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Moving early music: Improvisation and the work-concept in seventeenth-century French keyboard performance

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Citation
Edwards, M. T. C. (2021, January 7). *Moving early music: Improvisation and the work-concept in seventeenth-century French keyboard performance*. Retrieved from https://hdl.handle.net/1887/138943

Version:	Publisher's Version
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Title: Moving early music: Improvisation and the work-concept in seventeenth-century French keyboard performance
Issue Date: 2021-01-07

Chapter Four: Inductive Improvisation

Learning to improvise in a given style can feel like a mammoth task. After all, for most of Western musical history, performers and composers were primarily responsible for working in a single musical style; they learned this style from their earliest days as a result of their continual immersion in a particular geographical and historical setting, and as they reached maturity, their own style emerged as an inflection of a common musical language.[1] We, however, as twenty-first century musicians, cannot possibly recreate this same experience, constantly surrounded as we are by a multitude of different cultures and styles. We develop tremendous stylistic breadth at the expense of a deep mastery of any particular style: say, for example, the style of mid-seventeenth-century *clavecinistes* like Chambonnières.

In attempting to improvise in an historical style, I fully accept the impossibility of perfectly recreating the conditions under which a young harpsichordist may have learned to improvise in seventeenth-century France. After all, I cannot go back in time to "re-do" my formative musical training in a manner more conducive to my research aims. Moreover, historical improvisation has no more claim to "authenticity" than any other kind of musical performance. Nevertheless, following principles of HIP, I can attempt to recreate some of the experiences and stimuli that might have formed the young harpsichordist's education, and thus follow a course of study similar to their own. In this way, I can at least develop an historically *inspired* improvisational style, guided by historically *inspired* pedagogical techniques (Mooiman and de Jong 2016). Even though my sensitivity to these

[1] Indeed, Gjerdingen's project in *Music in the Galant Style* is predicated on the existence of a common musical language, shared between musicians and audiences. Of course, an individual musician could also work in several different styles, as in the case of musicians writing in the galant style for the court and in *stile antico* for the church. Nevertheless, this stylistic diversity pales in comparison to the postmodern plurality of styles in which contemporary musical life now takes place.

stimuli will no doubt be dull in comparison to that of a child, it is the effort and intention behind the activity that count most. Through this process—of intending to improvise using historical methods and techniques, and of seeing, hearing, and using historical repertoire as a repository of improvisational artifice—I defamiliarize my own usual practice as a performing musician, as well as the music that I play or improvise. As I argued in Chapter One, this is an essential part of how HIP-as-method ultimately leads to new styles of performance.

A central goal of my research is to understand music by Chambonnières as embodied improvisational knowledge, and to be able to engage with that knowledge through performance: in other words, to refamiliarize this repertoire within my own practice. An important sub-goal of my research, therefore, is to learn how to improvise in the style of Chambonnières. But, how exactly should I go about learning such a thing? And, once learned, how can I describe or articulate this type of knowledge in a form that can be written down and shared, such that it might be useful to other musicians and scholars? The previous chapter focused on developing a theoretical and analytical frame for understanding historical improvisation as activity, and it concluded with some general recommendations for applying that frame to the music of Chambonnières. In the present chapter, I document and analyze my own attempts at learning to improvise in Chambonnières's style, focusing on the improvisation of the most frequently occurring genre in his oeuvre, the courante. After some methodological reflections, I will describe the various steps I took in tailoring my pedagogical approach. An experimental phase of practice eventually leads to codifying a discrete set of schemata that I use to analyze my corpus of twenty-seven courantes. Using a python library for computational musicology (music21), I design software that programmatically creates a variety of pedagogical exercises, modeling in part the expert knowledge of a *maestro*, and I use these exercises to develop my skill in improvising.

Methodological Considerations

First, we need to make some distinctions about the kinds of knowledge I am generating through my research. While gaining some declarative knowledge (knowing-that) about a piece's improvisational elements and techniques will be helpful, my focus here will be on describing procedural knowledge (that is, knowing-how). As I put forward in Chapter Two, music like Chambonnières's may be productively read as the *entextualization* of an improvisational practice, frozen in notation and removed from its original discourse. What I propose in the present chapter, then, is to engage in what Moseley (2013) termed an *archaeological* mode of interaction with these entextualized utterances, in which I attempt to understand the text as *material*, created by living agents employing complex skills. Such material consists not of a specific set of notes and rhythms on the page, but rather of a collection of improvisational processes, procedures, and ideas that might potentially generate a piece once set in motion through performance. Procedural improvisational knowledge thus grants me access to the embodied activities and processes represented in the musical text, and allows me to engage creatively with them.

Another useful distinction here is that of tacit (or implicit) vs. explicit knowledge. Explicit knowledge is the more straightforward of the two, easily codified and transferred through writing or verbal interaction. Tacit knowledge, on the other hand, defies easy codification or articulation: or as Michael Polanyi, the polymath who originated this concept, puts it, "we can know more than we can tell" (1966, 4). Tacit knowledge is created through the accumulation of personal or social experiences, and can usually only be transferred from one individual to another through long periods of shared interaction.[2] David Sudnow's *Ways of the Hand* (2001) is an unusually perceptive and

[2] Obviously, the degree of social interaction necessary for the development of such knowledge is relative to the complexity of the task. Learning to tie one's shoelaces, for example, takes relatively little time, while learning to improvise in a particular style takes far longer. All of these kinds of learning depend, however, on social situations employing "the pupil's intelligent co-operation for catching the meaning of the demonstration" (Polanyi 1966, 5).

successful example of how this type of knowledge can be verbalized. Through phenomenological analysis, he unpacks the content of his experience to articulate the tacit dimensions of how he learned to improvise. Usually, though, many aspects of tacit knowledge entirely resist verbalization, and the only effective way to convey this knowledge is through shared experience. Sudnow, for one, also needed to rely upon photographs of his hands on the keyboard in order to explain his experience, and moreover, these illustrations remain a poor substitute for re-creating the experience for oneself at the piano.

Many musicians have over time attempted to codify the tacit knowledge of the composer-performer-improviser, transforming practice and experience into general principles and recommendations for amateurs.[3] Conversely, the partimento tradition of instructional figured and unfigured basses, described in the previous chapter, sought to convey tacit knowledge through a long, curated chain of experiences. By confronting the student with a graded series of instructional bass lines to realize with the assistance of their maestro, the Neapolitan conservatories created the appropriate conditions for students to gain an improvisational skillset. Although this method of instruction took far longer to carry out than explicit, rationalized methods, it had the advantage of not reducing the complexity of musical practice to fit a simple explanation.[4] Contrary to the familiar adage that the way is "long by precepts, short by example," in the case of partimento instruction, the way by example is both long and deep.

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[3] Such treatises reached a highpoint in popularity in the mid-eighteenth century. J.F. Daube's *Generalbass in drey Accorden*, published in 1756, is an excellent example of this tendency: it reduces the enormous complexity of compositional practice, including dissonance treatment and voice leading, by deriving all harmony from only three basic chords (Wallace 1983).

[4] Someone following a rationalized method like Daube's would, of course, complete their course of study more rapidly than a student at a Neapolitan conservatory. They would, however, also miss out on the nuance. As Holtmeier puts it, the partimento tradition "does not seek to deduce harmony and melody, line and sonority (*Klang*), chord and counterpoint from a single coherent principle, as Rameau does, but permanently works through the tension between those poles in a dialectical way" (2007, 43).

What then should be the starting point in my search for tacit knowledge? How do I decide on what constitutes the style of Chambonnières? Should I look for seventeenth-century French treatises describing composition and follow their recommendations? Or should I begin with the pieces themselves to observe their style? As I argued earlier, historical improvisers develop their knowledge (and know-how) through the controlled interaction of an exemplar (or a body of exemplars) and an analytical, theoretical, musical frame. There is always a (productive) tension between these two forms of knowledge. On the one hand, the exemplar invites the improviser to discover its secrets intuitively and apply them to one's own work. The analytical frame, on the other hand, provides rules, principles, and guidance by which the improviser can create music. The distinction at play here is analogous to that of deductive (top-down) and inductive (bottom-up) reasoning. A deductive approach to learning improvisation would begin with some general principles of music-making, and based on those principles, elaborate a logically consistent set of recommendations and constraints, forming a theory of improvisation. An inductive approach, on the other hand, would begin with particular examples and generalize recommended practice based on observation. Jean-Philippe Rameau, for example, developed a largely deductive theory of musical composition in the *Traité* of 1722, in which he traces a number of general principles to a natural origin.[5] Johann David Heinichen, on the other hand, uses his compendious *Der Generalbass in der Composition* of 1728 to develop an inductive theory of musical composition, directly based on the example of established musical practice, founded upon "rules of art" (*Arth-Regeln*) (Holtmeier 2007, 43).

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[5] Of course, books three and four of the *Traité* on composition and accompaniment, respectively, are driven by largely practical concerns, and the pedagogy they propose is generated inductively from Rameau's musical practice. Christensen identifies within Rameau's theory a "rich dialectical interplay . . . between musical and cultural forces, between the 'internal' problems of musical practice and pedagogy that he addressed, and the 'external' ideas and language indigenous to the French Enlightenment by which he solved them" (1993, 4). As Holtmeier notes, however, this balance between internal and external shifts heavily towards the latter from 1726 onward, in which the "*basse fondamentale* becomes the paramount principle which usurps even musical practice" (2007, 12).

At which end should I start? I probably ought to start somewhere in the middle, of course, since these two modes of reasoning can also mix. More generally, inductive observations will always necessarily be influenced by the observer's existing analytic frame, and those observations will also eventually generate change within that same frame. I may begin by approaching a particular exemplar inductively, working with it intuitively to transform and re-use it in my own improvisations. This intuition is, of course, an *informed* intuition, shaped by my artistic experience as a performer and improviser, and more specifically, by my own pre-existing base of various kinds of (tacit) knowledge. Eventually, upon reflection, I may (though not necessarily) develop analytical insight into how this particular exemplar works, both in the form of knowing-about and knowing-how. I may also gain various forms of tacit and/or embodied knowledge through the experience of playing and improvising with the exemplar, thus effecting change within my own informed intuition. After accumulating enough of these insights with enough exemplars, I may eventually discern some more general guidelines concerning the exemplars' handling of counterpoint, harmony, rhythm, melody, or phrase structure. From these guidelines, I may then be able to deduce new ways of dealing with my musical material apart from those discovered in the exemplars. And finally, through this newly acquired analytical frame and its accompanying set of embodied experiences, I can both generate new improvisational exemplars, as well as re-analyze existing exemplars, thus starting the whole process anew.

