The polyphonic touch : coarticulation and polyphonic expression in the performance of piano and organ music

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Part IV: Polyphonic Expression

Performance of the Chopin Etudes depends on the mastery of a sophisticated layering of coarticulation, and in a similar way the realisation of polyphonic expression depends on the mastery of certain other body schemata which structure coarticulation in a different way. Just as the body schemata developed in the Chopin Etudes give a flexibility and sophistication in coarticulatory layering that is then available to be used in the expressive shaping of any music, development of the body schemata associated with polyphonic expression provides another dimension to musical imagination. How difficult the project of learning the Chopin Etudes seems depends on the individual pianist and his or her innate capabilities, experience and training, and similarly the relative previous experience of and proficiency in polyphonic expression will vary among pianists.

To begin, in §17 I will examine some different musical examples to question what polyphonic lines can be found. This will result in my own terminological distinction between lines, which are affordances of scores, and voices, which are created in performance. Once the various embodiments of such voices are brought into the discussion, I will then characterise musical expression *in performance* as homophonic or polyphonic, and contrast homophonic and polyphonic voicing. This will lead - finally - to a gesture-based definition of polyphonic expression. In §18 I will report on a voyage of artistic experiments, reflections and outcomes on which I embarked when I began this research project. In §19 I will suggest how to use exercises for the development of the

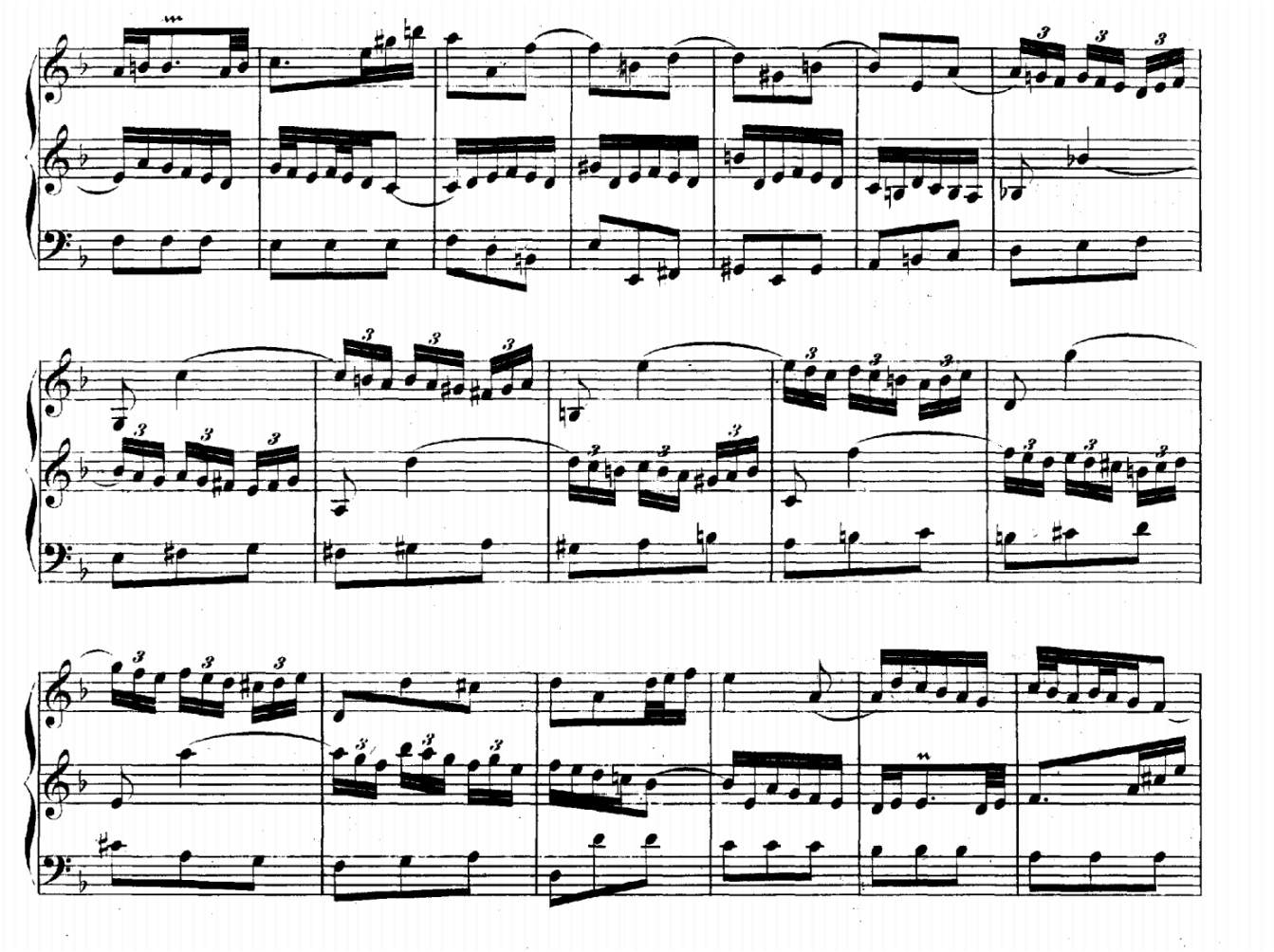
body schemata of polyphonic expression and share some other experiences that have helped me in this practice. In §20 I will turn to the preparation of a recital program, showing a few examples of polyphonic voicing in several contrasting works.

A few disclaimers are in order. First, the definition of polyphonic expression I give here and the practice that it represents remain only one possibility which, when mastered, is available for use in performance. Many other important expressive possibilities for the performance of polyphony remain for future research. Aspects of historical informedness such as style, applicability on period instruments, and conformity to existing performance traditions are extremely interesting to consider in relation with polyphonic expression, but I leave these aspects for other research. The artistic choices I have made in the examples presented are based on my own experience and taste, which is also continually in development.

17 Voices

In the performance of vocal polyphony, the separation between voices is relatively clear: each voice is sung by one person or one section. In performance, the colour and spatial location of each individual voice is different, so the delineation of voices is rather audible, and in the score the notation of who sings what is rather unambiguous. In keyboard music, finding and delineating voices is often a crucial constitutive element of individual interpretation. For dividing a musical score into separate lines, the clearest examples are the most contrapuntal: fugues, or imitative counterpoint of any kind.

However, even the clearest examples afford possibilities for hearing voices resulting from the crossing or interference of two lines or from the division of one line into multiple voices. In the first case, consider this passage:

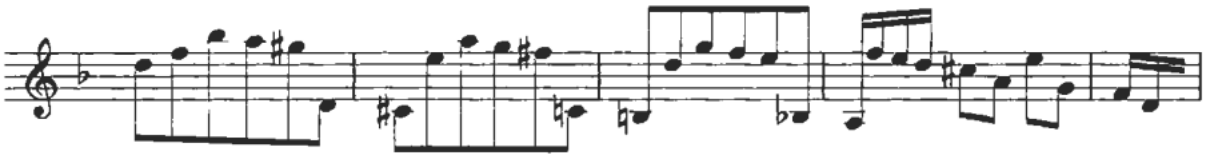


Example 17.1: Bach Trio Sonata in D Minor, BWV 527 - Third Movement (Breitkopf, Becker, 1853)

Despite a difference in timbre between the three voices (which is dependent on registration) an emergent ascending line is apparent, constituted from the quarter notes starting with the B-flat and ending with the A. This line borrows notes alternatively from two voices, creating the impression of another voice that temporarily subverts the prevailing division between the two voices played on the manuals. Similarly, the triplet sixteenth notes form their own sort of continuity, which can be perceived as a voice. The perception of this particular effect of voice crossing is of course to some extent dependent on registration, since when the primary octave is perceived to be different, the effect is greatly diminished.

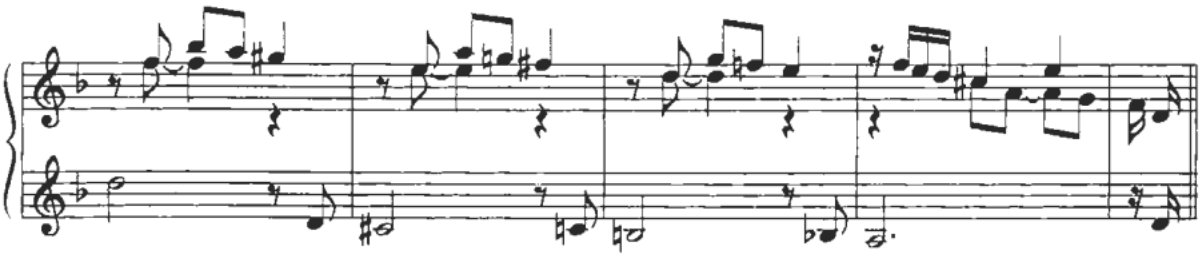
On the contrary, one line can outline several voices in different registers that are heard as continuities in voice leading, despite the gaps that might separate one note or group of notes from the next. Music theorist Kent Kennan uses this example to explain what he calls "compound melodies":

Example 10 BACH: Chaconne



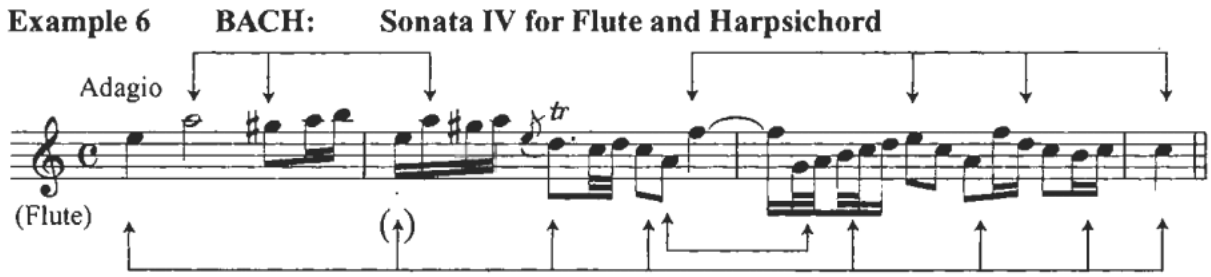
If the three lines implied in this passage were written as such, they would look approximately like this:

Example 11



Example 17.2: Compound melody analysis of Bach's Chaconne by Kennan (1998: 12)

Kennan also shows how melodies can be composed around implied pitch progressions of a second which he calls "step-progressions." These progressions can be seen or heard as lines despite their separation by intervening notes.



Example 17.3: Step-progression analysis of Bach's Flute Sonata no. 4 by Kennan (1998: 10)

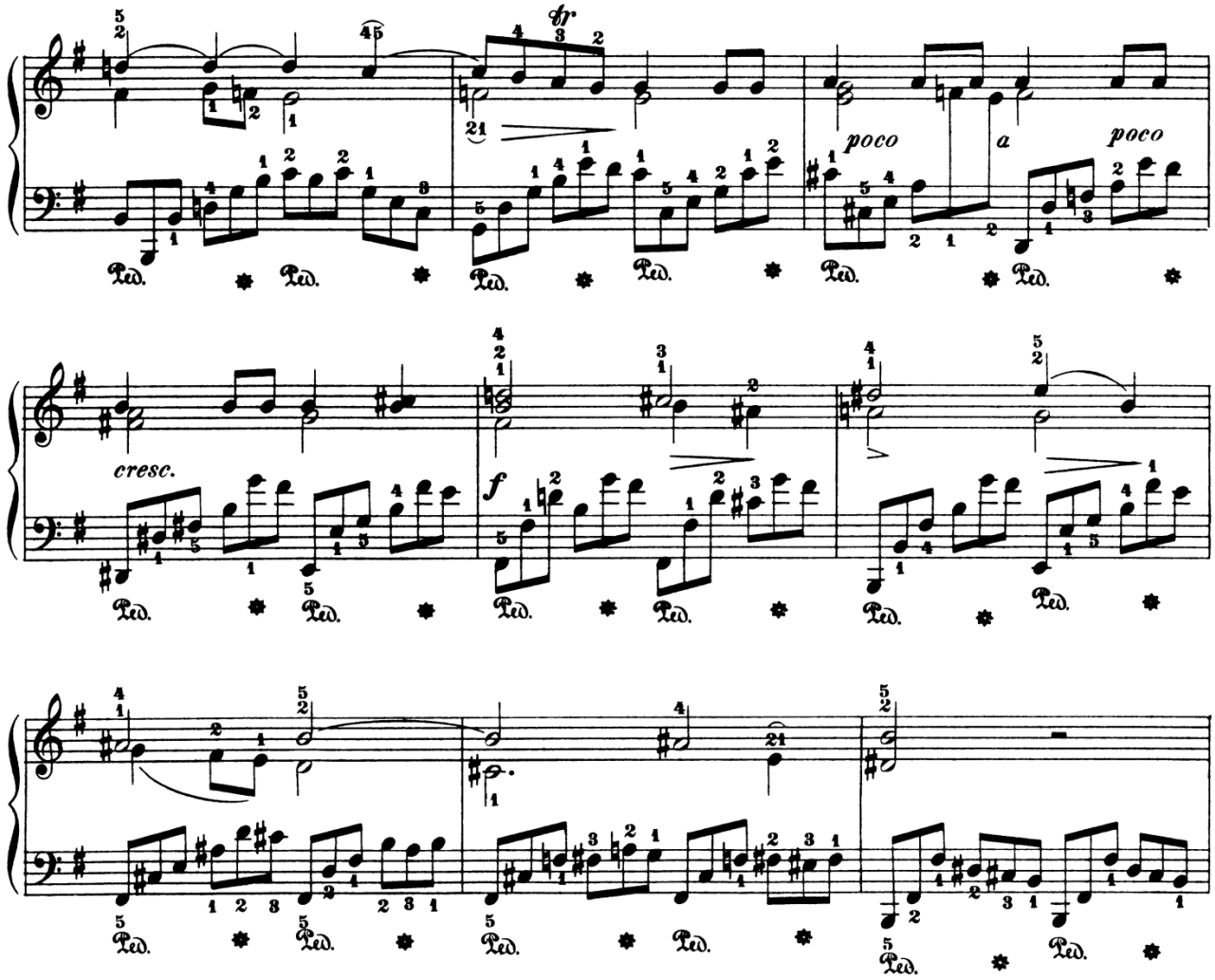
In performance, how such compound lines and step-progressions are heard is to a certain extent up to the performer, since he might emphasise the compound nature of the melody by differentiating its constitutive elements. In the case of step-progressions, gravitation around the register of one or the other progression can bring out or colour the hidden line. This colouring and shaping need not occur as an act of conscious interpretation. Step-wise progressions are often clearer to the ear than to the eye, and are emphasised by the physical location of the notes on the instrument, so they are built into the kinaesthetic "feel" of the melody. For both performer and listener, the perception of continuity in lines is based on a pre-reflective gestural understanding of the lines. In explaining how this understanding might work, music researcher Alicia Peñalba Acitores describes a theory of musical perception based on two layers of consciousness: "*primary consciousness* takes place in the perception of sensory stimuli while *higher-order* consciousness is concerned with the perception of self" (emphasis mine, Peñalba Acitores 2011: 215). She connects these two levels of consciousness to what she calls "grabbiness" and "bodiliness," respectively.

> Human beings, within the process of perception, switch constantly from bodiliness to grabbiness. Bodiliness implies awareness of our own body - observing how it has an influence on the perception of stimuli - whereas grabbiness relates to the capacity of environmental stimuli to attract our attention - in relation to the bodily responses in us that they elicit (Peñalba Acitores 2011: 224).

Explaining further, she writes, "grabbiness […] captures the idea that the environment guides the subject in perception. Certain features in music are more likely to draw our attention - to make us move internally - than other stimuli, although this may be different for each person" (Peñalba Acitores 2011: 222). In describing how bodiliness and grabbiness mediate the perception of step-wise progressions, she writes:

> The phenomenon known as pseudo-polyphony, found among other places in J.S. Bach's solo violin and cello music, consists of the creation of two or more concurrent contrapuntal lines (or streams) using a sequence of single-sounding tones, produced by the rapid alternation of pitches separated by relatively large musical intervals. According to bodiliness, when we listen to one of these passages we are unable to sing along to the literal succession of pitches, because of its speed and pattern of intervals. As a result, we tend to 'sing' (internally, virtually) a melody consisting of either the higher or the lower pitches. The fact that we sing only certain pitches (a factor of bodiliness) makes us perceive the high pitches as belonging to a single line, even though they are interleaved with lower pitches. High pitches may also constitute grabbers since their salience (grabbiness) makes us focus our attention on them when they appear (Peñalba Acitores 2011: 223).

Consider the following passage from Chopin, which exemplifies all of the devices so far discussed:



Example 17.4: Chopin Nocturne in E Minor op. 72 no. 1 (Schirmer, Mikuli, 1895)

The flow of *all* the eighth notes forms a real continuity of line because of the coarticulatory shape that is inevitable in its execution, forming waves of gesture on the timescale of the half measure. On the other hand, their status as one voice is challenged by the grabbiness of the step-progressions that they outline. The eighth notes in the left hand form step-progressions that connect non-adjacent notes, most obviously in the ascending chromatic bass line. Making matters even more interesting, the last two eighth notes of each half measure (beginning with the *poco a poco cresc.*) form a step-progression with the ensuing lower half note in the right hand.

17.1 Focus of attention

These possibilities exist as affordances in the score that the performer can decide to bring out. While the grabbiness in pseudo-polyphony referred to by Peñalba Acitores functions regardless of performance expression (even, for example, in a MIDI playback), the performance itself can highlight or suppress grabbiness of many other lines or step-progressions that may not be characterised by "rapid alternation of pitches separated by a relatively large interval" (Peñalba Acitores 2011: 223). There are in fact two layers of grabbiness in a performance: a) the grabbiness of the lines in the score and the unfolding of their embodiment in performance, which feature in the perception of the pianist in all three time perspectives (imagination, playing, listening §9.6) and depend on his individual body schemata, and b) the grabbiness of the voices as perceived by the listener. If the "constant interchange between bodiliness and grabbiness provides one way to understand individual difference in the experience of music listening" (Peñalba Acitores 2011: 223), then this same interchange can explain differences in the pianist's musical perception of the score. What comes up to the level of awareness for the pianist is a series of line possibilities that are based on this pre-reflective understanding, possibilities which may be supplemented through conscious analysis and which may be brought out in performance.

The question remains as to what this "bringing out" of a step-progression actually means. It would be rather difficult and pointless to pinpoint the details of expression involved (such as playing this note louder, or that note later) since those details will always be in flux. It is clearly a question of *hearing, listening to* and *embodying* the progression, all of which involve the direction of attention. In the following paragraphs, I will examine the direction of attention through discussing a particular (but not uncommon) pedagogical scenario. In doing so, I will again refer to the three perspectives in time: the *imagination*, *playing*, and *listening perspectives* (§9.6).

Imagine a somewhat less talented student who comes to his piano lesson with the the Chopin Nocturne in E minor op. 72 no. 1 (Example 17.4) after having learned it well enough to play the notes. In his first performance of the lesson, he plays what is written on the page as understood through his own particular musicality, but in this passage he does not hear the connection between the last two eighth notes of the half-bar in the left hand and the ensuing quarter note in the right hand. The teacher knows that the student does not hear this connection because the line, formed between the two hands, lacks continuity of gesture in the student's performance, thus it lacks grabbiness in the listening experience. In this state the student *hears* the notes in terms of sound waves passing into ears, but does not *hear* (or *embody*) the line in question as a gestural continuity.

Now the teacher points out the affordance of this line in the score to the student, and asks the student to *listen* to it. The student plays the passage a second time, this time playing the line in question louder. The teacher explains that this is not what he meant, and asks the student to try the passage again returning the dynamic level of the line to where it was but still *listening* to it. The student follows the teacher's instructions and delivers a third performance in which the line in question is well shaped, but in which the soprano melody is not. When the teacher points out this insufficiency, the student remarks in frustration that he cannot *listen* to both at once. The teacher tells the student to practice it a couple of times, and after a short while the student plays the passage for a fourth time simultaneously *hearing* the inner line in question and the soprano voice (as well as, perhaps, other step-progressions like the chromatic ascent of the bass or interactions in inner voices).

