary change of collection	T _C <i>x</i> where <i>x</i> is the number of half steps above the starting pitch level (0–11)
Order position	subject pitches are numbered in temporal order; anacrusis is 0, remaining pitches are numbered in order	0, 1, 2, 3, etc...
Modification	specific operations that modify specific segments of the subject (see Table 2.3)	<i>m(p)</i> where <i>m</i> is a modification type and <i>p</i> is a segment of order positions

Table 2.1. Summary of conventions

A Recipe and a Menu of Modifications

A recipe is a set of systematic instructions to arrive at a finished product. The specific ingredients used in the recipe affect the finished product. The current analytic method can be employed in the service of two different products: a modified *inverted* subject and a modified *uninverted* subject. One of the strengths of the present method is its ability to accurately describe both of these situations. The point of departure for the present discussion will be a common finished product that can be found in the keyboard suites—an inverted subject that begins on the dominant thereby conforming to the basic tonal design of a binary dance form. All inverted subjects undergo at least two

transformations—inversion and transposition. The number of modifications, and the segments upon which these modifications operate, varies. The recipe for generating a modified inversion is outlined in Table 2.2.¹⁵

- | |
|--|
| <ol style="list-style-type: none"> 1. Invert subject around diatonic scale-degree axis within collection 2. Transpose (diatonically or chromatically) by specified number of steps 3. In the minor mode, raise or lower $\hat{6}$ and $\hat{7}$ according to context 4. Apply modifications from the menu to specific pitch segments |
|--|

Table 2.2. Modified inversion recipe

This recipe is designed to be flexible. It describes a general process but does not specify, for instance, which axis of inversion or which transposition level is most appropriate. There are, however, two common occurrences that will be addressed briefly: inversion around $\hat{3}$ and diatonic transposition up 4 steps. Inverting around $\hat{3}$ preserves all members of the tonic triad ($\hat{3}$ is self-mapping, $\hat{1}$ and $\hat{5}$ map onto each other). By inverting around $\hat{3}$ we can generate an inversion of the subject that would fit with the same functional harmonic progression as the subject (T–D–T); however, many of the inverted subjects we wish to describe do not start on tonic but rather on dominant.¹⁶ By diatonically transposing the inverted subject up 4 steps within the collection we arrive at a subject whose functional progression is D–T–D. As the subsequent analyses will

¹⁵ By omitting the first step in the recipe—inversion—a modified *uninverted* subject can be generated.

¹⁶ From this point forward, harmonic functions will be designated, following Riemann, as follows: T = tonic, S = subdominant, D = dominant.

illustrate, this functional progression is typically modified so that the inverted subject moves from dominant back to tonic rather than prolonging the dominant.

Table 2.3 presents a menu of modifications for inverted subjects grouped into categories according to the musical parameters with which they deal (harmony, melody, rhythm, etc.).¹⁷ Each modification is given a label that will be used to identify the modification.¹⁸ Some modifications require additional details that are given in curly brackets. For instance, in the modification SECDOM the scale degree to which the dominant is applied must be specified as a roman numeral.

Some specific conventions when modifying rhythm and are illustrated in Example 2.7. If a rhythmic value is added, resulting order positions retain the same numeral as the original order position and a lower case letter (a, b, c, etc...) is added to all of the pitches within that segment. When new rhythmic values are created they retain the same pitch as the generating note. Additional modifications can then be applied to the newly created pitches. When rhythmic values are deleted the segment becomes the range of pitches from which it was derived. The first pitch of the segment is retained.¹⁹

¹⁷ These categories are fluid and there is a fair amount of overlap between them, particularly regarding harmony and melody.

¹⁸ These labels are in the spirit of similar operational labels developed by David Lewin in a wide range of publications. The reader will hopefully find them intuitive after some practice with the system.

¹⁹ The rationale for retaining the first pitch is primarily one of economy. There is, however, a compelling musical reason for doing so. Often, the pitches that follow the first pitch of a given beat unit are embellishments of the main note. In this respect the rhythmic embellishments are eliminated. (However, one could certainly find counter examples where this is not the case.)

<i>Category</i>	<i>Operation</i>	<i>Label</i>	<i>Specifications in curly brackets</i>	<i>Example</i>
Collection	Change collection	COLL{x}	M=major key, m=minor key	COLL{Dm}
	Change to parallel major or minor mode	MODE		
Embellishment	Change embellishing function	EMB{x→y}	R=repetition, CS=consonant skip, PT=passing tone, UN=upper neighbor, LN=lower neighbor, AP=appoggiatura, p=prefix, s=suffix	EMB{R→PT}
Harmony	Change chord inversion	CDINV{x→y}	Figured bass symbols	CDINV{ $\overset{6}{5}$ → $\overset{3}{3}$ }
	Create dominant triad	DOM		
	Create dominant seventh chord	DOMSEV		
	Create picardy third	PIC		
	Create root position triad	RTPOS		
	Create secondary dominant seventh chord	SECDOM{x}	Roman numeral to which the dominant is applied	SECDOM{iv}
	Substitute chord of similar function	SUB{x→y}	Roman numerals	SUB{IV→ii}
	Change chord member	CHORD{x→y}	R=root, 3=third, 5=fifth, 7=seventh	CHORD{R→3}
Melody	Change octave	OCT{x}	↑=shift up, ↓=shift down	OCT{↓}
	Resolve chordal seventh down by step	SEVDN		
	Create long-range <i>sol-do</i> motion	SODO		
Other	A free modification	OTHER		
Rhythm	Shift anacrusis to upper voice	ASHIFT		
	Change rhythm	RHY{x→y}	Actual rhythmic values	RHY{♩→♪♪}
Transposition	Diatonic transposition	T _D x	x = 0–6 steps within the diatonic collection	T _D 4
	Chromatic transposition	T _C x	x = 0–11 semitones	T _C 7

Table 2.3. Menu of Modifications

0 1 2 3 4 5 6 7 8 9

subject

unmodified inversion I3, T_{b0}

RHY{J→JJ}(5)

RHY{JJ→J}(6-8)

Example 2.7. RHY operation; Courante, English Suite in F major

Multiple ways of describing the same event are often possible. Consider the subject and unmodified inversion in Example 2.8. The unmodified inversion clearly expresses dominant seventh harmony in the key of D minor. On beat 3, the unmodified inversion arrives on $\hat{4}$ and should resolve downward to $\hat{3}$; however, it moves up to $\hat{5}$ instead on the downbeat of the next measure. In order to remedy this voice-leading error the final pitch should be $\hat{3}$ (F4). There are at least three different operations that would accomplish this transformation. The first is a simple diatonic transposition, $T_{D-1}(9)$. (Note that the minus sign preceding the transposition level indicates transposition *down* a step.) This operation specifies the exact distance to move the pitch but does not convey any additional information.²⁰ A second option would be to describe the transformation as a change in chord member, $\text{CHORD}\{5\rightarrow 3\}(9)$. This operation is more informative since

²⁰ For that matter every modification could be described as a transposition, however, this simplistic description would not convey any interesting insights into the motivations behind, or the effects of, those transpositions.

it accounts for the harmonic context within which the inverted subject operates. The third operation is the most evocative, SEVDN(7–9). The operation is translated as “with respect to the segment of pitches 7–9 the pitch functioning as a chordal seventh should resolve down by step.” Notice that in this operation a larger segment of pitches is referenced but only one pitch is actually changed. Not only is the harmonic context taken into account—as was the case with CHORD—but the voice leading is also taken into account. The analyst must often choose among multiple operations that can describe a given event. In each case, preference should be given to the operation that does the best job of explaining the larger function of, or motivation for, a given modification.

subject

unmodified inversion

Dm: V V⁷ i

I₃, T_D⁴

T_D⁻¹(9)
or
CHORD{5→3}(9)
or
SEVDN(7–9)

Example 2.8. Possible modification operations; Courante, French Suite in D minor

An Analytic Example

In order to demonstrate the analytic potential of the proposed system, let’s consider the subject and inverted subject of the Courante from the French Suite in D minor (Example 2.9). The analytic task is to be able to catalog the operations that transform the subject into its modified inversion. In other words, which axis of inversion,

which level of transposition, and which operations applied to which segments are necessary to transform the subject into its inversion.²¹

Example 2.9. Subject and inverted subject; Courante, French Suite in D minor

Example 2.10 reproduces the subject with order positions attached. The first operation, I₃, inverts the subject around $\hat{3}$ within the D-minor collection ($\hat{7}$ is raised since it is functioning as a lower neighbor). The next operation, T_D4, diatonically transposes the inverted subject up four steps within the D-minor collection ($\hat{6}$ and $\hat{7}$ are raised since they are part of an ascending scalar passage). Now that the unmodified inversion has been created, the next task is to compare the unmodified and modified inversions and determine the operations necessary to transform the former into the latter. The modifications are normally carried out in temporal order.

The first modification, SEVDN(7–9) was previously discussed in Example 2.8. After fulfilling this basic voice-leading requirement the remaining modifications are simply embellishments to the basic underlying structure present after the first modification. The next modification, EMB{R→sUN}(8), reads, “the embellishing

²¹ In subsequent chapters I will cut straight to the chase, so to speak, and eliminate all of the intermediary steps, arriving only at the final description of the modified inverted subject. My present purpose is to familiarize the reader with the analytic method.

function of order position 8 is changed from repetition to suffix upper neighbor.” This transforms order position 8 from G to A.

subject

0 1 2 3 4 5 6 7 8 9

I3

unmodified inversion

T_D4

9

SEVDN(9)

8

EMB{R→sUN}(8)

9a b c d

RHY{♩.→♪♪♪}(9)

0 9d

SODO(0-9d)

9a 9c

actual

EMB{PT}(9a, 9c)

Example 2.10. Analytic example; Courante, French Suite in D minor

The next modification, RHY{♩.→♪♪♪}(9), creates three new attack points.

Recall that when rhythms are created they retain the same pitch as the generating rhythmic value and the resultant order positions carry lower-case letters as suffixes. Note also that there is a discrepancy in the total duration of this transformation. The precise

ending point of a subject can be difficult to determine and Bach often treats the final pitch or pitches of the subject flexibly. There is often a similar mismatch between the rhythmic values in the subject and the modified inversion. There is no great significance to this; rather, this procedure falls in line with the flexible treatment of voices in the keyboard suites.

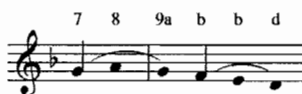
The next operation, SODO(0–9d), reads, “with respect to the segment of pitches 0–9d create a long-range *sol–do* motion.” This creates an overall trajectory from A to D.

The final operation, EMB{PT}(9a, 9c), reads, “the embellishing function of passing tone is created on order positions 9a and 9c.”²² This operation creates a passing tone G between the pitches A and F, and a passing tone E between the pitches F and D.

The foregoing discussion has shown the precision with which the analytic system can describe Bach’s inverted subjects. While the system is capable of describing almost anything one encounters in the music, the descriptions may, at times, seem cumbersome. This is not a weakness of the system but highlights the fact that it can describe *most* situations with relative ease. The fact that it cannot describe all situations with ease leaves the door open to other methods of explaining a given situation. In many cases this other mode of explanation can take the form of a Schenkerian voice-leading sketch. For instance, the modifications applied to order positions 7–9d from the D-minor Courante reveal a typical surface diminution of a suspension of $\hat{4}$ across the barline, which then is

²² In this instance the EMB operation does not involve changing an operation by rather crating one. This occurs only rarely and is primarily a means of economy designed to reduce the number of modifications. Described as a change of embellishing function two operations are needed: EMB{CS→PT}(9a) and EMB{R→PT}(9c). The difference in the two initial embellishing functions—CS versus R—is merely a consequence of the stages in the analytic method and not a salient feature of the unmodified inversion.

decorated with a descent to $\hat{1}$ (Example 2.11). While voice leading will only be a secondary concern in this thesis, the reader should bear in mind that the precision with which the analytic method developed in this chapter can describe the surface modifications to a subject can always be understood in terms of the larger compositional function and voice-leading structure.



Example 2.11. Voice-leading sketch of pitches 7–9d; D-minor Courante

CHAPTER III

SMALL-SCALE ANALYSES

This chapter will reveal salient aspects of Bach's treatment of inverted subjects—as well as briefly touch upon uninverted subjects—by applying the analytic method developed in Chapter II. While the following list of features is by no means exhaustive, it nevertheless represents some salient aspects of Bach's subject treatment:

- subjects are comprised of harmonic modules that remain intact upon inversion, although the function of individual modules may change
- the second-reprise reply can be understood as a reply to the inverted subject, or as an inversion of the first-reprise reply
- placing the subject in the bass creates additional considerations for inversion
- the accompaniment can be inverted
- segments of the subject can remain uninverted
- additional uninverted subject statements can occur in the first reprise, and additional inverted subject statements can occur in the second reprise
- multiple candidate inversions are possible

Inversion in the keyboard suites is not a rigid procedure that is applied in the same manner throughout the second reprise. Instead, inversion is a flexible procedure carried out according to context. The diversity of subject designs, and the multitude of variables that influence inversion, preclude any *a priori* prediction of a subject's treatment.

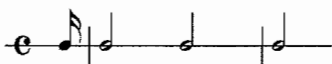
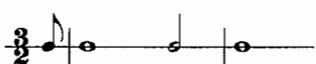
Subjects are Modular

Bach's subjects contain modules that remain intact upon inversion. The modules are based on a standardized harmonic rhythm reflective of each dance type's characteristic meter: duple meter for allemandes, and triple meter for courantes.¹ As mentioned in Chapter II, all subjects in the keyboard suites contain a complete T–D–T motion. The harmonic rhythm of this T–D–T motion in the first-reprise subjects of allemandes and courantes is illustrated in Example 3.1a.² The modules based on this characteristic harmonic rhythm remain intact in the second reprise but the harmonic function of individual modules is often altered. The most common functional harmonic progression for inverted subjects in the second reprise is D–D–T (Example 3.1b). In the larger context, however, the final tonic of these inverted subjects is often an “apparent tonic” rather than a structural tonic. An apparent tonic does not represent an arrival; rather, it is an intermediate harmony in the context of the larger prolongational span.³ The “apparent” nature of this tonic is heightened by the immediate move to another harmonic area at the conclusion of the reply, often the subdominant.