The Corpus

Given the centrality of the exemplar to the entire enterprise of historical improvisation, the specific source of chosen exemplars is therefore of critical importance. While it is true that compositional-improvisational procedures may reappear across diverse genres—particularly, in the case of Chambonnières, across the many dance genres that constitute his nearly exclusive output—it is nevertheless the case that different genres of music demand slightly different skillsets from the

improviser. Of course, all dance genres rely on a generalized skillset, including skills like making good counterpoint, controlling modulation, etc., but each genre also tends to have a special quirk. The allemande, for example, relies upon imitative control, while the sarabande relies on effective variation of texture and melodic ornamentation.[6] Among the various dance types, however, the courante reigns supreme in Chambonnières's oeuvre: of the sixty pieces in Chambonnières's two published book of harpsichord music, twenty-seven of them are courantes, and the courante is also the most frequently occurring genre in Chambonnières's manuscript sources. The genre's prevalence here is a testament to its popularity in seventeenth-century France, first in the ballet, and later under Louis XIV as the most important component of the court ball (Little and Cusick 2001).

Beyond its importance to Chambonnières, the courante also presents unique challenges as an improvised genre. The most important element of the courante is undoubtedly its rhythmic and metrical complexity. Written in 3/2 meter, keyboard courantes, including those by Chambonnières, are effectively études in hemiola, as they constantly vacillate between a clear triple meter (3/2) and a duple one (6/4). A great deal of a particular courante's musical interest, therefore, is wrapped up in the manner in which this rhythmic complexity is expressed. Will meter changes be clear, or ambiguous? Will they happen simultaneously in all voices (particularly bass and treble)? By what musical devices (ornamentation, rhythmic detail, texture) will the meter be expressed? These are essential questions in determining how successfully a given courante represents and plays with its own genre.[7] It is worth recalling in this connection the example of D'Anglebert's recomposition of

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[6] I will return to the improvisation of allemandes and sarabandes in Chapter Five.

[7] If we think in terms of improvisational reworking, the question of what "material" or "content" a dance movement consists in becomes important. What material is any given courante reworking? For a courante to "play with" its genre, then, is for it to use the courante genre itself—including all of its usual generic expectations—as its primary material. Margot Martin (1996), for example, has discussed the question of the "content" of dance music. In the case of character pieces, the music's content is often related to the character or affect in question. Martin argues, however, that in the case of dance music without any additional appellation, the music's primary content is its own genre: that is, the piece expresses itself through its play with the rhythms and gestures proper to the dance type. Laurence Dreyfus (2004) makes a very similar point with respect to the music of J.S. Bach, who composes "against the grain" of particular genres. Bach

Chambonnières, discussed in Chapter One. In many of D'Anglebert's interventions, particularly in courantes, his chief aim seems to have been to clarify, finesse, or entirely alter metrical detail in Chambonnières's score, relying upon ornamentation and rhythmic or textural alteration to suppress or introduce a hemiola.

The courante relies upon rhythmic and metrical control for the improviser as well. Given that improvising is something that happens in real time, this makes mastering such control an even more difficult task.[8] It is for this reason that I find the courante, of all genres represented in Chambonnières's works, the most tantalizing. I freely admit that rhythmic control is the weakest element of my own improvisational practice. Working with courantes will thus afford me the opportunity to learn new rhythmic skills from scratch, all while becoming deeply familiar with the dance type most central to Chambonnières's work as a composer/performer/improviser. In this chapter, therefore, I take the twenty-seven courantes from Chambonnières's two published books of harpsichord pieces as my corpus. I have chosen these pieces because they come from a source close to the composer, and as such, they provide a wealth of performerly detail (as discussed in Chapter Two) from which I can also learn.

An Initial Analytical Frame

So, how should I begin to understand my corpus? How do I begin to see through the score to the improvisational techniques and gestures contained within? As I argued above, any attempt to understand an exemplar necessarily begins from an analytic frame. In this case, I have constituted an

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thus defines his music, in part, by his thwarting of the usual expectations surrounding dance genres.

[8] Strobbe and Regenmortel (2012) understand this as an issue of "feedforward:" that is, the pre-hearing, feeling, and playing of improvised material before it is actually played in time. This means that a large part of learning to improvise is in learning to control and accelerate the passage between something imagined or "pre-heard" to something played in real time. Obviously, the more rhythmically complex the material, the more difficult this passage becomes.

historically-informed analytic frame according to the recommendations formed in the previous chapter. First, however, a word about different types of analysis.

A musical analysis, if done well, sheds light on some facet of a composition. It might describe how a listener (real or ideal) hears the music, or explain the piece's formal functions, or even, in the case of Schenkerian analysis, seek to explicate the piece's gradual unfolding or enactment of tonality. The goal of my analysis, however, is to uncover techniques, structures, and principles of use to improvisers, and to internalize them through practice. To that end, I rely on a number of simple analytical tools (like figured bass) that describe individual sonorities or the connections between those sonorities (voice leading), but critically, these tools are usually not an end in themselves. Rather, the idea is to describe improvisational processes at the same level of detail as experienced by the players themselves in the course of improvising, whether consciously or not.

I fully accept that this goal is an elusive one. For one thing, as described by Callahan (2010, 31), the improviser may not be consciously focusing on the same kinds of detail at all times; their attention may on occasion shift from large-scale formal concerns (is it time to modulate to the dominant?) to lower-level concerns of texture or ornamentation. Moreover, to fully encompass *all* the musical decisions steered by the player, including the unconscious ones, would necessarily result in an unwieldy analysis. Nevertheless, I think we can identify in each improvisation a critical level of performative awareness coupled with a particular improvisational technique, what William Porter calls a "generating principle" (2002, 72). The early North German *praeambulum* that Porter describes achieves its effect through the alternation of different generating principles, stereotypically linked to different portions of the piece's form. For example, the piece's opening "exordium" is governed by "harmonic progression," while the following section is governed by "dialogue employing various figures" (Porter 2000, 32). From some of my formative lessons with Porter, I recall a similar approach to the improvisation of fugues. He taught the exposition, for example, as a succession of

generating principles: after the initial subject entry, we accompanied the answer using primarily thirds and sixths in two-voice counterpoint; subsequent subject entries were treated as either a harmonized bass (for entries in the lowest voice) or melody (for entries in the highest voice). Thus, from moment to moment, the improviser is occupied with a succession of generating principles, and out of this concatenation of principles evolves a larger form.

In the case of relatively short dance movements like Chambonnières's courantes, there is usually only one significant generating principle at play: namely, the harmonic bass accompanying a melody. There will undoubtedly be other principles at work from time to time; keyboard allemandes, for example, tend to feature more or less pervasive imitation between voices. These other principles are, however, nearly always subservient to the harmonic bass (or thoroughbass) that undergirds them. And, as I discussed earlier in Chapter Three, a thoroughbass is constructed (and, during the seventeenth century, was also taught) not just as a note-to-note succession, but also as the realization of a particular schema or *Satzmodell*.

The level of the schema (or for Callahan, elaboratio) is thus the meaningful bridge between the piece's form or dispositio—which, especially in the case of dance movements, is pre-determined by genre norms, and is thus partly a pre-improvisational decision—and its sounding surface or decoratio. Moreover, if Gjerdingen is correct in his theorization of historical modes of listening, the schema also describes the minimum unit of syntactically and semantically meaningful music, both for listener and for improviser-composer. Notwithstanding my caution earlier in applying Gjerdingen's results to other periods and styles, it is tempting to imagine that schemata also functioned this way for seventeenth-century French musicians. The succession of schemata therefore constitutes the piece's generating principle, and it is therefore at this schematic level that I

will focus my analysis. With this understanding of improvisational analysis now in place, in what follows, I will briefly sketch my own analytic frame and its terminology.[9]

The Schematic Toolbox

The cadence is perhaps the most important schema in all of tonal music. In my own practice, I follow the systematization of cadence types described by Johann Gottfried Walther (1684-1748) in which the cadence is formed by the interaction of four melodic formulas: the discant, alto, tenor, and bass clausulae (Figure 4.1) (Gjerdingen 2007, 139ff.).[10]

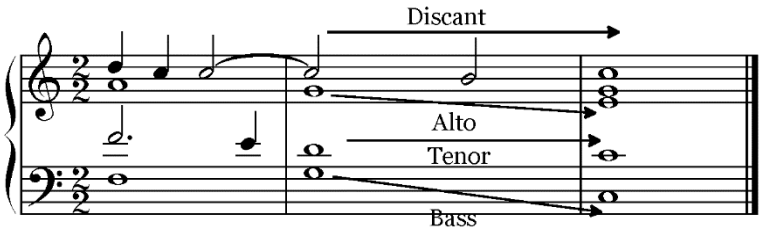

Figure 4.1. Walther's Clausulae

Recording 4.1. Walther's Clausulae

Walther's classification of cadences depends on which one of the clausuae appears in the lowest sounding voice, forming a complete melodic/harmonic complex. For example, when the bass clausula occurs in the lowest sounding voice, a bass cadence (*bassizans*)—or more simply, a cadence—results. If one of the other clausulae appears in the lowest sounding voice, a different sort of cadence results: a *cantizans* (discant cadence), *altizans* (alto cadence), or *tenorizans* (tenor cadence). Each of these cadence types denotes a different kind of closure; the bass cadence is strongest, followed by the tenor cadence, followed by the still weaker discant cadence, followed finally by the

[9] Since I have borrowed quite liberally from both Anglo-American and German traditions of music theory, I have also created my own idiosyncratic vocabulary, mostly borrowed from these sources, but occasionally invented by me.

[10] I will shortly examine several French descriptions of cadences. To my knowledge, there is no seventeenth- or eighteenth-century French source that discusses cadences in terms of clausulae. My decision to use this German terminology also comes from a desire to situate my own work within the wider practice of historical improvisers. The authors of the *Compendium Improvisation* (Schwenkreis 2018), for example, use exactly this classification scheme.

alto cadence. Indeed, the *altizans* is actually most often used as a way of evading a cadence, particularly when it steps down by way of scale degree 4 (see Figure 4.2).

Figure 4.2. Altizans Cadence/ Evaded Cadence

Recording 4.2. Altizans Cadence/ Evaded Cadence

Already, this particular slippage between the schemata of the *altizans* and the evaded cadence points to a more general kind of connectedness between related schemata. In performing schematic analysis, choosing one specific schema over another is not necessarily the point of the exercise, since often a particular passage can convincingly be analyzed in multiple ways. Rather, as long as one remains aware of the connections between two related schemata, it is enough to choose the analysis that offers the most explanatory power; or, if preferred, provide both options.

Although seventeenth-century French sources do not discuss cadences in exactly these terms, they do nevertheless acknowledge that cadences differ in terms of their degree of finality. La Voye-Mignot (1656, 74-6), for example, describes three types of cadences: perfect (*parfaite)*, waiting (*attendante*), and broken (*rompue*). The perfect cadence, defined as a cadence that ends with a perfect consonance, encompass all the types of cadence discussed above, with the exception of the *altizans*. The broken cadence refers to any type of deceptive or evaded cadence, with the bass ending on scale degree 3 or 6. The waiting cadence roughly corresponds to our contemporary notion of the half cadence, but the way in which it invokes the idea of "waiting" or "expecting" a conclusion to an unfinished cadence is certainly more evocative. Charles Masson (1699, 49), meanwhile, distinguishes between the cadences *par degrez conjoints* and *par degrez disjoints*. The *cadence par degrez*

conjoints is further subdivided into an *en descendant* form, roughly corresponding to the *tenorizans,* and an *en montant* form, corresponding to the *cantizans*. Although Masson does present many of the same cadence types as Walther, I will continue to rely on Walther's terminology. Not only is this German terminology more succinct (compare *cantizans* with *cadence par degrez conjoints en montant*), but it is swiftly becoming a sort of lingua franca for historical improvisers as well (Schwenkreis 2018).