The activity of *listening*, then, is distinct from *hearing* in that it is consciously focused. This conscious focus has been described by psychoanalyst and art-teacher Anton Ehrenzweig as "differentiation," a term which he applies both to seeing and hearing. This

term follows from Sigmund Freud's evaluation of dreams, which holds that the chaotic structure of dreams is due to a lack of differentiation in opposites, in time and space and in other attributes which might lend a firm structure (Ehrenzweig 1967: 3-7). A differentiated attention, then, separates figure from background or in other words assembles a gestalt impression that can be consciously grasped (Ehrenzweig 1967: 22). An undifferentiated attention takes in the work as a whole without consciously grasping or fixing on any gestalt impression. These two kinds of attention are described by Paul Klee, who describes how lines outline what can be considered an inside area (endotopic) and an outside area (exotopic) (Klee 1961: 50-60, Ehrenzweig 1967: 22). A differentiated view can grasp one or the other area, or can alternate between the two. An undifferentiated view of both at once requires the scattering of attention, which is considered impossible by gestalt theory. "According to gestalt theory we have to make a choice; we can choose either to see the figure; then the shape of the ground becomes invisible, or else - with an effort - to scrutinise the negative shape cut from the ground; then the original figure disappears from view" (Ehrenzweig 1967: 22). According to Klee, artists can choose either this endotopic/exotopic differentiated focus, or an undifferentiated focus on the whole. Ehrenzweig goes on to use the example of creating visual "counterchanges" like this one:

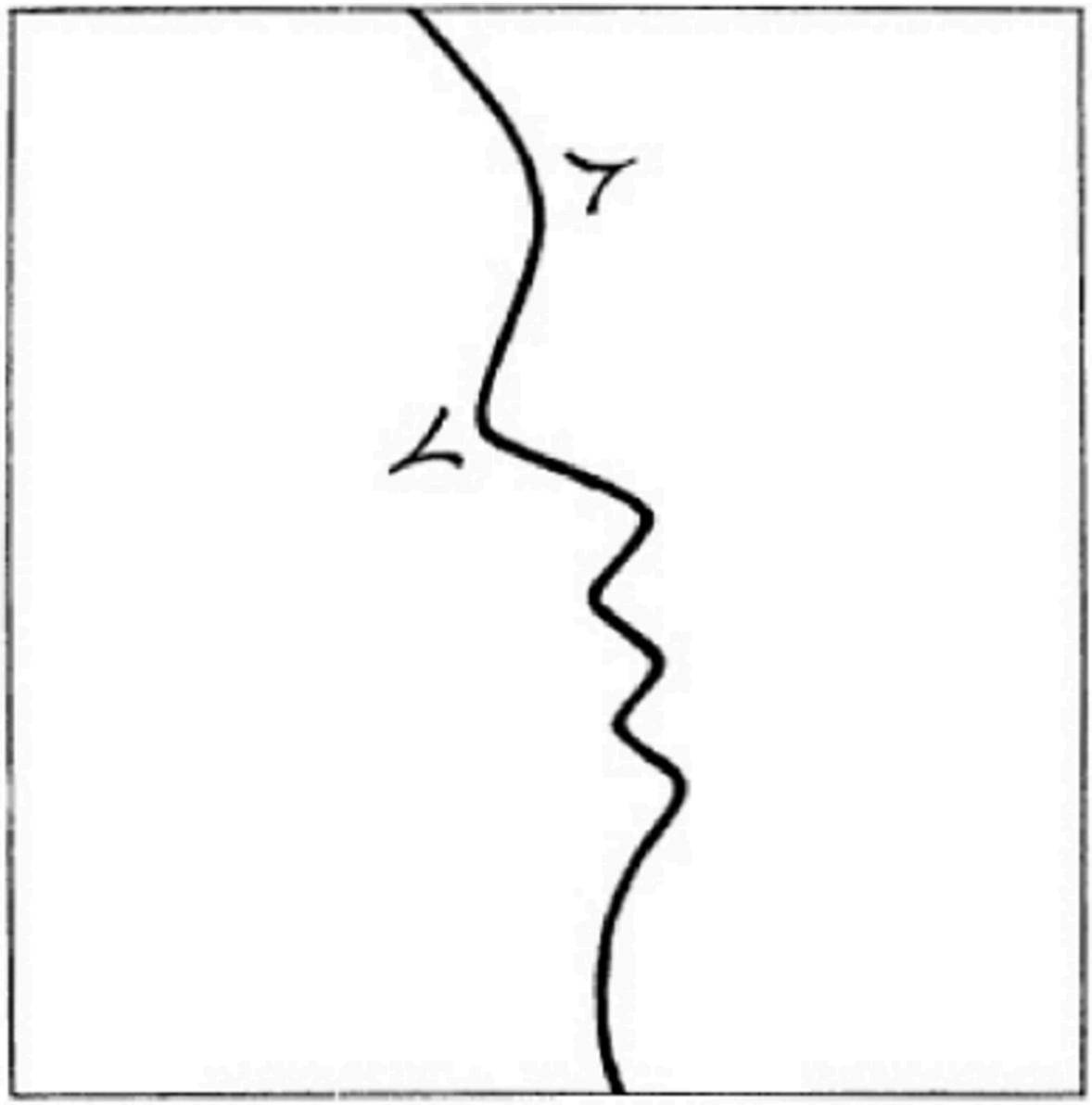


Figure 17.1: A visual counterchange (Ehrenzweig 1967: 24

He argues that successfully *creating* such counterchanges does not involve alternating between the view of one figure and the view of the other, but rather a simultaneous view of both.

> What, of course, is needed is an undifferentiated attention akin to syncretistic vision which does not focus on detail, but holds the total structure of the work of art in a single undifferentiated view. Introspection will fail us. The content of this

> scattered attention appears essentially blank and empty to conscious memory (Ehrenzweig 1967: 23).

Returning to the pedagogical encounter of Chopin's E minor Nocturne, the difference in attention between the student's first performance and his second and third performance is quite clear: in the first performance, he was not particularly attentive to anything at all (besides perhaps playing the correct notes) but in the second and third performance his attention was focused in a differentiated way on the particular line pointed out by the teacher, to the detriment of the other lines. In his fourth performance, the student returned to an undifferentiated focus in which he could grasp and hear the lines simultaneously. The difference between the first performance and the last performance is a certain continuity in the simultaneous lines. This continuity is felt in the imagination perspective and in the playing perspective as a continuity of gesture. This gesture *embodies* the line in question in the sense that whether it begins in the imagination or playing perspective, through its grabbiness and bodiliness (Peñalba Acitores 2011) in the repetition of practicing it eventually permeates all three perspectives (§9.6). Just as grabbiness functions pre-reflectively, this physicality of embodying the line does not always rise into awareness. One must not forget that the process that occurred between the student's first performance and his fourth performance included both directed attention to the line and repetition, which in combination inevitably activate some kind of continuity of movement in the hands. The passing off of the line between the hands can be compared to the passing of the baton in a relay race: the runner taking over begins to run before he receives the baton in order to preserve the continuity of movement. Similarly, the continuity of line is passed between the hands, regardless of whether such physicality arrives in conscious awareness (the physicality of this passing off has been discussed in

§15.2.5.2). These pathways of continuity remain and easily coexist in hand and ear in the fourth performance without the need for differentiated attention.

A similar physicality underlies Ehrenzweig's psychoanalytic account of attention. He emphasises the importance of brush strokes, scribbles and handwriting. "Indeed the great emotional power of spontaneous handwriting testifies to its hidden meaning and symbolism" (Ehrenzweig). He repeatedly and noticeably refers to differentiated focus as "rigid" and to undifferentiated focus as "flexible," connecting bodily and psychological states. He characterises the healthy fluctuation between differentiated and undifferentiated states of attention as possessing "rhythm" (Ehrenzweig 1967: 21-31). Throughout his text, however, he seems to view the physical gestures such as brush strokes, handwriting and inadvertent inflections as reflections of unconscious thoughts. The paradigm of embodied cognition (as introduced in chapter two) might suggest, on the other hand, that such physical gestures actually constitute the thinking rather than merely reflecting it insofar as we tend to offload cognitive tasks onto the environment (§7).

While in our example, the student became consciously aware of the line pointed out by the teacher, such conscious awareness is not always necessary. The physicality of playing the passage, especially multiplied by the repetitions in practice, represents its own kind of thinking which coordinates many elements of the music-making without explicit conscious awareness (without, in other words, differentiating attention). However, such physicality is inextricably entrained with the kind of comprehensive hearing associated with undifferentiated attention - the hearing of actual sounds from the listening perspective. In our example, the teacher appealed to the student's conscious attention (the imagination perspective) by pointing it towards the line in the music. By doing so, he awakened in the student the differentiating kind of attention that, while pinpointing one voice, neglects the others. After some practice, the student was able to return to a more

undifferentiated kind of attention. This process could be greatly simplified if the teacher addressed the problem through the playing perspective, by pointing out the physicality of passing the voice between the hands. Such a direction, because it encourages flexibility and continuity in movement, does not trigger a differentiated focus of attention on one voice. Because of the imbrication between embodiment (the playing perspective) and hearing (the listening perspective), which I have previously outlined (§9.6), the undifferentiated *hearing* of this line as a continuity would automatically occur, making it available to the imagination as an option for future performances. Thus, using language associated with this physicality enables the teacher to skip the misunderstandings evident in the student's second and third performances.

While working out gesture that follows lines in the playing perspective can be productive, it depends on careful listening by the performer to the actual sound of the instrument (that is, from the listening perspective rather than the imagination perspective). If the quality of this listening is undifferentiated, inner voices and associations emerge and rise into awareness as if by themselves because of their grabbiness, which itself depends on learned body schemata. This kind of emergent awareness can be described as an act of understanding rather than as an act of interpretation or analysis. Interpretation and analysis remain useful as another pathway towards awareness, but it is a pathway that depends on a different kind of attention.

17.2 Perception

It is relevant to consider how polyphonic expression is perceived by audiences of non-musicians, since reaching and communicating with such audiences is obviously an important over-arching goal of performance. In this research, I have not conducted any structured experiments with non-musician audiences, but from my own practice as a

concert pianist, I have continual feedback from such audiences, both in the comments I receive after concerts and in the presence or absence of small sounds during the concert itself: coughing, rustling of programs, loud breathing, applause. While neither category of feedback includes precise information about perception of polyphonic expression, I am extremely well-attuned to whether the audience is engaged and attentive, and I am able to grab the audience's attention when I feel it slipping away. To some extent, every successful performer has this connection with the audience, which is difficult to explain but easy to feel. In the normal course of performing, this feedback helps to shape performances, and the ideas presented in the performances can be "tried out" for how well they work with the audience.

From such a context of performing practice, I feel almost certain that even non-musicians perceive polyphonic expression at a gestural level, even if they cannot articulate what it is they hear. Music students spend time developing their ear, for example singing parts in choirs, taking polyphonic dictations in ear training classes, tuning chords in a string quartet. That such skills of hearing pitches must be expressly developed suggests that non-musicians do not possess them. The question of what non-musicians actually hear remains. While my answer to this is speculative, the background research presented thus far in this dissertation supports this answer: non-musicians perceive the gesture that the performance communicates, and when such a gesture is polyphonic, the polyphonic nature of the music is felt. Perceiving gesture through sensorimotor mirroring (through the activation of mirror neurons) is an innately human ability learned from birth onwards during normal development (§9.1, Lepage & Théoret 2007), and even though instrumental musical training will enable the perceiver to be more closely attuned to the technique of playing, gestural qualities such as smoothness, angularity, tension and rhythm are universally perceived, according to the sensitivity of each individual, even when gestures

are layered polyphonically together. As discussed earlier (§15.2.1.3), the theory of intonation further connects these gestures and their felt qualities with socially constructed experiences of the world.

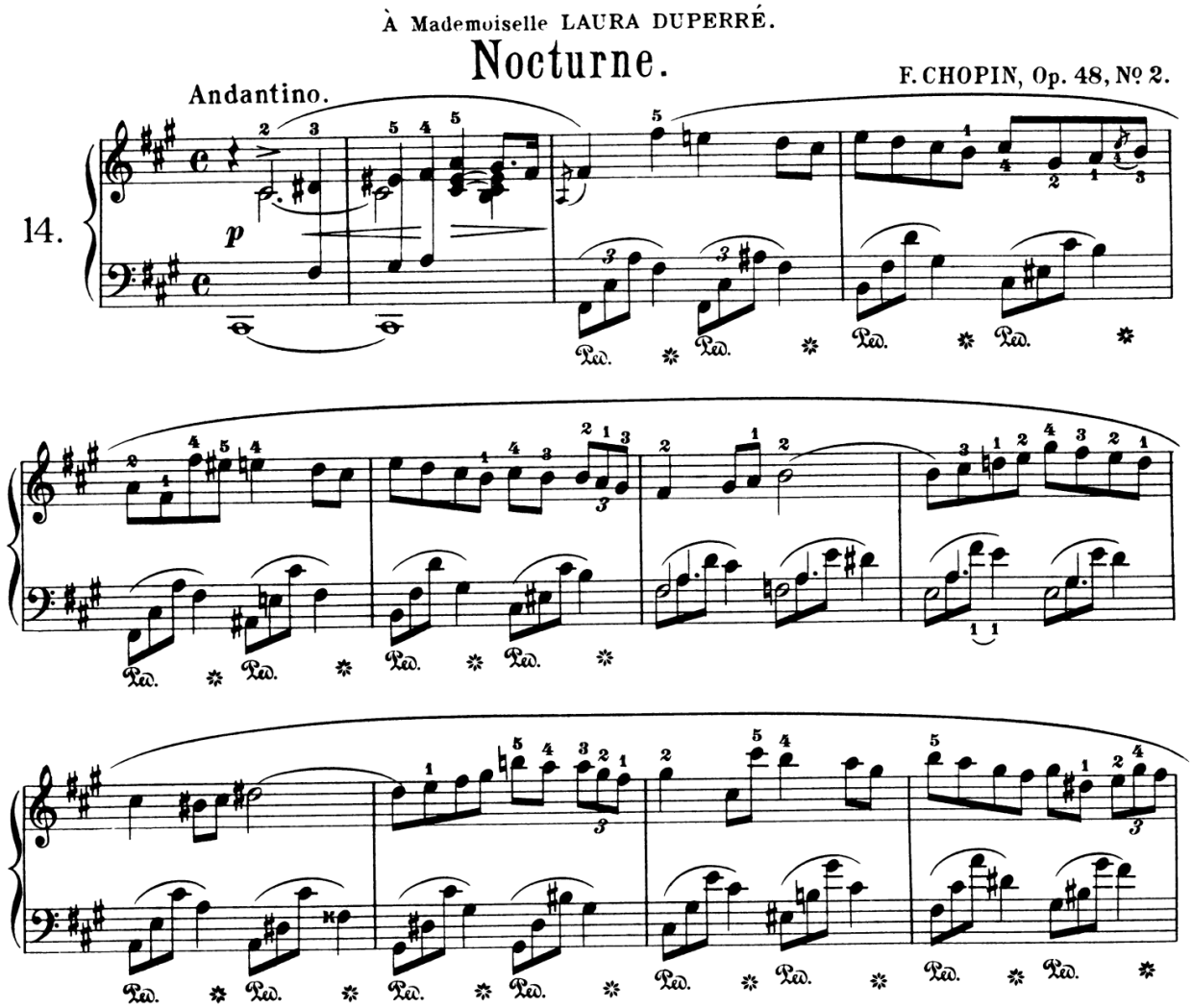
This gestural hearing, described above by as the interaction of grabbiness and bodiliness (§17.1), can coincide with various levels of ability in polyphonic pitch perception. Alongside musicians, non-musicians can develop a sense of polyphonic pitch hearing. In folk cultures that emphasise part-singing, for example, the ability to sing one's own part while hearing the others is possessed by all who participate in such a tradition. Musicologist Izaly Zemtsovsky created the useful term *homo polyphonicus* to describe such people (Zemtsovsky: 2002). Undoubtably, both people with such cultural backgrounds and musicians hear polyphony with a sharper perception of the individual pitches in a vertical sonority. For experienced and non-experienced listeners alike, however, attention can be drawn to the individuality of each simultaneous line through what I will call voicing.

17.3 Voicing lines

Lines as found in the score are possibilities or affordances. In the case of our Chopin Nocturne student (§17.1), he became aware of a certain line and ultimately played it with a sense of individual continuity that coexisted with the soprano line. The structure of such continuity is nuanced by coarticulation, and thus may be a hierarchical nesting of continuities. The local continuity between two eighth notes and the ensuing half note is superseded by an overarching continuity across the whole sequence (*poco a poco cresc.*), a continuity that is shared with the other voices. The act of investing a line (which, to repeat, is merely an affordance of the score) with such continuity of gesture by *hearing* it as a line, by *listening* to it as a line or by *embodying* it as a line is what I will call *voicing*. The resulting

sound can be perceived by the listener, starting with the performer himself, as a gestural continuity because of its increased grabbiness (§17.1). Therefore the distinction between lines - which are mere possibilities - and voices - which are embodiments of such lines in gesture and sound - puts the responsibility for voicing completely on the performer.

If voicing is an act of investing a line with a sense of felt continuity of gesture, then one might wonder what a non-voice would sound like in performance. In the case of the student, the non-voiced line in the first performance showed a sort of discontinuity that betrayed the fact that the student did not hear the notes in question as a line. But to give a more general example, consider the soprano melody from Chopin's Nocturne in F-sharp minor op. 48 no. 2. The melody is full of corners, for example across the bar line between measure three and four. In a simply digital performance (that is, using only the fingers with a rather fixed hand and wrist) these corners are heard as abrupt or angular, destroying the overarching continuity that is suggested by the long slur. As I have explained before (§15.2.1.1 and §9.3), the physics of the change in direction in gesture ask for a rounding of the corner if it is to be perceived as a continuous voice. This rounding of the corner can most easily be created by a rounded coarticulatory gesture of the hand and wrist, which in turn influences the timing and dynamics around the corner. Such a rounded quality is readily perceived by the listener. In a good voicing of this soprano line, this quality of continuity should be felt also at the overarching levels of the sub-phrase and at the level of the whole phrase, continuities which may be felt physically in the arms and torso as well as in the build-up of visceral intensity.

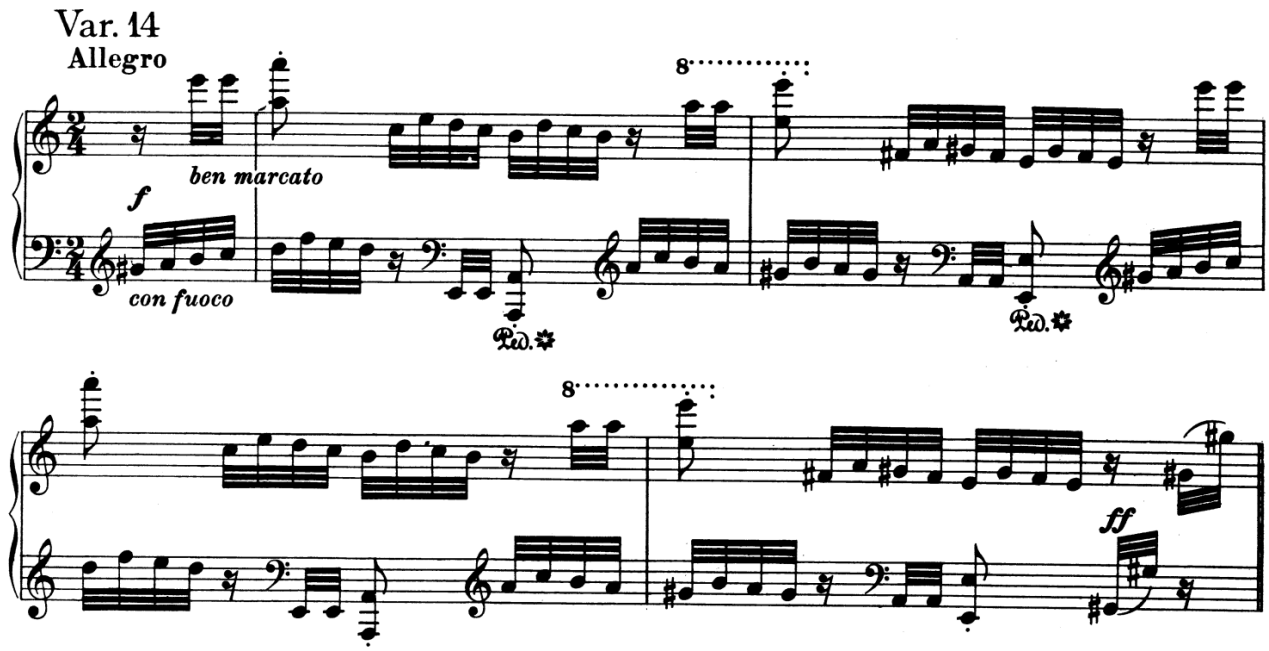


Example 17.5: Chopin Nocturne op. 48 no. 2 in F-sharp minor (Schirmer, Mikuli, 1894)

What this example suggests is that there are various degrees of voicing organised around three poles: (a) which and how many hierarchically nested timescales are voiced; (b) whether the voicing occurs by means of *embodied expressed timescales* or *disembodied expressed timescales* (§14.3); (c) whether the voicing is *involuntary*, *allowed without being willed, willed,* or *willed and overt* (§9.7). In other words, voicing may be structurally sophisticated, including several such layers of expressed timescales, or it may be simple. The effect of voicing can be achieved through the imagination perspective by manipulating timing, dynamics and articulation to give the impression of continuity of gesture without actually following with physical movement in the playing perspective (*disembodied expressed*

timescales) or as continuity of gesture that is both imagined and physically felt (*embodied expressed timescales*[68]). Moreover, the voicing may emerge involuntarily (§9.7) without awareness as a gestural topological response to the topography of the keyboard (*involuntary*), it may be allowed to emerge similarly but with awareness (*allowed but not willed*), it may be superimposed (*willed*) or it may be superimposed in such a way as to call the conscious attention of the listener (*willed and overt*).