¹ Interpreting the meter in courantes presents some interesting challenges that are beyond the scope of this thesis. In short, although courantes are notated with a time signature of 3/2, the actual meter can be interpreted as 3/2 or 6/4. This metric ambiguity is often debated by theorists and exploited by composers. For more on meter in courantes see Little & Jenne (2001, 114–28). A distinction should also be drawn between the French courante and the Italian corrente. The French courante—written in 3/2—is typically characterized by a slower tempo and exploits the metric ambiguity addressed above. The meter and rhythm in the Italian corrente—written in 3/4—is less complex while ornamentation and elaboration of pitch material figure more prominently (Little & Jenne 2001, 134). The distinction between courante and corrente cannot always be deduced from the mere spelling of the dance title in the score. Modern *Urtext* editions remain faithful to the distinction, but older editions—such as the Bach-Gesellschaft—are not always faithful to the distinction in spelling.

² The anacrusis can be thought of as an additional module at the start of each reprise. The anacrusis typically repeats the first pitch of the subject.

³ For a more thorough discussion of the apparent tonic see Smith 1995 and Schachter (1990, 171).

<i>Allemandes</i>	<i>Courantes</i>
	
a) 1st reprise: T D T	T D T
b) 2nd reprise: D D T	D D T

Example 3.1. Harmonic rhythm and functional progression

The Courante from the French Suite in D minor illustrates the modular nature of Bach's subject construction. Example 3.2 reproduces the opening of each reprise with both a roman-numeral and harmonic-function analysis. While each of the subject statements results in a different harmonic progression, the harmonic rhythm remains the same. The subject in the first reprise contains a T–D–T motion over a tonic pedal. The first-reprise reply is imitated at the octave and therefore has the potential to duplicate this T–D–T progression. However, because the first-reprise reply occurs in the bass voice, ends on $\hat{5}$, and is not supported by a tonic pedal, this particular reply contains a T–S–D progression. The inverted subject in the second reprise contains a D–D–T functional progression. The second-reprise reply enters a fifth below the inverted subject and contains a T–D(s)–S functional progression.⁴ By applying the analytic method developed in the previous chapter we can see how the modifications to the inverted subject and second-reprise reply occur within the harmonic modules just discussed.

⁴ If viewed in terms of the subdominant key area the reply suggests a functional progression of D–D–T, however, the initial dominant chord is minor and therefore lacks true dominant function.

The image shows two systems of musical notation for a piano accompaniment. The first system, labeled 'first reprise', consists of two staves (treble and bass clef). Above the treble staff, three chords are indicated: T, D, and T. Below the bass staff, five chords are indicated: i, (vii^{o7}), i, iv⁶, and V. The second system, labeled 'second reprise', also consists of two staves. Above the treble staff, three chords are indicated: D, D, and T. Below the bass staff, five chords are indicated: V, v⁷, i, V^{2/iv}, and iv⁶. Below the second system, three chords are indicated: T, D(s), and S.

Example 3.2. Courante, French Suite in D minor

The modifications to the inverted subject are detailed in Example 3.3. We have already discussed the modifications to this subject at the end of Chapter II; however, we did not discuss how these modifications relate to the modular harmonic structure. Although there is no change of chord when the chordal seventh (G) arrives on beat 3, it nevertheless strengthens the dominant by adding the chordal seventh. This dominant seventh chord occurs in the same metric position as the fully-diminished seventh chord in the first reprise. The chordal seventh then resolves down to an apparent tonic in the second measure.

subject

unmodified

actual

9a b c d

SEVDN(7-9)
EMB{R→sUN}(8)
RHY{d→e}(9)
SODO(0-9d)
EBM{PT}(9a, 9c)

Example 3.3. Inverted subject; D-minor Courante

In its unmodified form, the second-reprise reply resembles a first-reprise subject by prolonging tonic through a T–D–T motion (Example 3.4). In the actual reply, the opening tonic module remains intact and the original dominant module is transformed into a secondary dominant via the operation $\text{SECDOM}\{\text{iv}\}$, which transforms the C^\sharp from the unmodified inversion into C^\natural . The harmonic function of the second and third modules is thus identical between the unmodified and modified inversion; the unmodified inversion contains a D–T progression in the key of D minor and the modified inversion contains D–T progression in the key of G minor.

unmodified

actual

$\text{SECDOM}\{\text{iv}\}(7-8)$
 $\text{SEVDN}(7-9)$

Example 3.4. Second-reprise reply; D-minor Courante

Second-Reprise Replies

The second-reprise reply can be understood in two different ways: as a reply to the inversion, or as an inversion of the reply. This distinction can be made clear by comparing the modifications applied to the inverted subject and reply in the second reprise. If all, or most, of the modifications from the inverted subject are carried over to the reply, then the reply is understood as a reply to the inversion. If few, if any, of the modifications from the inverted subject are carried over to the reply, then the reply is understood as an inversion of the reply.

Reply to the Inversion

The Allemande from the English Suite in A minor contains a second-reprise reply that is a nearly exact imitation of the inverted subject. Example 3.5 reproduces the score of the opening of each reprise.⁵ Example 3.6 details the modifications to the inverted subject and the reply to the inversion. The inverted subject is derived from an untransposed inversion around $\hat{3}$. The modifications create a long-range D–T motion and the final tonic contains a picardy third. The inverted subject contains a large number of modifications, many of which alter surface details such as substituting triad members and removing the tie from beat 3 to beat 4. The most salient modification, DOM(0–2), transforms the first three pitches of the inverted subject from A to B in order to fit with dominant harmony.

⁵ The harmonic modules in the first reprise are slightly expanded from the typical T–D–T motion. The dominant on beat 4 is preceded by a dominant preparation (ii^{*97}) on beat 3, nevertheless, I consider beats 3 and 4 part of the same dominant module.

Example 3.5. Allemande, English Suite in A minor

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

subject
Am: i v⁷ i

unmodified
Am: i v i

actual
Am: v⁷ I

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

unmodified
Dm: i v i

reply to the inversion
Dm: v³ I

actual
Dm: v⁷ I⁶

DOM(0-2)
DOMSEV(3)
T_D-2(7-10)
RHY{♩→♩♩}(10-11)
CHORD{3→5}(11)
T_D-3(12-14)
PIC(15)
OCT{↓}(15)

DOM(0-2)
DOMSEV(3)
T_D-2(7-10)
RHY{♩→♩♩}(10-11)
CHORD{3→5}(11)
T_D-3(12-14)
PIC(15)
OCT{↓}(15)

RTPOS(1-2)
OCT{↑}(1)

same modifications applied

add'l modifications

Example 3.6. Inverted subject and reply to the inversion; A-minor Allemande

The reply is derived from an unmodified inversion that is chromatically transposed to D minor. All of the operations applied to the inverted subject are transferred to the reply, therefore, this reply is understood as a reply to the inversion (see “reply to the inversion” in Example 3.6). If this reply to the inversion were stated in an upper voice, no additional modifications would be necessary. However, when this reply to the inversion is placed in the bass voice it begins with a third inversion dominant and therefore does not provide a stable point of arrival for the previous inverted subject, or a stable point of departure for the reply. A further modification is therefore necessary to provide this root position stability. The actual version shown in Example 3.6 modifies order positions 1–2 to create a root position triad, which is then embellished with an octave leap.

Inversion of the Reply

The Courante from the English Suite in A minor contains a second-reprise reply that is not an exact imitation of the inverted subject. Example 3.7 reproduces the score of the opening of each reprise. (This allemande is one of the few whose second reprise begins with the relative major rather than the dominant; the final cadence of the first reprise is also in the relative major). In the first-reprise reply, the first beat contains a rhythmic embellishment. Despite this rhythmic embellishment the salient A–B (♩. ♪) from the subject is still present in the reply.

first reprise

second reprise

i V⁵ i V² i⁶

III ii⁶ V V⁷ i

Example 3.7. Courante, English Suite in A minor

A detailed analysis of the modifications in the second reprise reveals that none of the modifications applied to the subject are carried over into the reply; thus, the second-reprise reply may be more economically understood as an inversion of the first-reprise reply. In order to better understand the inversion of the reply we should first consider the inversion of the subject (Example 3.8). Since this subject begins on the relative major rather than the dominant, some interesting challenges arise upon inversion.⁶ Determining the implied harmony of beat 3 is challenging since it outlines a harmony that does not make a well-formed harmonic progression. At the surface, beat 3 appears to outline subdominant harmony and this interpretation creates a retrogression of harmonic syntax.

⁶ It is interesting to speculate whether the structure of the subject led Bach to harmonize it with the relative major upon inversion—and then retrospectively end the second reprise with the relative major—or whether Bach chose to move to the relative major and then found a solution to subject inversion that was amenable to that harmony. Bach does seem to favor the relative major as a key area for the second reprise in a number of the other dances from the same suite. The Sarabande, Bourrée I, and Gigue all begin the second reprise with the relative major.

In addition to the harmonic ambiguity of beat 3, the first three pitches of the unmodified inversion can outline either the relative major or the dominant (the pitches E–D–C clearly fit with both C-major and E-major triads). As the inverted subject continues to descend, the neighbor motion A–G[#]–A foils this dual interpretation. The presence of G[#] precludes the relative major interpretation and reinterprets the opening harmonic module as dominant. The modifications applied to the unmodified inversion allow the first harmonic module to clearly outline the relative major by eliminating the G[#] through a temporary collection change to C major.⁷ The second module is transposed and makes use of a temporary change of collection to E major resulting in a dominant preparation chord.⁸ The final module ends on the dominant and is transposed so that it outlines a dominant third (G[#]–A–B).

subject

unmodified

actual

0 1 2 3 4 5 6 7 8 9 10 11 12 13

i v^7 i

V $iv?$ i I3, T_D0

III ii^7 v

COLL{CM}(0-6)
COLL{EM}(7-13)
 $T_{D-2}(7-10)$
 $T_{D-3}(11-13) = DOM$

Example 3.8. Inverted subject; A-minor Courante

⁷ Order position 6 is the only pitch affected by the operation COLL{CM}. This operation is not absolutely necessary since order position 6 is the variable $\hat{7}$. By applying the conventions for contextual treatment of $\hat{7}$ we could determine that order position 6 should be G[#] since the melodic line is descending. However, since the subject then immediately ascends through $\hat{6}$ and $\hat{7}$ I have specified this change of collection in order to make the analysis clearer.

⁸ This chord could have been V^7/V were it not for the D^b in the accompanying bass voice.

The inversion of the reply is derived from an untransposed inversion around $\hat{3}$ just like the inverted subject. Example 3.9 provides an analysis of the inversion of the reply (in this example an intermediate stage of modification has been included in order to elucidate the modifications to the end of the reply). By comparing the modifications applied to the inverted subject, one can see that none of these modifications are carried over to the reply (compare the modifications in Examples 3.8 and 3.9). Not only are none of the modifications from the inverted subject retained, the rhythmic embellishment from the first-reprise reply is retained and further strengthens the connection between the replies in each reprise. The “intermediate stage” in Example 3.9 transposes the subject up a diatonic step beginning with order position 2. This transposition is a first step towards additional modifications. The inversion of the reply arrives on the leading tone (G \sharp) on beat 3, which is then embellished before resolving to tonic on the downbeat. Thus, the reply to the inversion mimics a typical tonal motion normally found in inverted subjects at the start of the second reprise—a move from dominant to tonic.

Example 3.9. Inversion of the reply; A-minor Courante

Inverted Subject in the Bass

When the subject is placed in the bass voice, it provides harmonic support.

Subject statements in the bass do not normally occur at the outset of a reprise and are most often classified as replies. Replies typically lead to other harmonic areas and follow a variety of tonal paths. However, when the inverted subject is stated in the bass at the outset of the second reprise it must begin and end with a root-position triad in order to provide tonal stability.

In the Allemande from the English Suite in E minor, the second reprise begins with the inverted subject in the bass rather than the soprano and constitutes a contrapuntal inversion of the typical subject/accompaniment relationship (Example 3.10). If the inverted subject in the bass is to mimic the typical tonal motion of dances that do not employ contrapuntal inversion—in other words, when the bass is the accompaniment to

the inverted subject in the soprano—it should contain a large-scale *sol–do* motion supporting a D–T progression. The unmodified inversion meets the basic requirement of departing from a point of tonal stability by beginning with a root position dominant (Example 3.11). Although it begins with a root position dominant, beats 3–4 imply a third inversion dominant (the slurs in Example 3.11 are meant to clarify the harmonic units). This third inversion dominant resolves as expected to a first inversion tonic on the downbeat of the second measure and therefore follows rules of proper voice leading and harmonic progression. However, a root position tonic is more stable and consequently is more desirable as a point of arrival. The final tonic module of the inverted subject is modified so as to eliminate the filled-in third and arrive on a root position tonic.

The image shows a musical score for an Allemande in E minor. It is divided into two systems: 'first reprise' and 'second reprise'. The first reprise consists of six measures. The second reprise consists of five measures. The score includes treble and bass staves with various musical notations such as slurs, ties, and a dotted bracket in the second measure of the second reprise. Below the staves, Roman numerals indicate the chords for each measure.