Later, and using his new concept of the fundamental bass, Rameau distinguished between a number of different cadence types. The fundamental bass of the *parfaite* moved down a fifth, roughly corresponding to the *bassizans* above; the fundamental bass of the *imparfaite*, however, moved *up* by a fifth. As Christensen notes, "Rameau was profoundly ambivalent about this cadence" (1993, 118). Since the cadence was primarily defined by motion of the fundamental bass, it could therefore encompass motions from tonic to dominant (like the *attendante* described above) as well as motions from subdominant to tonic, or what we would now define as a plagal cadence.[11]

Indeed, this bass motion had long reflected greater ambiguity than the corresponding motion down a fifth. In seventeenth-century discussions of the realization of unfigured basses, the authors' recommendations impart a quasi-tonal meaning to motion down a fifth (or up a fourth): they suggest playing a major third above the first bass note in such progressions, effectively creating a leading tone and turning the bass motion into a progression from dominant to tonic (de Goede-Klinkhamer 1997, 87-90). In the case of motions up a fifth (or down a fourth), they suggest instead playing the third that is natural to the mode. In most tonal situations, it is a simple matter to distinguish between plagal cadences and half cadences, despite their similar bass motions. But there are also analytical situations in which it is preferable to allow the progression's tonal interpretation to remain ambiguous, particularly when both chords in the progression are of the same quality (major

[11] The term "plagal cadence" only entered common circulation in the nineteenth century. For a fairly full history of the term, including some important French and Italian eighteenth-century usages, see Mutch (2015).

or minor). In my own work, I have nicknamed this tonally ambiguous schema the *Gasparini* (or "gasp" for short) in honor of Francesco Gasparini, author of an influential treatise on thoroughbass.[12]

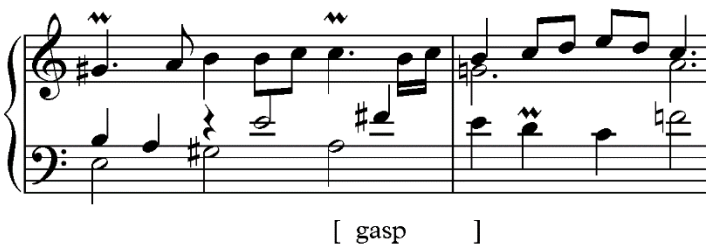

Figure 4.3. The *Gasparini* in GusC 4, mm. 3–4

Recording 4.3. The *Gasparini* in GusC 4, mm. 3–4

Figure 4.3 presents an example of this schema in one of Chambonnières's courantes in A minor, GusC 4. The excerpt begins in A minor, but the second bar's E minor chord already causes tonal uncertainty. Is this a minor dominant chord in A minor, or have we modulated to E minor? I feel that this passage ought to be analyzed in a way that properly reflects this momentary tonal ambiguity, even if, ultimately, it turns out to be part of a modulation to C major. What we are left with is a nexus of related schemata, all sharing the same type of bass motion, but yielding different tonal interpretations: the half cadence (or *attendante*), the plagal cadence, and the ambiguous *Gasparini.*

After cadences, the next significant element of my analytic frame is a collection of scale segments. Of course, any starting point for this discussion would include the Rule of the Octave

[12] The naming of these schemata can be somewhat arbitrary, and in cases like the "Gasp," even a little silly. However, my purpose in this study is not to develop a common language for scholars and musicians to share, as in Gjerdingen's work on galant music or in the *Compendium Improvisation,* but rather to illustrate how one might develop a *personal language* for improvisation. Indeed, the primary reason that I might name something is so that I (and only I) can better remember it and use it in the course of improvising, as well as recognize it in other exemplars I might wish to analyze. In this connection, I might also cite a memorable moment during one of my improvisation lessons with Rudolf Lutz, in which Lutz enjoined me to invent distinctive, personally-significant names for these schemata. He suggested that names like "popcorn" or "marshmallow" would be fine, so long as they were memorable for me.

(*règle de l'octave*, or RO for short). The RO provides a normative harmonization for an ascending and descending diatonic scale. It provides stable poles at the tonic and dominant with 5/3 chords, and leads between those poles by way of unstable 6/3 chords. By the eighteenth century, the various unstable scale degrees had been further individualized with characteristic dissonances (Figure 4.4).

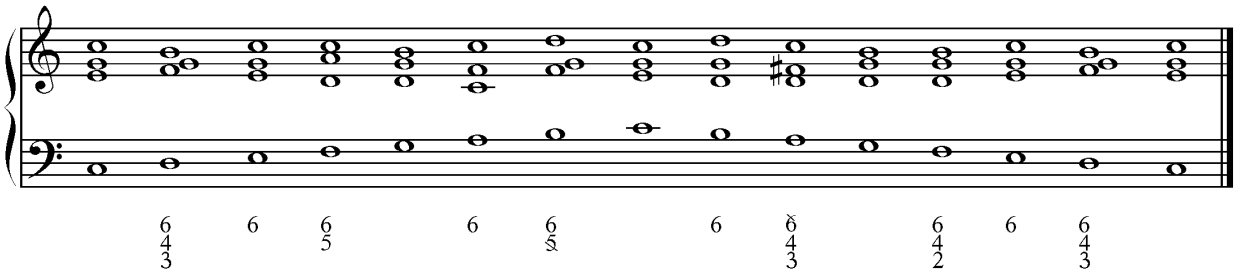

Figure 4.4. The Rule of the Octave in C major

Recording 4.4. The Rule of the Octave in C major

In a very practical way, the RO provides continuo players with an easy method of realizing unfigured basses: simply determine what key you are in, and then plug in the appropriate harmony above the given scale degree, so long as the bass is moving by step. For this reason, the RO achieved tremendous popularity as a pedagogical aid throughout seventeenth- and eighteenth-century Europe. Beyond its utility to accompanists, the RO also offered composer-improvisers a means of navigating tonality, and as such, it was also common to use segments of the scale as tonal pathways.[13] The standard RO divides the octave into two parts: a pentachord from tonic up to dominant, and a tetrachord from dominant up to tonic. Likewise, the descending form of the RO is divided into two component parts: a tetrachord from tonic down to dominant, and a pentachord from dominant

[13] C.P.E. Bach's explanation of how to improvise a free fantasia is an excellent example of this method. Although Bach is not necessarily prescribing the RO's harmonization, preferring instead a more varied set of figures, he does recommend orienting the improvisation's form around scale segments: "[w]ith due caution he fashions his bass out of the ascending and descending scale of the prescribed key, with a variety of figured bass signatures; he may interpolate a few half steps, arrange the scale in or out of its natural sequence, and perform the resultant progressions in broken or sustained style at a suitable pace" (Bach 1949, 431). My own presentation of these scale segments, meanwhile, mirrors that of Job IJzerman (2019, 78-98).

down to tonic. Each of these tetrachords and pentachords thus offers a more flexible means of moving convincingly between tonic and dominant, without necessarily reproducing the scale *in toto*.

For all its simplicity, the RO is also limited. For this reason, treatise writers introduced various alternative harmonizations in addition to the most common version of the RO.

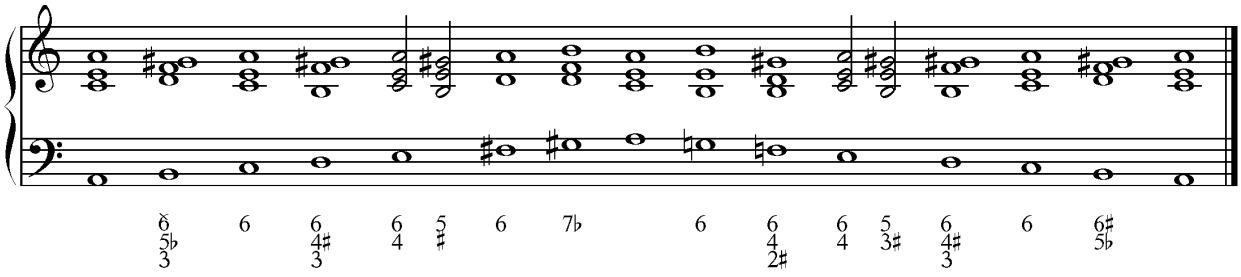

Figure 4.5. An Extended Rule of the Octave

Recording 4.5. An Extended Rule of the Octave

This "extended" rule of the octave was intended to provide greater flexibility for the accompanist and to better represent the range of options a composer might have used in the obligato parts. Yet even beyond the extended RO, the system is also limited by its point of division. What about other divisions of the octave, say, between tonic and subdominant?

As Grazzini (2014, 214ff.) has shown, French authors around the turn of the eighteenth century also prized a flexible approach to scale fragments. Saint-Lambert (1707), to cite one approach, describes a number of three-, four-, and five-note scale fragments, each with a unique harmonization dependent on the intervallic structure of the given fragment. He distinguishes, for example, between four different versions of the descending tetrachord, including one major, two minor, and one "phrygian" tetrachord.[14]

[14] This approach to scale segments in multiple harmonizations was certainly not unique to France. See, for example, Christensen's (2008) description of the South German *Fundamenta* tradition.

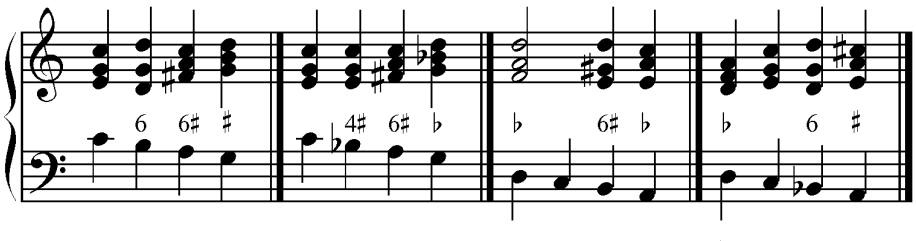

Figure 4.6. Four Tetrachords from Saint-Lambert

Recording 4.6. Four Tetrachords from Saint-Lambert

What makes these scale fragments so flexible is their lack of tonal grounding, each one presented in the absence of any definite tonal center. The major descending tetrachord, therefore, could represent the passage from tonic to dominant in the key of C major, or equally, from subdominant to tonic in the key of G major. Indeed, this tonal ambiguity is also baked into the RO: its descent to the dominant was problematic for some eighteenth-century critics, for whom it improperly mixed tones from other modes, but at the same time, the progression was also largely considered proper to its home key (Holtmeier 2007, 29). Robert Gjerdingen has also capitalized on this tonal ambiguity in defining his "Prinner" schema, which occurs in both modulating (from tonic to dominant) and non-modulating (from subdominant to tonic) varieties. But at least in seventeenth-century repertoires, I feel that trying to tie a particular scale fragment rigidly to a particular tonality causes it to lose its tonal potentiality. Like Grazzini, I prefer to conceive of scale fragments in a tonally agnostic way, particularly when it comes to tetrachords.