The imagination perspective remains crucial in voicing lines that are divided in the playing persepective. Consider this example from Brahms' Paganini Variations:



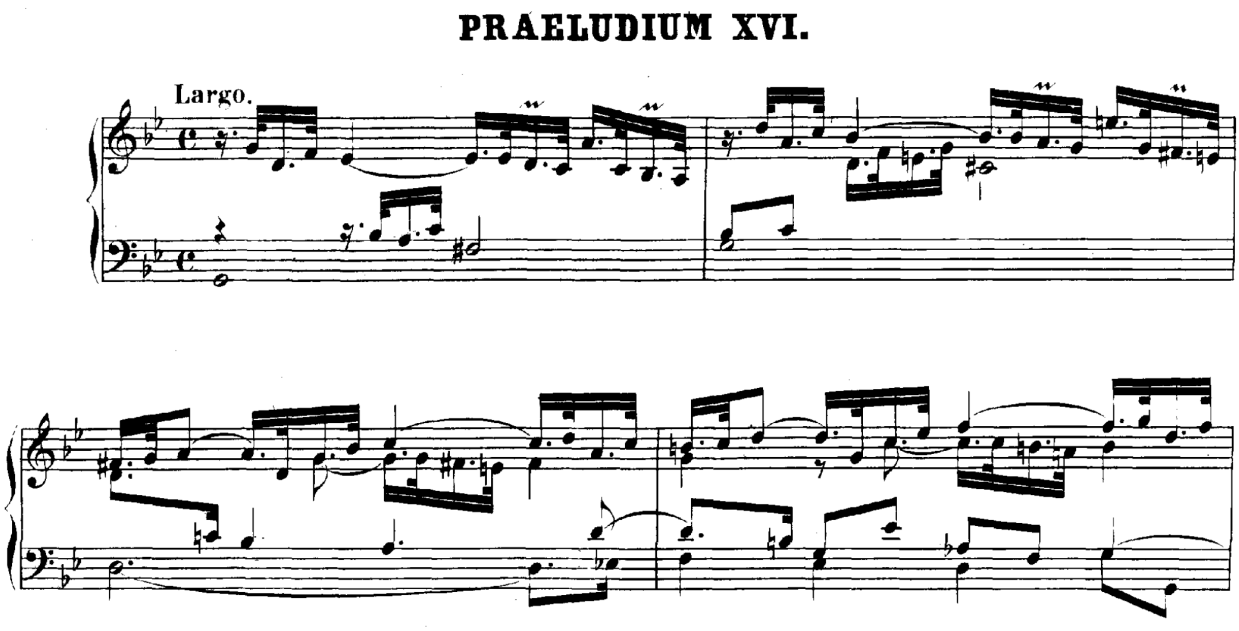
Example 17.6: Brahms Paganini Variations op. 35 (Breitkopf, Mandyczewski, 1926)

One clear line is formed by the continuous thirty-second notes that are passed between the hands. This line, starting from the first full measure, outlines a descending scale pattern on the timescale of the eighth notes. The coarticulation of the groups of thirty-second notes remains always in one hand or the other, while the continuity of the whole two-measure phrase is passed between the hands. The continuity on the two

[68] As I have argued in Part II and Part III, embodied expressed timescales are to be preferred.

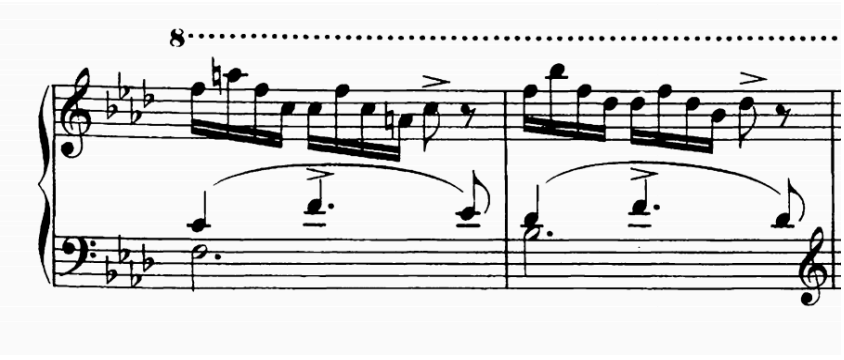
measure timescale is heard as a gesture in the imagination and listening perspectives, but occurs as separate gestures in the hands. If the continuity on the eighth note timescale and the continuity of the two-measure phrase are both voiced, the option still remains to voice the grouping found on the quarter note timescale (whether lining up with the division between the hands or not).

Boulez defines voices as constellations or recurring patterns of elements in music (Boulez 1971: 117). If we broaden the idea of voicing beyond the embodiment of lines and step-progressions, myriad possibilities for voicing emerge. A rhythmic pattern migrating between lines, when executed with a particularly close attention to continuity or similarity, becomes a voice in performance in the sense that the persistence of its expression draws attention. Consider, for example, the dotted rhythm in the Prelude in G Minor of Bach, BWV 885. Most performances do not realise the dotted rhythm with mechanical accuracy, but rather with a somewhat shorter thirty-second note. This provides a very particular rhythmic signature, felt as a repeating gesture, which when continued identically or in a progression between lines becomes in and of itself a voice.



Example 17.7 Bach: Prelude in G Minor from the Das wohltemperierte Klavier II, BWV 885 (Breitkopf, Kroll, 1866)

Similarly, patterns of accents distributed between voices can be emphasised as recurring patterns, and thus voiced. In the case of this example from Schubert, the continuity between the implied accent on the first beat and the accents on the second and third beats, each part of a different line, can be voiced.



Example 17.8: Schubert Impromptu op. 90 no. 4 in A-flat (Breitkopf, Epstein, 1888)

One might ask if it is possible to perform such a passage correctly playing the accents, but *without* voicing the accent pattern. Clearly the answer is yes, since the precise

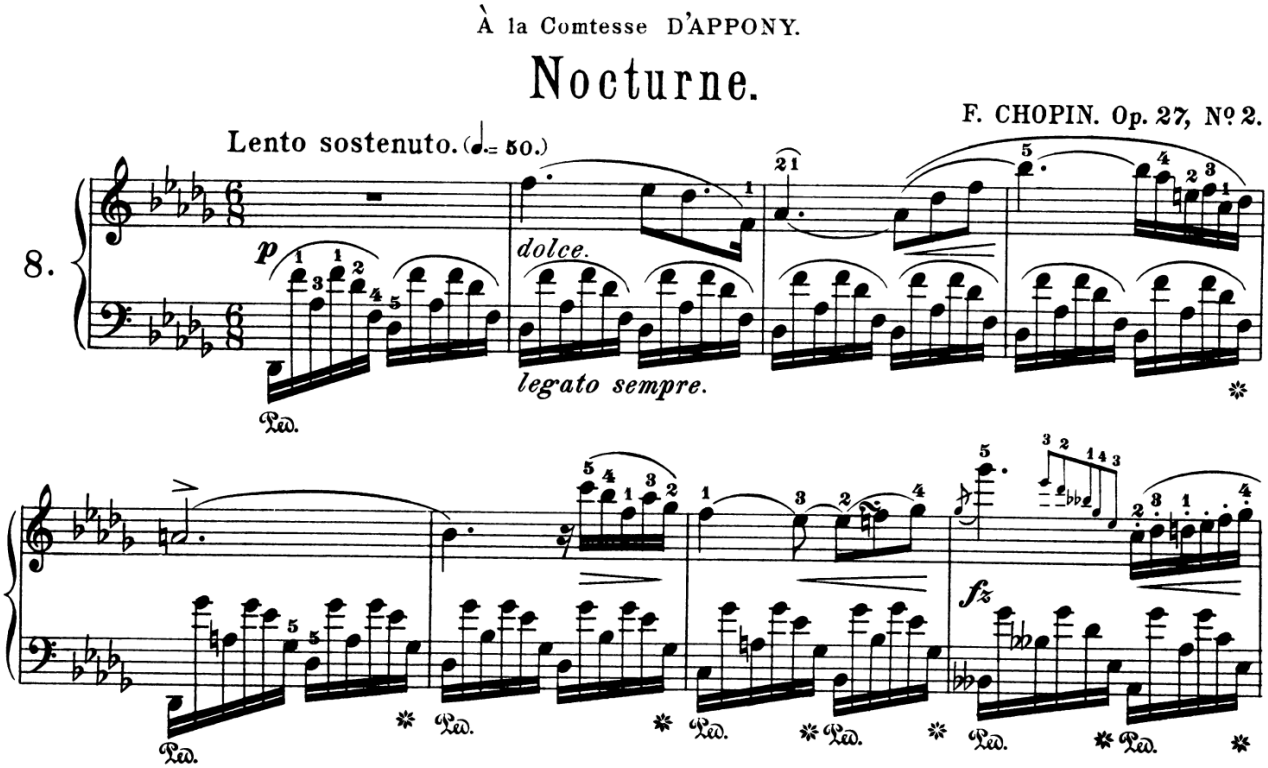
continuity of timing, the dynamic balance between accents, and the felt quality of gesture suggested by the accents all must conspire to create such a voicing, and if any of those elements is sufficiently askew, the voicing is lost. In this way, the attention of the performer in the sense of how he *hears*, *listens*, or *embodies* a voice is communicated to the audience. Of course whether such a voicing is desirable is an entirely separate issue.

In summary, various recurring or continuing elements in the score, such as lines and patterns, can be thematised or brought out through voicing. The process of voicing increases the grabbiness of the line or element voiced, making it resonant with listeners at a bodily level. To the extent that listeners are attuned to their own bodily experience (bodiliness), these voicing can then rise to awareness. Compound melodies, hidden step-progressions, rhythmic accents or gestures, lines created using alternating fragments of other lines all can be voiced. The expression of such voices is conditioned by the hierarchical nesting structure of expressed timescales, and thus each voice has such a hierarchical structure, whether it has few or many layers. This gestural structure can be heard through details in the sounding surface of the music, whose grabbiness communicates the experience and structure of such voicing to the listener. The degree to which voicing occurs is variable in that it may be conscious and planned or rather inadvertently physical, but the more structurally sophisticated the voice is, the more likely coarticulation will be needed to simultaneously express each level of the voice's hierarchical structure.

17.4 Voicing homophony

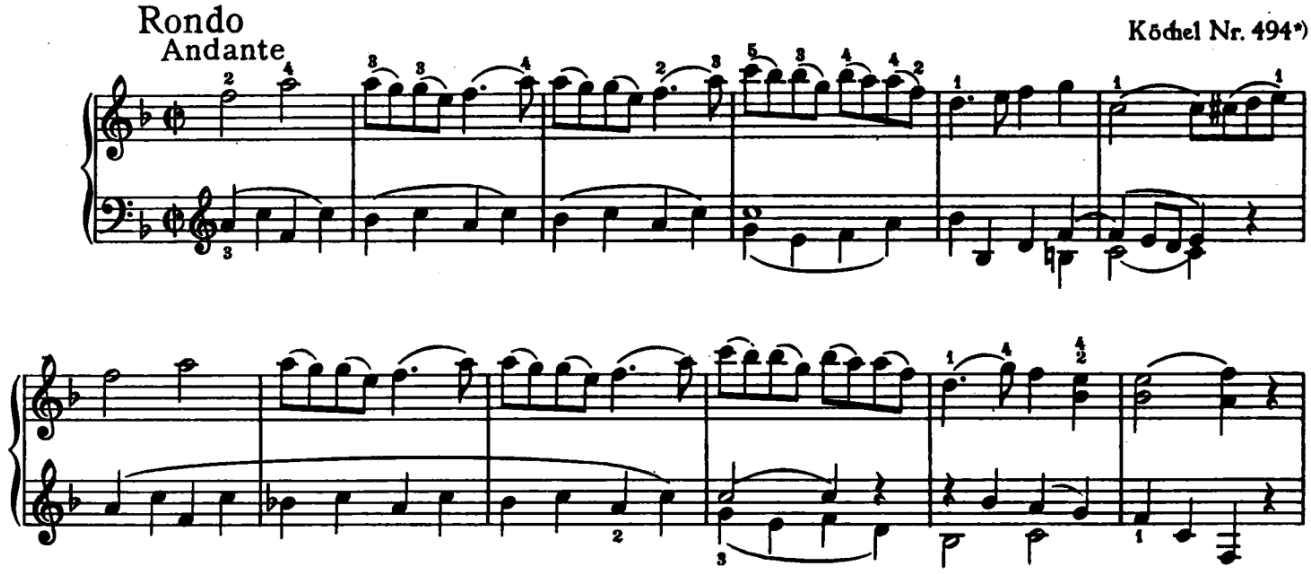
Due to the decay in sound of single notes on the piano, voicing long lines that contain long notes can be challenging. Playing the melody from Chopin's Nocturne op. 27 no. 2 by itself, even with the most elegant intonation and phrasing, is unlikely to achieve

the same degree of voicing that is possible when combined with the accompaniment. This is because the accompaniment, quite apart from the acoustic constructive interference of harmonics, provides one level of support in the hierarchical filling-out of gestural continuity of the melody. The movement of the sixteenth notes coalescing into the movement of the half measure provide the fundamental continuity onto which the overarching continuity of the melody (felt on the timescale of the whole measure and of several measures) can be painted. The accompaniment pattern *explains* the gesture of the melody in that it can be manipulated to show direction (slight and gradual progressions in tempo and dynamics) while still maintaining the continuity of its undulating pattern of sixteenth notes and half bar groupings. The hierarchical gestural structure of the melody, then, is splayed out asymmetrically across the two hands.



Example 17.9: Chopin Nocturne in D-flat op. 27 no. 2 (Schirmer, Mikuli, 1894)

This asymmetrical mapping across two hands is also often reversed in the sense that longer continuities in the accompaniment hold together shorter segments in the melody which otherwise might sound fragmented. Similarly to the above example, the timescales nest within each other.



Example 17.10: Mozart Rondo in F major K. 494 (Peters Urtext, Martienssen & Wiesman, ca. 1938))

In this example, the left hand in the first phrase voices continuities of one measure, and in the second phrase one long continuity of four measures. The right hand voices timescales that nest within the longer timescales of the left hand. Taken alone, the right hand would sound jumpy in gesture and the left hand would sound rather static in gesture. Together, the two hands build a much more fuller spectrum of voiced timescales: individual notes (eighth notes, quarter notes, half notes, whole notes), groupings on the timescale of quarter notes, half notes, whole notes and four bars as well as the general phrasing over six bars and the period over twelve bars.

In expression, performances of both of these examples as I have described them typify what I will call *homophonic voicing*. The accompaniment and melody parts nest within each other hierarchically in timescale relationships that are reducible to a whole integer over one (2:1, 3:1, 4:1, etc.). While the gestural expression of the melody and accompaniment parts are realised on different timescales, the hierarchical "nestability" of these timescales into each other allows them to be felt and perceived as belonging together to the same voice. This homophonic voicing can be distinguished from *monophonic voicing,* where the gestural content of both voices coincides in the same expressed timescales.

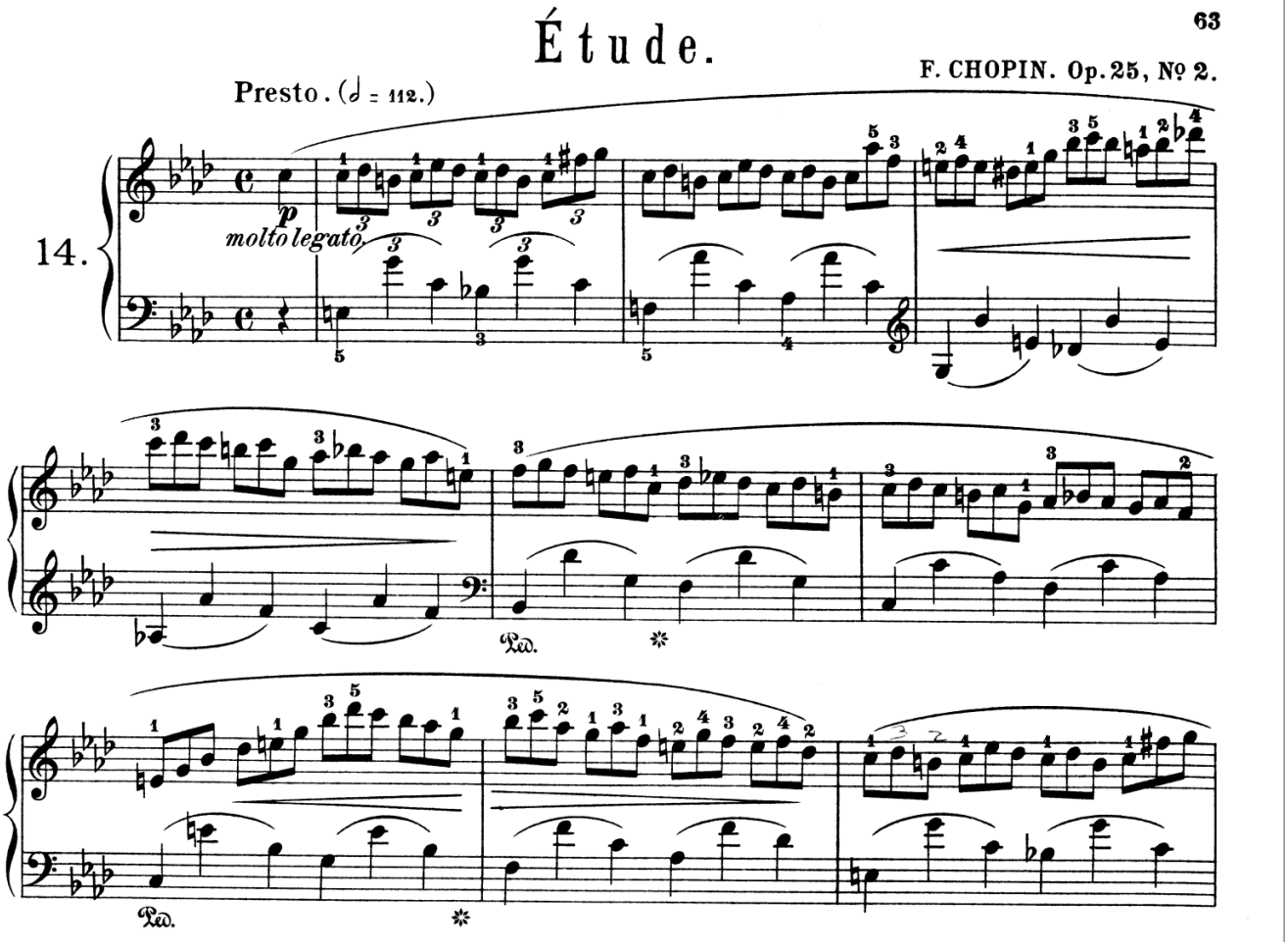
It bears emphasis that voicing, and therefore the homophonic voicing and monophonic voicing discussed in this section, happens in performance and not in the score. The slurs in the preceding examples of Chopin and Mozart may be interpreted in other ways (see discussion of §15.2.1 and §16). I chose these examples since the slurs demonstrate the timescale relationships between the melody and accompaniment. In the Mozart example, the last F in the left hand in measure five begins a slur that spreads over the timescale of four quarter notes, a timescale which does not nest without remainder in the timescales of the other voices. This phrase ending is an example of *polyphonic voicing*, which I will introduce in the next section.

17.5 Voicing polyphony

Gestural polyphony, which results in polyphonic expression, is characterised either by simultaneously voiced timescales that have a non-divisible or fractional relationship (2:3, 3:4 etc.) or by simultaneously voiced timescales that are similar but in which the direction of the gesture is dissimilar.