Example 3.10. Allemande, English Suite in E minor⁹

⁹ The dotted bracket in the second measure of the second reprise indicates that only portions of the reply are present. The initial point of departure for the reply (E4) elides with the end of the subject and is realized as an initial rest in the alto voice. On beat 3 the reply ceases to be notated in the alto voice. On beat 4 the soprano voice picks up the tail of the reply exactly as it should have been realized in the alto voice.

subject

unmodified

intermediate stage

actual

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

i $ii^{\circ 5}$ v^7 i

v v_2^4 i^6

ASHIFT(0)
 EMB{sUN→R}(9)
 OCT{↑}(11-17)
 EMB{sUN→R}(12)

CHORD{R→3}(8)
 CHORD{R→5}(9)
 CHORD{5→7}(10)
 CHORD{5→R}(12)
 CHORD{7→3}(14)
 EMB{CS→pUN}(11, 13)
 RHY{♪♪♪→♪}(15-17)
 SODO(1-17)

Example 3.11. Inverted subject; E-minor Allemande

The large range of the subject—a tenth—has consequences for its inversion. The unmodified inversion, while certainly within the range of a keyboard instrument, lingers in the lower register. The modifications create an overall upward trajectory rather than the downward trajectory of the unmodified inversion. This ascent is quite dramatic, rising from B2 to E4, and expands the overall range of the subject to an eleventh.

The modifications applied to the inverted subject stretch the present analytic system to its limits. While the system is certainly capable of describing all of the modifications, it becomes quite cumbersome to do so. Nevertheless, each modification can be accurately accounted for. Many of the modifications involve exchanging members of the dominant seventh chord and then adding embellishments. The first half of the subject remains intact except for the requisite shifting of the anacrusis to the soprano

voice. (The anacrusis is always in the soprano voice no matter which voice contains the subject at the outset of the second reprise.) The upward momentum of the modified inversion corresponds to the modular structure of the functional progression D–D–T. The two dominant modules are articulated as two large upward gestures indicated by the slurs in Example 3.11. The first gesture is a stepwise ascent (B2 to A3) outlining V^7 , and the second gesture is an arpeggiation that is embellished with prefix upper neighbors (B#3 to B#4) implying V_3^4 .¹⁰

Inverted Accompaniment

Inversion of the accompaniment at the outset of the second reprise is not a normative practice in Bach's keyboard suites; however, when it does occur, the present analytic method can describe the inverted accompaniment in the same way it describes the inverted subject.

The Allemande from the English Suite in F major contains two distinct subjects (Example 3.12). The first subject occurs in m. 1 and is not imitated. It also does not contain a dominant-function chord like other subjects in the keyboard suites. Nevertheless, it still retains the character of a subject since it begins each reprise and has a clear beginning and ending point. The second subject occurs in m. 2 and contains a typical T–D–T harmonic motion, which is then imitated at the octave to form the reply.

¹⁰ The final beat of the first measure (order positions 11–14) recalls the uninverted form of the subject although the embellishing functions have changed. In the uninverted subject, the embellishing pitches are order positions 12 and 14, which function as suffix lower neighbor, and consonant skip, respectively. In the inverted subject, the embellishing pitches are order positions 11 and 13, both of which function as prefix upper neighbors. The embellishing tones in the first reprise fall on weaker portions of the beat, and the opposite is true of the embellishing tones in the second reprise—they fall on stronger portions of the beat.

This same structure is repeated in the second reprise. The present analysis will limit itself to the first subject.

The image displays a musical score for an Allemande in F major, divided into two systems: 'first reprise' and 'second reprise'. Each system consists of a treble and bass staff. The first reprise features 'subject 1' and 'subject 2' with their respective replies. The second reprise features 'inverted subject 1' and 'reply to inverted subject 2'. Chord symbols are provided below the bass line for both systems.

First Reprise Chords: F: I, vi, ii⁶, V⁷, I, V⁴, I⁶

Second Reprise Chords: C: I, I⁶, V⁴, I⁶, V⁴, I

Example 3.12. Allemande, English Suite in F major

Inversion is utilized in three ways at the outset of the second reprise: (1) the subject is melodically inverted, (2) the accompaniment is melodically inverted, and (3) the subject and accompaniment are contrapuntally inverted. Another remarkable feature of this allemande is the fact that hardly any modification to the inversion is necessary (Example 3.13). An inversion and chromatic transposition allows the subject to clearly express dominant harmony; however, the unmodified inversion begins on $\hat{2}$ and ascends to $\hat{5}$ implying a *sol-do* motion in the key of the dominant ($V^7/V-V$). By applying the operation RTPOS to the first two pitches, $\hat{5}$ is placed in the bass and provides the firm

harmonic support of a root position dominant for the opening of the second reprise. A dominant tonicization is still implied leading into beat 2, however, this motion is now in a weak, rather than strong, metric position. The anacrusis is shifted to the upper voice in accordance with Bach's usual practice regarding subjects in the bass at the start of the second reprise. The accompaniment receives the anacrusis that was shifted from the subject in the bass. The anacrusis, now in the accompaniment, is the same pitch-class (G) that was present in the unmodified inversion.

The image displays musical notation for Example 3.13, titled "Inverted subject and inverted accompaniment, F-major Allemande". It is divided into two main sections: the subject and the accompaniment.

Subject Section:

- subject 1:** Treble clef, measures 0-14. Harmonic analysis: I (measures 0-1), (V⁷) (measures 2-10), I (measures 11-14). Includes triplets in measures 11, 12, and 13.
- unmodified:** Bass clef, measures 0-14. Harmonic analysis: V⁷/V (measures 0-1), V (measures 2-14). Includes triplets in measures 11, 12, and 13. Labeled "I3, Tc7".
- actual:** Bass clef, measures 0-14. Harmonic analysis: V (measures 0-14). Labeled "ASHIFT(0) RTPOS(1-2)".

Accompaniment Section:

- accompaniment:** Bass clef, measures 0-10. Includes a rest in measure 0.
- unmodified:** Treble clef, measures 0-10. Labeled "I3, Tc7".
- actual:** Treble clef, measures 0-10. Labeled "RHY({♪♪→♪})(1-2)".

Example 3.13. Inverted subject and inverted accompaniment, F-major Allemande

Segments Remain Uninverted

In some instances, a segment of the subject remains uninverted. Typically, the initial inversion and transposition operation that generate the unmodified inversion are assumed to act on the entire subject; however, the inversion operation can also be carried out on a smaller segment of the subject.¹¹ In the Courante from the Partita in D major, half of the subject remains uninverted (Example 3.14). Order position 7 is the same pitch (A4) in all versions of the subject, which is also the axis of inversion ($\hat{5}$). Recall from Chapter II that different combinations of axis of inversion and transposition level can achieve the same results. A specific case was addressed: $I_3, T_D4 = I_5, T_D0$. While it has generally been most useful to model subject inversions as I_3 at some transposition level, the present example makes the I_5, T_D0 designation more compelling since the axis of inversion is emphasized as the point at which the inverted and uninverted segments of the subject converge. The harmonic rhythm of the subject, and the point at which the inverted and uninverted segments converge, also exploits the ambiguity between 3/2 and 6/4 meters in courantes.¹² The harmonic rhythm implies 3/2 meter while the motivic material implies 6/4 meter.

¹¹ The usual designation of I_3 for a given subject is actually shorthand for $I_3(0-x)$ where x is the final order position of the subject.

¹² According to Little and Jenne, “Almost every measure [of this courante] is ambiguous and can be performed in several different ways, metrically” (2001, 128).

first reprise

second reprise

subject

unmodified

actual

Axis of inversion

0 1 2 3 4 5 6 7 8 9 10

I V⁷ I

v I

v V⁷ I

15(0-7), T_D0

EMB{PT→CS}(4, 6)

CHORD{3→5}(0-1, 3)

CHORD{5→R}(2)

CHORD{R→3}(4, 6)

RHY{♩→♩. ♩}(8-9)

Example 3.14. Courante, Partita in D major

In addition to leaving the second half of the subject uninverted, two additional modifications have important ramifications for the structure of the inverted subject. The first involves changing the embellishing function of order positions 4 and 6 from passing tone to consonant skip (B is transformed into A), and the second involves changing the triad members of order positions 0-6.¹³ The modifications to the inverted subject also

¹³ This changing of triad members could also be described in terms of Deutsch and Feroe's (1981) "operations on alphabets." The "alphabet" in this case is the A-major triad (the entire alphabet consists of the pitches A, C#, E) and the "operation" transposes pitches within that alphabet.

have interesting ramifications for the voice-leading structure. The subject contains an ascending sixth-progression subdivided into a third-progression and fourth-progression (Example 3.15). The unmodified inversion inverts this structure to a descending sixth-progression subdivided in the same manner. With the elimination of the passing tone (B) and transposition within the A-major triad, the actual subject contains a descending arpeggiation of the A-major triad (A–C♯–E) rather than a descending third-progression (C♯–B–A).

The image displays three musical staves in D major (one sharp). The top staff shows the voice-leading sketches with Roman numerals I, V, V, and I. The bottom staff shows the corresponding arpeggiated accompaniment. The first staff is labeled 'subject', the second 'unmodified inversion', and the third 'actual'.

Example 3.15. Voice-leading sketch of second-reprise subjects; D-major Courante

The descending arpeggiation of the A-major triad in the second reprise's inverted subject is mirrored by an ascending arpeggiation in the accompaniment, thus there is an implicit pairing of inverted and uninverted motives (refer back to the score in Example 3.14). Bach continues to pair ascending and descending arpeggiations in the second reprise. For example, in the sequential passage, mm. 25–29, the opening arpeggiated motive of the inverted subject alternately ascends in the lower voice and descends in the upper voice (Example 3.16). Beginning with the second half of m. 27, the voices exchange their roles of ascent and descent and overlap. All of this speaks to the broader

use of inversion over the course of the entire movement rather than just the opening subject and reply.

The image shows a musical score for a D-major Courante, measures 25 through 29. The score is written for piano in 3/4 time. It consists of two staves: a treble staff and a bass staff. The music features a sequence of eighth and sixteenth notes, with slurs and ties indicating phrasing. Measure 25 starts with a treble staff entry, followed by a bass staff entry. Measures 26 and 27 continue the sequence with similar rhythmic patterns. Measure 28 shows a change in the bass line, and measure 29 concludes the sequence. Dynamic markings like 'p' (piano) are present throughout.

Example 3.16. Sequence and inversion; D-major Courante, mm. 25–29

Additional Subject Statements

All of the allemandes and courantes studied thus far contain a subject and reply in the first reprise—which are identical—and an inverted subject and reply in the second reprise—which are not identical. Beyond this initial pair of subject entries at the outset of each reprise, additional subject statements can occur in either reprise. When additional subject statements occur they often do so in pairs, just as they do at the outset of each reprise.

Additional Uninverted Subjects in the First Reprise

In the Courante from the French Suite in D minor, an additional pair of subject statements occurs in mm. 6–8 (Example 3.17). These two modified subjects are part of a larger falling-fifths sequence that eventually leads to a perfect authentic cadence in the dominant key in m. 10 to close the first reprise.

Example 3.17. Courante, French Suite in D minor, mm. 6–8

These modified subjects maintain the modular harmonic rhythm characteristic of courantes, and continue to express a dominant-function chord on beat 3 of m. 7 and m. 8. The first of these subjects in m. 6 is derived from a diatonic transposition up two steps within the D-minor collection (Example 3.18). The original subject contains a half-step upper neighbor on beat 3, which creates a fully-diminished seventh chord that functions as a dominant. When the subject is transposed this half-step upper neighbor becomes a whole-step. While multiple harmonic interpretations are possible, I have chosen to interpret this event as vii^{o7}/III .¹⁴ Whereas the original subject expresses a strong dominant function on beat 3, the unmodified version (in this case the subject is not inverted) expresses a weak dominant function with its secondary half-diminished seventh chord. The modifications create a secondary dominant seventh chord on beat 3 that necessitate a resolution to a different tonal area than the one in which the subject began. Thus, this

¹⁴ Another possible harmonic interpretation of the unmodified subject is III_3^{5-6-5} (or I_3^{5-6-5} in the key of F major).

modified first-reprise subject is similar to inverted second-reprise subjects in that it does not prolong a single harmony.¹⁵

subject

unmodified

actual

1 2 3 4 5 6 7 8 9

i vii^{°7} i

III vii^{°7}/III III T_{D2}

III v⁷/VI VI

SECDOM{VI}(7-8)
SEVDN(7-9)
EMB{R→sUN}(8)

Example 3.18. Modified subject; D-minor Courante, m. 6

The subject in m. 7 is derived from a chromatic transposition of the subject resulting in an implicit change of collection to B-flat major (Example 3.19). Much like the subject in m. 6, this unmodified version contains a weak dominant function on beat 3 and prolongs a single harmony. The modifications create a stronger secondary dominant function chord on beat 3 (it is only when coupled with the upper voice on beat 3 that the harmony becomes clear). However, the resolution of this dominant chord does not occur on the downbeat but is delayed until beat 2 of the second measure. Some of the modifications applied to this subject rely on the upper voices for context. For instance, order positions 7–8 by themselves do not necessarily imply dominant harmony and are thus specified as a transposition.

¹⁵ There is an interesting similarity between the subject in m. 6 and the inverted subject in m. 11. In both subjects, order position 8 is the root of a dominant seventh chord, which is functioning as a suffix upper neighbor to the chordal seventh (refer back to Example 3.3).

subject

unmodified

actual

1 2 3 4 5 6 7 8 9

i vii^{°7} i

VI vii^{°7}/VI VI

9a b c d e

VI v²/III v³/III III

T_c8

T_D2(7-8)

T_D1(9)

EMB{R→PT}(8)

RHY{♩→♪♪♪♪}(9)

OTHER(9a-e)

Example 3.19. Modified subject, D-minor Courante, m. 7

Additional Inverted Subjects in the Second Reprise

The Allemande from the English Suite in E minor contains an additional pair of inverted subject statements in mm. 17–19 (Example 3.20). Measure 17 marks the arrival of the subdominant key area with a perfect authentic cadence. When additional subject statements occur in the second reprise they often begin after a cadence in a non-tonic key. The analysis of these additional inverted subject statements could be approached in two different ways. Either the first-reprise uninverted subject or the second-reprise inverted subject can be the “original” subject from which additional modifications are carried out. I will analyze these additional statements in terms of the second-reprise inverted subject since the reuse of inverted subject material confirms the thematic importance of the inverted subject. Starting with the second reprise, we have a new baseline subject against which to describe additional modifications as the inverted subject passes through new tonal areas.