The final major component of my analytic approach is a collection of sequential bass patterns, referred to in the previous chapter as *movimenti*. In other genres, particularly in the fantasia, these bass patterns function as the repertoire's key generating principle (Butler 1974). Moreover—by way of their simple, memorable structures, and their ready capacity for variation, repetition, and diminution—they enable the improvisation of complex contrapuntal forms with relatively little effort. I cannot expect these sequential patterns to have nearly the same degree of ubiquity in my

own corpus, but nevertheless, they do form a key part of the style. I have adopted my own idiosyncratic terminology for these patterns, borrowed mostly from the German *Satzmodell* tradition, but also occasionally from Gjerdingen's schemata. For example, the Falling Thirds pattern (*Terzfall*) is identified by the largest interval within the bass pattern (a descending third).[15] The Romanesca pattern, meanwhile, encompasses all of the variants described by Gjerdingen, including leaping, step-wise, and galant variants (Figures 4.7–4.9).

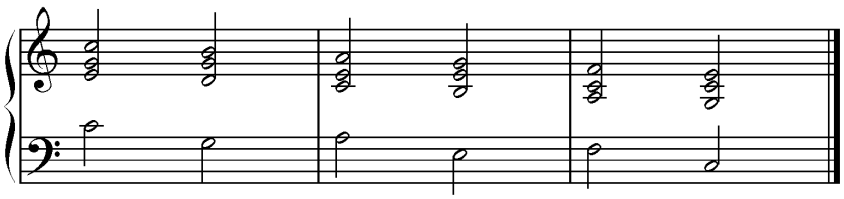

Figure 4.7. "Leaping" Romanesca variant

Recording 4.7. "Leaping" Romanesca variant

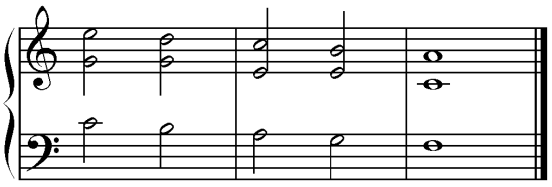

Figure 4.8. "Stepwise" Romanesca variant

Recording 4.8. "Stepwise" Romanesca variant

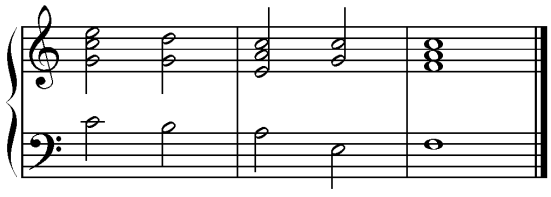

Figure 4.9. "Galant" Romanesca variant

Recording 4.9. "Galant" Romanesca variant

[15] For more on a systematic terminology of sequences, see Menke (2009).

These improvisational patterns thus form the starting point for my own analysis of the corpus. Admittedly, most of these schemata are derived from eighteenth-century sources, foreign to the seventeenth-century French style I am attempting to re-create. I should expect, therefore, that if these same schemata do figure within the language of Chambonnières, they may not necessarily be used in the same way that galant composers might use them. Indeed, a variety of seventeenth-century sources do include many of these same scale harmonizations, cadences, and sequential bass patterns. Both Alessandro Poglietti's *Compendium* (1676) and Muffat's *Regulae Concentuum Partiturae* (1699), for example, are fairly exhaustive in this respect, even if their terminology and usage differ from eighteenth-century galant norms as codified by Gjerdingen.[16] These generalized schemata therefore form the lens through which I can at least begin to understand Chambonnières's improvisational language in all its complexity and specificity. How, though, should I apply this frame to Chambonnières's scores? As was noted in the previous chapter, we lack any sort of "how-to" manual for improvisation in seventeenth-century France. More critically, we lack any contemporaneous discussion of the relationship between skills in counterpoint or thoroughbass and the composition or improvisation of keyboard music. If, however, I take the inductive approach, then I start directly with the musical corpus—in all its messiness—and ask the question: how could this have been improvised? Or even better: what skills would I need to learn in order to improvise this?

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[16] Closer to Chambonnières's style, one might also cite the variety of schemata offered by Nivers (1689) and Chaumont (1695). Both authors present a number of ways of harmonizing common bass patterns, including scales and sequences. In accordance with the slightly modal orientation of their musical style, they also both show a marked preference for diatonic 5/3 sonorities over the variety of sixth-chords favored by eighteenth-century musicians (Christensen 1992, 99). Interestingly, Chaumont presents his method as a "règle générale," both "pour toucher le contrepoint" and "pour le plein chant," thereby reflecting the continued importance of contrapuntal principles within church music in France. The distinction between modal and tonal orientations is complex and contentious, particularly since tonality during the seventeenth-century was only a developing construct. Compare, for example, the opinion of McClary (2012), for whom modal theory *does* hold explanatory power within seventeenth-century musical practice, with that of Wiering (2001), who holds that modal theory functioned mainly prescriptively rather than descriptively of actual practice. Far more useful to my own project, I think, are the various contrapuntal *Satzmodelle* discussed in the previous chapter, bridging the modal Renaissance and the (quasi-)tonal Baroque (Froebe 2007).

Into the Corpus

Until this point, my discussion of schemata has been couched in purely music-theoretical terms and techniques. The analytical work I perform later in this chapter, however, is only possible because of its grounding in my artistic practice. That is, I approach these musical texts not solely as a theorist, but also—and perhaps primarily—as a performer and improviser. The analysis that results is not solely the product of my analytical frame described above; it is also the result of a gradual excavation of my own tacit knowledge as a performer of some experience. The work of analysis is thus an ongoing synthesis. Through attempting to analyze the corpus, I reach a new analytical frame from which to perform further analyses. More importantly, the analyses are tested, problematized, revised, and supplemented through the medium of performance, and later, through improvisation. This kind of analysis occurring through performance is part of what Östersjö understands as *thinking-through-practice*, "a second species of musical interpretation, not based on language and analytical, verbal processes but on action and perception" (2008, 29). In this mode of thought, the performer has the opportunity of understanding music in its full temporality, as an aural event unfolding over experienced time rather than a visual event organized in a score. Moreover, the performer may also understand it as a physical, embodied process, created through the interface between player, instrument, acoustic space, and a host of other agents and factors. For improvisers, this embodied understanding of musical processes may allow them to discover kinesthetic links between exemplars, points of comparison that might otherwise have remained obscure in a traditional score-based analysis. As Östersjö observes, these two modes of thought are not mutually exclusive, since "typically, there is a mixture of analytic processes and thinking-through-practice in any artistic process" (2008, 78). The analysis that follows for the rest of the chapter, then, is constructed through the continual play between these two kinds of thinking. More specifically, it is

formed through interaction between two inseparable components of my musical persona: the theorist, and the performer-improviser.

The first step was to play through each of the twenty-seven courantes exactly as written, rather in the manner of David Fuller's suggestion to "soak up the style" (1993, 201). I used this as an opportunity to engage in thinking-through-practice, gaining knowledge about these pieces intuitively, and mostly tacitly. Moreover, this was an opportunity to develop certain qualities of attention: of learning to recognize the *feeling* of certain repeated chord voicings or patterns of ornamentation. This feeling consisted of a complex combination of sound and touch, analogous to the "grabbed places" discussed by Sudnow (2001, 12) in learning to play jazz. Of course, this kind of intuitive attention was also necessarily informed by analytical processes, derived from my experience with music theory and history. Learning to recognize a feeling, though, came about through the complex interactions of multiple agents that characterizes thinking-through-practice, including embodiment, engaged listening, and a whole host of performative factors like perception of timing, affect, and touch. Each new piece was thus an opportunity to discover new facets of Chambonnières's style to recognize and appreciate, both aurally and kinesthetically.

The next step was to transform the pieces into partimenti: (figured) bass lines over top of which I could improvise. My practice method corresponds roughly with what I learned from Rudolf Lutz during improvisation lessons conducted in 2014 and 2015. Lutz's lessons included a number of discrete "phases" of practice, consisting of phases A through D. The A-phase corresponds to what most people imagine improvisation to be: music created on the spot without any special preparation. Recalling Benson's (2003) notion of "reworking," the A-phase is not created out of nothing; rather, it responds to some form of raw material, be it a partimento, a theme, an affect, or even a set of genre-specific expectations. To rework something on the spot, then, means that this reworking takes

place in real time, without the benefit of reflection or revision in hindsight.[17] The B-phase consists in reconsidering the results of the A-phase: ironing out details that did not quite work, practicing important passages, and exploring alternatives. The C-phase involves fixing the improvised piece into a more or less ideal form, and it may involve notating the result as a composition. In the D-phase, finally, the player reworks the fixed piece of phase C, using its raw materials to fashion something new. In effect, the D-phase inaugurates a new A- or B-phase, in which the fixed "composition" of the C-phase is broken down into material for improvisation (a partimento, a theme, etc.). By these means, the improviser has access to a potentially inexhaustible supply of invention, each time reworking the raw materials into yet a new source for reworking. In this chapter, I will primarily be concerned with the A- and B-phases. A discussion of my work with C- and D-phases will be presented in Chapter Five.

My approach—discussed more thoroughly in the previous chapter—mirrors that of Friedrich Niedt in the *Musikalische Handleitung* as well as the recommendations of Rudolf Lutz in the *Compendium Improvisation*. In extracting a thoroughbass from a composed piece, I am furnished with a fixed, unchanging element to "rework" in the course of improvising; when the improvisation is finished, I can then compare my own result with the composer's. In working with these partimenti, I experimented with playing from both figured and unfigured basses. Although figuring Chambonnières's bass lines was initially a useful exercise in understanding his harmonic language, I very quickly learned to work from the bass alone, without figures. As an example of this stage in my improvisation practice, consider the following partimento, extracted from Courante no. 2 (Figure 4.10), as well as two improvisations on this partimento, the first corresponding to the A-phase, and the second to the B-phase (Recordings 4.10 and 4.11).

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[17] This does not preclude, however, reflection taking place within and during the improvisation. Later in this chapter, I will address this kind of reflection, called *reflection-in-action* (Schön 1983).