17.5.1 Fractional timescale relationships

In the Mozart Rondo discussed previously (Example 17.7), a fractional relationship in timescales can be observed in the last two measures. This phenomenon is commonly seen at the level of individual notes, and can be seen in the following example from Chopin:

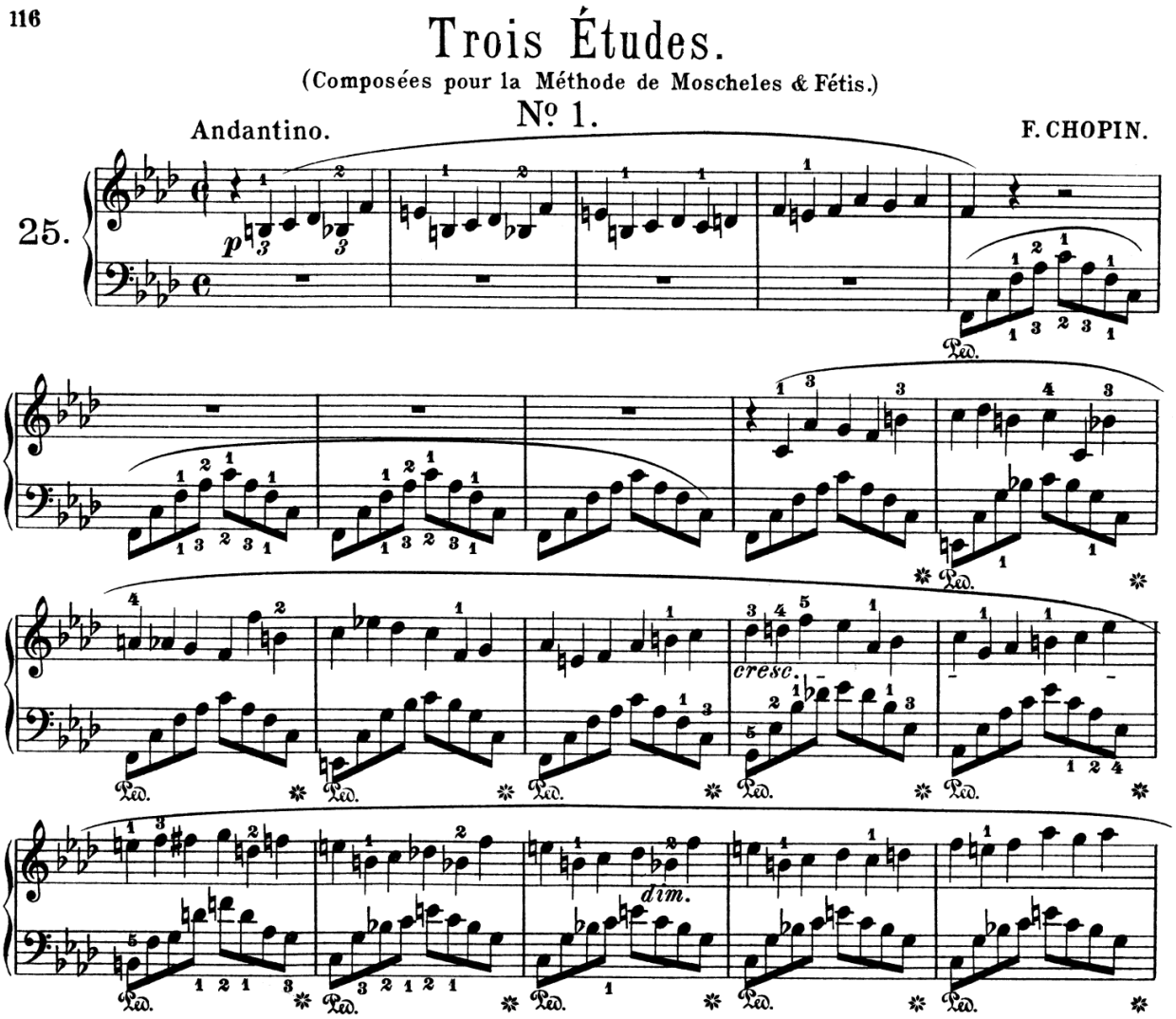


Example 17.11: Chopin: Etude in F Minor op. 24 no. 2 (Schirmer, Mikuli, 1895)

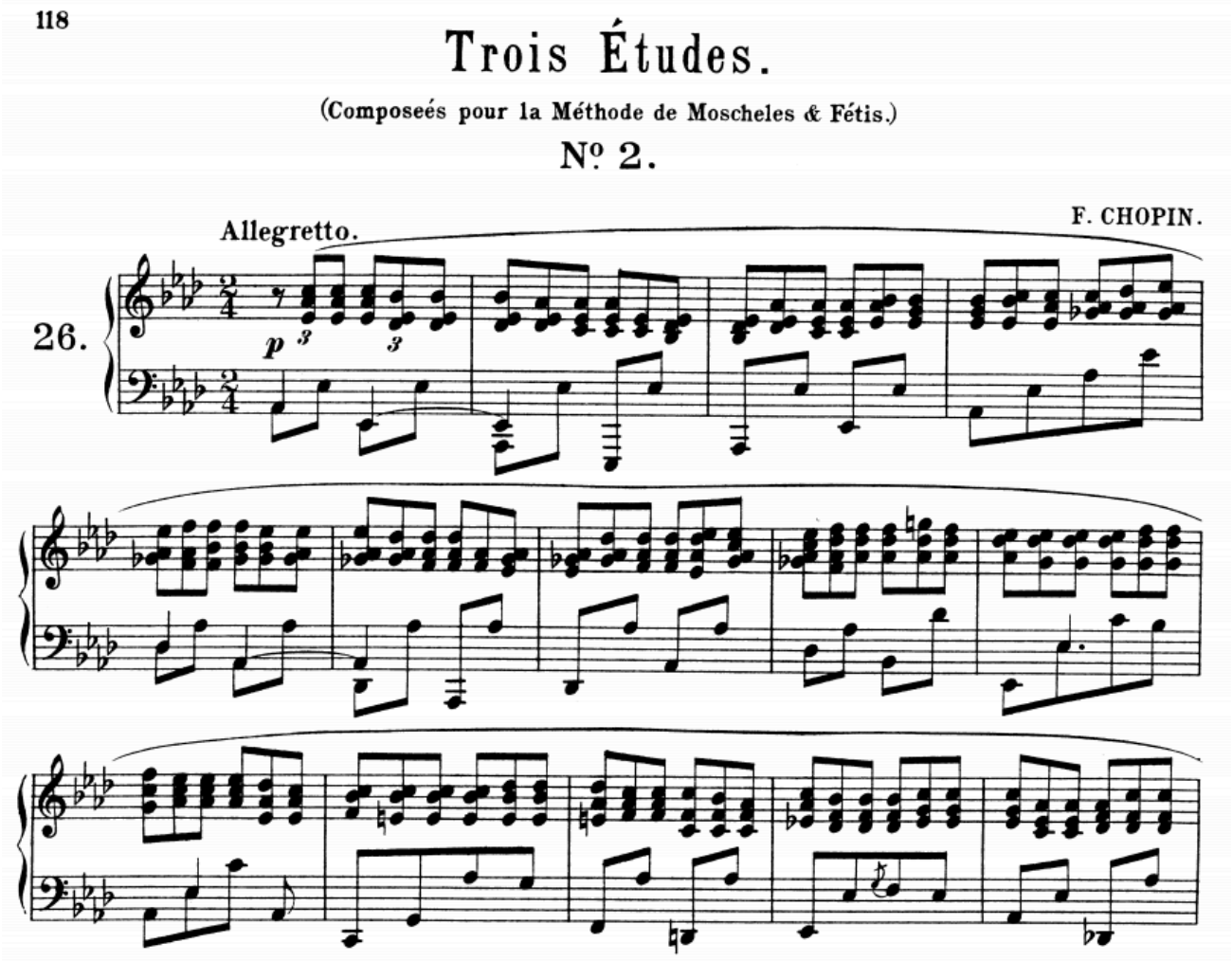
The intonation of the right hand is indicated by the beaming of the notes in groups of three, which has a fractional relationship to the left hand quarter note triplets. Some pianists gloss over this by grouping the right hand notes in twos, so they do dissolve into the left hand in a non-fractional relationship (which is a homophonic voicing). An

interpretation might also combine both possibilities in different measures, depending on the ways the figuration circles around its central note (in groups of three or in groups of two). Which interpretation is better depends on whether one prefers homophonic voicing or polyphonic voicing, but all aesthetic considerations aside, the gesturally homophonic version might seem slightly easier to play since the body schemata underlying homophonic voicing are rather more deeply ingrained for most pianists, so it offers the path of least resistance. In my opinion, the grouping of right hand notes shown by the beaming should be voiced, and the resulting polyrhythm seems to be one of the central characteristics of the Etude.

In the last Etudes Chopin wrote (from the *Trois nouvelles études* written for the Fétis and Moscheles method book), polyrhythm is of primary importance. Its use, as I will explain, emphasises the coarticulated overarching gesture.



Example 17.12: Chopin Etude in F Minor op. Posthumous (Schirmer, Mikuli, 1895)



Example 17.13: Chopin Etude in A-flat op. Posthumous (Schirmer, Mikuli, 1895)

For experienced musicians, it is easy to forget how even the simplest polyrhythm (two against three, or three against four) depends on embodied knowledge. In teaching, we may introduce a strategy that subdivides to the lowest common multiple, for example a two against three would subdivide the timescale into six. Counting in such a way - interpolating the notes of both lines onto one stream of subdivisions - voices the two lines together into one continuity. Unfortunately, the gestural continuity of each *individual* rhythm then feels disjunctive, as the felt common subdivisions - and perhaps even the felt gesture of the note in the other line - interrupt the smooth passing from one note to the next.

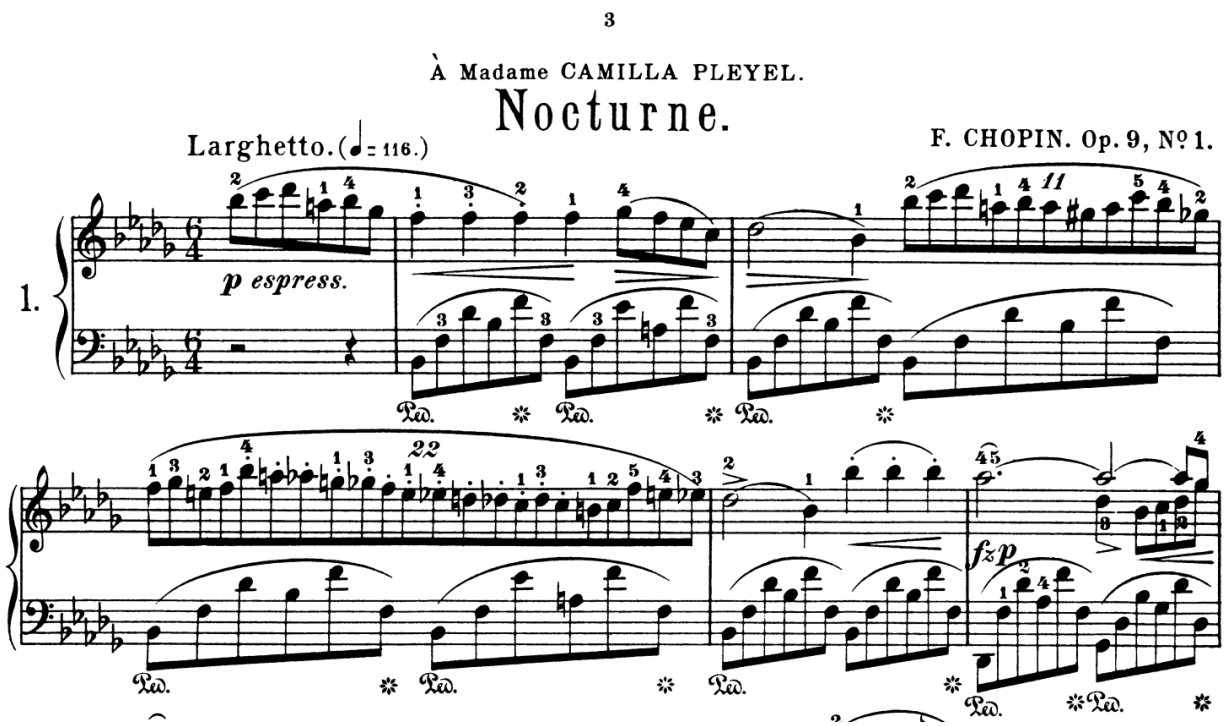
Subdivision to the lowest common multiple is only one of several possible heuristics, each of which may approach mathematical rhythmic accuracy while depending on the unification of hierarchical rhythmic pulse into one line instead of two. When I was taught four against three, I was taught the phrase: "eat your goddamn spinach!"

Subdivision:	1	2	3	*4*	5	6	*7*	8	9	10	11	12
Four:	Eat			your			damn			ach		
Three:	Eat				god-				spin-			

While this helps to approximate the mathematical layout of one rhythm against the other, the word "your" interrupts what should be a gestural continuity between "eat" and "god-." Attention hops back and forth between each line. The point is that any such heuristic eliminates polyphonic gesture by reducing two lines into one rhythmic voice. The use of such subdivisions is readily audible. The heuristics can be practiced until the overarching continuity of gesture of each line is felt, and when the heuristics are then discarded the gesture becomes polyphonic. This is an embodied knowledge (because it depends on felt continuity of gesture rather than mathematics). The embodied side of execution of such rhythms can remain unnoticed - after all I can *imagine* such rhythms quite easily - but for me it came into focus most dramatically when I tried to execute such rhythms on the organ pedals, either between two feet or between manuals and pedals. Three against four for my hands is a well-trodden path, but for my hands against my feet it had a decidedly different feel. I found myself needing to use the heuristics of subdivision, long since unnecessary for my hands, to teach my hands and feet the rhythm. Some repetition later I could discard the heuristic and execute the rhythm with its appropriate continuity for both voices.

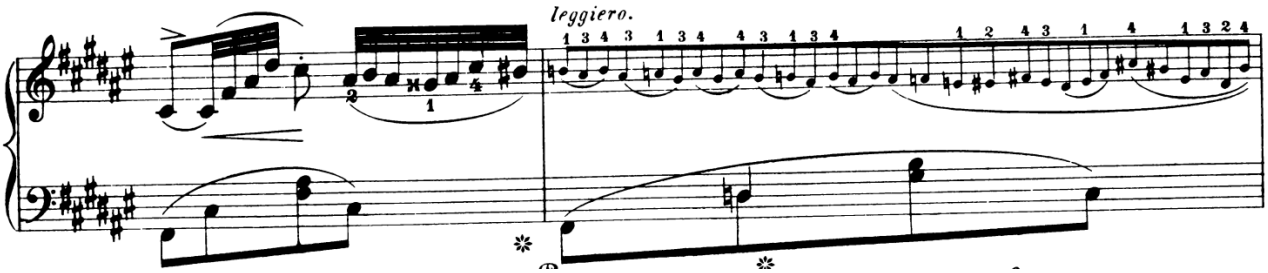
If the subdivision approach is used in either of the Nouvelle Etudes shown above, they sound plainly non-legato (legato being understood in the sense of "in a smooth and flowing manner" §15.2.1). Such a performance would sound unmusical to even the most novice ears, since the grabbiness of the melodic line as a continuity is obvious and such subdivisions would be felt as interruptions of this continuity. By setting up this situation, Chopin cleverly forces the student to focus on the overarching coarticulated continuities. It is a general principle that divergence on a lower hierarchical level tends to emphasise the continuity of superordinate trajectory shapes. This becomes easily apparent in the application of divergence to other musical examples, where it is not suggested so clearly by the notation, and I will provide some examples in §20.

Chopin's music is full of florid passages where the mathematical relationship in notes on a given timescale is not divisible without a remainder. In such passages, a fluent execution almost always presupposes polyphonic gesture on at least the lowest level in the hierarchical structure of gesture (the individual notes).



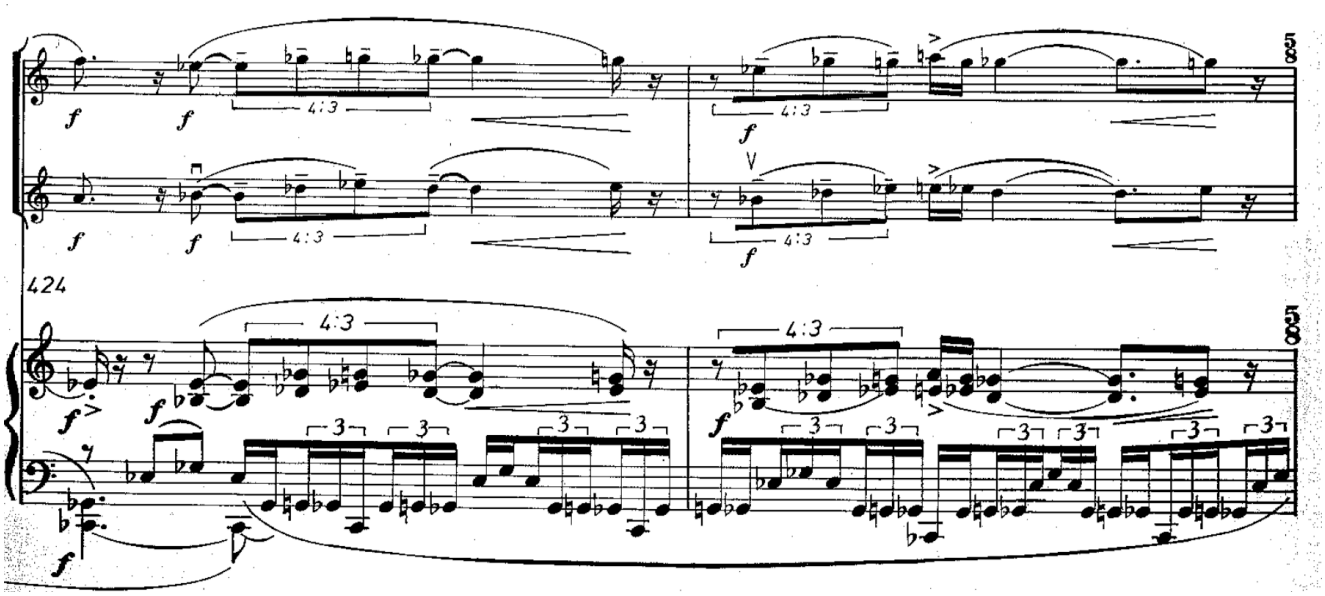
Example 17.14 Chopin Nocturne in B-flat Minor op. 9 no. 1 (Schirmer, Mikuli, 1894)

Chopin's lines often suggest groupings within such florid passages, which can be voiced with coarticulation. In the following example from Chopin's Nocturne op. 15 no. 2, groupings in the florid passage are explicitly notated with slurs, and these intonations remain free from the rhythm of the eighth notes in the left hand. The voicing of these groupings through coarticulation results in a polyphony of gesture on a higher timescale than individual notes. If finger attacks articulate individual notes, coarticulation of the wrist articulates the small groupings and the top arm, for example, provides the continuity of the longer overarching grouping at the end, all of those levels of coarticulation can be said to diverge from the left hand on every timescale less then the full measure.



Example 17.15: Chopin Nocturne in F-sharp op. 15 no. 2 (Schirmer, Mikuli, 1894)

Chopin's arabesques are quite flexible and free in their temporal unfolding. Such fractional integer relationships can also occur on hierarchically higher timescales in more rhythmically precise passages, as is shown in this excerpt from the Trio for Clarinet, Viola and Piano by the Dutch composer Rudolf Escher (Example 17.16). The time signature is 9/8 and the piano part by itself demonstrates four against three in which the three is further subdivided into two and three. The three is thus one hierarchical move away from the foreground.

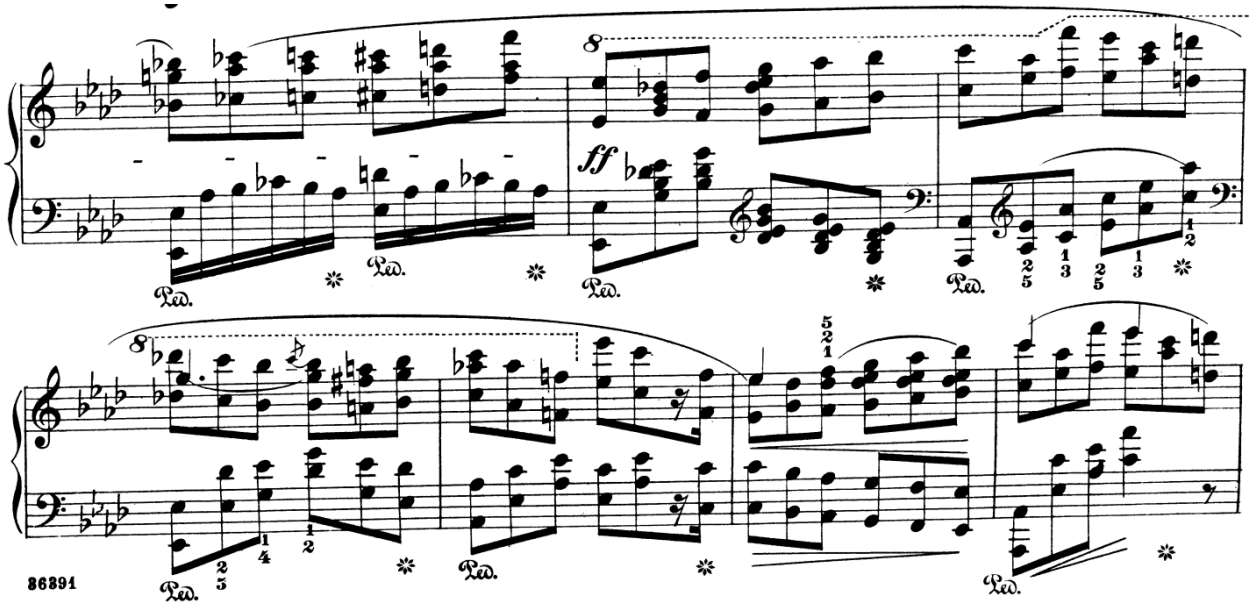


Example 17.16: Rudolf Escher: Trio for Viola, Clarinet and Piano (Edition Donemus, 1981)

Executing the passage requires both feeling the three against four and subdividing the three correctly. Because of the changing subdivision of the three (which is subdivided into two on beat three and into three on beats three and four), a strategy of interpolating the right hand notes approximately between or over the left hand notes is destined to fail. If the passage is to be played with the correct rhythm, the intonation of the rhythm in the left hand must be first practiced in and then this gestural feeling of three can be set up against the four, instead of the individual sixteenth notes against the four.