Example 3.20. Allemande, English Suite in E minor, mm. 17–19

The two inverted subject statements in mm. 17–19 are part of a falling fifths sequence that eventually leads back to the home key. The inverted subject in m. 17 is derived from a chromatic transposition and MODE shift that results in a subject in the temporary key of D major (Example 3.21). The first pitch of the subject (A4) is an octave higher than the unmodified inversion. In the score, the notation of the multi-voice texture does not make this connection clear.¹⁶ The assertion that the first pitch of the inverted subject is A4 and not C3 (as the beaming in the score suggests) is strengthened when we consider that the preceding measure descends by step to A4 forming a perfect authentic cadence on the downbeat of m. 17. The unmodified inversion could remain intact and fulfill the harmonic function within the falling-fifths sequence without modification. The modifications that are made are simply differences in surface detail.

¹⁶ Most modern editions retain the old style of polyphonic notation where each individual contrapuntal line or pitch is stemmed separately.

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

inverted subject
Em: V⁷ i

unmodified
Am: V^{7/iv} iv

actual
Am: i V^{7/IV} IV

T_c10
MODE

OCT{↑}(1)
CHORD{3→5}(8)
CHORD{5→7}(9)
CHORD{7→R}(10)
EMB{pUN→CS}(11)

CHORD{R→5}(12)
T_p3(13-14)
CHORD{R→3}(15)
RHY{♩→♪}(15)
CHORD{3→R}(15c)
EMB{R→PT}(15b)

Example 3.21. Inverted subject; E-minor Allemande, m. 17

The inverted subject in m. 18 continues the falling-fifths sequence begun in m. 17. The unmodified inversion is a chromatic transposition with MODE shift that brings the subject to G major (Example 3.22). The only additional modification is a slight rhythmic change to the final pitch.

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

unmodified
G: V⁷ I

actual
Am: IV V^{7/VII} VII

T_c8
MODE

RHY{♩→♪}(15)

Example 3.22. Inverted subject; E-minor Allemande, m. 18

Candidate Inversions and Replies

In the preceding analyses there have been many cases where different modifications could have been applied to arrive at an inverted subject or reply that

maintains the same underlying harmonies. Alternatively, modifications could be applied that alter the implied harmonies. Operations can be applied to an unmodified inversion in a process of testing and revising to achieve different candidate inversions.

The modifications applied to the Allemande from the English Suite in A minor are quite complex and were detailed earlier in this chapter (refer back to Example 3.6). The only modification that is essential for harmonic reasons is the transformation of the opening A4 into B4 so that the inverted subject opens with dominant harmony rather than tonic. The rest of the modifications have no direct bearing on the underlying harmony, which already conforms to Bach's typical practice. A simplified candidate inversion is presented in Example 3.23 where only the first three pitches are modified to fit with dominant harmony. This candidate inversion outlines the same underlying harmonies as Bach's actual version (with the exception of the picardy third). Although this candidate inversion fits with the same underlying harmony it seems less satisfying than Bach's version. The candidate inversion places greater emphasis on the pitch B, and even though it resolves the chordal seventh (D) introduced on beat 2, it does so in a different octave.¹⁷

¹⁷ Bach's version creates a smoother voice-leading line. If one reads an implied E on the downbeat, the salient voice-leading line of the lower voice in a compound melodic structure is $\hat{5}-\hat{4}-\hat{3}$ (E4-D4-C4). This same $\hat{5}-\hat{4}-\hat{3}$ descent appears as the upper line in a compound melodic structure in the original subject. Thus, one could speculate that voice leading played a role in determining Bach's actual version.

The image displays a musical score for Example 3.23, titled "Candidate inversion; Allemande, English Suite in A minor". The score is presented in four staves, each with a label on the left and chord annotations below the notes. Above the first staff, a sequence of numbers from 0 to 15 is aligned with the notes. The first staff, labeled "subject", shows a melodic line with chords Am: i, v⁷, and i. The second staff, labeled "unmodified", shows the same melodic line with chords Am: i, v, and i, and is annotated with "I3, T_D0" on the right. The third staff, labeled "candidate", shows a different melodic line with chords Am: v⁷ and i, and is annotated with "DOM(0-2)" on the right. The fourth staff, labeled "actual", shows the final melodic line with chords Am: v⁷ and I.

Example 3.23. Candidate inversion; Allemande, English Suite in A minor

In addition to generating additional inverted subject candidates, additional candidate replies to those inversions can be generated. In the Courante from the Partita in D major, the second-reprise reply is best understood as an inversion of the reply. We can generate a candidate inversion that is understood as a reply to the inversion by transferring the modifications from the inverted subject to the reply (Example 3.24). Since the reply occurs in the bass voice one additional modification is applied—a root position tonic is created at the outset (the small notehead in parentheses indicates the pitch generated before this additional modification). By applying the same modifications to the candidate reply that were applied to the subject, the resulting reply arrives in the same tonal area as Bach's actual reply—the subdominant. The main difference is that Bach's version tonicizes that subdominant whereas the candidate reply does not.

The image shows a musical score with four staves. The top staff is labeled 'subject' and contains a melodic line in treble clef with notes numbered 1 through 10. Below it are three bass clef staves: 'unmodified', 'candidate', and 'actual'. The 'unmodified' staff has chords I⁶ and V. The 'candidate' staff has chords I and IV, with a note on beat 4 marked with a flat and a slur. The 'actual' staff has chords I⁶, V^{1/2}/IV, and IV⁶. To the right of the staves are several annotations: 'I3(1-6), T_D-4(7-10)' next to the unmodified staff; a list of modifications: 'EMB{PT→CS}(4, 6)', 'CHORD{5→R}(2)', 'CHORD{3→5}(3)', 'CHORD{R→3}(4, 6)', and 'RHY{♩→♩. ♩}(8-9)'; and 'RTPOS(1)' with an arrow pointing to the first measure of the candidate staff. A bracket groups the modification list with the text 'modifications applied to the inverted subject', and the text 'add'l modification' is placed below the RTPOS annotation.

Example 3.24. Candidate reply; Courante, Partita in D major

The process of generating additional candidate inversions could obviously be continued at great length. While I am certainly not claiming that Bach worked though the process of inverting subjects in this manner, it can nevertheless serve as a metaphor for the process one might go through. The intriguing aspect is that there is no one correct solution; many different solutions are possible limited only by the stylistic and tonal conventions of the binary dance form and the design of the subject itself. Within these numerous possibilities, however, some candidates are more satisfying than others. In addition to harmonic considerations, other factors that may influence the suitability of a given candidate include voice-leading structure, compound melodic structure, motivic connections to the original subject, and embellishing function.

CHAPTER IV

ALLEMANDE, ENGLISH SUITE IN G MINOR

The Allemande from the English Suite in G minor contains the most thoroughgoing contrapuntal treatment of the subject in the allemandes and courantes from the keyboard suites.¹ With the exception of several sequential and cadential passages, virtually every measure of the allemande contains a subject statement. Even in passages where explicit subject statements are not present, motives from the subject are utilized.²

Not only is the treatment of the subject and its inversion more extensive than in any other allemande or courante, the subject also contains several unique characteristics. (Example 4.1). The subject spans a tenth—quite large in comparison to Bach's other subjects in the keyboard suites. The subject is first stated in the bass rather than soprano, and represents a contrapuntal inversion of the normal subject/accompaniment relationship at the outset of the first reprise. A contrapuntal inversion of this type is not uncommon in the second reprise, but the G-minor Allemande is the only dance that begins with this type of contrapuntal inversion. The subject is also unique because it begins with a rest.

¹ The following allemandes and courantes also treat the subject extensively and are worthy of more detailed study: Allemande, English Suite in E minor; Courante, English Suite in E minor; Courante, French Suite in D minor; Courante, Partita in C minor; Courante, Partita in D major.

² A complete score is provided in the Appendix.

While many of Bach's fugue subjects begin with rests,³ all the other subjects in the keyboard suites exclusively begin with an anacrusis (an anacrusis is still present at the start of the first reprise but is stated in the soprano).⁴ Successive subject statements maintain the notion of a rest on the downbeat. The beginning of the subject is often articulated by a change of register between the first and second sixteenth notes of the measure. As I conceive it, the reply in m. 2 begins with the second sixteenth note (G) and the D on the downbeat represents the arrival of the accompaniment figure in m. 1. The accompaniment of m. 1 and the reply of m. 2 thus belong to two different "voices," although the notation does not make this distinction clear (as notated they belong to the same "part").⁵

The image shows a musical score for two staves. The top staff is in treble clef and the bottom staff is in bass clef. The key signature has two flats (B-flat and E-flat). The time signature is common time (C). The first measure (m. 1) shows a subject starting with a rest on the downbeat, followed by a sixteenth note G and a sixteenth note D. The second measure (m. 2) shows a reply starting with a sixteenth note G and a sixteenth note D on the downbeat. The third measure (m. 3) continues the subject and reply. Brackets labeled 'subject' and 'reply' indicate the respective parts.

Example 4.1. Subject and reply, mm. 1–3

³ Two good examples are the C-minor and G-minor fugues from Book One of the *Well-Tempered Clavier*.

⁴ This follows Bach's typical practice when subjects are stated in the bass at the start of the second reprise. Regardless of which voice has the subject the soprano always has the anacrusis.

⁵ For an interesting discussion of the distinction between "voice" and "part" see Wen 1999. The distinction between the two terms is defined this way: "The term 'part' is defined by a work's performing forces or textural elements and is usually bound by the constraints of a particular tessitura (e.g., SATB). A 'voice,' on the other hand, is not dependent upon the limitations of the medium expressing the musical idea." (Wen 1999, 277).

A more detailed analysis of the pitch structure of the subject reveals an interesting aspect of its construction; it contains an inherent inversion of contour and reflection about a vertical axis of symmetry (Example 4.2). Chapter III showed how subjects are understood in terms of modules based on harmonic rhythm. Example 4.2 shows that this subject can be divided into T–D–T modules based on harmonic rhythm, and can be further subdivided according to the octave and third spans within these tonic and dominant modules. An ascending octave and descending third belong to the tonic module, and are answered by an ascending third and descending octave that belong to the dominant module (note the difference in how each octave is spanned). The rest that begins the subject and the final tonic pitch on the downbeat are distinct elements; nevertheless, they balance each other on either side of the axis of symmetry. Many of the modifications applied to this subject will take place within one or more of these modular subdivisions.

The image displays a musical score for a subject in bass clef, 3/4 time. The melody is divided into three measures labeled T, D, and T. The first measure (T) contains an ascending octave and a descending third. The second measure (D) contains an ascending third and a descending octave. The third measure (T) contains an ascending octave and a descending third. Below the staff is a diagram illustrating the modular structure. A vertical dashed line represents the axis of symmetry. Arrows show an 8ve interval on the left side and a 3rd interval on the right side, mirroring the structure of the melody.

Example 4.2. Subject analysis, m. 1

A close reading of this allemande will allow us to apply the analytic method in the service of a complete analysis of Bach's contrapuntal treatment of subject material and its inversion in a keyboard-suite movement. It will also further demonstrate the method's potential to describe modifications to uninverted subjects. Particular attention will also be drawn to the effect these modifications have on the functional harmonic progression of the subject. I will argue that one of the motivating factors for modifications to the subject and inverted subject in this allemande is the alteration of the functional harmonic progression. The alteration of the functional harmonic progression allows the subject to lead to different tonal areas in accordance with the more thoroughgoing use of the subject material throughout the allemande. In order to highlight some of the salient features of modifications to the subject, the voice-leading structure will be considered where appropriate. The overall voice-leading structure, and the way in which the subject and its inversion interact with this structure, will also be briefly addressed at the conclusion of this chapter.

First Reprise

In its original form, the subject contains a T–D–T functional progression and thus prolongs tonic harmony. The initial subject and reply are both stated on the tonic and follow Bach's typical practice in the keyboard suites. Four additional subject statements occur in the first reprise. In accordance with the wider range of tonal areas explored in this allemande, the source of many of these additional subject statements is a chromatic transposition. Recall that the chromatic transposition has the effect of transposing the

subject to a new tonal area while maintaining the T–D–T progression. A chromatic transposition also results in an implicit change of collection corresponding to that new tonal area.⁶

After transposition, modifications to the subject occur within its modular subdivisions. A typical modification involves transposing the opening octave arpeggiation, which causes the subject to begin and end on a different chord and affects a modulation to the final chord of the subject. Four modified subject statements occur in mm. 6–9. Example 4.3 reproduces this portion of the score with brackets indicating these subject statements along with a harmonic analysis. The subjects in this excerpt are paired in much the same way that the initial subject and reply are paired at the outset of each reprise.

Example 4.3. Score excerpt, mm. 6–10

⁶ Occasionally the mode of this chromatic transposition is switched. In the specific context of G minor, the operation MODE will be applied at T_C3 (transposition to the mediant B-flat major rather than B-flat minor), T_C8 (transposition to the submediant E-flat major rather than E-flat minor), and T_C10 (transposition to the subtonic F major rather than F minor).