Figure 4.10. Courante in A minor, GusC 2 - Partimento

Recording 4.10. A-Phase Improvisation

Recording 4.11. B-Phase Improvisation

My A-phase improvisation (in G minor) is a fairly representative example of my initial work with these partimenti.[18] In fact, in some ways it is even more successful than my usual result, in that I managed to retain much of the improvised melodic shape during the repeats: there are sometimes small changes (in m.5, for example), but the overall impression is of more or less the same music in repeated sections. The affect of the piece is energetic and active, while remaining somewhat reserved and suave. Some aspects of the improvisation are not particularly compelling: the parallel thirds in m.13, for example, continue longer than would be usual for Chambonnières, and m.12 features an overly static soprano part. The courante's texture, meanwhile, betrays a certain "thoroughbass" orientation; that is, the melody I improvise is mostly accompanied by right-hand

[18] The scores presented here mimic some of the notational conventions of Chambonnières's 1670 print. The double barline before m.9, for example, indicates a repeat, as does the double barline at the end of the piece. Conventions within HIP with respect to repeats are somewhat loose, and my own practice here follows suit. Some of the recordings of dance movements included in this dissertation, therefore, do include repeats, while others do not.

chords, with only a few exceptions (like the trill in the tenor in m.15). Nevertheless, the result is at least fairly fluent and idiomatic.

My B-phase work consisted in experimenting with my realization of the partimento. I wanted to find ways of activating and varying the left-hand texture, using two voices in the left hand to accompany a solo melody in the right hand. In the first reprise, I think I accomplish this fairly successfully in mm. 3, 5, and 7, for example. This attention to the tenor voice in my left hand also encouraged me to vary the rhythm of the melody. I found that if the left hand were more active, I could allow the right hand to move more simply, as in mm. 1–2. I also found opportunities to enliven the right hand's rhythm at times. In m.12, for example, I imitated the rhythm I had previously used at the end of m.9. Inspired by this change, I replaced the tedious parallel thirds of the A-phase's m.13 with contrary motion, and introduced a consistent eighth-note motion through mm. 14 and 15.

As I mentioned above, the most challenging (yet rewarding) aspect of improvising a courante is in its rhythmic detail. The courante achieves its effect through the delicate interplay of bass and treble, sometimes in agreement, and other times not; creating this interplay is part of my job as an improviser. Responding to a suggestion from the *Compendium Improvisation*, I created a number of "rhythmic partimenti," in which I included the melody's rhythm (notated as a percussion part) as another staff in the partimento (Figure 4.11) (Unternährer-Gfeller 2018).

Figure 4.11. Courante in A minor, GusC 2 – Rhythmic Partimento

Recording 4.12. Improvisation on Courante GusC 2, in D minor

My A-phase improvisation on this rhythmic partimento (in D minor) demonstrates the profound effect that transposition can have on a piece's affect and tone color. In this case, the move to D minor has encouraged me to create a much more somber, reflective piece than the preceding ones in G minor. Part of this is achieved with a noticeably slower tempo, allowing more time to savor each sonority as I play it. Registration also plays a part: playing on a single 8' register, in contrast to the two-8' registration in the G minor pieces, creates a smoother, more supple effect in the melody.[19]

[19] This is hardly a subjective reaction to harpsichord registration. When playing on two 8' registers together, in order to avoid extreme heaviness of touch, the two registers are regulated such that they pluck their strings not simultaneously, but staggered. As a result, the player is naturally encouraged to depress the keys relatively quickly to bring these staggered plucks as close together as possible, effectively sounding as one; if, instead, the key is depressed slowly, then the two

In sympathy with a more refined and delicate touch, I also add a variety of ornaments to heighten the melody's sensuous quality, including, for example, the trills and *ports de voix* from the second half of m.6 to the cadence in m.8. The bass line's new tessitura has only necessitated small, occasional changes to the line, as in the cadential figuration in m.8.

This work allowed me to learn the characteristic rhythmic gestures of the courante while still being responsible for inventing its melodic shape. Although I learned a couple of standard courante rhythms through this process, and how to use them appropriately, I am still at a loss as to how to describe in words the variety and balance created through contrasting rhythms. Gradually, however, I came to anticipate many of the rhythmic details of the upper part, and eventually, to internalize them and make them my own.

Next, I began the process of learning and internalizing the schemata described above. Many of these patterns were already deeply familiar to me as a result of my previous work as an improviser and continuo player, particularly the segments of the Rule of the Octave. After reminding myself of a particular schema's essential voice leading, I began to look for the same pattern within the music I was playing. In looking for the *cantizans*, for example, I had no trouble finding numerous instances of this schema in the first piece I had practiced, the Courante in a GusC2 (m. 13). After isolating one, I transposed it to several different keys, and gradually, the excerpt began to surpass its particular configuration of pitches and assumed the abstract character of a pattern. I also transposed complete pieces to several different keys, at sight. Interestingly, after first experiencing the same piece in a variety of different tonalities, it became much easier afterwards to recognize the schemata in their musical context. Moreover, I began to notice how certain schemata would effortlessly lead into

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plucks are staggered very audibly. Playing on a single 8' register, however, players are free to depress the key as slowly or quickly as they wish, thus creating the possibility of a slow, controlled pluck.

others. Implicitly, then, I was slowly gaining knowledge about how the corpus's patterns interact within the context of a larger formal structure.

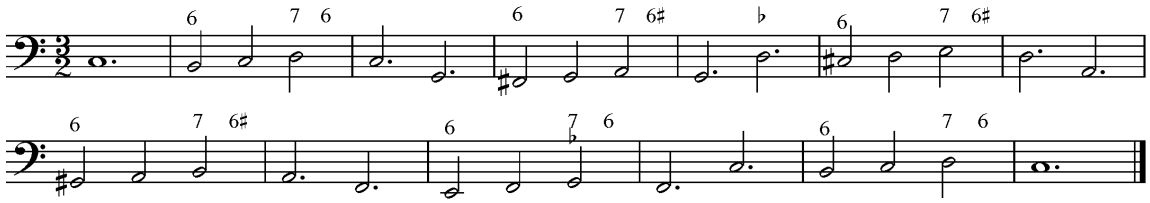

Figure 4.12. Dandrieu *Parcours* – With *Cantizan* and *Tenorizans*

Recording 4.13. Dandrieu Parcours, Improvisation 1

Recording 4.14. Dandrieu Parcours, Improvisation 2

As a way of continuing to internalize the schemata, I designed a number of partimenti to practice and transpose, each exemplifying a particular schema.[20] The partimento in Figure 4.12, for example, adapted from the *parcours* offered in Dandrieu's thoroughbass tutor, is intended for practicing the *cantizans* and *tenorizans* schemata.[21] I also practiced each partimento in a variety of different dispositions, using a method the authors of the *Compendium Improvisation* call "declination" (Schwenkreis 2018, 217). For example, my improvisations on Figure 4.12 present two different realizations of the *parcours*: the first with two voices in the right hand, and one in the left (Recording 4.13); and the second with one ornamented voice in the right hand and two in the left (Recording 4.14). Such declination exercises constitute another kind of thinking-through-practice. By

[20] The *Compendium Improvisation* provides numerous examples of these partimenti.

[21] Nearly all of the "tables" in Dandrieu's (1718) thoroughbass treatise follow the same pattern of keys: C major, G major, D minor, A minor, F major. The keys thus form a kind of *Monte Romanesca,* to use Gjerdingen's terminology.

experiencing the same schema in different dispositions, the improviser begins to develop an embodied understanding of the schema's aural and kinesthetic *feeling* as it presents itself in different situations. Moreover, the improviser learns to connect this embodied feeling with analytically-derived knowledge about the schema, learning to recognize it more quickly and reliably as well.

After this initial phase of exploration and experimentation, I attempted my first formal analysis of several pieces from the corpus. My analysis of the Courante in A minor, GusC 2 is presented in Figure 4.13. It consists of a very small repertoire of schemata, used repeatedly in varying contexts. In fact, nearly all of the analysis, save for a few passages of connective filler like the "descending third (or d3) schema in m.6, consists of various kinds of cadences: there are instances of the *doppia*, *composta*, *cantizans*, *altizans*, and *tenorizans*, not to mention several *attendantes,* plagal cadences, and evaded cadences. Since cadences were the centerpiece of baroque pedagogy, I take it as an encouraging sign that they are also central to Chambonnières's style, pointing to a congruity between my analytical frame and the corpus.

Testing the Analysis

Taking my analysis back to the keyboard is, however, the only way to test its success, and there are always improvements to be made. First, I reviewed my analysis in the course of playing; or put another way, I played the courante in the course of analysis. More specifically, I attempted to perceive, understand, and re-enact the analysis, in real time. The goal of this exercise was to join analysis and performance in one motion, allowing me to reflect on my analysis in the course of performing, and reflect on my performance in the course of analyzing the music. In this respect, this process concords well with what philosopher Donald Schön refers to as *reflection-in-action*. Schön's concept speaks to the common notion of "thinking on your feet," acknowledging that "we can think about doing something while doing it" (1983, 54). Within my own practice, this

Figure 4.13. Courante in A minor, GusC 2

Recording 4.15. Courante in A minor, GusC 2

process has the potential to create immediate connections between my awareness as a player and my understanding as an improviser. It demands that I pay very close attention to how a given passage instantiates or realizes its abstract schema; or perhaps not, if the analysis is faulty. The following verbal re-enactment approximates what this is like:

As I prepare to play the first bar of GusC 2, I remind myself what the attendante is supposed to be: something expectant, arriving at the dominant, yet waiting for more to come. As I begin to play, I ask myself questions, and I answer with my fingers on the keys. Where am I starting? On the tonic. What is the next harmonic event? Moving to the subdominant. How does the subdominant arrive at the dominant? By snaking around the dominant, starting below and then heading above. And now I have arrived at the dominant, and the schema is complete.

Recording 4.16. Analysis 1

I hesitate, and go back. I feel something else happening at the end of bar 1, heading into bar 2. There is something else to this snakiness. I play only the second half of the bar, and its resolution on the following downbeat, but slowly this time, savoring each sonority.

Recording 4.17. Analysis 2

At this speed, it sounds like something else entirely. The third beat realizes another familiar schema, and as I put my analyst's hat back on, I pay closer attention to consonance and dissonance. This is what I hear:

Recording 4.18. Analysis 3

I recognize this immediately: a phrygian cadence. I play it several times over, gradually accelerating to something like my original tempo. And now I return to the beginning of the piece once again, and I pay attention to both my

newfound discovery and my original analysis. I hear both at the same time, the phrygian cadence is still there, however briefly, embedded within my original trajectory. This makes sense.

Of course, the handy thing about reflecting upon these analyses at the keyboard is that I can mostly avoid verbalizing such discoveries. After playing through the piece several times in the deliberative manner described above, I was ready to refine my analysis and inaugurate a new round of reflection and testing at the keyboard. Over the course of many analyses, and many iterations of the same analysis, I gained greater insight into both the corpus and my analytic frame, the particulars of which I describe in the next section. As I explain below, I developed methods for describing schema variants, identified certain idioms specific to the corpus, and finally found an improvisational approach to modulation and large-scale form tailored to Chambonnières's fluid style.