17.5.2 Divergence in direction

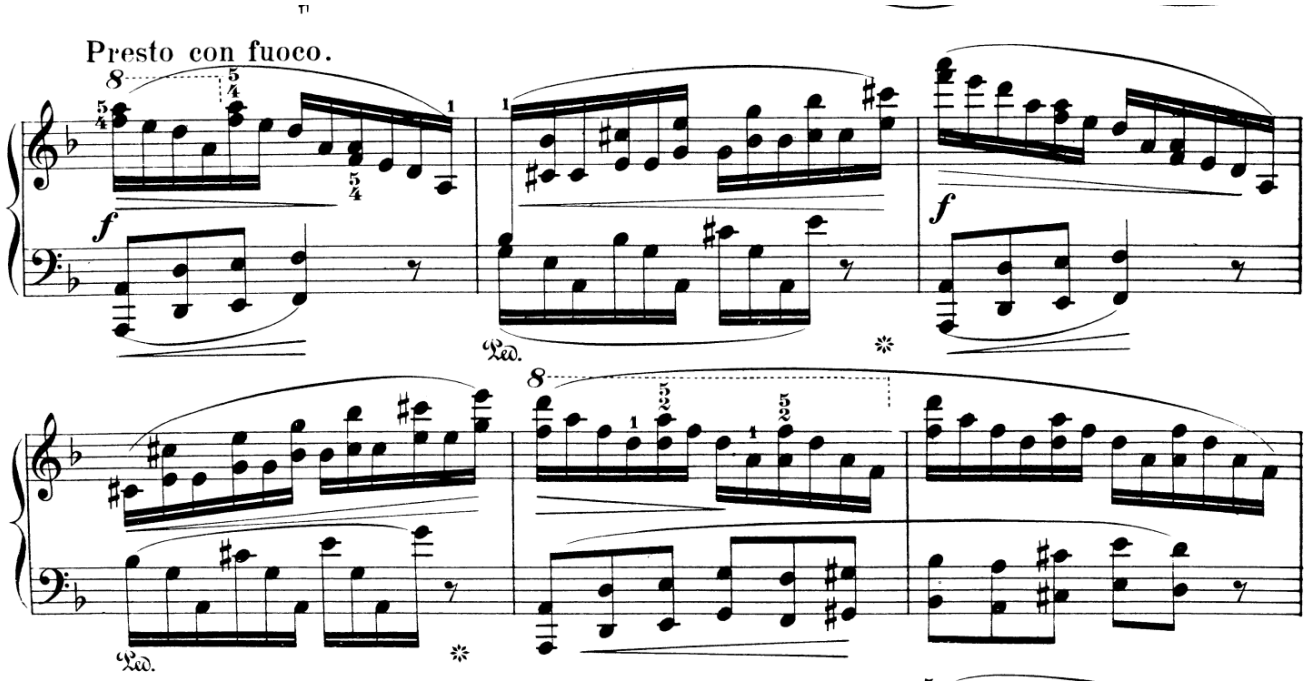
In §10.1 I characterised gesture with direction, which can be explained with the distinction between *prefix,* which leads towards a point of emphasis and *suffix,* which comes away from such an emphasis. When one timescale is voiced with two simultaneous directions (*prefix* and *suffix*) the underlying gesture can be said to be polyphonic. It was with such an example I introduced polyphonic expression in the introduction to this dissertation:



Example 17.17: Chopin Ballade No. 3 in A-flat, op. 47 (Schirmer, Mikuli, 1894)

In the third bar of the second line, such a divergence in gesture is represented by the simultaneous crescendo and diminuendo. In fact, since *prefix* and *suffix* gestures often occur together around a point of emphasis, taking a timescale in which these two phases diverge tends to divide the gestures, rather artificially, into parts. The benefit of such division, however, is that it provides a clear timescale on which divergence occurs, and therefore can serve as a constitutive part of our definition of *polyphonic expression*.

Written indication of divergence in expression is relatively common in Chopin's music compared to the scarcity of such notation in the music of other composers. In this passage, for example, the repetition of such divergent expression shows its deliberateness.



Example 17.18: Chopin Ballade no. 2 in F Major, op. 38 (Schirmer, Mikuli, 1894)

Even though it is not often notated, music of all time periods has affordances for polyphonic voicing. Through the experiments and examples that follow, it is my goal to develop awareness of these affordances in order to explore the possibilities for polyphonic expression.

17.6 Voicing and performer's choice

In the sense of the word that I have developed in the last section, *voicing* occurs in the domain of performance rather than in the score. The score provides affordances for various voicings which even in the simplest musical textures provide many options, considering that voicing can operate on many hierarchically nested timescales, between step progressions hidden within a melody, between lines, or it can bring out motivic and rhythmic patterns.

Indeed, considering the broad definition of voicing and the possibilities it entails, the musical score is teeming with affordances that go far beyond what is explicitly notated, or what is suggested by analysis. Many possible voicings that are not suggested by the notation also do not go *against* what the composer wrote, leaving a wide space for creativity. In this sense, the musical score has far more possibilities for the performer than for the analyst, who must justify his conclusions with what is written. The contrast between homophonic and polyphonic voicing, described above, explains one such option - an option that exists in performance but not in the score.

Should voicing every timescale of every voice, every pattern, every step progression and so on be entirely up to conscious acts of interpretation in the moment of performance, performing would be either be nightmarishly complicated, or the result would be musically fatuous. Luckily, voicing happens naturally at many sites of the pianist's inner experience. In the first place, voicing most often happens through a continuity of gesture in the playing perspective, a continuity that is simply taken for granted and noticed only when it is missing or when it goes wrong during the course of the performance. This continuity *embodies* the lines in the scores. This is closely entrained to *hearing* the lines, which constitutes the rising into awareness of a voice with an

undifferentiated focus. Of course the pianist can also *listen* to the voice, which brings it into conscious awareness with a differentiated focus, or at least its most salient hierarchical layer of expression.

One must not infer from this discussion that hearing and listening are always built onto a substrate of gestural embodiment. Listening, especially in pedagogical settings, often starts with a conscious awareness, which gradually inspires extensional gesture (as exemplified in the pedagogical Chopin Nocturne story above). This can also be thought of as continuity beginning with the imagination perspective, which often is answered by continuity in the playing perspective. But the overlap between these continuities is not to be taken for granted. While talented students spontaneously develop such fluidity of movement that gives continuity to lines, less talented students must be taught this fluidity. Experience builds such continuity into the instrument-specific habitus of the performer, and such pre-reflective gestural know-how is both the primary way of understanding the score and the first tool for voicing. For every consciously worked out expressed timescale (§14.4), there might be several timescale expressions that happen automatically due to the pre-reflective ecological relationship to the instrument. These less salient expressed timescales certainly rise to awareness, but they emerge as *allowed but not willed* (§9.7). When such conscious willpower is used, it is often focused on the most salient hierarchical layer of expression, while the subordinate and superordinate layers remain at the periphery of awareness.

18 Experiments - layered recordings

Since voicing in general is at least partly a result of embodied knowledge and the habitus of performer in relation to the instrument, it follows that reducing the issue of polyphonic expression to a purely mental act of interpretation oversimplifies what is in fact a process that involves the pianist's whole self. Each line in a multi-voiced texture feels different when played in the context of the whole texture or when played alone, since the embodiment is different. Even when the same fingering is used, the feel of the voice in the hand is different when played alone, since the various tensions, stretches and competing pulls of other notes is removed. In this way, particularly when the fingering is allowed to be free, playing voices individually allows for a different voicing than playing them within the whole texture.

Playing voices individually is an important and universal practice habit, which allows the pianist to listen to each voice and to shape it without the constraints of polyphony. This can be thought of as a horizontal simplification. As discussed in §13.2, a parallel vertical simplification is found in Whiteside's technique of "outlining" (Whiteside 1998). Such horizontal and vertical simplification techniques allow a freedom of both movement and expression and call forth a broader palette of gesture, involving the undivided musicality of the whole self. Through practicing in such a manner, the pianist can pull himself up by the bootstraps, recreating the natural response to the simplified texture in the expression of the voice within the whole texture.

What this suggests, conversely, is that the embodiment of several voices at once is limited compared to the embodiment of each voice played diachronically (one-after-another). If it is true that musical expression emanates from embodied knowledge and the gestural habitus of the performer in relation to the instrument, then the nature and role of this embodied knowledge can be elucidated by comparing expression of voices when

played diachronically to their expression within the polyphonic texture played synchronically (all together).

If recorded separately, individual voices will thus display greater autonomy of expression. The research evaluation of such expression should occur in perceived sound, rather than by measuring the dynamic and temporal contours. A quantitative approach using measurements of timing (and possibly dynamics) could possibly compare the diachronic and synchronic recordings of individual voices, but such an approach would reduce gesture into its sounding details, while neglecting to consider their psycho-acoustic impact, or how they are perceived by a human listener (§10.1, Eitan & Granot 2006). The focus on details rather than gesture leads the performer to a cerebral orientation, where interpretation is a series of *conscious* choices that override the kind of thinking-in-movement that is suggested by the phrase "interpreting through the body" (§7). For these reasons, such approaches do not lead to the kind of artistic results that I seek. On the other hand, simply playing each voice individually and critically comparing it to a full-textured performance relies on memory - which may be faulty - and on an objectification of details through the linguistic analysis. The best elucidation is through the actual sound recordings, whereby differences in expression caused by differences in embodiment are readily audible, and which can be understood first on their own terms - in sound and gesture - and later reflected upon through verbal analysis.

Recording multi-voiced textures in layers allows for the synchronous playback, which juxtaposes separately recorded voices. Instead of measuring the timing of each voice in milliseconds - which would be holding the voice up to the measuring stick of world time - layered recordings allow each voice to be held up for measurement against its neighbouring voice, which can be thought of as felt time, conditioned by musical gesture. The divergence in gesture between the two voices is thus highlighted.

In such layered recordings, there are a number of trade-offs. In the first place, the separation into layers rigidifies the conception of what the voices might be in the score. As discussed previously, the possibilities for voicing the score go far beyond the obvious separation of lines that an analyst might see. This complexity is thus sacrificed in the layered recording, where the decision of which notes belong to which voice is fixed in the design of the experiment. Also, the interaction of voices with each other is severely limited, depending on the setup of the experiment (see §18.2). For music originally written for the piano, the unifying effect of the pedal and the sympathetic resonance between the voices is lost.

The benefit of allowing each voice to speak as an individual, however, is that such a layered process dramatises the divergence in expression between voices. The degree of divergence can be scaled depending on experimental design, ranging from slight divergence to utter chaos. This experiment, a deconstruction of sorts, brings out the polyphonic tension in expression between voices that is normally minimised by the unifying factor of simultaneous embodiment.[69] Since the underlying gesture causing the divergence can be expressed in three different kinds of detail (temporal, dynamic, articulatory) the divergence, which in the temporal sense causes the texture to fall apart in the diachronic recordings, can be translated into dynamics and articulation, which can then be incorporated into synchronically-played concert performances.

18.1 Goals and expectations

In the initial stages of planning this experiment, I envisioned it as a way to abstract the musical expression of each voice from what I viewed as the physical and mental constraints of playing several voices at once. As I began the research trajectory, I quickly

[69] This unifying factor results from the phenomenon of bimanual interference, which will be discussed and explored through exercises in §19.

realised the faulty thinking behind this conception. Like many pianists before me, I was presupposing a separation between musicality and technique, whereby technical constraints were to be overcome to allow the more perfect expression of some ideal imaginative interpretation. What I quickly realised was that the much more relevant issue was how the embodiment of the music coloured both my image of the sound (imagination perspective) and my perception of the sound (listening perspective). This highlighted the importance of embodiment as not an obstacle to be overcome in expressing some ideal sound picture, but as a constitutive element in the sound picture itself.

Before beginning this series of experiments, I thought through what I expected to happen. I expected to be able to work out, through repetition, a way of achieving an artistically convincing result through mixing the separately recorded voices. As the experiments proceeded, the results diverged widely from my expectations. Thinking through the experiments and actually doing them proved to be incredibly different. Indeed, throughout my entire research trajectory, the difference between thinking and doing has been striking, which is perhaps inevitable in any research with an embodiment focus. It is precisely this reduction of music to propositional thought that is favoured by score-based musical discourses such as musicology and music theory. This reduction obviates the role of the performing body, and therefore the central topic of this dissertation. As I have argued in previous chapters, the gestural content of performance is a primary site for working out the artistic result, which explains why conducting the experiments in thought alone might be so different from the actual experience of doing. Though I perhaps cannot convince the reader to recreate the experiments for himself, I hope that the recorded traces that I present alongside this dissertation will give a vicarious taste of what happened.

As I have mentioned, I expected to be able to achieve (through successive diachronic recordings of the same example) an artistically convincing result, and one which would transcend the limits of embodiment inherent in simultaneous execution. I expected, for example, that when prompted by a small auditory incipit to set the tempo, voices would diverge only slightly, since I assumed my sense of rhythm would hold the texture at least approximately together. In fact, many such assumptions proved to be false, and many other unexpected experiences and perceptions emerged.

18.2 Method

The experimental setup involved many parameters, which in successive iterations I could manipulate to control the amount of divergence in the end result. Such decisions that had to be made for each experiment were:

-Would I hear playback of one voice while I recorded the next? For the third voice, would I hear a mix of the first two?

-If not, how would I set the tempo? Would I set it by a metronome reference or by an auditory incipit?

-Would I use video for playback?

-Would I use pieces that are already in my repertoire, or would the fact that I already knew the full texture bias the results unconsciously towards convergence?

-What sorts of musical examples would I use?

I chose to use only audio recordings in order to focus on heard gesture (as opposed to seen, see §9.1). I will present here three examples, showing three different experimental

settings. For each example, I will describe the experimental setup and process, followed by a sound recording, which is the result. With a second sound recording, I will also show how the divergence, which in some cases is extreme, can be voiced into a synchronic performance (that is, one that involves playing all voices at once in the manner customary to concert performance). In making this second recording, I observe the details of temporal disjunction in the diachronic recording and translate them into dynamic and articulatory divergences. Rather than doing this literally, I do it with a liberal sense of artistic license. The process as a whole, while simple, allows many points of reflection along the way.

For the experimental recordings, I used the open-source audio editing program Audacity, which easily allows multi-track layering of recording. I connected a Zoom H6 audio recorder to my laptop via USB. One of the difficulties of layered recordings is the multiplication of static noise with each added layer. I decided not to filter out static noise since I wanted to be sure not to subtly interfere with the dynamic profile of each voice. When using playback, I experienced some latency issues with the default settings in Audacity, but trial and error helped me to minimise that effect. The setting of a latency adjustment of -305 milliseconds worked for my particular setup.

The selection of musical examples was an important beginning point. While the scope of this dissertation covers almost all piano music (since almost all piano music affords a polyphonic voicing), for these experiments I focus on examples with clearly notated contrapuntal lines. In order to open the field maximally, I used organ examples as well as piano examples.

18.3 Experiments

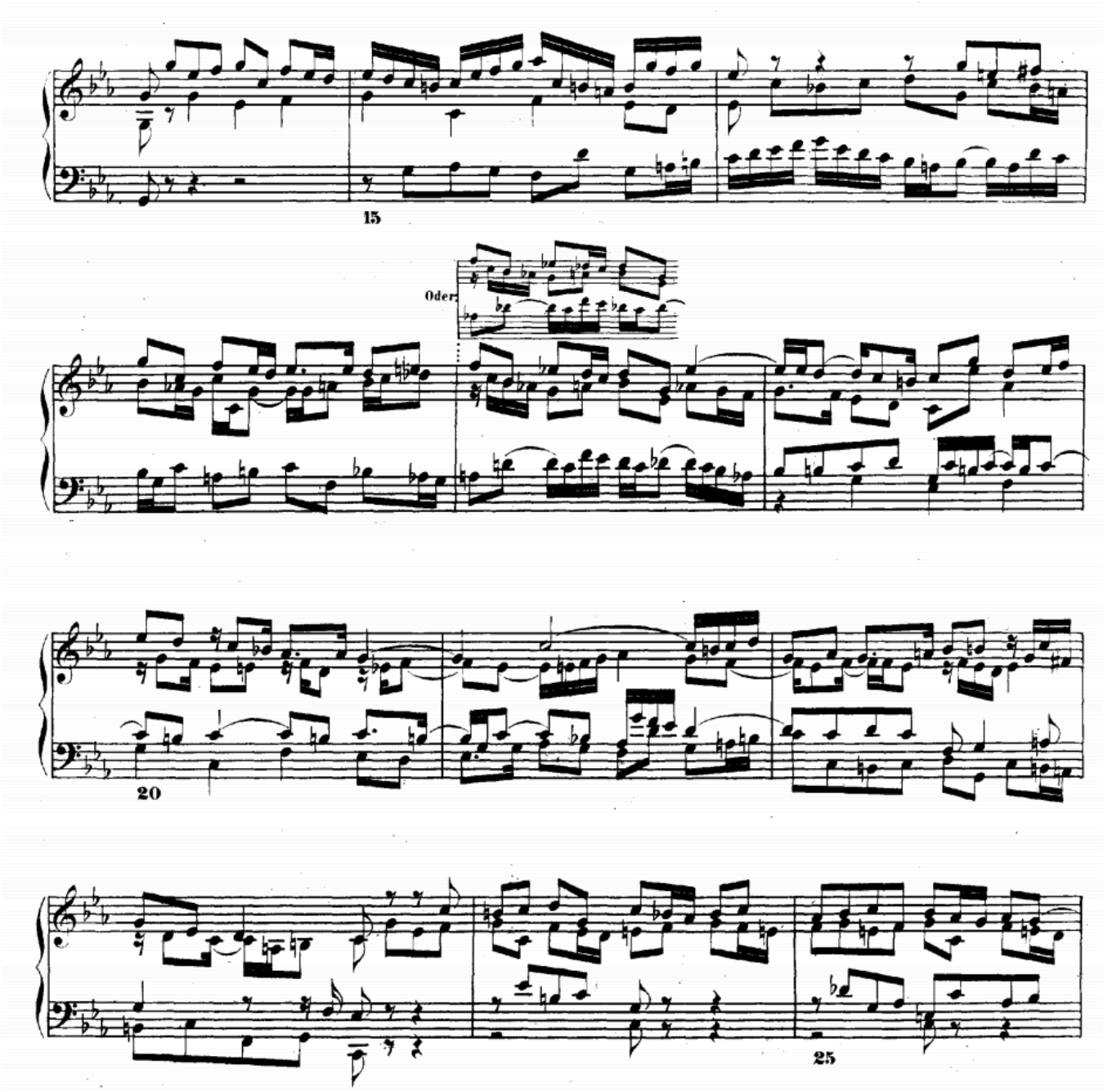
In presenting these experiments, I will discuss findings pertaining specifically to each experiment in the section about the experiment. I will present more general reflections pertaining to all of the examples in the following subsections.

18.3.1 Bach: Prelude and Fugue in C Minor, WTK II

For the first example, I chose J. S. Bach's Prelude and Fugue in C minor from *Das wohltemperierte Klavier II*, which is part of my repertoire and thus deeply familiar to me. Having studied it before the beginning of my research trajectory using the normal practice tricks (such as playing individual voices or pairs of voices, singing one voice playing another, for example), I wanted to find out if I could find something new even on this familiar terrain. Would I find polyphonic voicing that I had not previously considered? How would I perceive the agency of individual voices when "frozen" by the recording process, and how would this freezing of interaction affect the sense of legato in each voice? Would recording individual voices prompt me to hear the other voices, in which case would the hearing of these other voices normalise the expression of the voice being played, and thus limit divergence in the end result?

Though in the first trials I began with the first half of the fugue, the example I will present here is from the second half, beginning in bar 14 and ending at the cadence in bar 23. The reason for this is that this selection has four lines (the first half has only three), and also the augmentation of the subject provides an interesting complication. I experimented with different orders of recording the voices, and here I will include a recording of the order: soprano, alto, tenor, bass. In the first case (Audiovisual Example 18.1), I experimented with playback (listening to only the first voice recorded), deliberately allowing voices freedom to diverge in time. In the second case (Audiovisual

Example 18.2), I created an audio incipit to set the tempo for each voice, and then recorded each voice separately, *without* listening to the previously recorded voices on each successive voice after the first. In order to time the bass entry in bar 19, I "shadow-played" the soprano part after the incipit, touching the surface of the keys without sound. The second recording was thus a "blind" recording, designed to maximise divergence. Finally, I recorded the section synchronically (Audiovisual Example 18.3)



Example 18.1: Bach Prelude and Fugue in C Minor, Das wohltemperierte Klavier II BWV 871 (Breitkopf, Kroll, 1866)

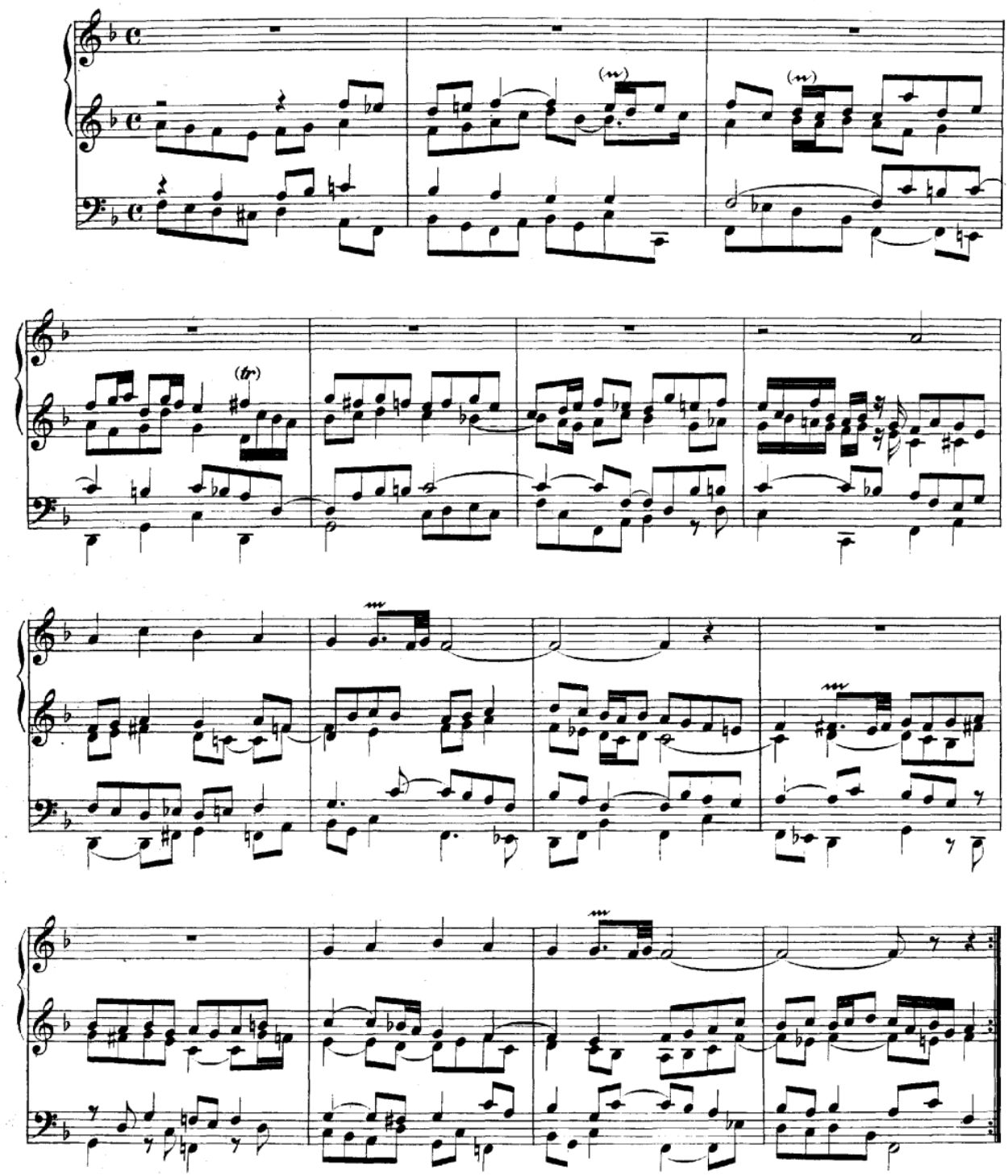
In listening to the "blind" mix (Audiovisual Example 18.2), I was initially quite surprised at the degree of divergence. It seemed as if my sense of rhythm - which I had not really ever questioned - was much less stable than I could have predicted. Voices, which began together, fell completely apart already by the second measure. The degree of divergence measured in timescale ranged almost up to a half bar. However, the

divergences were actually more organised than first impression might suggest. Remarkably, the divergence happened *more* on shorter and medium length timescales and *less* on longer timescales. The recording begins with voices together, and as the recording plays the voices quickly diverge. What is surprising is that by the end, at the final cadence, the voices come together again. This finding not only reinforced the idea of longer overarching continuities, but it showed how relatively accurate the timing and direction of such long overarching continuities could be compared to shorter timescales. The sense of rhythmic freedom apparent on shorter timescales was local and formed part of a very accurate overarching temporal unity.