The modified subject entry in m. 6 leads to the subdominant on the downbeat of m. 7 (Example 4.4). The unmodified subject is chromatically transposed (T_{C5}) and transforms the subject from the key of G minor to C minor. However, as one can see from the score below, the point of departure for this subject statement is not the local tonic of C minor but rather its dominant. The modifications applied to the subject have the effect of changing the functional harmonic progression from T–D–T to D–D–T.

unmodified

1 2 3 4 16

Cm: T D T

T_{c5}

actual

Cm: D D T

$T_{b4}(1-4)$

CDINV $\{3 \rightarrow 4\} (1-4)$
RTPOS(16)

Example 4.4. Modified subject, m. 6

In order to modify the subject's opening harmony, the initial arpeggio is diatonically transposed up four steps within the C-minor collection. This transposition changes the opening arpeggiated triad from C minor to G major, and the harmonic function of the opening module is thus changed from T to D. After transposition, the arpeggiation itself is transposed within the G-major triad collection so that the subject begins the arpeggiation with the fifth of the G-major triad rather than the root. I will refer

to this process as *revoicing*.⁷ To describe this revoicing in our analytic system, the linear triad arpeggiation is reconceived as a vertical sonority. The operation CDINV then transforms the root position triad (or arpeggiation) into a second inversion triad (or arpeggiation). The revoicing creates a smoother melodic line and allows the subject to remain within its initial range of a tenth. Despite the transposition and revoicing the distinct octave and third modules remain intact, and the initial descending third module (E \flat –D–C) is still present on beat 2 at the surface. A closer look at the voice leading, however, reveals that E \flat –D–C no longer articulates a harmonic unit (Example 4.5). The E \flat now becomes an upper neighbor to the D. Another descending third is present but consists of D–C–B \natural and belongs to dominant harmony.

Example 4.5. Voice leading of subject in m.6

The subject in m. 7 is based on the original, untransposed form of the subject and the opening arpeggio is diatonically transposed up 3 steps within the G-minor collection (Example 4.6). The resulting functional progression of S–D–T has yet to be encountered

⁷ This revoicing could also be modeled with Deutsch and Feroe’s (1981) “operations on alphabets.” Each instance of triad revoicing can be conceived of as a transposition within a triadic “alphabet.”

in this thesis. Once again, transposition of the opening arpeggio to a new diatonic pitch level corresponds to a change in function of the opening harmonic module. This subject brings us back to the tonic after the previous tonicization of the subdominant in m. 6.

The image shows two staves of music for Example 4.6. The top staff is labeled 'unmodified' and the bottom staff is labeled 'actual'. Both staves show a melodic line in G minor with a tonicization of the subdominant (D) in measure 3. The 'unmodified' version is labeled T_{c0} and the 'actual' version is labeled $T_{D3(1-4)}$. The harmonic analysis for the 'unmodified' version is Gm: T D T, and for the 'actual' version is Gm: S D T. The measures are numbered 1, 2, 3, and 4 above the notes.

Example 4.6. Modified subject, m. 7

A voice-leading sketch of the subject once again reveals that the descending third module of the unmodified version ($B\flat-A-G$) does not function in the same manner after modification (Example 4.7). Rather than articulating a tonic third-progression, the pitch succession $B\flat-A-G$ is subsumed within a fourth-progression that is initiated with the arrival of the initial arpeggiation of the C-minor triad.

The image shows two staves of music for Example 4.7. The top staff is labeled 'unmodified' and the bottom staff is labeled 'actual'. Both staves show a melodic line in G minor. The 'unmodified' version shows a 3-prg (third-progression) and the 'actual' version shows a 4-prg (fourth-progression). The harmonic analysis for the 'unmodified' version is Gm: i v i, and for the 'actual' version is Gm: iv v i. The notes are connected by dashed lines indicating voice leading.

Example 4.7. Voice leading of subject in m. 7

The subject in m. 8 is derived from a chromatic transposition (T_C7) that transposes the subject to D minor (Example 4.8). The initial arpeggio is then diatonically transposed up 3 steps within the D-minor collection. As in the previous example, the resulting functional progression becomes S–D–T in terms of the local tonic arrival on D minor. Notice, however, that the actual subject is not entirely within the D-minor collection. Instead, the subdominant module remains within the G-minor collection and the dominant module moves to the D-minor collection. The distinction is subtle, and only affects order position 6 by using E^b from the G-minor collection rather than E^{\natural} from the D-minor collection. This difference is hardly noticeable at the surface of the music since E^b is functioning as a passing tone. The voice leading of the subject in m. 8 is exactly analogous to that of the subject in m. 7 whereby the third-progression of the unmodified subject is subsumed into a fourth-progression in the modified subject (Example 4.9).

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

unmodified T_C7

Dm: T D T

actual $T_D3(1-4)$
COLL{Gm}(1-7)
RTPOS(16)

Dm: S D T

Example 4.8. Modified subject, m. 8

unmodified

Dm: i V i

actual

Dm: iv V i

Example 4.9. Voice leading of subject in m. 8

The final subject statement of the first reprise in m. 9 restates the previous D-minor transposition of the subject (Example 4.10). A single modification transforms the final pitch of the subject into a picardy third. In terms of the larger tonal plan of the first reprise, this subject confirms the move to the minor dominant key area by expressing a T–D–T motion within that key. The arrival in a new key area corresponds to a lack of modifications to the opening arpeggio and allows the subject to prolong a single harmony in a similar manner to the original subject. A sequence of the second half of the subject leads to the final cadence of the first reprise on the dominant.

unmodified

16

Dm: T D T T_{c7}

actual

Dm: T D T PIC(16)

Example 4.10. Modified subject, m. 9

When the four subject statements in mm. 6–9 are strung together, and the functional progression of each is considered in terms of its local tonic arrival, some interesting relationships result (Table 4.1). The arrival of each subject on a local tonic is elided with the start of the next subject statement, which can have a different function in terms of its local tonic goal. These alterations to the functional progression are accomplished by transposition of the opening arpeggiation.

<i>Subject Entry</i>	<i>Functional Progression</i>
m. 6	Cm: D—D—T
m. 7	Gm: S—D—T
m. 8	Dm: S—D—T
m. 9	Dm: T—D—T

Table 4.1. Chain of subject entries in mm. 6–9

Table 4.2 summarizes the salient features of subject statements in the first reprise. The *chromatic* transposition level of the unmodified version has the effect of transposing the subject to a new tonic—with an implicit change of collection—while maintaining a T–D–T progression. In the subject entry of m. 6, T_{C5} takes the subject to the C-minor collection. Once transposed to a new local tonic, the *diatonic* transposition level of the opening arpeggio (order positions 1–4) alters the function of the opening tonic module. The level of transposition corresponds to a new diatonic triad arpeggiation, which in turn determines the new function of the opening harmonic module. In the subject entry of

m. 6, the opening arpeggio is transposed by T_D4 and as a result the function of the opening harmonic module is changed from tonic to dominant.

<i>Subject Entry</i>	<i>Unmodified Version</i>	<i>Local Tonic and Collection</i>	<i>Opening Arpeggio</i>	<i>Functional Progression</i>
m. 1	T_C0	Gm	T_D0	T-D-T
m. 2	T_C0	Gm	T_D0	T-D-T
m. 6	T_C5	Cm	T_D4	D-D-T
m. 7	T_C0	Gm	T_D3	S-D-T
m. 8	T_C7	(Gm)→Dm	T_D3	S-D-T
m. 9	T_C7	Dm	T_D0	T-D-T

Table 4.2. Summary of subjects in the first reprise

Other transposition levels of the opening arpeggio are conceptually possible, and could even produce plausible functional progressions, but only one of these additional transposition levels is utilized in this allemande. Table 4.3 lists the functional progressions generated by transposing the opening arpeggio to each diatonic scale step. Example 4.11 realizes these transpositions in musical notation.

<i>Opening Arpeggio</i>	<i>Functional Progression</i>	<i>Example</i>
T_D0	T-D-T	mm. 1, 2, 9
T_D1	S-D-T	not used
T_D2	T-D-T	m. 19
T_D3	S-D-T	mm. 7, 8
T_D4	D-D-T	m. 6
T_D5	T-D-T	not used
T_D6	D-D-T	not used

Table 4.3. All possible arpeggio transpositions

The image displays six musical staves, each representing a different transposition level of an arpeggio. The notation includes notes on a staff and chord symbols below. Brackets above each staff indicate the transposition level. The chord symbols are: T, D, T, S = ii°, D, T for T_{D0}; S = ii°, D, T for T_{D1}; T = III, D, T, S, D, T for T_{D2}; S, D, T for T_{D3}; D, D, T, T = VI, D, T for T_{D4}; T = VI, D, T for T_{D5}; and D = vii°, D, T for T_{D6}.

Example 4.11. Realization of arpeggio transpositions

Transposition at T_{D2} is utilized in m. 19 of the second reprise and will be discussed in the following section. Transposition at T_{D3} and T_{D4} has already been discussed in the foregoing examples (mm. 7–8 and m. 6, respectively). None of the other transposition levels are utilized, although they create functional progressions that seem plausible. When the opening arpeggio is transposed at T_{D1} or T_{D6} diminished triads result (ii° and vii° , respectively).⁸ These diminished triads do not constitute a stable point of departure for the subject. Keeping in mind that the endpoint of one subject is typically elided with the beginning of the next subject, these diminished triads also do not provide a stable point of arrival for the preceding subject statement. Transposition at T_{D5} produces a T–D–T progression where the initial T is realized as a submediant triad (VI).

⁸ Transposition at T_{D6} could also conceivably be built not on the leading tone C^\sharp , but on C^\natural instead. However, this would arpeggiate the subtonic triad (VII) and form an atypical diatonic progression (VII–V–i).

This subject transformation certainly seems plausible since it begins with a stable major triad but is not utilized by Bach.

Second Reprise

The subject statements in the second reprise take a number of different forms. Inverted subjects occur most often, but there is also one uninverted subject statement, and a unique cadential gesture that combines inverted and uninverted forms of the subject. Before delving into a detailed analysis of these subjects it will be useful to examine the inverted subject at the surface of the music to see if the distinct octave and third modules reflected about the vertical axis of symmetry in the uninverted subject are still present upon inversion. Example 4.12 shows that this unique structure remains intact.

The image shows two staves of music. The top staff is in treble clef with a key signature of one flat (B-flat). The melody starts on G4, moves to D5, then D4, and ends on S. The bottom staff is in bass clef with a key signature of one flat, showing a rhythmic accompaniment. A vertical dashed line is drawn between the two staves, with arrows indicating intervals: '8ve' from the G in the top staff to the G in the bottom staff, '3rd' from the D in the top staff to the D in the bottom staff, '3rd' from the D in the top staff to the D in the bottom staff, and '8ve' from the S in the top staff to the S in the bottom staff.

Example 4.12. Inverted subject analysis, m. 13

The functional progression of the inverted subject in m. 13 is quite different from other subjects that have been encountered in this thesis. The inverted subject begins on

the dominant and then moves through a secondary dominant before arriving on the subdominant ($V-V^7/V-iv$). In terms of function, the progression as a whole can be described as $D-D(s)-S$. This inverted subject is more tonally active than any of the previous examples. While a tonicization of, and eventual cadence in, the subdominant key area is common in the second reprise, it normally occurs at the end of the second-reprise reply. This inverted subject concludes with an imperfect authentic cadence in the subdominant. The move to the subdominant is fleeting, however. Example 4.13 reproduces the opening of the second reprise with a harmonic analysis.⁹

13

Gm: V V^7/iv iv V^7/VII

iv: IAC

15 17

V^7/III I ii^6 V^4 I

Bb: V^7 III: PAC

Example 4.13. Score excerpt, mm. 13–17

⁹ The cadence in m. 14 is an example of what William Rothstein calls a “Schrock cadence” (see Rothstein 2006, 269–77). A Schrock cadence is a special type of inverted cadential six-four. The analysis of the second half of m. 13 is somewhat simplified in Example 4.13. A more detailed analysis would reveal a cadential six-four supported by the bass line E^b-F-G . This E^b belongs to tonic harmony (C minor) and seems to suggest a first inversion tonic before the cadential dominant. However, the passing motion from E^b to G is best understood as belonging to dominant harmony where G is the structural bass tone. For a specific example of the Schrock cadence that utilizes the same exact bass line—coincidentally in the same key—see Rothstein (1991, 311) Examples 19 and 20.

The unmodified inversion creates a prolongation of dominant with a D–T–D functional progression (Example 4.14). This is a typical progression we have seen many times before when I_3, T_{D4} , is applied to a subject containing a T–D–T progression. The first, and most obvious, modifications to the inverted subject are the addition of an anacrusis and the removal of the downbeat rest. No specific operations were devised to account for these two situations since each is rare in the keyboard suites. In this case a more intuitive explanation seems appropriate. The anacrusis and down-beat pitch simply duplicate the first pitch of the inverted subject an octave lower. These two pitches can be thought of as belonging to a different “voice.”¹⁰ We could, however, conceive of a hypothetical subject that contains an anacrusis and eliminates the rest on the downbeat, which, when inverted, would produce the opening of the actual inverted subject (Example 4.15).

The image shows two musical staves for Example 4.14. The top staff is labeled 'unmodified' and the bottom staff is labeled 'actual'. Above the staves are measure numbers from -1 to 16. The 'unmodified' staff has chord symbols: Gm: D, T, D. The 'actual' staff has chord symbols: Gm: V, D; V⁷/iv, D(s); iv, S. Below the 'actual' staff, there are two dotted boxes: one containing Gm: V, D and another containing Cm: V⁷, D. To the right of the 'actual' staff are the labels: OTHER(-1-0), SECDOM{iv}(8-15), and SEVDN(14-16). Arrows point from the 'actual' staff to the 'unmodified' staff at measures 8, 12, 13, and 14.