From Schema to Tag

Very quickly, I felt a need to distinguish between different variants of the same schema. Consider, for example, the various kinds of cadence: simple, composta, and double. Beyond those labels, I also had to account for long cadences, evaded cadences, deceptive cadences, etc., as well as be prepared to deal with some combination of these variants: a long, evaded, double cadence, for example. Furthermore, I wanted to describe in my analyses not just a succession of schemata, but also some of the improvisational tools used to realize those schemata. In GusC 2, for example, I wanted to capture the imitation that happens in bar 9 as part of the larger attendante schema, as well as the snake-like voice exchange in bar 1 and the passing motion (5/3 - 6/4) of the soprano and tenor at the end of bar 4. I needed something analogous to the "applications" introduced by Strobbe in *Tonal Tools*: a repertoire of techniques to vary and enliven a small number of basic tonal pathways (2014, 22-3). To this end, I decided to use a system of *tags* in my analyses. The analysis still consists of a series of discrete schemata, corresponding to semantically meaningful stretches of music, but each schema is now accompanied by a series of tags to further describe how the schema

is realized. If smaller-scale schemata function as constituent parts of a larger schema (as does the phrygian cadence in bar 1 of GusC 2), then this schema is included as a tag attached to its parent schema (the *attendante*, in this case).[22]

Specific idioms

It did not take long for me to discover that certain patterns observed in the corpus fit only imperfectly into my analytical frame. Take, for example, the cadence that occurs in bars 6 and 7 of GusC 2, shown in Figure 4.14.

Figure 4.14. Courante in A Minor, GusC 2, mm. 6–7

This is *very nearly* a double cadence, but not quite. Like a standard double cadence, it begins on beat 2 with a 5/3 sonority (or in this case, a variant: 7/3), before proceeding on the next quarter note to the required 6/4 sonority (the so-called consonant fourth).[23] Normally, this 6/4 should prepare a 5/4 sonority on the next beat, which would then resolve to 5/3. Chambonnières's example, however, skips the 5/4 sonority to move directly back to 5/3. For a variety of reasons—perhaps because the 5/3 stage is twice as long as the preceding two stages, or perhaps because of the trill in the soprano—this still sounds like a double cadence, despite its lack of any suspended fourth. In fact, this particular cadence schema (5/3 - 6/4 - 5/3) occurs so much more often in the corpus than the traditional double cadence that it *should* properly be understood as a double cadence,

[22] See later in this chapter for several examples of complete analyses using this system of tags.

[23] The "consonant fourth" is discussed extensively by Knud Jeppesen (1992, 193-4), who describes it as a fourth introduced stepwise on a weak beat, preparing a stronger dissonance occurring on the next strong beat.

albeit a French *cadence double*.[24] At this stage, it is of no particular importance whether this is a matter of national (French) style, personal (Chambonnières's) style, or generic style; all that matters is that I recognize it, and make it a part of my own style.

After living with this music for long enough, I began as well to notice certain recurring patterns that had not yet figured in my analytical frame. Let us look, for example, at what happens in mm. 4–5 of GusC 2 (Figure 4.15).

Figure 4.15. Courante in A minor, GusC 2, mm. 4–5

After the preceding bar's plagal cadence in a minor, the bass steps up to scale degree 2, harmonized with a ♮6 chord rather than the usual ♯6 demanded by the rule of the octave. This leads to scale degree 3 in the bass, harmonized with a 5/3 chord and effectively tonicizing C major by way of a cantizans. The tonic-to-mediant bass motion has thus been recontextualized as submediant to tonic, and this move to C major will be confirmed over the next three bars by a double cadence in C. Look however, at the same schema in mm. 1–2 of GusC 3, shown Figure 4.16.

Figure 4.16. Courante in A minor, GusC 3, mm. 1–2

[24] This is a good example of adapting a more general kind of schema (the double cadence) to the particulars of a specific musical style. The French *cadence double*, then, should be understood as a kind of specialized double cadence, with its own set of norms and standard usages.

Here, we observe exactly the same pattern, but rather than continuing in C, the bass immediately returns to A as its tonal center of gravity. Viewed tonally, this passage provides only a fleeting hint of the relative major, and it seems preferable to analyze the passage as staying in its home key of A minor. Despite their differing tonal implications, both of these passages exemplify the same schema, one that harmonizes the stepwise ascent from scale degree 1 to 3 in this particular fashion. As I mentioned above, conceiving of scale fragments in a tonally flexible way allows me to accommodate both the modulating and non-modulating varieties of the schema under the same heading, or even to remain agnostic as to a passage's exact tonal interpretation. The schema occurs with great enough frequency in the corpus to justify its inclusion in my own *zibaldone,* however, and its effect is different enough from the standard RO harmonization to give it its own name: the *1-to-3*.

Dispositio and Modulation

Thinking about schemata in terms of their tonal implications leads naturally to thinking about modulation, and with it, the dispositio or form of the piece. In the case of French music, and Chambonnières's music more particularly, it seems difficult to speak of any rational tonal plan behind these pieces. Contemporary reception of Chambonnières's music has focused on its melodic elegance, but not necessarily its tonal coherence. Music theorist Drora Pershing, for example, offers a mostly negative assessment of his music, noting that "the harmonic motion in many of his pieces often seems almost random; without directed motion to clarify the structure, and with a top voice often lacking the coordination with the bass that helps define the form, we find few Chambonnières pieces with the cogency of the *Courante de Madame*" (2006, 126). To a large extent, such negative appraisal reflects the still largely Austro-German vantage point of music theorists. Nevertheless, even a sympathetic critic like James R. Anthony could find seventeenth-century French lute music "mannered, precious, even decadent; its melodies are surcharged with ornaments, its rhythms fussy, its harmony often aimless, and its texture without unity" (1978, 243). Responding to this, Susan

McClary (2012, 243) identifies a specific cause for listeners' discomfort with French music: namely its cultivation of stasis, timelessness, and lack of teleology. Through an extended analysis of D'Anglebert's *Tombeau de Mr. de Chambonnières*, McClary highlights the ways in which rhythmic, textural, and ornamental variety conspire to achieve this effect. Most important of all, though, is D'Anglebert's resolute refusal to fully modulate, to provide cadential confirmations for his tonal excursions. In McClary's view, the piece never properly leaves the key of D major, despite its wandering motion towards other tonal centers. This utter lack of tonal goal-directedness, rather than unmasking D'Anglebert as an incompetent composer, instead points towards his complete mastery of an alternative set of aesthetic ideals:

> Put briefly, D'Anglebert's task is to produce an experience of time in which the listener is absorbed by each present instant. He is obliged to satisfy the rules of orderly succession (the much vaunted *raison*) as he moves from moment to moment: the transgression of fundamental propriety would undermine the idyllic security of this prolonged stasis. He may even group together a couple of measures in a quasi-causal conspiracy, as in the case of the implied modulations, although none of these actually comes to fruition. […] Gradually we learn from this music not to bother at all with future-oriented thought, but to embrace the serene beauty of each new configuration as it arises. (McClary 2012, 248)

As I play through Chambonnières's courantes, trying to make sense of their tonal plan, I often think of this timeless, present-focused quality identified by McClary. Like D'Anglebert, Chambonnières follows the laws of compositional order (*raison*), but he delights in leading us to our ultimate destination by roundabout ways. The form of the courantes is, therefore, always generically correct: it begins in the "right" key, leading to a cadence on a generically accepted degree before the double bar, and then leading back to the home key by the end of the piece. The Courante in g, GusC 27 is an excellent example of this (Figure 4.17).

After establishing G minor with a phrygian half cadence in m.2, m.3 tonicizes C minor with a *cantizans* before attempting to reaffirm G minor with a cadence in m.4. This cadence is evaded by way of a flattened leading tone (F♮) on beat 3, causing tonal uncertainty that is only resolved by the

Figure 4.17. Dispositio of Courante in G Minor, GusC 27

tenorizans in mm. 5 and 6, tonicizing Bb. A modulation to Bb is confirmed by a cadence in mm. 7 and 8, but a deceptive cadence in mm. 8 and 9 pivots us back towards G minor, ending with another phrygian half cadence before the double bar. By m.12, we have once again tonicized C minor. The cadence in mm. 13 and 14, however, reveals that this is only part of a modulation to Bb. Measure 14 immediately modulates once again: the E♮ in the soprano on beat 2 points towards F major, but the *tenorizans* that follows into m.15 (with the soprano F#) reveals this to be part of a modulation to G minor. The downbeat of m.15, however, reveals that our arrival point is actually a G major chord, the dominant of C minor. C minor is, however, immediately turned back towards G minor in m.16 (by way of the tonally vacuous "Gasparini" schema). The presence of F♮ in m.16 points us seemingly towards the relative major, Bb, but mm. 17 and 18 reveal that this is instead only part of a long double cadence in G minor, thus ending the second half of the piece.

With apologies for potentially trying the reader's patience, this play-by-play description of Chambonnières's tonal "plan" demonstrates how nebulous the very notion of a plan is. One could imagine that a composer *might* pre-determine this zigzagging path as a pre-compositional decision, but would an improviser do that? Clearly not.

Grazzini (2014) distinguishes between what he calls "top-down" and "bottom-up" approaches to modulation. He describes the top-down method (via Rameau's suggestions in book three of the *Traité*) as a matter of re-interpreting scale degrees, analogous to the traditional harmonic analysis of "pivot chords."; for example, one can reinterpret the original tonic as the subdominant of the new key, and effect this reinterpretation by way of an "irregular cadence" (257). Grazzini also cites modulating formulas like the Fonte (or "key-seeking" progressions as Callahan would call them) as examples of the top-down method. These approaches thus entail beginning with a modulatory goal in mind that the improviser subsequently carries out. Meanwhile, the bottom-up method, according to Grazzini's reading of Rameau, consists of "altering the quality of the tonic triad, changing it from

major to minor, for instance, or to a sixth chord of some sort" (260). In Grazzini's view, this represents a fundamentally different improvisational mindset from top-down methods: "you begin with the chord in front of you. You change its quality, and then you see where it leads" (261). In this way, improvisers find their modulatory path as each opportunity to modulate presents itself in the course of playing.

It seems to me that Grazzini's characterization of bottom-up modulation is somewhat naive. In his analysis of a prelude in D major by Louis Couperin, for instance, he speculates that a #4 chord is introduced "as if Couperin altered the quality of a local tonic, and then followed the new chord to see where it might lead" (Grazzini 2014, 261). Perhaps, at least initially, this type of exploration functions as Grazzini proposes: that is, the hypothetical player introduces the #4 chord and then wonders, "where can I go from here?" But after the improviser has gained even a modicum of experience, it no longer works so innocently. Rather, the player learns to associate chordal alterations, like the #4, automatically with particular modulatory pathways. In my own work as an improviser and continuo player, this is how I experience modulation. As a result of my long acquaintance with the RO, there is a nearly instant association between the 6/#4/2 chord and the subdominant degree, descending to the mediant. As a result, introducing a #4 chord automatically implies an appropriate reinterpretation of the bass. Moreover, if I decide to alter a chord in the way Grazzini describes, I do so already imagining at least some of its tonal potentiality. As I further gained experience, I also expanded my range of pathways. In the same way as expanded versions of the RO encompass a wider variety of sonorities, the #4 sonority eventually came to represent a multitude of paths (Figure 4.18).