18.3.2 Bach/Krebs: Wir glauben all' an einen Gott BWV 740

As one of the organ examples, I was keen to include a piece with a double pedal part. Apart from the fact that the physicality of navigating divergent intervals is a vivid embodied experience, due to the size of the pedal keys, the balance on the organ bench, and the relative weight of the legs, I also was curious if the voicings emerging from my feet would be rather different than from my hands. In order to examine this, I also made a recording using the hands to play the pedal parts. Because of the length of notes in the cantus firmus, it was clear that this had to be recorded last. The fact that this reverses the compositional process - which begins with the given cantus firmus - is interesting but irrelevant. This piece was not new to me at the beginning of the experimental process, but it was much less familiar than the prelude and fugue discussed above. The work is sometimes ascribed to Bach as BWV 740 and sometimes to Krebs.

For all of these recordings, I used an audio incipit to set the tempo, and proceeded to record each voice without playback (Audiovisual Example 18.4).



Example 18.2: Bach/Krebs Wir glauben all' an einen Gott (Breitkopf, Naumann, 1893)

Because of the jumps in individual pedal voices, and the widely agreed-upon idea that in performing Baroque organ pieces, one must primarily use the toes (due to the shortness of pedal keys on the relevant historical organs), the individual voices of the feet have wide "holes" in the legato. Taken alone, each voice gives a rather jumpy impression.

Together, the alternation of moving eighth notes and longer note values between one foot and the other foot allows for a grounding of the texture, both in terms of the sound picture and in terms of the physical experience of playing. This concept of balancing articulation between voices emboldened me to magnify the articulatory differences between the voices in a final, synchronic recording (Audiovisual Example 18.5). In this final recording, I experiment with how big I can make the holes in the legato without destroying the continuity of the whole.

18.3.3 Grieg: Fugue in G minor

In the previous examples, I had already heard and played the polyphonic texture as a whole before making the layered recordings. In contrast, I had never heard nor even *seen* the sheet music for Grieg's Fugue in G minor, which I asked a colleague to transcribe into a set of parts. In such a way, I could not know for sure how the parts would combine, and they would be recorded each on their own terms. Playback was not used, and I set the tempo by looking at a metronome pulse before playing. After recording each voice in the passage, I synchronised the recording (Audiovisual Example 18.6). I then did a second layered recording, knowing from the experience of the first approximately how the parts would combine, and listening to a playback of the first voice for all subsequent voices (Audiovisual Example 18.7). In this second recording, the process of attunement between voices began to take place, but only in sound and not in embodiment. I consciously allowed each voice the freedom to create divergence. Finally, I practiced the passage normally to be able to play it as written (Audiovisual Example 18.8).

The difference between attunement of one voice to another - in this case a voice fixed by recording - and *mutual* attunement, in which the voices subjectively interact was striking. Even though I could listen back and follow my own musical intentions in the first

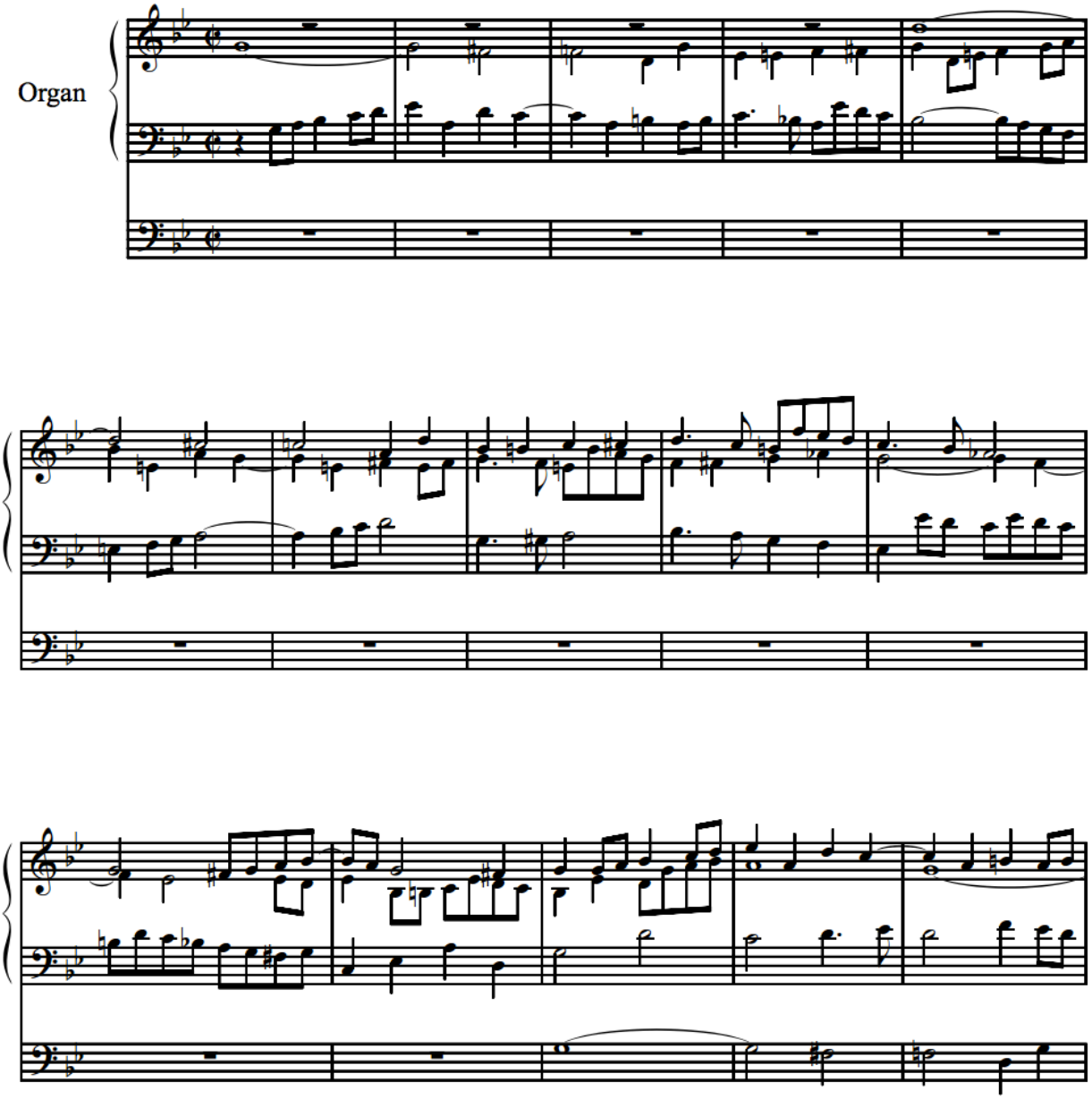
voice, I found it difficult to try to attune the second voice to the first. While I have participated in a couple of contemporary music projects that feature recordings as part of the performance, I had never felt before how difficult it is to relate strands of counterpoint when one voice is fixed. The musically subjective experience of apprehension of a pre-recorded voice as a fixed object in the experiment was an interesting departure for reflection, and I will come back to this idea in the following section.

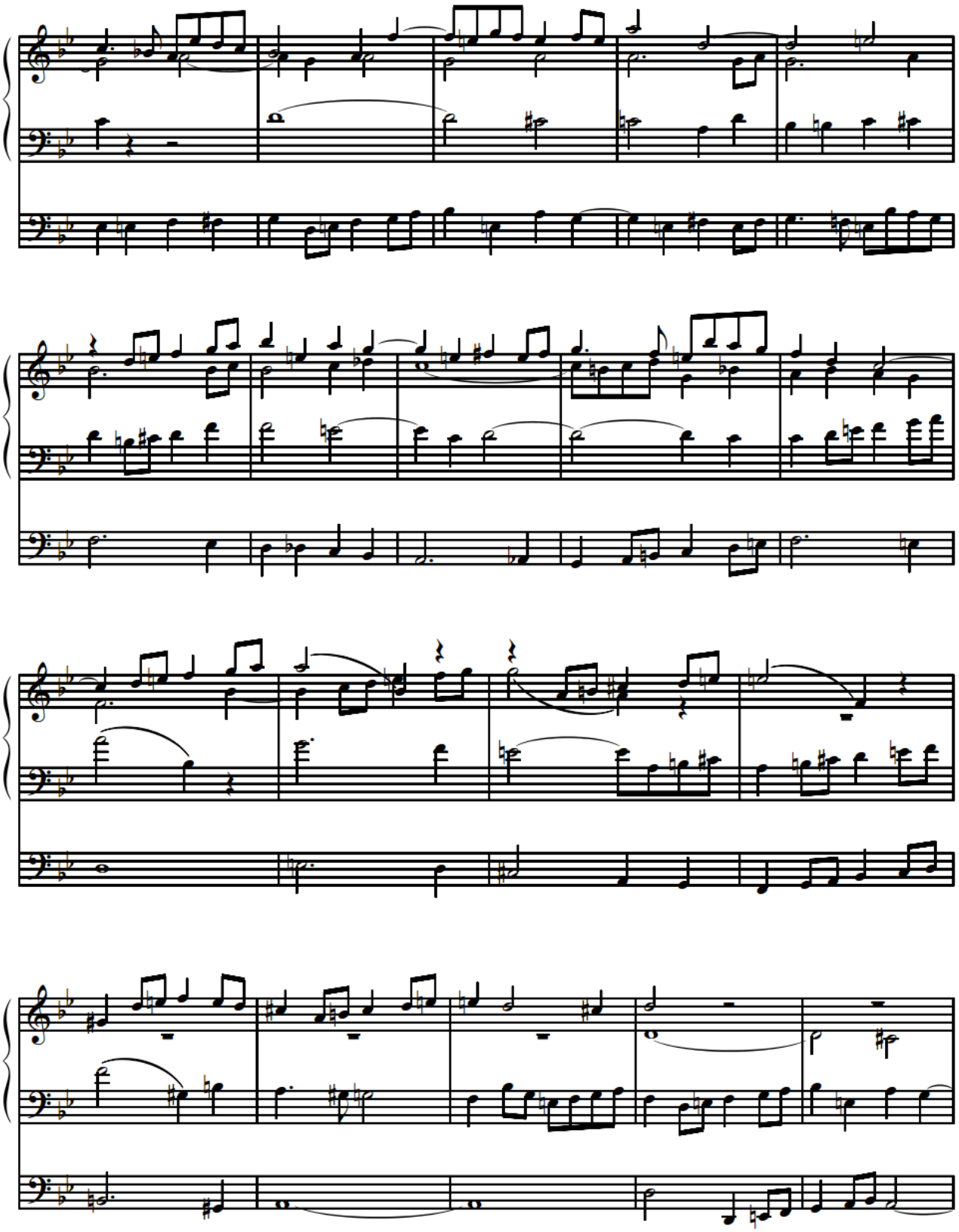
In my first recording, I tried to test whether I could "blindly" achieve similar results as in the Bach Fugue (§18.3.1) in the sense of arriving at the end of the passage with the voices ending together. Since I did not have the piece already "formed" in my imagination (as it was my first recording, it was completely unfamiliar to me), my ear was not filling in the other voices while I played each voice. However, I used my left hand to conduct while playing, and this helped to stabilise the sense of tempo. Periodically during the recording of each voice, it occurred to me that my tempo was a bit too slow or fast, a feeling that arrived in awareness as a vague sense of having time as credit or deficit. This awareness came from the listening perspective as I reacted to what I had just played. At the end of the two pages, the top three voices came together but the bass voice ended somewhat too early.

Double Fugue

Andante non troppo

Edvard Grieg





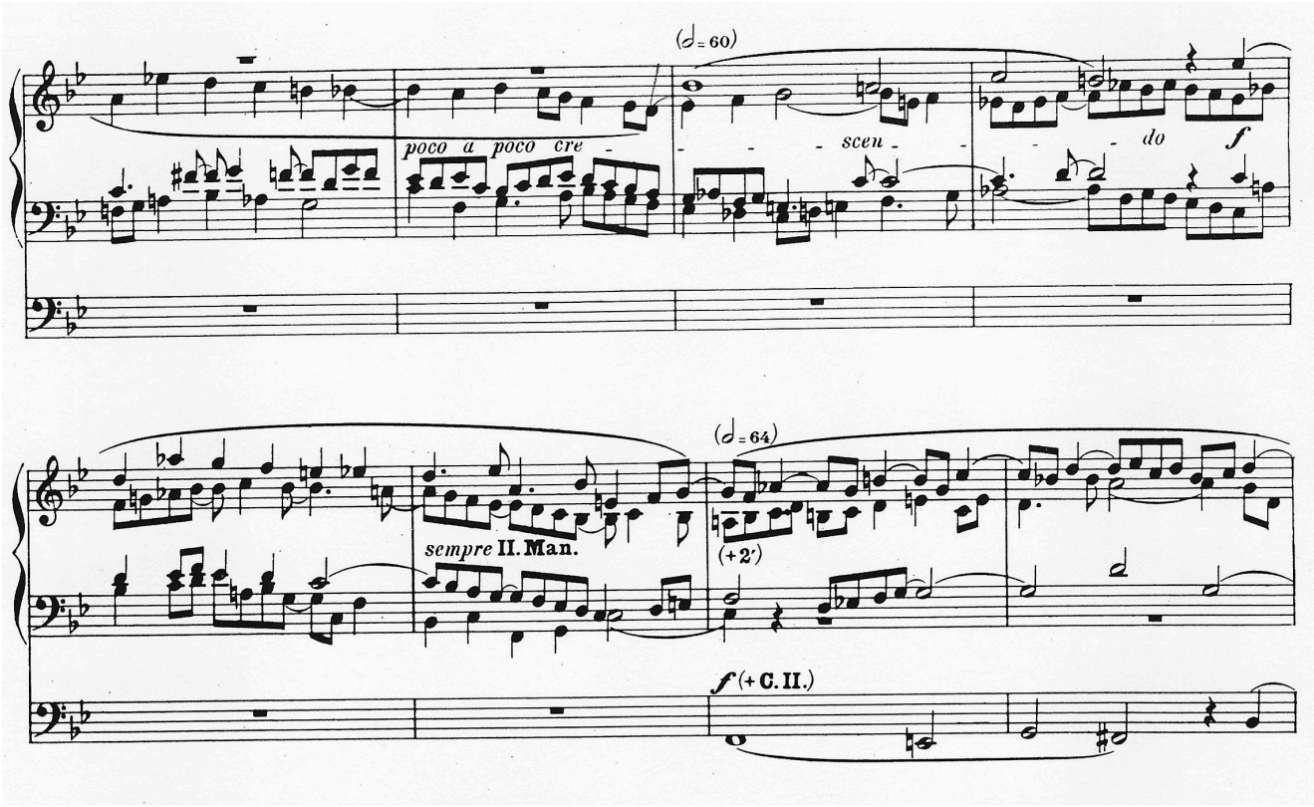
Example 18.3: Grieg Fugue in G minor (Abra, published on www.imslp.org)[70]

[70] <http://imslp.org/wiki/7_Fugues,_EG_184_(Grieg,_Edvard)> accessed Feb. 28, 2016.

18.3.4 Reger: Phantasie und Fuge über BACH

The fugue from Reger's Phantasie und Fuge über BACH op. 46 provides an interesting example for layered recording because of its slow, almost static opening which gradually evolves into a vigorous sense of gesture as the fugue progresses. It must be mentioned that there is vigorous debate surrounding the tempo of this work. The metronome mark seems quite fast considering the proportional build-up of tempo from the opening sostenuto to the end of the fugue. One solution to this "problem" by organist Marcel Punt (formerly known as Henrico Stewen) suggests that the metronome marks are to be interpreted as double-beat metronome notation, which in a nutshell means that the tempo should be half as fast (Stewen 2009). The result is an extremely slow tempo. In my view, neither interpretation of the written metronome mark works very well. The artistic image that attracts me to this fugue is the evolution from gestural stasis at the opening to a clear sense of movement and direction as the fugue progresses, and I choose a tempo that supports this image.

The passage that I chose for the layered recordings experiment begins with the measure marked with metronome 60 (Audiovisual Example 18.9). For this layered recording, I used a playback, beginning with the bass and moving upwards (tenor, alto, soprano) before finally adding the fifth voice in the pedals. After this, I made a synchronous recording (Audiovisual Example 18.10).



Example 18.4: Reger Phantasie und Fuge über BACH op. 46 (Universal, Aibl, 1900)

At this point in the fugue, the tempo is sufficiently advanced that even the subject has a feeling of overarching gesture, in contrast to the first statement of the subject at the beginning of the fugue where the combination of a slow tempo and absence of other voices create a feeling of stasis. In this example, the moving lines underneath the subject represent an interesting mix of gestural timescales, and through doing this layered recording experiment I was able to shed light on how these moving voices influence the timing of the subject itself.

18.4 Reflections

Through the experience of making these layered recordings, I was able to take a view at the embodied experience of polyphony from a different perspective. This perspective entailed first the abstraction of the individual voice from the complete texture, but also the abstraction of the musical expression from its embodied polyphonic dynamic.

The divergence inherent in this polyphonic dynamic was then foregrounded in the synchronised recordings. This specific process brought several reflections about polyphonic expression into focus. I will list these reflections in no particular order.