Example 4.14. Inverted subject, m. 13

¹⁰ This is in keeping with my earlier assertion that the subject always begins with the second sixteenth note of the measure.

of the subject by recognizing the initial dominant in the home key and the D–T motion in the subdominant key.

One important point to remember is that *context* motivates the modifications applied to a subject. The context of this particular subject and some interesting aspects of its construction might motivate a different approach to modification than that used in some of the other keyboard suites. If we wanted to create a candidate inversion that would generate a D–D–T progression in the home key, then we would need to take the tonic module of the unmodified inversion, transform it into a dominant, and then resolve this dominant in the final module. We could generate several candidate inversions and strive to modify as few pitches as possible to leave the unique octave and third modules intact.

The candidate inversion shown in Example 4.16a transposes the final two pitches up a diatonic step. This allows the subject to end on tonic, thus resolving the initial dominant. Order positions 8–12, however, unmistakably outline tonic harmony by filling in a tonic third (B \flat –A–G) and emphasizing both the third and fifth of the tonic triad on beats 3 and 4. This creates an undesirable progression of D–T?D?–T and does not maintain the modular harmonic rhythm. The candidate inversion could be improved by eliminating this tonic outline and creating a chordal seventh on beat 3 as shown in Example 4.16b. This candidate diatonically transposes the second half of the subject up a step. The tonic third (B \flat –A–G) on beat 3 now becomes a dominant third (C–B \flat –A) and the chordal seventh (C) falls on the beat, although it is approached by leap rather than step.

The image shows two musical staves, labeled 'a' and 'b', representing candidate inversions. Both staves are in G minor (one flat) and 3/4 time. The music consists of a single melodic line with a bass line. Above the staves, there are brackets indicating 'outlines tonic' for staff 'a' and 'outlines dominant' for staff 'b', both covering measures 8 through 16. Below the staves, harmonic functions are indicated: for staff 'a', D (measures 8-12), T? (measure 13), D? (measures 14-15), and T (measure 16); for staff 'b', D (measures 8-12), D (measures 13-15), and T (measure 16). To the right of each staff, the chordal analysis is given as I3, T_D⁴ and T_DI(15-16) for staff 'a', and I3, T_D⁴ and T_DI(8-16) for staff 'b'.

Example 4.16. Candidate inversions

These candidate inversions illustrate the important role of context in Bach's treatment of subject inversion. Rather than adhering to a more typical D–D–T progression for the inverted subject, Bach's version creates a new harmonic goal for the inverted subject. This example illustrates the fact that no single modification strategy or formula can be applied in all cases.

Returning to our analysis of the second reprise, the reply in m. 14 is understood as a reply to the inversion (Example 4.17). The opening G-minor harmony of the unmodified inversion obviously conflicts with the preceding arrival of the inverted subject on C minor. The modifications to the reply combine three previous modification strategies used in this allemande: (1) transposing the opening arpeggio to alter the harmonic function of the opening module (subjects in mm. 6–8), (2) revoicing this arpeggiation to create smoother melodic motion (subject in m. 6), and (3) creating a secondary dominant in the second module by raising order position 8 to create a leading tone to a new temporary tonic (inverted subject in m. 13).

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

unmodified I3, T_D0
Gm: i v i

modified T_D-4(1-4)
Gm: iv v i

actual RTPOS(1-4)
COLL{Cm}(1-7)
SECDOM{IV}(8-15)
SEVDN(14-16)
Cm: i v⁷/IV IV

Example 4.17. Reply to the inversion, m. 14

The opening arpeggiation of the reply is diatonically transposed down 4 steps so that it agrees with the closing harmony of the inverted subject (C minor). The opening of the reply contains a revoicing of the triad arpeggiation similar to the modified subject in m. 6. This revoicing allows the triad arpeggiation to begin and end on the root of the triad rather than the fifth. This specific revoicing will frequently be employed in the second reprise because the unmodified inversion will always produce a second-inversion arpeggiation rather than the more stable root-position arpeggiation. The reply mimics the harmonic motion of the inverted subject by creating a secondary dominant to the subdominant, although the entire reply is understood in the terms of C minor rather than G minor. Much like the inverted subject, the activation of a secondary dominant in the second harmonic module causes the final pitch to be modified via a SEVDN operation.

The reply also makes use of mode mixture, resolving its secondary dominant to F major (IV) rather than F minor (iv). This arrival on F major immediately becomes the dominant of B-flat major, eventually leading to a perfect authentic cadence in the key of B-flat major in m. 17. The bass line that supports this PAC combines inverted and

uninverted forms of the subject as shown in Example 4.18. Both forms of the subject are chromatically transposed to F major. The combination of these two forms is carried out according to the modular division of the subject; the tonic module of the uninverted source is combined with the dominant module of the inverted source. When these two source subjects are brought together in m. 16, they are immediately understood as the dominant of B-flat major. In the first module, order positions 4–7 are transposed down a diatonic step, which creates a dominant seventh chord and creates a stepwise connection between the inverted and uninverted forms of the subject (otherwise there would have been a leap between the uninverted subject's F3 and inverted subject's D3). The modifications applied to order positions 12–16 create a typical *sol–do* cadential gesture.

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

uninverted source T_c10

F: T D T

inverted source $I3, T_c10$

actual

COLL{BbM}
 $T_d-1(4-7)$
 RHY{♪♪♪♪→♪♪}(12-15)
 OCT{↓}(14-15)
 SODO(12-16)

Bb: v_3 $\frac{8}{\text{—}} \frac{7}{\text{—}} \frac{6}{\text{—}} \frac{5}{\text{—}} 1$

Example 4.18. Cadence, mm. 16–17

After the cadence in B-flat major, two paired subject statements lead to a cadence in the home key of G minor. Example 4.19 reproduces this portion of the score with a

harmonic analysis. The inverted subject in m. 17 serves as a pivot between B-flat major and G minor. It exploits B \flat ($\hat{3}$) as a common tone between the tonic, mediant, and submediant harmonies in G minor. The inverted subject in m. 17 is derived from a diatonically transposed inversion of the subject (Example 4.20). This diatonic transposition of the subject begins with an arpeggiation of the submediant triad. The modification to the opening arpeggio could be described as a transposition and subsequent revoicing, however, since the submediant triad (E-flat major) and mediant triad (B-flat major) both serve as tonic substitutes, they can be described by the operation SUB since they both have a tonic function. This operation is carried out by keeping the common tone B \flat and thus produces a stable root position arpeggiation. After the descending octave arpeggiation, the ascending third G–A–B \flat implies a “tonic third” in G minor before moving to the dominant. The root position arrival of the subject in m. 19 becomes a dominant pedal leading to the cadence in m. 20

B \flat : V I

Gm: III

III: PAC

v⁷

i: IAC

Example 4.19. Score excerpt, mm. 16–19

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

unmodified 13, T_b5

Gm: VI v⁷ i

actual SUB{VI→III}(1-4)
RTPOS(16)

Bb: I

Gm: III v⁷ v⁷

Example 4.20. Inverted subject, m. 17

The inverted subject in m. 18 begins over a dominant pedal and leads to an imperfect authentic cadence in G minor in m. 19 (Example 4.21).¹² This subject is derived from a diatonically transposed inversion and results in an opening arpeggio of the supertonic triad (ii⁰). The opening arpeggio is transposed to create a dominant triad and then revoiced to create a root position arpeggiation. The resulting functional progression is D–D–T and leads to the IAC in m. 19. In order to account for the half-step lower neighbor C[#] (order position 5) the opening module is understood in terms of a temporary collection change to D major (the dominant).

¹² It is interesting to compare the inverted subject in m. 18 with the inverted subject at the beginning of the second reprise in m. 13 (refer back to Example 4.14). The inverted subject in m. 18 resembles the typical inverted subject at the opening of the second reprise with its D–D–T motion. One could imagine a version of this allemande that begins with this inverted subject rather than the one in m. 13.

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

unmodified I3, T_D1
Gm: ii° V⁷ i

T_D-3(1-4)

actual RTPOS(1-4)
COLL{DM}(1-7)
Gm: v V⁷ i

Example 4.21. Inverted subject, m. 18

The return to the home key in m. 20 coincides with a return to the uninverted subject. Although this subject is modified from its original form, it is significant that Bach marks the return to the home key with a return to the uninverted subject. The uninverted inversion is chromatically transposed and contains a MODE shift resulting in an uninverted inversion in the key of E-flat major (Example 4.22). The opening arpeggiation is modified via a substitution of the tonic-function chord at the surface: G minor (iii) instead of E-flat major (I). Many of the previous examples have been discussed in terms of a goal-directed motion towards a local tonic *arrival*, however, there is a compelling reason to discuss this subject in terms of its local tonic *departure* since this point of departure marks the return to the home key with an IAC. Example 4.23 reproduces mm. 18–22 of the score. Following the uninverted subject statement in m. 19, a sequential passage arrives on the dominant in m. 22 and eventually leads to the final cadence of the piece in m. 24.

	1	2	3	4	16	
unmodified						Tc8 MODE
	Eb:	I		v ⁷		I
modified						SUB{I→iii}(1-4) RTPOS(16)
	Eb:	iii		v ⁷		I
→	Gm:	i		v ⁷ /VI		VI

Example 4.22. Modified subject, m. 19

Example 4.23. Score excerpt, mm. 18–22

The diversity of approaches to subject inversion in the second reprise create a variety of harmonic progressions. Table 4.4 summarizes the harmonic progressions of the subjects in the second reprise. Each subject entry is unique in some way, although a few common trends emerge. The initial inverted subject and its reply (mm. 13–14) both contain a secondary dominant leading to a new temporary tonic. The inverted subjects in m. 14, m. 17, and m. 18 revoice the opening arpeggio so that it begins with the root of the

chord. The subjects in m. 17 and m. 19 substitute mediant-related triads in the opening arpeggiation. Despite this diversity, all of these subjects maintain the modular harmonic rhythm characteristic of the subject, and the second module always expresses dominant function. The modular subdivision of ascending octave/descending third and ascending third/descending octave also remains intact. The transposition of the opening arpeggio remains central to the modification of the opening harmony in the second-reprise subjects in much the same way as it did in the first reprise.

<i>Subject Entry</i>	<i>Harmonic Progression</i>
m. 13	Gm: V—V ⁷ /iv—iv
m. 14	Cm: i—V ⁷ /IV—IV
m. 16 (cadential gesture)	B♭: V—I
m. 17	Gm: III—V—V
m. 18	V—V ⁷ —i
m. 19 (uninverted)	i—V ⁷ /VI—VI

Table 4.4. Summary of subjects in the second reprise

Voice Leading

Although this allemande is not a fugue, its extensive use of a clearly defined subject that is treated imitatively presents the analyst with some of the same challenges that arise when approaching a fugue. Chief among these is the fact that the voice-leading structure of the subject is not fixed in each specific instance, but depends not only upon the voice in which it is stated, but also upon its relation to the larger structure as a whole. While a detailed discussion of the voice leading of the entire allemande is beyond the

scope of this thesis, I will briefly compare the voice-leading structure at the opening of each reprise. Additionally, a summary of the background structure and its relation to the various subject statements will illustrate how the type of subject—unmodified, modified, inverted—interacts with the larger tonal structure across the course of the allemande.

The subject and reply prolong tonic at the opening of the first reprise. Example 4.24 presents a graph of the opening subject and reply. The subject contains three distinct voice-leading strands (G–F[♯]–G, D–C–B[♭], and G–B[♭]). In the subject (m. 1, level b) the upper voice-leading strand of the subject is shown as a neighbor motion G–F[♯]–G. In the reply (m. 2, level b) this G–F[♯]–G strand is now understood as the lower voice. While this neighbor motion could be understood to exist at some level in the upper voice, the surrounding linear progression precludes such an interpretation. There is a clear departure from, and return to, B[♭]4 at the surface of the music in mm. 1–3. The ascending third-progression B[♭]–C–D of the accompaniment in m. 1 leads to an interpretation of the salient upper voice of the reply as a descending third-progression D–C–B[♭]. At level b, the upper voice contains an ascending third-progression followed by a descending third-progression that is analogous to the ascending/descending third modules at the surface of the subject.

The image displays three systems of musical notation, labeled 'a', 'b', and 'c'. System 'a' consists of a treble and bass staff with a dashed line connecting notes across measures. System 'b' consists of a treble and bass staff with chord symbols *i*, V_2^4 , i^6 , *V*, and *i* written below the bass staff. System 'c' consists of a treble and bass staff with triplets and other rhythmic markings.

Example 4.24. Graph of subject and reply, mm. 1–3

The voice leading at the outset of the second reprise is quite different. I previously discussed how the modular structure of the ascending/descending octave/third remains intact upon inversion. Example 4.25 shows a graph of the inverted subject and its reply. The most noticeable difference between the two reprises is that the subject no longer prolongs a single harmony. Additionally, the activation of a secondary dominant in the second half of each bar results in an unfolded tritone between the chordal third and seventh of this dominant seventh chord. A stepwise descent in the upper voice of the inverted subject and reply recalls the earlier stepwise descent in one of the voice-leading strands of the original subject; nevertheless, the voice leading of the second reprise reflects the more tonally active nature of the subjects themselves.

The image displays three systems of musical notation. System 'a' consists of a grand staff with treble and bass clefs. The treble clef part has a melodic line with a slur over measures 13-15. The bass clef part has a harmonic line with chords Gm: i, iv, and Bb: V7. System 'b' also consists of a grand staff. The treble clef part has a melodic line with a slur over measures 13-15. The bass clef part has a harmonic line with chords Gm: V, V⁷/iv, iv, V⁶/VII, and Bb: V⁷ I. The third system shows melodic lines in both treble and bass clefs, with measure numbers 13 and 15 indicated.