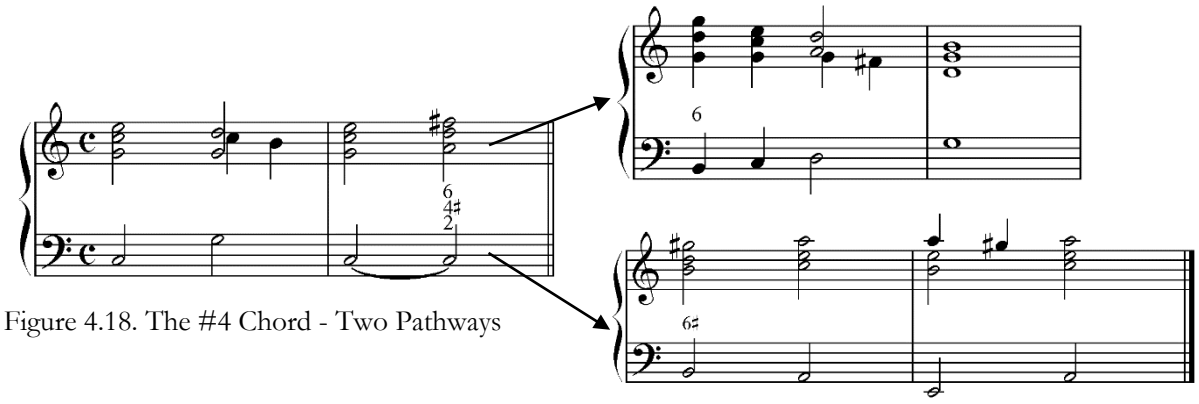

Figure 4.18. The #4 Chord - Two Pathways

Recording 4.19. The #4 Chord, Pathway A

Recording 4.20. The #4 Chord, Pathway B

Viewed in this way, the distinction between top-down and bottom-up approaches is negligible, since both involve reinterpreting scale degrees, and both eventually entail some degree of choral alteration. Nevertheless, the image that bottom-up modulation conjures—in which the improviser wanders from key to key, like exploring an attractive garden—is highly congruent with my own experience with Chambonnières's music, as well as that of critics like McClary with French music more generally. My point is only that the exploration already takes places with full knowledge of where the player might be going.[25]

Modulatory Strategy

Over the course of analyzing, playing, and improvising, I have tried to conceptualize modulation in a variety of ways. Lutz (2018) describes several of these in detail, including the reinterpretation of bass scale degrees discussed above. He also describes a process of scale mutation: in C major for

[25] In a way, the RO and the *Fundamenta* tradition are two different ways of coping with the complexity of actual musical practice, something that students can only fully grasp with experience. Where the RO provides one normative solution for harmonizing a bass, the *Fundamenta* tradition instead emphasizes a wide variety of solutions. In both cases, however, a teacher would need to intercede to fill in the gaps: in the case of the RO, the teacher would need to show the student when to deviate from the standard harmonization, and in the case of the *Fundamenta* tradition, the teacher would need to help the student in selecting from the various alternatives.

example, the introduction of scale degree #4 in any voice directly implies a move to the dominant; likewise, scale degree ♭7 implies a move to the subdominant. Although this is undoubtedly a useful way to think in the course of improvisation, for the purposes of my analysis, I found tracking these scale mutations to prove too unwieldy. Moreover, in line with my discussion above with Grazzini, I found it easier for myself to think of, and experience at the keyboard, these scale mutations as characteristic intervallic patterns above a bass. As part of my developing understanding of modulation, each kind of tonal motion came to have a distinct feeling, something that I could perceive and grasp often without thinking; or perhaps more accurately, that I could understand by thinking-through-my-fingers. This manner of embodied cognition allowed me to make complex decisions about how and where to modulate without analytical thought. Instead, my fingers led me where I needed to go, not unthinkingly, but rather relying upon the productive, intelligent interface between hand and keyboard. To better represent this emerging sense of key and modulation within my analyses, I settled on a more spatial metaphor for understanding how I could change key. I imagined a limited number of tonal directions of motion, each measured against the local reigning tonic: towards subdominant, dominant, relative major, relative minor, mediant, submediant, subtonic, and supertonic.[26] The piece's modulatory path, its dispositio, consists therefore in the concatenation of these tonal motions. If, in my analysis, a particular schema was used to accomplish a modulation in one of these directions, then I tagged the schema appropriately. I also observed that each of these tonal directions tends to entail characteristic chordal sonorities (like the #4 chord cited above in connection with a movement toward the dominant), and many often rely upon specific "tags" isolated in my analysis. For example, movement toward the subdominant is very often

[26] These designations are not intended to refer to tonal functions, but rather to scale degrees. A modulation to the "mediant," then, refers to a modulation to scale degree 3. This terminology is somewhat reminiscent of the *cordes essentielles,* consisting of *finale, médiante,* and *dominante*, which, as Pedneault-Deslauriers (2017) notes, had been common parlance since the early seventeenth century.

accomplished by the so-called *motivo di cadenza,* in which a cadence is evaded and redirected towards the subdominant by way of a flattened leading tone.[27]

In sum, I sought to represent in these analyses how I thought about and worked with a variety of improvisational procedures, techniques, and structures. Although I could undoubtedly refine my work further with enough time and experience, I ultimately arrived at analyses that felt right. Furthermore, I came to these analyses not solely through intellectualization, but also through a careful and reflective thinking-through-practice. With the analyses in hand, I could now put them to work.

Pedagogical Tools

One of the goals in performing these analyses was to sharpen my understanding of the theory behind Chambonnières's improvisational practice; to have a clearer idea of how pieces like his courantes *could* have been improvised. But beyond that, I wanted to engage with the corpus as a body of implicit, tacit knowledge, and moreover, to make this knowledge my own. I needed to transform my analyses into something like a collection of Neapolitan partimenti, offering, as I described above, a curated chain of experiences designed for maximum pedagogical impact. To that end, I turned to tools from computational musicology, namely the python library music21.

Music21 is, according to the developers, "an object-oriented toolkit for analyzing, searching, and transforming music in symbolic (scorebased) forms" (Cuthbert and Ariza 2010, 637). It consists of a variety of tools for working with XML files, and for representing and manipulating music programmatically, as well as a large collection of helper functions and objects for dealing with routine tasks in analysis and composition (like determining the key of a piece or passage, for example). While musicologists have increasingly relied on music21 for their corpus analysis projects,

[27] In my own analyses, I have affectionately termed this the "bLT," short for "flat leading tone."

in my own case, I am less interested in the software for its powers as an analytic tool than for its ability to programmatically organize and generate music.[28]

My first task was to turn my analyses into something intelligible to the software. I designed a standardized format for my analyses. Each piece's analysis was transcribed into a CSV file, with beats represented by columns and measure numbers represented by rows.[29] I conceived of an "excerpt" with a beginning (beat and measure number), end, and a series of descriptive tags. I entered each schema in the analysis into the appropriate "start" cell, with the primary schema indicated as the excerpt's first tag, and I indicated the end of the schema in the appropriate "end" cell.[30] As an example, Figure 4.19 shows the tag file for GusC 2.

I could now bring these tag files to bear on the corpus, represented as a collection of twenty-seven XML files. Using music21, I designed several data types and functions to represent the improvisational knowledge locked inside the corpus. In addition to a tag map, which programmatically represents a piece's analysis, I conceived of a tag dictionary. The tag dictionary catalogs every analyzed excerpt in the corpus and organizes them according to the excerpt's constituent tags. It is, effectively, a virtual *zibaldone*, full of every improvisational generating principle in Chambonnières's collection of courantes. With the tag dictionary, making inquiries about Chambonnières's style is effortless. With a few lines of code, I can look at every cadence in the corpus, side-by-side. Or, perhaps I might want to look at every double cadence modulating to the subdominant by way of a flattened leading tone. With a few more lines, I can see them all transposed to C major, or any other key of my choosing. The resulting pages of music are a little like

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[28] My project's up-to-date source code may be viewed and downloaded online on GitHub: https://github.com/medwards3/partimentifi.

[29] The courante's 3/2 meter was subdivided into 6 parts, giving us beats 1, 1.5, 2, 2.5, 3, and 3.5.

[30] In the tag files, schemata are indicated by strings of tags separated by spaces. The beginnings of subsequent schemata within the same bar are indicated by semicolons. The end of an excerpt is indicated by a backslash followed by the excerpt's schema (i.e. its first tag).

Measure	1	1.5	2	2.5	3	3.5
0						att X phr
1						
2	/att; ttc a				/ttc; cad	
3			/cad	gasp plag X		
4	1to3 tail a cant mod maj	/gasp				
5	/1to3; d3			/d3; cad double long gal		
6						
7				/cad	att imit 2vc	
8	alt			/alt; ten comp d		/ten
9	/att			cant		
10	/cant; d3			/d3; att mod min		
11	/att; cad double ev blt mod maj					
12	/cad; tail a cant	/tail; ttc d ten mod →				
13	/ttc; cant			/cant; cad mod ←		
14	/cad; 3to5 cad comp long mod min					
15						/3to5

Figure 4.19. A Tag Map for Courante in A minor, GusC 2

the pages and pages of *cadentiae* in Spiridione's *Nova Instructio* of 1670. By playing through so many realizations of the same schematic design, I began to develop a better understanding of how I could transform an abstract schema into sounding music, guided by Chambonnières's example.

Beyond this, I also wanted to develop my skills in realizing a schema in the context of the piece as a whole. What I needed was analogous to the *partimenti diminuiti* of Durante or the *Große Generalbass-Schule* of Mattheson: a pedagogical method aimed at teaching the various hierarchical levels of improvisation (dispositio - elaboratio - decoratio) holistically. Viewed pedagogically,

partimenti are not just "potential musical works," as Sanguinetti (2012, 167) describes them. Rather, according to Moseley, they serve as complex interfaces for musical games:

> A partimento typically takes the form of a bass line to be realized *ex tempore* by a student at the keyboard. As such, it is a concise script to be decompressed and processed via the hardware of a harpsichord, the interface of its keyboard, and the "wetware" of its player's experience, skill, memory, and associations en route to becoming music. Rather than a text to be read, it is an algorithmic puzzle that prompts and admits multiple polyphonic solutions. (Moseley 2016, 91)

In their partimenti, Durante and Mattheson create what are effectively puzzles or games to be mastered by the player. Although one might view any partimento in such ludic terms, Durante and Mattheson are particularly clear in articulating the game's rules. In each partimento, the player needs to discover when and where to apply the various textures, figurations, and stylistic features suggested by the composer. Since each suggested diminution pattern is keyed to a particular schema, the player solves the puzzle by learning to recognize these schemata in the partimento, and by correctly adapting and applying the appropriate diminution. After encountering the same schema often enough, in diverse settings and with diverse patterns of diminution, the player intuitively and tacitly knows how to use and embellish the schema effectively in the course of improvising.