18.4.1 Reification of expression

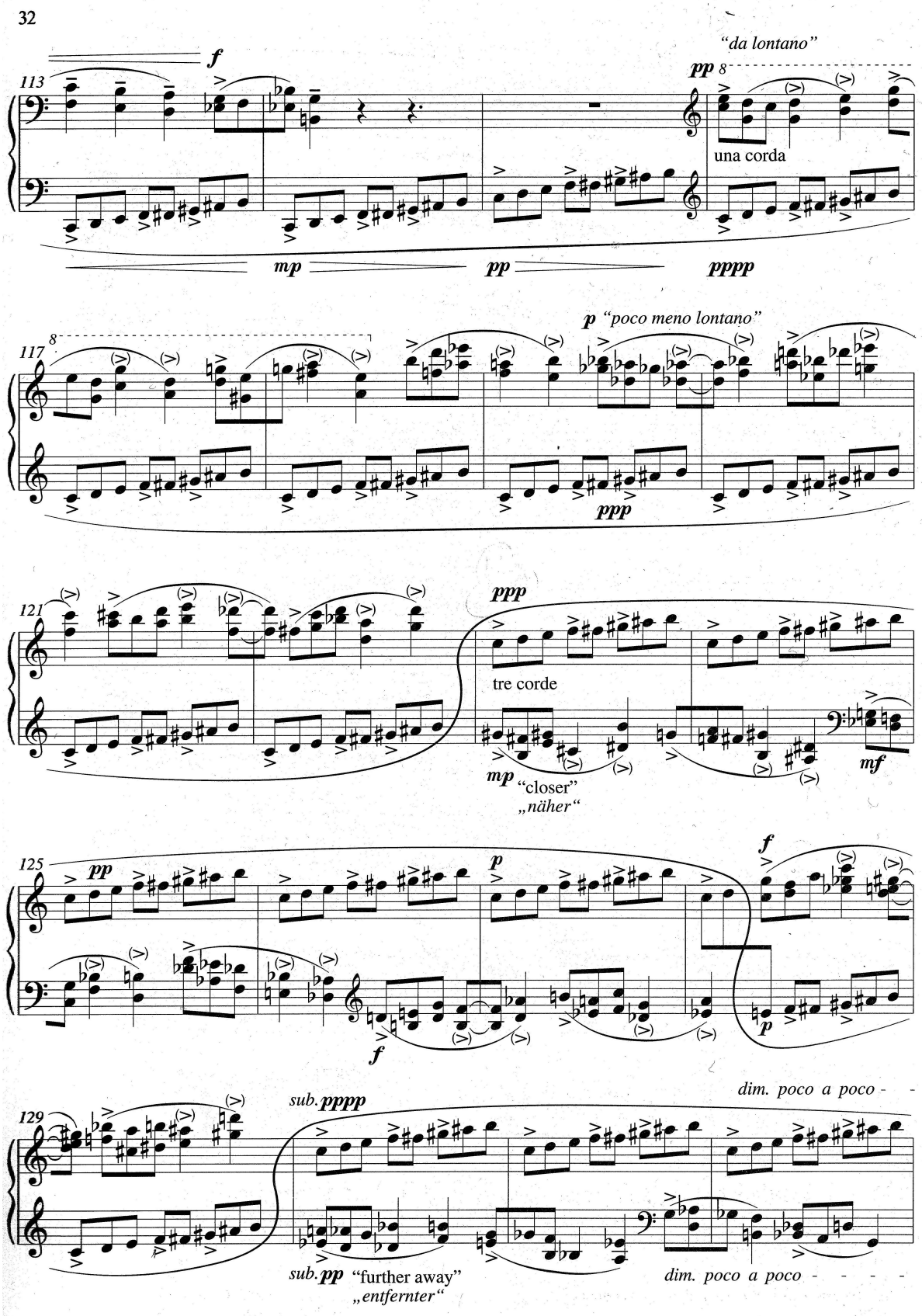
When I made my first recording using playback (that is, listening to the first voice while recording the second) I was immediately struck by how different it felt to play with a recording of myself compared to a live chamber music partner. While I could recognise my own musical tendencies in the recording, its fixedness made it very difficult to understand. I tried to fit in the second voice around the timing of the first, and as it became clear I was not succeeding very well, I tried to follow the recorded voice, vertically lining up simultaneous moments. The closer I listened to the first voice, the more unnatural the musical expression of the second. Listening with a more distant perspective allowed me to focus on rather larger timescales and on important "goal" moments towards which both voices aimed. Such a strategy resulted in somewhat greater divergence on the short timescales but also greater musicality.

Even though the time between recording the first voice and listening to its playback was short, my perception of how it felt was quite different. This perception was coloured by the activity of playing the second voice. When taken alone, this second voice involved rather more movement of the body in the activity of expressive shaping than would be felt in a performance of the same voice surrounded by the rest of the musical texture. For this reason, the body was not fully "available" to understand the first voice - in other words, to feel the gesture of the first voice in sympathy. The entire structure of the playing mechanism - from torso to fingertips - was employed with the second voice,

whereas in simultaneous performance the voices co-inhabit gesture of the larger levers, forming a unity on larger timescales. I could limit movement of larger levers while freely using smaller, more peripheral levers (forearm, wrist, hands) and thereby lessen this effect, but since my goal was to show how the body mediates polyphonic expression, I found it most useful not to limit movement and thus to allow greater divergence.

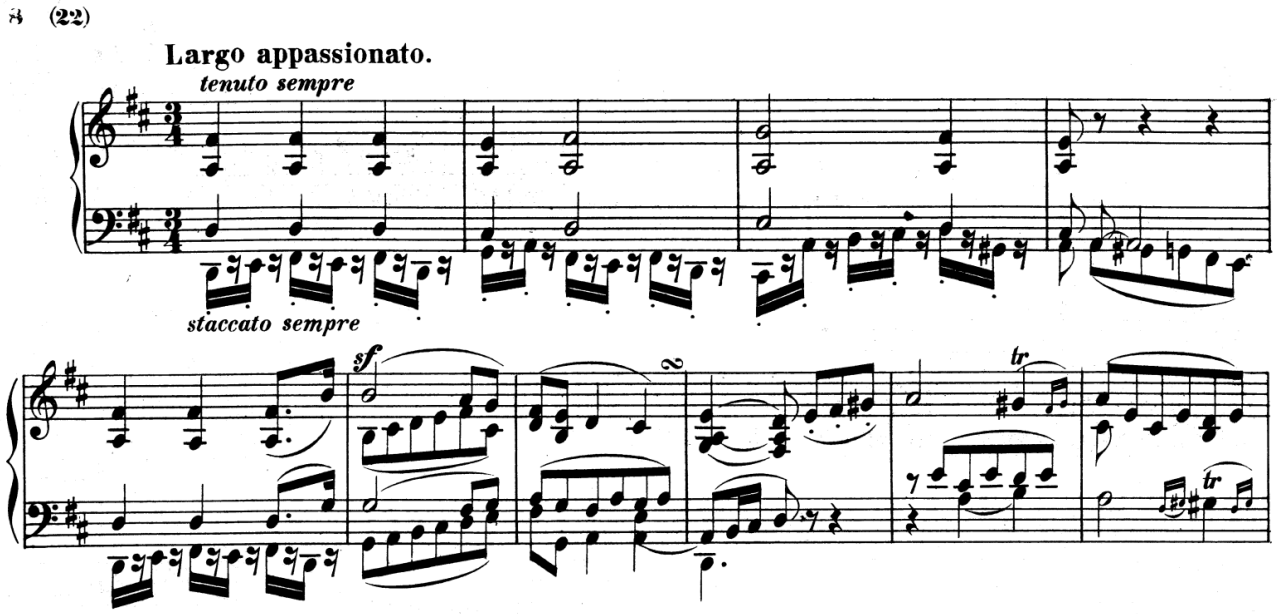
An awareness of this relationship in the embodiment of distinct voices becomes quite useful in music of rhythmic complexity. In the Etude *Fanfares* by György Ligeti (Example 18.5), the "African" rhythm of 3 + 2 + 3 eighth notes is shared by both hands during the first section of the piece. At bar 91, the hands begin to diverge in the sense that the groupings of two and three eighth notes no longer line up. At bar 116, a 24 bar passage begins during which the both the hand with the ostinato and the other hand articulate continuous eighth notes, the ostinato in a pattern of eight (3 + 2 + 3) and the other hand in a pattern of seven (3 + 2 + 2) in double notes. The accents marking the beginning of each pattern of seven are full accents, but each subdivision of the seven-note group is articulated by an accent in parentheses. In playing this passage, I use double rotation (§15.2.2.2) and barely-legato fingers for each double note. When practising the double note hand alone, my reflex is to use a subtle articulation of the torso for the beginning of each group of seven. When combining this embodiment with the ostinato voice, this subtle articulation is likely to interfere with the incisiveness of the accents. If this were the case, the stream of power from torso to fingertip would only be compatible with one of the two rhythmic patterns. Because the torso is anyway connected to both arms, the arm playing the ostinato pattern would have to flexibly adapt around this external torso articulation and to neutralise it with the elbow and shoulder joints acting as shock absorbers. However, if when practicing the double note part alone I guard against using any participation of the torso, this sort of subtle interference is eliminated, and as a

consequence the simultaneous embodiment of both voices feels somewhat easier or simpler.



Example 18.5: Ligeti Etude Book I no. 5 "Fanfares" (Ligeti, Schott)

For comparison, I tried recording an example in layers for which I designed a convergence in expression. I used the second movement from Beethoven Sonata op. 2 no. 2 . As I predicted, it was much easier and more natural to achieve vertical alignment between voices (Audiovisual Example 18.11).



Example 18.6: Beethoven Sonata in A major, op. 2 no. 2 (Breitkopf, 1862 [reprinted Kalmus 1933])

A similar comparison can be made between making chamber music with another person and making chamber music with a recording (in this case with myself). Responsiveness between live players is multi-directional, even when one player is "leading" and another is "following." In playing with a string player, I feel in my own arm that the attack of a simultaneous entrance is activated by the attack in the bow arm of my partner. It is as if we become entrained at a level far below consciousness. I prepare the attack, I aim it within a small window of time, but the actual energy and precision of the attack happens intersubjectively between the bow arm of the partner and my hand. The more I understand the quality of the attack the partner wants to use, the easier it is to

follow, since the quality of attack - sudden, cantabile, fragile, vehement - suggests the gesture from which the attack is born. Of course this is only one example - the experience of following the string player's vibrato, the flute player's breath, the singer's diction are all similarly physical.

The shaping of phrases is similarly intersubjective, in that the direction of the phrase - the leading up to or away from a moment of arrival - is easily felt from another player, and, absent any other conscious or textural intervention, a well-trained chamber musician is likely to follow or co-create such a shape. In explaining polyphonic divergence to a class that I teach at the Royal Conservatoire of the Hague, every year for the last two years I have assigned the students to prepare duets. Then in the class, in front of the other students, I ask them to create expressive divergence. To do this, I work with each player to find points of arrival in their part, around which they can shape (using dynamics, timing, vibrato, or whatever else their instrument allows). I ask them to try the parts individually, to confirm that the points of arrival "make sense" and "feel right" both to the player and to the observing students. Then I ask them to play together, and to maintain the divergent shapes we have agreed upon, and I ask the observing students to give feedback about whether the divergent shapes are audible. Invariably, in the discussion that follows such an experiment, students express their surprise regarding two aspects: a) to what degree they have to shape their part to make the divergence audible and b) how uncomfortable it is to go against the instinct to shape together, even though the resulting performance is rated as musical by the observing students.

The traps of "over-following" (where concern for vertical alignment of every note interrupts musicality of gesture) and "over-thinking" (where a conscious placement of attack trumps the physicality of entrainment) are similar for chamber music and for making layered recordings, but in the latter case they are far more noticeable. After a voice

is recorded, its fixedness and resultant lack of responsiveness makes it feel foreign and unwieldy. The absence of a responsive partner, and the embodied intersubjectivity that such a partner offers is intensely felt. This typifies the difference between first person, second person and third person perspectives in music making. In the first person (subjective) perspective and in the second person (intersubjective) perspective, the understanding of the music is readily accessible since it is mediated by musical gesture. In the third person perspective, when the recording or performance is assessed as an object, it becomes at once much more complicated and at the same time loses its resonance in the "weave of life" (Wittgenstein 2009), or in its socially constructed resonance of intonation (§15.2.1.3).

18.4.2 Agency of voices

In piano playing, unlike in for example a string quartet, the illusion of legato for one voice relies on the use of other voices to create a sustaining sense of gestural progression. This happens to some degree consciously and to some degree automatically. One voice in a multi-voice texture, then, uses the gestural shaping of other voices in order to emphasise its own shape. The expression of this voice is thus included in the mix of factors for shaping the other voices. Each voice is a site of negotiation for all other voices, and the balance of agency between voices is tilted towards voices that are considered most important or salient in expression. The affordances for expression for each voice are then automatically conditioned by the whole texture. This web of interaction is highly embodied and becomes most apparent when it is missing.

Notice that this web of embodied interaction describes points to the agency of individual voices, and how that agency is balanced in performance. Cone asked the question: "if music is an utterance, then who is speaking?" (1982: 1). This seems to be a

question running parallel to the consideration of agency. Unlike in a string quartet, where it is easy to ascribe a separate "persona" to each voice, these examples point to an intensification of personal agency by its division into several contrasting streams. These streams are characterised by streams of gesture local to each voice as well as the apprehension of other voices.

The process of making layered recordings with playback should favour the first voice recorded in giving it the most agency over the flow of the whole texture. This is of course partly true, but not to the degree I expected. Because I played the second voice at a different time, the first voice recorded could not "use" the second voice for its own expressive purposes. I could intentionally try to shape the second voice around the first one, but the kind of shaping that would happen in a normal performance is far more subtle and complex than can be modelled by intentions. Furthermore, the absence of such affordances given by the other voices changes the shape of the first voice.

18.4.3 Musical tension

Playing synchronically with divergent expression creates a strong feeling of musical tension. However, when listening to the layered recordings, it is striking how little musical tension is felt, even though voices diverge dramatically. Because of the lack of mutual responsiveness and engagement, the voices seem to "talk past" each other. Perhaps what causes the feeling of mutual responsiveness and thus musical tension is the subjective apprehension of one voice to another. Divergence in this embodied apprehension is responsible for the feeling of musical tension in the result. Voices strive to escape from the hegemony of the vertical sonority, and the quality of relatedness - of striving against something, in this case at a very physical level - creates the feeling of polyphonic tension.

By contrast, in layered recordings the voices coexist but do not have the feeling of straining or striving - they simply sound unrelated. Because the meeting of voices at the level of gesture is missing, both in terms of mutual responsiveness and in terms of gestural divergence, musical tension is absent.

In thinking of musical gesture, one can localise one sort of musical tension in the hierarchical structure of coarticulation. The prefix and suffix of gesture describe an overarching push forward towards a goal and relaxation afterwards. Within the push forward of an overarching gestural prefix are many foreground intonations or phrases each requiring specific expression and timing for their articulation. The contradictory forces - pushing forward toward a climax, and taking time to articulate foreground - create their own sense of musical tension. This tension is vertically situated in the hierarchy of coarticulated gesture.

Musical tension in the polyphonic sense is horizontally situated. Rather than the opposing forces on hierarchically removed timescales, polyphonic musical tension incorporates the resistance of one voice to another in expression. Because the act of embodying such polyphonic expression inevitably involves some physical experience of divergence, which in turn is a form of tension, polyphonic musical tension results from normal performances - where voices are played simultaneously - but not from layered recordings.

18.4.4 Spatiality

Sound sources are perceived in space relative to each other by our native capacity to distinguish the very small distinctions in time that provide a stereo comparison between the two ears. Whether a sound reaches one ear or the other first helps us to locate the

sound, and various sound sources in our environment help us to create a sense of "sound space" or a subjective grasp on where things are based on sound sources.

Sound space in concert halls depends on the sound sources as well as the acoustic of the hall, but can also be manipulated by the performer. With a large orchestra, the sound sources are spread across the stage, and the attack of the orchestra, whether more or less together as measured against objective time, has a spread based on its spatial coordinates. We might perceive it as being together but at the same time we perceive it as being spread across a sound space, as being three-dimensional.

A similar spread in sound space is created by large organs. For the player, the time between playing the note and hearing it sound from the pipes is dramatically different for different manuals - if the pipes are close it is relatively immediate and if they are far it is relatively delayed. This spread in time of attack gives a strong spatiality to the organ sound when perceived from the middle of the church or hall, but can sound distractingly disjointed from the acoustic perspective of the player on the organ balcony. In addition to this spatial spread, the sound of mechanically coupled manuals often creates an additional spreading of attack. In well-regulated mechanical organs, pressing one note on the first manual with all couplers active gives first the sound of the first manual, and as the key goes deeper the coupler for the second manual and third manual activate. The attack is spread thus not only in space, but also over the relatively short time of the keystroke.

By contrast, pianos are a relatively small sound source when placed in a big hall. A chord played together on the organ or by the orchestra gives a spread in sound that gives the sense of a three dimensional sound space. On the piano, this chord sounds like it is

coming from one point. However, *ꝺpreaꝺing*[71] of the attack alters the piano sound and gives it spatiality.

There are a few important considerations in such chord spreading. The first is the order of the notes. As most keyboard players will know, playing a note slightly early is a way of making it heard, of giving it prominence. Very generally speaking, it seems that pianists during the nineteenth century tended habitually to play with the bass note first, but now one hears more commonly the top note first. Arguments for both approaches can be made based on the sympathetic resonance between the bass and other notes, and how this resonance can help sustain melody notes. Of course, playing an inner voice early can also help to bring out the inner voice. In all cases, the question is: to what *ꝺegree* can a chord be spread? In the subtlest examples, the chord still seems to sound together, but the note that sounds first seems to be slightly more prominent. As the spread becomes wider, it can be heard as a spatial spread similar to the spatial spread of an orchestra or large organ. At this level, the sound space of the piano seems to open from being relatively small to filling a much larger space in the hall. This illusion of spatiality, however, fades when the spread becomes too large.

What characterises the boundary between a spread that is perceived as "spatial" and a spread that simply sounds disjointed? Such judgments are difficult to pin down, since they depend on acoustics, distance, instrument, the perception of the player and many other factors. They are also inherently personal aesthetic judgments. Despite these disclaimers, I would argue that this boundary is not best characterised by a limit in the number of milliseconds across which the chord is spread, but rather by the embodiment

[71] Other words can be used for the same phenomenon, but "spreading" reflects spatiality in the best way. "Dislocation" tends to imply a more extreme temporal divergence, while "rolling" implies a harp-like strumming, and "fringing" (Newman 1995) recalls a historical Baroque practice from harpsichord technique.

with which the spreading is created. The question is, does the chord *feel* like it was played together, even though it might seem to be spread in "sound space"?

The artful spreading of chords allows for an untangling of the individual notes, which by the spatiality it suggests helps to differentiate various lines or voice-leadings that might connect chords. Voicing such inner lines with spreading constitutes a temporal divergence between such lines, even though the spreading might be slight. While in the layered recordings presented here, the dislocation of verticals is so extreme that the music seems to fall apart, the same order of voices sounding in a vertical moment can be preserved while reducing the dislocation to a subtle spreading, thereby taming the divergence for use in normal playing.

18.5 Conclusion

Experimenting with layered recordings is an activity that helps to unpack the experience of embodiment in polyphonic voicing by taking it apart. The influence of embodiment on musical shaping is best felt when this influence is drastically altered by such a total shift in parameters. In this case, the voicing became monophonic during the diachronic recording process. Such a shift allows voices to speak (or sing) autonomously, although their interdependence for expression becomes clear by their musical insufficiency when heard alone. This process, while not a scientific experiment, proved to be a springboard for reflection.

19 Exercises for pianists

While in the previous section (§18) I purposefully avoided the simultaneous embodiment of polyphonic expression in order to focus on the independent expression of each voice, in this section I will focus on the synchronic embodiment aspect. The reason divergence in expression can seem difficult to execute is hard-wired in certain features of our sensorimotor system. Much empirical research has examined a phenomenon known as *bimanual interference*, which documents the deleterious effects on the operation of one hand by the simultaneous performance of a task in the other hand. These effects have been measured in increased reaction time to stimuli and a strong tendency towards symmetry of movement (Albert 2007, Diedrichson 2001, Mechsner 2001, Ohbi 2004, Ohtsuki 1994, Kennerley 2002, Hazeltine 2005, Obhi & Goodale 2005). This performance deficit has also been observed in experienced pianists. Psychologist Michael Peters, in testing pianists for bimanual interfence, observed:

> There was interference between the hands in general, and, specifically, more interference when the nonpreferred hand took the rubato. These findings support the contention that the central nervous system, when guiding different motor activities at the same time, can only issue one basic chain of timed commands, into which other activities subject to separate time pressures must be fitted. (Peters 1985: 481)

Because of bimanual interference, the execution of polyphonic expression is cognitively more expensive than homophonic expression. Despite the fact that bimanual coordination is developed continually throughout the learning trajectory of piano students, the cross-talk between movement patterns remains a unifying force on the expression of simultaneous voices. Bimanual coordination improves with practice, and in this section I will explore several pathways for the development of the specific body schemata involved

in polyphonic expression. While these are directed specifically at pianists, some of them may be used with some adaption by organists.

If the question is, how should a pianist be trained in order to play with polyphonic expression, the popular reflexive answer is: "play Bach!" However, the choice to play highly polyphonic music and the minimal ability to play it do not necessarily guarantee polyphonic expression in the definition I have suggested (§17.5). Bach can be played without any polyphonic expression (and often is). In order to make this point clear, I propose a list of competencies which might in real-life run together, but for the purposes of this argument clarify a series of stages which lead up to polyphonic expression but do not include it. I will emphasise that these steps are not really separate, but they are useful to distinguish here in order to make the point that many competencies may be involved in playing contrapuntal music, but that these competencies should not be confused with polyphonic expression. If one were to imagine the competencies involved in playing a Bach fugue, for example, one might include these categories:

1. Basic technical skills: fingering, playing the notes, memorising the notes.

2. Aural skills: Listening to all lines, being able to hear all lines at once.

3. Stratification in voicing: Voicing one line louder than the others (let us say for example the top voice throughout). This stratification might involve several layers.

4. Alternate stratification: Voicing several lines louder alternatively (for example the tradition of emphasising the subject wherever it occurs).

5. Oblique divergence - shaping one line independently from the others (a very common state of affairs where one line is shaped and the others remain flat).

None of these skills describe polyphonic expression. Furthermore, polyphonic expression is subject to faulty sensory feedback. Because the underlying gesture is cognitively more expensive, it is often the case that simply imagining polyphonic expression does not result in audibility. The imagined experience of polyphonic expression can then overwhelm accurate sensory feedback; the pianist may hear the polyphonic expression in his own playing simply because he imaginatively projects it onto the sounded result. Often when pianists think they are accomplishing polyphonic expression, a close listening to the sounding result would reveal that it is more akin to oblique divergence where one voice is shaped and the others remain flat. There is nothing particularly wrong with this performance texture, and indeed it describes the predominant texture I hear in most performances of the Bach's *Das wohltemperierte Klavier*. It is also true that the competencies listed above are of vital importance for the development of every piano student. However, with the kinds of exercises proposed here I will focus much more specifically on the embodiment of polyphonic expression, which can be viewed as the step beyond these competencies.