Example 4.25. Graph of inverted subject and reply, mm. 13–15

A few brief comments regarding the background structure will help to contextualize the various subject statements within the larger tonal plan (Example 4.26). The initial subject and reply prolong tonic, which is followed by a falling-fifths sequence leading to the dominant and the arrival of $\hat{2}$ in the *Urline* in m. 5. The modified subject statements in mm. 6–8 do not prolong a single harmony and link this major dominant to the minor dominant in m. 9. In m. 9 an modified subject statement in D minor prolongs that single harmony—in contrast to the previous three subject statements—and secures the minor dominant key area before proceeding to a PAC on the dominant to close the first reprise. The first two inverted subject statements in the second reprise are tonally active and eventually move toward the mediant in m. 17. In the upper voice, this move to

the mediant corresponds to a motion towards $B\flat$, which is understood as an upper neighbor to $\hat{2}$ of the *Urfine*. Measures 17–18 contain two inverted subjects that affect a modulation back to the tonic in m. 19. The return of the uninverted subject in m. 19 begins a descending motion in parallel tenths that leads to the dominant preparation for the final cadence. The analytic method I have developed in this thesis to describe modifications applied to subjects and their inversions in an rigorous and systematic manner at the surface of the music can, and should, be balanced with a larger consideration of how these subjects interact with the tonal structure across the whole composition.¹³

S = subject
 MS = modified subject (uninverted)
 IS = inverted subject

Example 4.26. Background graph

¹³ The parallels to fugal analysis are obvious. William Renwick (1995), Carl Schachter (1973), and Heinrich Schenker ([1926] 1996) have argued along similar lines for a broader perspective when dealing with contrapuntal works.

CHAPTER V

CONCLUSION

Throughout this thesis we have seen the multitude of ways in which subjects and their inversions are treated in Bach's keyboard suites. The most important motivating factor for modifications to an inverted subject is harmonic progression. These modifications result in several common harmonic progressions. The specific harmonic progression varies depending on whether a given subject statement is understood as a subject or reply. The most common progression for second-reprise inverted subjects is D–D–T. The harmonic progression of second-reprise replies can take a variety of paths, but most often contains a tonicization of the subdominant. When additional subject statements occur in either reprise their harmonic progression is modified to fit within the local harmonic context. These additional subjects often affect a modulation to a new key area or participate in a falling-fifths sequence.

While some modifications result in a change of harmonic progression, other modifications simply alter surface details. These types of modifications frequently involve substituting different members of the same triad, altering surface rhythm, changing the embellishing function of specific pitches, and other types of modifications that do not alter the harmonic progression of the subject. All subject modifications—

regardless of whether or not they alter the harmonic progression—can be understood as instances of varied repetition and motivic development.

The analytic method developed to describe these modifications can serve as a metaphor for the compositional process. While I am certainly not claiming that Bach worked through the method as described in the thesis, it is nevertheless suggestive to think that the process may have been similar. We could imagine Bach sitting at his keyboard, trying out different candidate inversions until he arrived at a satisfactory solution. By applying the method we are able to deepen our understanding of this commonly acknowledged, but little understood, phenomenon. The modifications applied to subject inversions can be accounted for in a systematic way, thereby elevating the description of inverted subjects from the traditional designation of *tonal inversion*. By applying the method we are able to specify with precision the ways in which a particular inversion is *tonal* as opposed to *real*. The method is not without its limits—as some of the more complex analyses have illustrated—but virtually any modification can be accounted for. The remainder of this chapter will offer suggestions for future research and conclude with some additional perspectives from which to view Bach's use of melodic inversion in the keyboard suites.

Additional Applications of the Analytic Method

While this thesis has focused on applying the analytic method to subjects from Bach's allemandes and courantes, future research could be carried out in a number of different directions. The first, and most obvious, direction for future research lies in the

analysis of gigue subjects from Bach's keyboard suites. The gigue subjects were purposely excluded from this thesis; however, gigue subjects are constructed in much the same way as subjects from the allemandes and courantes. Gigue subjects typically contain lengthier subject statements, and state the subject more often than allemandes and courantes, making them particularly good candidates for future study. The analytic method could also be applied to any of Bach's fugues or fugal movements that contain subject inversion such as the Fugue in D minor from Book One of the *Well-Tempered Clavier*. All subject inversions could be described as transformations of the original subject statement in a similar manner to that employed in the keyboard suites.

Although Bach's contemporaries utilized melodic inversion much less frequently, selected dances by other composers could be studied (see the discussion in the following section, "Historical Context," for examples). This would allow the opportunity to compare Bach's practice with that of his contemporaries. Looking beyond the Baroque period, fugal movements from the Classical period containing subject inversion could be examined. For instance, the final movement of Beethoven's Sonata in A-flat major, op. 109, contains a fugue whose subject is inverted.

In addition to analyzing other repertoires, the method itself could be expanded and refined. This thesis limited inversion to diatonic axes; however, a chromatic axis of inversion could also be utilized. This might prove useful in analyzing more chromatic repertoire. Additionally, new modifications could be developed to account for new and distinct situations frequently encountered in a given repertoire.

Now that the analytic potential of the method has been explored, I would like to return to the second potential application of the method discussed in Chapter II; that is, the compositional application. More specifically, the compositional application can be understood as a pedagogical tool for model composition. Present-day counterpoint textbooks that focus on eighteenth-century style frequently devote time to teaching students how to write binary keyboard suites and fugues (among other genres).¹ Discussion of melodic (or mirror) inversion is frequently taken up in regards to canon but is less often attached to subject inversion in binary dance forms.²

A potential pedagogical application would have students write binary dances incorporating melodic inversion in the second reprise. As a precursor to model composition, the method could first be applied analytically so that students gain an understanding of Bach's typical practice in the keyboard suites. Some of the modifications to the inversion students would discover analytically in second-reprise inverted subjects have been revealed in the course of this thesis: those motivated by the typical harmonic motion of the subject (D–D–T) and eventual move to the subdominant key area, the downward resolution of chordal sevenths, beginning and ending on root-position triads when the subject is stated in the bass voice, and various others. After composing their own subjects students could generate an unmodified inversion and then apply specific operations from the menu of modifications in response to particular harmonic, melodic, and stylistic constraints.

¹ See Gauldin 1988, Kennan 1999, Owen 1992, and Parks 1984.

² Notable exceptions are Owen 1992 and Parks 1984.

Additional Perspectives

Historical Context

In order to better understand Bach's use of melodic inversion within the larger historical context—and more specifically within the dance-suite genre—we should briefly consider whether the use of melodic inversion in the second reprise of dance movements is a practice found exclusively in Bach's keyboard suites. A brief survey of keyboard suites written by Bach's contemporaries reveals that Bach was not alone in his use of melodic inversion in the second reprise. However, few composers use inversion in such a systematic and consistent manner as Bach.³ When other composers utilize melodic inversion in the second reprise of their keyboard suites they typically do so only in giges.

Although the suites of Johann Jacob Froberger (1616–1667) predate those of Bach, they are significant to the German reinterpretation of the French dance suite. More specifically, Froberger's motivic technique of implicit inversion in the second reprise has been cited as an important precursor to the development of Bach's double-fugue giges⁴ (Danckert 1924, 92). Although Froberger's dances are considerably shorter and less thematically rigorous than Bach's, implicit melodic inversion is present in at least fifteen dances.

The suites of Johann Adam Reincken (1623–1722) contain several instances of explicit melodic inversion of a subject. All six of the giges from Reincken's *Hortus*

³ Among the keyboard suites of Bach's direct contemporaries such as George Friderich Handel, Johann Kuhnau, Dietrich Buxtehude, and Georg Böhm, inversion is not used with any degree of consistency.

⁴ A double-fugue gigue employs an inverted subject in the second reprise.

Musicus (a collection of dance movements for chamber ensemble) and three giges from Reincken's keyboard suites utilize explicit melodic inversion of the subject in the second reprise.⁵ Additionally, implicit inversion is present in eight other dances (allemandes, courantes, giges) from the keyboard suites. It is well known that Bach admired Reincken, and even transcribed some of his works for solo keyboard.⁶ There is no evidence to suggest that Reincken's giges served as a model for Bach's use of melodic inversion, but it is nevertheless interesting to note the connection.⁷

Binary Form and Parallel-Section Constructions

The harmonically active nature of second-reprise subjects seems perfectly appropriate when one places them in the context of typical expectations for a movement in binary form. One expects the opening of the second reprise—typically on the dominant—to be less stable than the opening of the first reprise. Eventually, the tonal stability of the home key is restored toward the end of the second reprise. However, this view of binary form is more congruent with Classical-era models where issues of tonal stability and thematic contrast play a larger role. In the Classical-era binary form the

⁵ The keyboard suites whose giges utilize melodic inversion are as follows: Suite no. 4 in C major, Suite no. 7 in G major, and Suite no. 8 in B-flat major.

⁶ Bach's Sonata in A minor (BWV 965) is a transcription of Reincken's first Partita from *Hortus Musicus*. Bach's Sonata in C major (BWV 966) and Sonata in B-flat major (BWV 954) are additional transcriptions of Reincken's partitas.

⁷ Wolff (1986) discusses the importance of Bach's arrangements of Reincken's works—in addition to his arrangements of Italian trio sonatas—as important to the evolution of Bach's fugal writing but mentions nothing regarding giges. Schulenberg (2006), however, downplays this influence: "Even if the arrangements were an act of personal homage to a respected older musician, their existence does not necessarily indicate Reincken's particular influence on Bach" (90).

opening of the second reprise is typically loosely related to the original thematic material (if at all), and the return of this original material is often withheld until later in the second reprise. This results in what is commonly called a rounded binary form. This Classical-era conception of binary form—and its subsequent conceptual refinement continuing to the present day—can be retrospectively applied to binary forms from the Baroque with varying degrees of success.⁸ The second reprises in Bach’s binary dance forms always begin with the opening thematic material, and therefore project a stronger sense of thematic parallelism between the two reprises.

Joel Lester (2001) offers an alternative perspective from which to view Bach’s binary forms. Lester argues that most of Bach’s compositions, regardless of genre, are based on three constructive principles: (1) the opening of a piece states material that is worked with throughout the composition; (2) recurrences of this material exhibit a heightened level of activity in some or all musical elements; and (3) movements subdivide into roughly parallel sections within which these heightened levels of activity occur (Lester 2001, 52–3). When Bach’s binary dances are reinterpreted through Lester’s notion of “parallel-section constructions” we can interpret all of the features associated with second-reprise subjects as instances of a “heightened level of activity”: the use of melodic inversion, the use of contrapuntal inversion, modifications to the subject inversion, the recurrence of additional subject statements after the opening of the reprise, and the more active tonal plan. Not only does this perspective allow us to better

⁸ Many textbooks on musical form regularly place binary dances by Bach, and minuets by Haydn, under the heading “binary form” (Green 1979, 167–77). While it is certainly true that both Bach’s and Haydn’s binary forms share many similarities, subtle differences also arise. It is these differences that are interesting to reflect upon.

understand the compositional processes at work in the keyboard suites—and more specifically the use of melodic inversion—it also allows us to connect Bach’s keyboard suites within an overarching process operative in most of Bach’s compositions.

Perception

The way in which we perceive the inverted and/or transposed subject as a varied repetition of the original subject has important ramifications for the aural perception of the work as a whole. David Beach relates an interesting anecdote concerning the importance of motivic repetition in Bach’s keyboard suites:

One of my professors announced to his class on Form that he wanted us to listen to a short composition he was going to perform on the piano, and to identify what, if anything, might be lacking in it. He proceeded to play what we all assumed was a suite movement by Bach, an Allemande, as I recall. Actually, what he played was a hybrid formed by juxtaposing the first part of one Allemande with the second part of another one in the same key. It was only with subsequent hearings that the “problem” became evident. The two parts were not compositionally linked in any way. That is, the hybrid form lacked motivic integrity. (Beach 2005, 3)

The above anecdote raises some interesting questions, namely, by what criteria does a listener evaluate the similarity of melodies, and do inversion and/or transposition affect the perception of melodic similarity? Research in cognitive science has identified contour as one of the most important factors in determining the similarity of melodies.⁹ Additional studies have focused on recognizing transposed melodies,¹⁰ but no one has yet studied in depth the perception of inverted melodies (which may, or may not, be

⁹ See Dowling 1994, Deutsch 1999.

¹⁰ See Marvin 1999.

transposed).¹¹ A more detailed study of the perception of inverted melodies could not only address the cognitive processes involved, but could also compare listeners' ratings of similarity between second-reprise subjects that are simply transposed against those that are inverted as well as transposed. Additionally, the effects of an unmodified, versus modified, inversion on the perception of similarity could be studied. One would imagine there is a threshold of modification, beyond which the similarity to the original is no longer recognizable.

Analogies

In addition to investigating the perception of melodic similarity between first- and second-reprise subjects, we might also investigate analogies between subjects and their replies by exploring the ways in which they “do the same thing” in different ways. The above phrase, “do the same thing,” is taken from work done by Douglas Hofstadter on analogies. Hofstadter and his colleagues have developed several computer programs whose purpose is to model the cognitive process of analogy making. The first of these programs is called Copycat and is designed to solve analogy problems involving letter-strings like the following: “Suppose the letter-string *abc* were changed to *abd*; how would you change the letter-string *ijk* in ‘the same way’?” (Hofstadter & Mitchell 1995, 206). The most common answer is *ijl*. In the first pairing (*abc*→*abd*) the rightmost letter was changed to its alphabetic successor. This operation is then applied to the next string

¹¹ Dowling's (1971) brief article, “Recognition of Inversion of Melodies and Melodic Contours,” is a notable exception, however, the melody used in this experiment was merely five pitches in length and was only subjected to two inversions and two transpositions. Dowling concludes that interval sizes and contour function independently of each other. In inverted melodies, interval size is still recognizable even though the contour is inverted.