In order to put my virtual *zibaldone* to work, I designed several more functions to create *partimenti diminuiti* on demand. These functions take a given piece from the corpus, transform it into a partimento (or a rhythmic partimento, if preferred), select several schemata from the piece's tag map, select several excerpts from the tag dictionary corresponding to those schemata (either drawn from the same piece, or if desired, from the corpus as a whole), and present these excerpts—or *modi* as Durante would put it—to the player. Each of these steps in the process can be customized and/or randomized to present the player with a partimento exercise that looks unfamiliar. For example, I might generate the following exercise, shown in Figure 4.20.

Figure 4.20. Excerpts and Partimento (Courante GusC 9)

Recording 4.21. Improvisation on GusC 9

In this case, my program has generated a partimento based on the Courante in C, GusC 9, transposed to G major. It has selected four sets of tags at random from the courante's tag map, printed in abbreviated form above the respective excerpts: d3 (descending third), alt (*altizans*), alt mod sub 5c! (*altizans* modulating to the subdominant with a surprising 5/3 chord), and att 5-6 (an attendante with 5-6 motion). The program then randomly selected exemplars of each of these tag sets from the tag dictionary, resulting in a d3 from Courante no. 39, an *altizans* from Courante no. 48,

another *altizans* from Courante no. 9, and an *attendante* from Courante no. 44.[31] With the partimento and the *modi* in hand, I was ready to start looking for improvisational solutions to the puzzle before me.

Rather than working from an improvised A-phase, I elected to begin immediately experimenting with adapting the excerpts to the partimento. I worked in stages. For each excerpt, I would first experiment with where to introduce it into the piece, and then improvise a courante including that excerpt in the chosen spot. For each subsequent excerpt, I would incorporate it into a new improvisation, all while retaining the previously worked excerpts. It was very easy to fit excerpt no. 3 to m.8, since it had originally been drawn from the same piece as the partimento bass. Excerpt no. 1 was the next simplest, in that I only needed to modify slightly the rhythm of the partimento's bass in m.1 to correspond with the excerpt. Excerpt no. 2, likewise, was quite simple to adapt to m.12: that is, I was able to recognize the excerpt's bass line as a diminution of the partimento's bass line in this bar. There were, however, several difficulties in adapting excerpt no. 4. I recognized the only possible opportunity for applying this schema in m.5, but I had encountered a problem of phrasing. Each time I improvised on the partimento, the melodic line came to rest of the downbeat of m.5; the excerpt, meanwhile, seemed to demand melodic continuity. Ultimately, I decided to maintain my own phrasing. I altered the excerpt nearly beyond recognition to achieve a degree of melodic repose on the downbeat, while allowing the tenor to project forward towards the next beat.

Simple Computational Modeling of Improvisation

While these exercises were certainly useful in developing improvisational skill, they were also limited by the size of the corpus. Without taking into account transposition of the bass, there are only twenty-seven partimenti available, corresponding to the twenty-seven courantes of the corpus.

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[31] The selected exemplars are all transposed by the program to the same key as the partimento, in order to facilitate the player's work.

One way to remedy this limitation might be to expand the size of the corpus to include all of Chambonnières's manuscript courantes, but this would be missing the point. The entextualized improvisational knowledge embodied by even a small corpus should be capable of generating a practically infinite number of pedagogical exercises. I therefore resolved to find a way to design entirely new partimenti from which to learn, generated from the raw materials of the corpus.

Based on my experiences until this point, I had confirmed for myself a (perhaps obvious) characteristic of courantes: namely, that the rhythmic motion of the bass line is often organized in bar-length units. That is, a given musical gesture starts at the downbeat, or immediately afterwards, and continues through until the next downbeat. By way of confirmation, in my schematic analyses I found that a large majority of excerpts do indeed begin and end on downbeats. Furthermore, I reminded myself that these bar-length rhythmic gestures, the elaboratio, were in the service of fulfilling the piece's dispositio: each bar, by virtue of its modulatory movement (or not), fulfills a particular function in the piece's larger formal design. I also reasoned that the bars fulfilling a given structural function (a "dispositio element") were all more or less interchangeable, so long as they all started and ended in the same place (i.e. on the same scale degree and in the same key). Based on this reasoning, I developed a new approach to constructing partimenti. By treating each bar in the corpus as a module, categorized according to a strict set of criteria, I could construct a new courante by concatenating a group of randomly-selected modules in sequence, each fulfilling a particular structural function.

There are two critical components in this model: first, a vocabulary of valid musical utterances, consisting of every bar-length module in the corpus together with its identifying features; and second, a decision-making process to select which bars to string together. I created the model's vocabulary by programmatically analyzing every bar in every courante, each in relation to the bar immediately following it. Unlike the system of tags I described in the previous section, this kind of

analysis could be performed automatically by the program I designed, and subsequently stored in memory. The function I created thus analyzed each bar according to the following criteria: first, the scale degree of the initial bass note; second, the chordal sonority over the bass ('5/3' vs. '6/3'); third, the current tonic (recorded as a scale degree in the piece's home key); and fourth, the structural function of the bar (e.g. Modulating, Cadential, Closing etc.). Each measure was categorized according to these criteria, taking into account as well the same set of criteria at the arrival of the downbeat of the next measure. These bar-length musical excerpts were stored in a data structure (a dictionary) allowing easy retrieval based on the aforementioned criteria.

With this vocabulary, I could now create any number of new courantes modeled after a given courante's formal design. After analyzing the selected courante to determine its sequence of dispositio elements, I use my catalog of bar-modules to introduce alternative modules to fulfill the same structural functions, selected by the computer at random. Figure 4.21 presents a comparison of the original bass line of GusC 2 with the output of music21. In fact, there are only two small differences between the two bass lines, in bars 3 and 10. Despite the fact that this particular output follows the original piece quite closely, it has nevertheless inspired me to improvise a piece with a markedly different tempo, affect, melodic line, ornamentation, and touch than the pieces in Recordings 4.10 and 4.11. The result is a piece that closely follows the same formal plan as the original, yet realized with contrasting materials: the same dispositio (or structure) with a slightly different elaboratio (or realization of that structure). By practicing a variety of different realizations of the same dispositio, generated by music21, I slowly acquired a very practical feeling for how each elaboratio functions within the formal structure of the piece.

Figure 4.21. Comparison of GusC 2 (top staff) with music21 output (bottom staff)

Recording 4.22. Improvisation on GusC 2

But I also wanted to learn how to determine the piece's dispositio myself, and so I created a computational model for this kind of knowledge. More precisely, my goal was to create a tool for generating pedagogical exercises that might lead me to develop my own improvisational know-how. The model's decision-making process was intended to mirror, in highly simplified form, the decision-making process of an improviser. Here, I am contrasting an improviser's decisions, which are made in real time, to a composer's decisions, which are made outside the constraints of real time. In making compositional decisions, it is indeed possible to make choices that reflect the state of the composition as a whole, and these decisions can be revised at any point during the compositional process. Improvisational decisions, on the other hand, are made moment-to-moment, primarily

projecting forward into the future. With a limited working memory, it is highly unlikely that the improviser makes decisions taking into account all previously made decisions. Rather, it is probable that the improviser makes decisions based on a limited range of past decisions, or perhaps even, potentially, only the most recent decision.[32] This also accords well with the model of modulation introduced above, in which the piece's dispositio evolves as a result not of a clear design, but rather of moment-to-moment tonal motion. The improviser's skill consists in concatenating these tonal motions, creating an effect of modulatory wandering while still satisfying the genre's tonal demands. This description of improvisational decision-making, however limited, can nevertheless be modeled well by a Markov chain. A Markov chain models a random process in which any future state's probability depends only on the process's present state. All potential states of the process are included in the chain's "state space," and the probabilities of any given state moving to any other state are listed in the chain's "transition matrix" (Gerhard 2009, 67-9). In this respect, the reader may recall Gjerdingen's transition matrix of galant schemata from Chapter Three (Figure 3.5). For my own part, I chose to model the corpus as simply as possible, using a first-order Markov chain: that is, the set of transition probabilities is only dependent on the system's current state, not any of its past states.[33]

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[32] Of course, this notion of memory also encompasses the memory of the body, such that the fingers might "remember" the actions they just performed without any conscious awareness on the player's part. This embodied memory is also absent from the computer model, which is very much intended solely as a pedagogical aid, not as an accurate re-creation of improvisational skill.

[33] In reality, it would be impossible to model adequately the improvisation of a courante using only a first-order Markov chain. Even if the improviser is mainly thinking moment-to-moment (or bar to bar, in my model), they are nevertheless also aware of large-scale, long-term structure in predetermined forms like the courante. The improviser, knows, for example, that after a certain period of time, or a certain number of bars, they need to reach a cadence in a related key, corresponding to the written courante's double bar. In order to accommodate some of these larger structural concerns, I modified my implementation of the Markov chain. My implementation still constructs new courantes using the first-order transition probabilities observed in the corpus. However, after a certain number of bars, it also begins actively selecting for modules that will lead to a cadence in an acceptable key. If after five bars of looking the program has not yet reached a cadence, then the generated courante is rejected and the process starts anew.

As interesting as it is to know such things, it is of little help to the improviser. Such a matrix forms the declarative representation of what is normally procedural knowledge. That is, while expert improvisers may not be capable of articulating the probability of choosing one path (i.e. one state transition) over another, they will nevertheless intuitively—that is, using an intuition informed by their wealth of improvisational experience—make an appropriate choice in the course of improvising. In order to transform this explicit, declarative knowledge into tacit, procedural knowledge, I needed to engage myself creatively with a large number of newly generated pedagogical examples. Taken together, these exercises collectively exemplify the improviser's tacit knowledge of dispositio, or realization of underlying structure. My Markov chain implementation, then, will create any number of unique courantes, each one constructed according to the transition probabilities observed in the corpus. As an example, consider the courante in A minor shown in Figure 4.22, improvised on a partimento generated by music21.

Figure 4.22. Courante in A minor, generated by music21

Recording 4.23. Improvisation on Figure 4.21

Conclusion

In summary, I have presented this process of improvisational reading as an excavation of sorts, sifting through the hierarchical layers of improvisational activity. I have tried to understand the various techniques and strategies by which Chambonnières could have improvised his keyboard pieces. By way of both traditional and more contemporary means, I have designed pedagogical materials to unlock the tacit improvisational knowledge embedded in these pieces. In using these materials myself, I have developed improvisational skill within the stylistic constraints of the corpus. In effect, having observed the traces of Chambonnières's improvisational language in his published works, I have learned to speak that language myself, albeit filtered through my own twenty-first-century sensibilities.

In the following chapter, I turn to the ways in which this newly acquired knowledge can be brought to bear on the issues raised in Chapters One and Two. I will explore what happens when twenty-first-century musicians read musical texts not as a series of performance instructions, but rather as a collection of improvisational ideas. In doing so, I will confront competing notions of work, style, and authenticity to carve out a new space for the historically-informed performer's freedom and creativity.