(*ijk*→*ijl*). There are of course other possible answers, one of which would be to invoke a literal—or “smart-aleckey” as Hofstadter calls it—operation defined as replacing the rightmost letter with *d*. This yields an answer of *ijd*, which seems less satisfying than the first answer posited.

A related program that grew out of Copycat is called Tabletop.¹² In the Tabletop domain, two people are seated across from each other at an ordinary coffeehouse tabletop. This tabletop contains common objects—cups, glasses, plates, forks, knives, spoons, etc.—in various spatial arrangements. The basic idea is that two people sit across from each other and pose “do this” puzzles that involve touching various objects on the table. (The names Henry and Eliza are used for the two people seated across from each other.) For instance, if Henry touches his coffee cup and says, “do this,” Eliza touches her coffee cup. But what if Eliza does not have a coffee cup on her side of the table but instead has a water glass? In this instance the coffee cup and water glass are analogous because they each belong the same category (cup and glass are both drinking vessels).

So what does all of this have to do with inversion in Bach’s keyboard suites? The same type of “do this” puzzles could be posed regarding subjects. Let’s consider the now-familiar subject of the Courante from the French Suite in D minor (Example 5.1a). One could pose a problem like the following: Given a subject *S*, “do the same thing.” By answering this problem in a literal fashion we would arrive at the subject shown in Example 5.1b. This answer is identical to the reply, whose pitches are exactly the same as the original subject. However, when the reply is placed in the bass voice, the resulting

¹² See Hofstadter & French 1995.

harmonic progression differs from the original subject even though the pitches are the same. Therefore, the reply “does the same thing” as the subject but functions in a different way.

a subject S
 Dm: T D T

b literal
 (change of context)
 Dm: T S T

c T-D-T
 in home key
 Dm: T D T

d T-D-T
 A: T D T

e begins on normative harmony,
 contains a dominant-function chord,
 ends on tonic
 Dm: D D T

Example 5.1. Subject analogies; Courante, French Suite in D minor

A similar problem could be posed: given a subject S , “do the same thing” under inversion. In order to “do the same thing” we must first define the characteristics of the subject so that we can apply those same characteristics to the inversion. If we were to define the subject as *expresses a complete T-D-T motion in the home key*, then the solution might look like Example 5.1c. This makes a good analogy but does not fit with what we know to be the tonal conventions of a binary dance form. If we redefined the subject as *expresses a complete T-D-T motion* (eliminating the phrase *in the home key*) then we would be free to transpose the inverted subject to the dominant key area as

shown in Example 5.1d. While the analogy is again clear, this is not the typical tonal motion present in Bach's inverted subjects. If we continue refining our definition of the subject so that it will produce the desired result—that is, Bach's actual inverted subject—our definition of the subject would be *begins on the normative harmony of the respective reprise in a binary dance form, contains a dominant-function chord, and ends on tonic*. This definition would yield the result shown in Example 5.1e. In applying the above definition, the subject and its inversion are allowed to begin with their respective harmonies according to the conventions of binary form—tonic for the first reprise, dominant for the second reprise—and each contains a dominant function chord and each ends on tonic. The ways in which the inverted subject differs from a one-to-one mapping of the subject under inversion and transposition reveals how the inverted subject “does the same thing” in a different way.¹³

To complete our discussion of analogies we could also form a “do this” puzzle in the second reprise by taking the inverted subject as our starting point (Example 5.2a): Given an inverted subject *IS*, “do the same thing.” The literal solution to this problem is shown in Example 5.2b. In order to make a less rigid analogy we must once again define the characteristics of the subject. Let's see what happens if we define the inverted subject as *expresses a D–D–T motion in the home key*. This definition of the inverted subject yields the same literal response shown in Example 5.2b. If we redefine the inverted subject as *expresses a D–D–T motion* (eliminating the phrase *in the home key*) then we are free to transpose the inverted subject to another tonal area. If we take Bach's practice

¹³ In this example the last three pitches differ from a one-to-one mapping: G[♯] is used instead of G[♮], and the final pitch is F rather than A.

as our guide this other tonal area is the subdominant. This solution is shown in Example 5.2c and matches Bach’s actual reply to the inversion. Once again, we can see that the answer to the problem “does the same thing” in a different way.

Example 5.2 consists of three staves of musical notation, each with a label to its right. Staff (a) is in treble clef, 3/4 time, and shows a sequence of notes: A4, Bb4, C5, D5, E5, F5, G5, A5. Below the staff are the chords: Dm: D, D, D, T. The label to the right is "inverted subject *IS*". Staff (b) is in bass clef, 3/4 time, and shows a sequence of notes: F4, G4, A4, Bb4, C5, D5, E5, F5. Below the staff are the chords: Dm: D, D, D, T. The label to the right is "literal & D–D–T in home key". Staff (c) is in bass clef, 3/4 time, and shows a sequence of notes: Bb3, C4, D4, E4, F4, G4, A4, Bb4. Below the staff are the chords: Gm: D, D, D, T. The label to the right is "D–D–T".

Example 5.2. Inverted subject analogies; Courante, French Suite in D minor

By incorporating these additional perspectives we are able to broaden our understanding of Bach’s treatment of subject inversion in the keyboard suites. The rigorous methodology developed and employed throughout much of this thesis allows us to examine the compositional details at the surface of the music with precision. When these surface details are then contextualized by taking into account the voice-leading structure, use of varied repetition, historical context, form, aural perception, and analogies between various forms of the subject, we gain a richer understanding of the myriad of forces that affect subject inversion.

APPENDIX:

ALLEMANDE, ENGLISH SUITE IN G MINOR (SCORE)

Measures 1-2 of a piano piece. The music is in 7/8 time and B-flat major. The right hand features a melodic line with eighth and sixteenth notes, while the left hand provides a rhythmic accompaniment with eighth notes.

Measures 3-4. Measure 3 begins with a triplet of eighth notes in the right hand. The piece continues with a steady eighth-note accompaniment in the left hand.

Measures 5-6. Measure 5 contains a triplet of eighth notes in the right hand. Measure 6 features a trill in the right hand. The left hand continues with eighth-note accompaniment.

Measures 7-8. Measure 7 continues the eighth-note accompaniment in the left hand. Measure 8 features a half note in the right hand, marking the end of a phrase.

Measures 9-10. Measure 9 continues the eighth-note accompaniment in the left hand. Measure 10 features a half note in the right hand, marking the end of a phrase.

Measures 11-12. Measure 11 begins with a half rest in the right hand. Measure 12 features a half note in the right hand, marking the end of a phrase. The piece concludes with a double bar line.

13

Musical notation for measures 13 and 14. The system consists of a treble clef staff and a bass clef staff. The key signature has two flats (B-flat and E-flat). Measure 13 features a complex melodic line in the treble with many accidentals and a steady eighth-note accompaniment in the bass. Measure 14 continues the melodic development with a fermata over the final note.

15

Musical notation for measures 15 and 16. The treble staff shows a melodic line with a fermata on the final note of measure 15. The bass staff provides a consistent eighth-note accompaniment.

17

Musical notation for measures 17 and 18. The treble staff has a melodic line with a fermata on the final note of measure 17. The bass staff continues with eighth-note accompaniment.

19

Musical notation for measures 19 and 20. The treble staff features a melodic line with a fermata on the final note of measure 19. The bass staff has a more active eighth-note accompaniment.

21

Musical notation for measures 21 and 22. The treble staff has a melodic line with a fermata on the final note of measure 21. The bass staff continues with eighth-note accompaniment.

Musical notation for measures 23 and 24. The treble staff has a melodic line with a fermata on the final note of measure 23. The bass staff continues with eighth-note accompaniment. The system ends with a double bar line and repeat dots.

BIBLIOGRAPHY

- Beach, David. 2005. *Aspects of Unity in J. S. Bach's Partitas and Suites: An Analytical Study*. Rochester, NY: University of Rochester Press.
- Beck, Hermann. 1966. "The Suite." In *Anthology of Music*, vol. 26, trans. Robert Kolben. Cologne: Arno Volk.
- Berry, David Carson. 2002. "On Teaching 'Tonal Mirror Counterpoint:' A Guide to Concepts and Practice." *Journal of Music Theory Pedagogy* 16: 1–56.
- Danckert, Werner. 1924. *Geschichte der Gigue*. Leipzig: Kistner and Siegel.
- Deutsch, Diana. 1999. "The Processing of Pitch Combinations." In *The Psychology of Music*, 2nd edn., ed., Deutsch, 349–411. San Diego: Academic Press.
- Deutsch, Diana, and John Feroe. 1981. "The Internal Representation of Pitch Sequences in Tonal Music." *Psychological Review* 88/6: 503–22.
- Dowling, W. Jay. 1971. "Recognition of Inversion of Melodies and Melodic Contours." *Perception and Psychophysics* 9/3B: 348–49.
- _____. 1994. "Melodic Contour in Hearing and Remembering Melodies." In *Musical Perceptions*, ed. Rita Aiello and John Sloboda, 173–90. New York: Oxford University Press.
- Drabkin, William. 2001. "Inversion." In *The New Grove Dictionary of Music and Musicians*, ed. Stanley Sadie and John Tyrell, 12: 512–3. London: Macmillan.
- Gauldin, Robert. 1988. *A Practical Approach to Eighteenth-Century Counterpoint*. Prospect Heights, IL: Waveland Press.
- Green, Douglas. 1979. *Form in Tonal Music: An Introduction to Analysis*. 2nd edn. New York: Holt, Reinhart, and Winston.
- Gove, Philip Babcock, ed. 1981. *Webster's Third New International Dictionary of the English Language Unabridged*. Springfield, MA: G. & C. Merriam Company.

- Hofstadter, Douglas, and Robert French. 1995. "Tabletop, BattleOp, Ob-Platte, Potelbat, Belpatto, Platobet." In *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought*, 323–58. New York: Basic Books.
- Hofstadter, Douglas, and Melanie Mitchell. 1995. "The Copycat Project: A Model of Mental Fluidity and Analogy-making." In *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought*, 205–73. New York: Basic Books.
- Kennan, Kent. 1999. *Counterpoint Based on Eighteenth-Century Practice*. 4th edn. Upper Saddle River, NJ: Prentice Hall.
- Kim, Scott. 1981. *Inversions: A Catalog of Calligraphic Cartwheels*. Peterborough, NH: BYTE Books.
- Lester, Joel. 2001. "Heightening Levels of Activity and J. S. Bach's Parallel-Section Constructions." *Journal of the American Musicological Society* 54/1: 49–69.
- Little, Meredith, and Natalie Jennie. 2001. *Dance and the Music of J. S. Bach*. Expanded edn. Bloomington: Indiana University Press.
- McConkie, James. 1950. "The Keyboard Suites of J. S. Bach: A Consideration of the Horizontal and Vertical Elements Found Therein." Ph.D. dissertation, Columbia University.
- Marvin, Elizabeth West. 1997. "Tonal/Atonal: Cognitive Strategies for Recognizing Transposed Melodies." In *Music Theory in Concept and Practice*, ed. James Baker, David Beach, and Jonathan Bernard, 217–36. Rochester, NY: University of Rochester Press.
- Owen, Harold. 1992. *Modal and Tonal Counterpoint: From Josquin to Stravinsky*. Belmont, CA: Wadsworth.
- Parks, Richard. 1984. *Eighteenth-Century Counterpoint and Tonal Structure*. Englewood Cliffs, NJ: Prentice-Hall.
- Renwick, William. 1995. *Analyzing Fugue: A Schenkerian Approach*. Stuyvesant, NY: Pendragon Press.
- Rothstein, William. 1991. "On Implied Tones." *Music Analysis* 10/3: 289–328.
- _____. 2006. "Transformations of Cadential Formulae in the Music of Corelli and His Successors." In *Essays from the Third International Schenker Symposium*, ed. Allen Cadwallader, 245–78. Hildesheim: Georg Olms.

- Schachter, Carl. 1973. "Bach's Fugue in B-flat Major, Well-Tempered Clavier, Book I, No. XXI." *Music Forum* 3: 239–67.
- _____. 1990. "Either/Or." In *Schenker Studies*, ed. Hedi Siegel, 165–79. Cambridge: Cambridge University Press.
- Schenker, Heinrich. [1926] 1996. "The Organic Nature of Fugue as Demonstrated in the C-minor Fugue from Bach's Well-Tempered Clavier Book I," trans. Hedi Siegel. In *The Masterwork in Music: A Yearbook*, vol. 2., ed. William Drabkin, 106–17. Cambridge: Cambridge University Press.
- Schoenberg, Arnold. 1969. *Structural Functions of Harmony*. Revised edn., ed. Leonard Stein. New York: W. W. Norton.
- Schulenberg, David. 2006. *The Keyboard Music of J. S. Bach*. 2nd edn. New York: Routledge.
- Siegele, Ulrich. 1960. "Die musiktheoretische Lehre einer Bachschen Gigue." *Archiv für Musikwissenschaft* 17/2–3: 152–67.
- Smith, Peter. 1995. "Structural Tonic or Apparent Tonic?: Parametric Conflict, Temporal Perspective, and a Continuum of Articulative Possibilities." *Journal of Music Theory* 39/2: 245–83.
- Wen, Eric. 1999. "Bass-Line Articulations of the *Urfuge*." In *Schenker Studies 2*, ed. Carl Schachter and Hedi Siegel, 276–97. Cambridge: Cambridge University Press.
- Wolff, Christoph. 1986. "Johann Adam Reinken and Johann Sebastian Bach: On the Context of Bach's Early Works." In *J. S. Bach as Organist: His Instruments, Music, and Performance Practices*, ed. George Stauffer and Ernest May, 57–80. Bloomington: Indiana University Press.
- _____. 1991. "Text Critical Comments on the Original Print of the Partitas." In *Bach: Essays on His Life and Music*, ed. Wolff, 214–22. Cambridge, MA: Harvard University Press.