In order to get a firm grip on polyphonic expression, students consciously need to know what it is, in a clear definition like the one I have provided (§17.5). Then it is helpful to have a few kinds of exercises that bring to the fore the very physical experience that it entails. Pianists and piano teachers often have a negative view of exercises, since in their traditional form exercises seem to promote mechanical, inexpressive playing. This is also reflected in the scores of exercises, which often present notes without expression markings. In the kinds of exercises I will explore here, the expression is the topic of the exercise, so such concerns should be at least partly allayed.

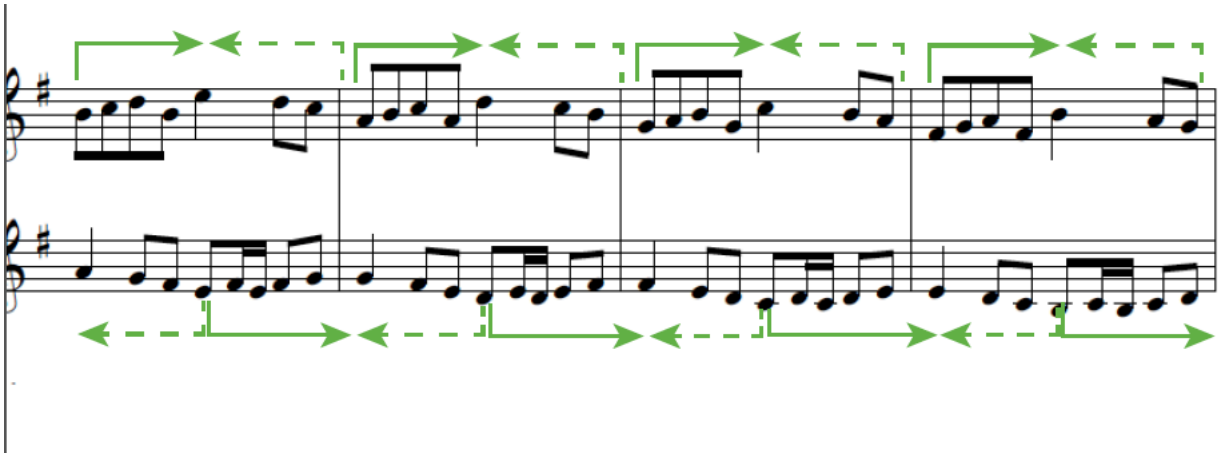
I will list here some examples of types of exercises that are useful. With a clear goal in mind, students must find their own pathway in creating exercises in these categories

that fit their own level of development. I think the primary function of these exercises is to raise awareness, and even the process of considering each category will already be a step towards such awareness.

19.1 Duets for one hand

Practicing the polyphonic expression in two parts for one hand is useful for providing a focus specifically on the divergence *within* each hand. When playing such two part exercises as the duet below (Example 19.1), I find that using two hands to model the sound I want to achieve is a good starting point, after which I play the exercise with each hand in turn. Exaggerating the polyphonic expression at a slow to medium tempo helps to highlight the embodied knowledge necessary for such an exercise, but at a slow tempo the felt continuity of over-arching gesture must not be lost. Indeed, the whole point of the exercise is to practice the simultaneous embodiment of the gestures shown. Thus, the green arrows should be realised as *embodied expressed timescales* rather than *disembodied expressed timescales* (§14.3).

In this and subsequent examples, I use the green arrows with a solid line to represent the prefix phase of gesture and the arrows with dotted lines to represent the suffix (§14.4). The culmination or highpoint of the gesture is represented between the two arrowheads, although of course all such transitions (both the high points and the low points between arrows) can be spread over several notes. The notation is sufficient to show the divergence in gesture, while remaining open to realisation through any sort of musical detail (articulation, dynamics, timing). It should be noted that while I have notated only the levels of coarticulation salient to the polyphonic expression that I wish to communicate, other levels of coarticulation on nesting timescales coexist.



Example 19.1: Exercise in the form of a duet

This exercise is just one example, and every pianist can create his or her own such duets. In fact, there are many ways to use this exercise, and by exploring these different ways of playing it, the pianist can get a lot of mileage out of it. First, it can be continued in a similar fashion over several octaves. It can be transposed to other keys, to feel the different angles created by the patterns of white keys and black keys. The expression can be accomplished with dynamics, articulation or by temporal dislocation. All of these experiences shed light on slightly different aspects of the embodiment of polyphonic expression.

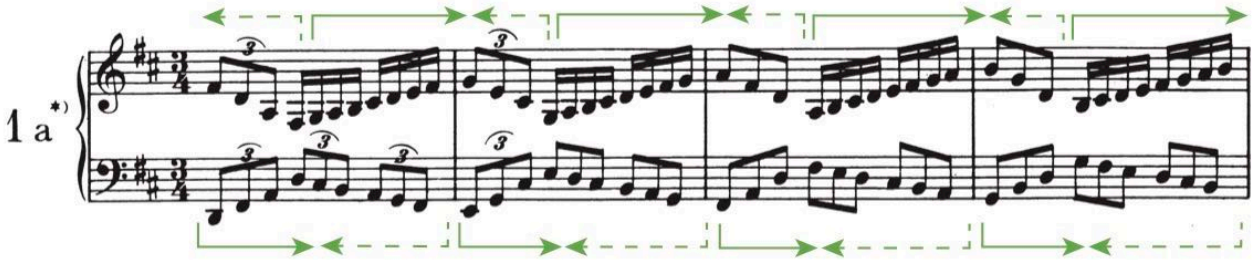
19.2 Polyphonic use of existing exercises

Playing existing exercises with polyphonic expression highlights the fact that polyphonic expression can be used even when it is not written. It is relatively easy to find polyphonic affordances of existing exercises. In some cases, polyphonic expression is already suggested by the contour of the notes, and in other cases, it can be applied over the notes variably. The exercises can be made at every level of difficulty. In my teaching practice, for example, I use Hanon to teach the students to find intonations in response to contour and rhythm. The youngest students, when taught the first exercise hands

separately and subsequently asked to play it hands together, often will spontaneously play it in contrary motion, which is probably a demonstration of a perceptual bias towards symmetry caused by bimanual interference (Hazeltine 2005). After having experimented with intonation in a few exercises, I have the students play one exercise in one hand and another in the other, keeping the particular intonation of each exercise intact. It must be noted that simply playing the expressionless notes of the two different exercises at once, while itself a kind of bimanual coordination, is far easier from performing them together *each with its own particular intonation*. But these are only the very first steps, and I will present here some examples from the Brahms exercises, which are substantially more difficult and lend themselves to polyphonic expression. These examples only serve as models, and pianists will find that most exercises can be used in a polyphonic way.

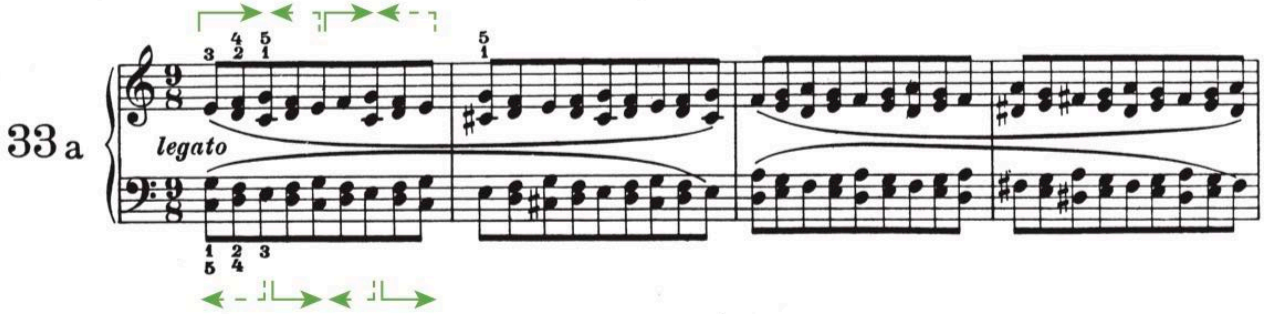
It should be noted that in all the exercises presented here, the goal is to master polyphonic expression through focus on the embodied experience that makes it possible. The exercises are most effective when played with very clear (perhaps even exaggerated) divergence of expression. The performer may decide to use any mix of details for any exercise (articulation, dynamics, timing) provided that the polyphonic expression is made audible. Exaggerating polyphonic expression is highly useful, and provides a vivid experience of the embodied feel of this practice. The presentation here shows a progression of difficulty from Example 19.2 to Example 19.5.

In the first Brahms exercise (and in its variations) the contour of the notes suggest polyphonic expression. The polyrhythm adds to the suitability of this exercise by emphasising the coarticulation of groups of notes suggested by changes in direction.



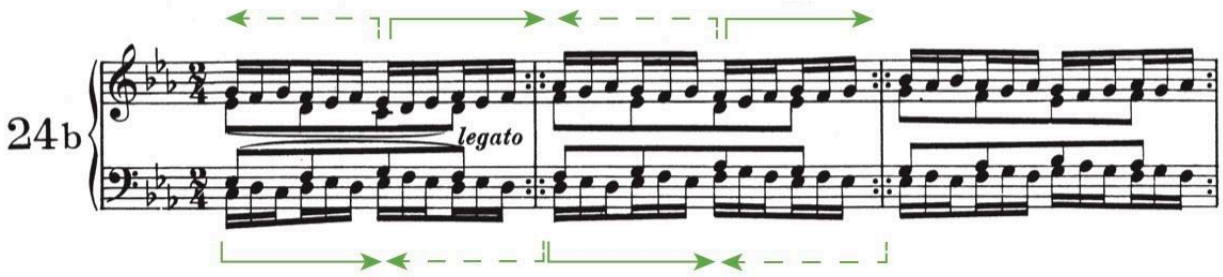
Example 19.2: Brahms Exercise no. 1a WoO 6 (Breitkopf, Mandyczewski, 1926)

It is important to emphasise the importance of including exercises with double notes. Double notes are coarticulated differently than single notes in the sense that the articulation of each individual verticality is often higher in the playing mechanism than for single notes (§15.2.2.2). This has the helpful effect of focusing divergence in gesture higher in the playing mechanism, giving such exercises a different feel.



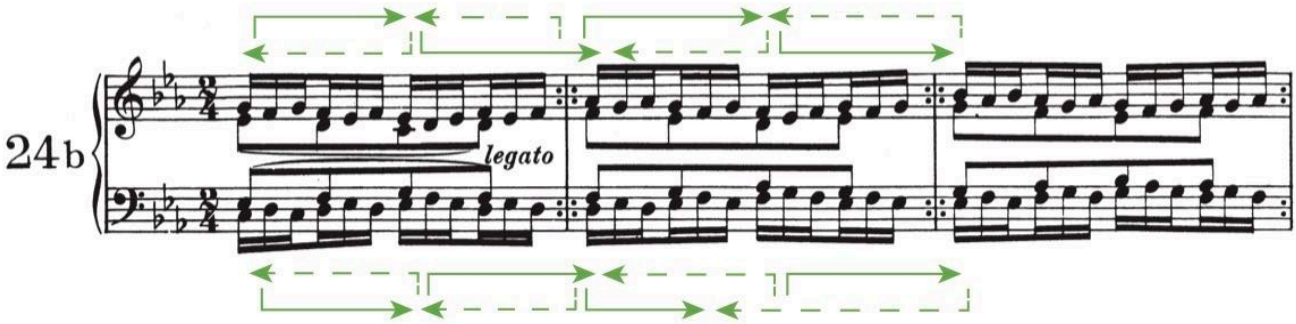
Example 19.3: Brahms Exercise no. 33 WoO 6 (Breitkopf, Mandyczewski, 1926)

Two different polyphonic expressions can be practiced using the notes of Exercise 24b. In the first case, divergence occurs between the two hands.



Example 19.4: Brahms Exercise no. 24b WoO 6 (Breitkopf, Mandyczewski, 1926)

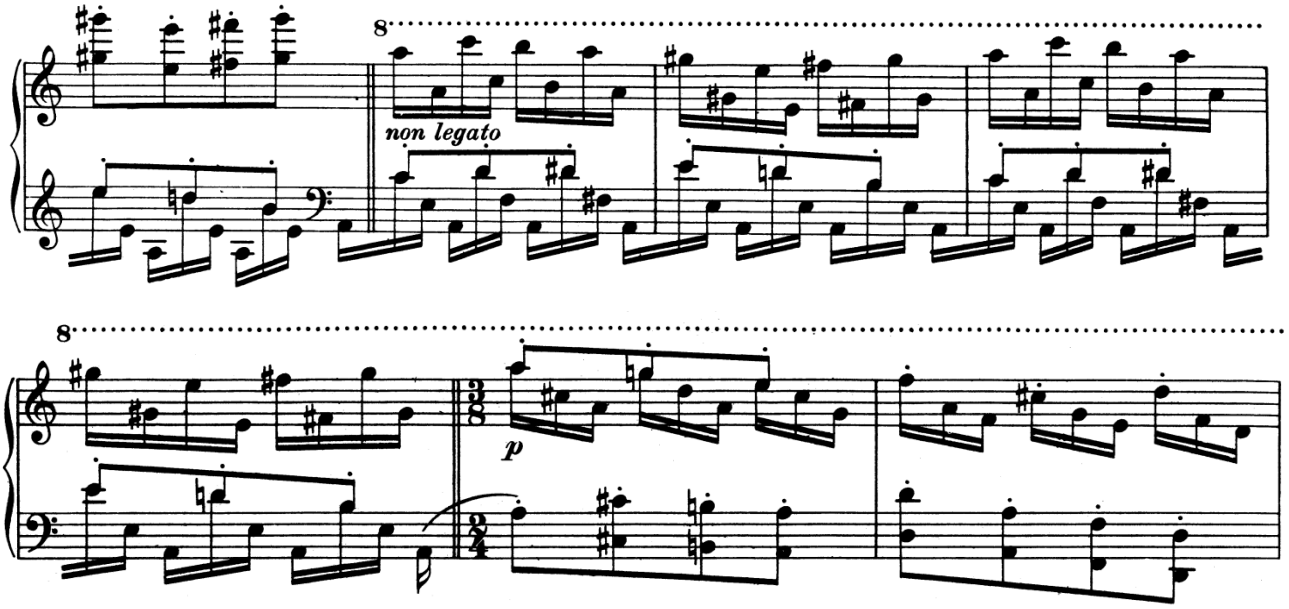
In the second case, the divergence happens within each hand:



Example 19.5: Brahms Exercise no. 24b WoO 6 (Breitkopf, Mandyczewski, 1926)

19.3 Polyrhythmic exercises

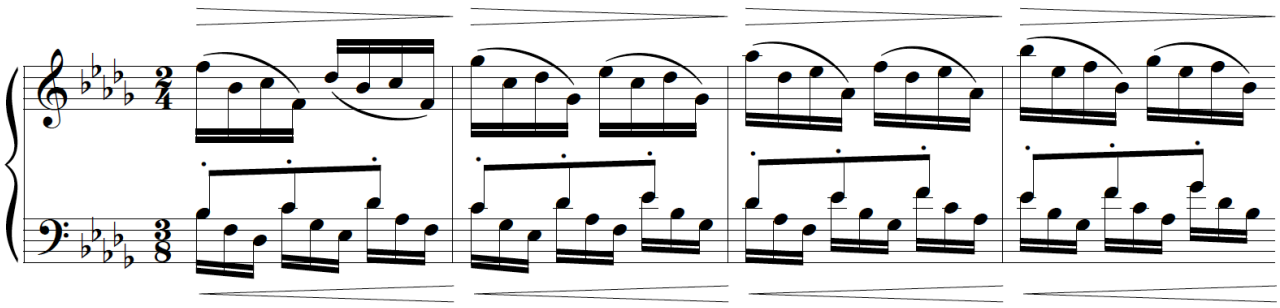
Practising polyrhythmic exercises is a very effective way to strengthen polyphonic expression. In discussing the first Brahms exercise (Example 19.2), I pointed out the usefulness of the four against three (see also §17.5.1). This polyrhythm already encourages the coarticulation of groups of notes on the timescale of the quarter note, thus unifying the overarching gesture while the hierarchically nested gestures of articulating each note diverge. Such divergence is minimal since it occurs at the lowest level in the playing mechanism. It is possible to force this divergence to a higher level of the playing mechanism by adding in one more layer of subdivision below the hierarchical layer that diverges. A good example of this layering is found in the following variation from the Paganini Variations of Brahms, beginning with the double bar.



Example 19.6: Brahms Paganini Variations op. 35, Book II, Variation 7 (Breitkopf, Mandyczewski, 1926)

Because of the notes subdividing the four against three rhythm, the divergence of the rhythm is built on top of coarticulated groups. It is thus embodied higher in the playing mechanism. The lateral movement required to play the left hand part intensifies the gesture overarching each group of three sixteenth notes, while the alternating rotation of the right hand broken octaves, provides a strong grouping for every two sixteenth notes. These already hierarchically layered gestures diverge around the polyrhythm of four against three, while being united by an overarching gesture on the timescale of each measure.

The spread of the left hand notes causes the overarching movements on the timescale of three eighth notes to be rather large. In the following exercise, I take the same rhythmic pattern but reduce the span of the patterns. The structure of overarching gesture should remain the same, but the amplitude is smaller and the particular arrangement on the black keys and white keys gives a suitable range of variation in the embodiment of the pattern.



Example 19.7: Exercise with multi-layered coarticulation and polyrhythm

Inverting the exercise is equally valuable, and I highly recommend experimenting with rhythmic patterns of similar hierarchical complexity.

19.4 Excerpts from pieces

An important part of using polyphonic expression is seeing the polyphonic expressive affordances of passages in normal repertoire. While it is my argument that after focusing and developing the embodied knowledge of divergent gesture - the affordances for its use in passages will be readily seen - it is also true that actively looking for such affordances and making exercises out of them can be an important part of developing both awareness and embodied knowledge. In §20, I will present some examples of polyphonic expression from a recital program. The specific passages that I have highlighted exemplify the kinds of passages that can be taken as the basis for exercises.

In my experience, the process of practicing the polyphonic expression in these passages optimally involves exaggeration of divergent expression, transposition to different keys, and translation between the different kinds of expressive details (articulation, dynamics, timing). In the first place, exaggeration of the polyphonic expression should

take the divergence beyond what is aesthetically pleasing to the performer. Exceeding the aesthetic boundaries of personal taste has the subtle side-effect of stretching those boundaries, thus expanding the aesthetic range of possibilities in a polyphonic direction. Transposition to other tonalities shifts the parameters of how the passage feels on the keys, thus giving a slightly different angle to the embodied feel of the passage. For this kind of practice, I generally use the same fingering for each transposition, even though some of the angles and crossings that result are uncomfortable. The navigation of such difficulties while projecting the overarching polyphonic expression is a particularly powerful way of exploring the embodied feel of divergent gesture. Finally, exploring divergences by translation between types of expressive details is also helpful both in building an awareness of the connection between the underlying gesture and the musical details and also in broadening the possibilities of expression. One of the easiest ways to practice this translation is by playing passages written for the piano on the organ, and passages written for the organ on the piano. Of course, passages need adaptation since, for example, the pianist's two hands often cannot reach all the notes for the manuals and the pedals, and conversely the organ manuals do not have enough notes for some piano passages. Excerpting the relevant parts of the passage makes it possible to play these passages on the "wrong" instrument, and the difference in the available types of musical details causes a shift in the mode of musical expression, while still expressing the same underlying gestures and groupings. For example, in translating the beginning of Bach's E Minor Fugue BWV 548 to the piano (see §20.4 for an analysis of the polyphonic expression) I might use dynamics to communicate the intonation of the eighth note groupings. The articulation then can remain uniform for all the eighth notes, but the underlying gesture is still audible by the touch-controlled dynamic expression, an expressive detail available on the piano but not on the organ. Conversely, if I play the opening of Scarlatti's D Minor Sonata L.

108/K. 213 on the organ, I use articulation and timing to communicate the polyphonic gesture in the absence of touch sensitive dynamic control.

That all three of these suggestions (exaggeration, transposition and translation) go beyond what is comfortable or normal highlights the fact that they are *exercises*. In going beyond the normal parameters of playing, they help stretch the abilities and sensibilities of the performer. Rather than being mechanical drills, they serve as explorations that are effective even when applied to only a few passages, since they build awareness of polyphonic expression and its embodiment.

19.5 Other helpful experiences

Aside from exercises, other experiences can indirectly aid in the development of polyphonic expression. In my own experience, several explorations resulted in experiences that supplemented the intellectual work of thinking about polyphonic expression during the course of preparing this dissertation and the artistic work of my own concert activity.

19.5.1 Kinaesthetic awareness using extra-musical techniques

While it is true that the coordination of every pianist is slightly different, this coordination can be developed through several established body awareness methods away from the piano. Evaluating these methods in detail goes beyond the scope of this dissertation (and beyond the scope of my experience with these methods) but it is important to mention that they exist, and that they can be extremely helpful in building awareness of the embodied experience of polyphonic expression.

My own experience has included several methods or practices, including the Feldenkrais method (approximately fifteen lessons over six months), Alexander Technique (approximately thirty lessons over two years), Rolfing (ten sessions in one year, then five

sessions five years later) and Yoga (ten months of twice-weekly classes). Of these methods, I found Alexander Technique to be particularly useful in building awareness of the hierarchical layers of movement in coarticulation. I don't feel that Yoga contributed directly to any specific aspect of the embodied practices outlined in this research, though it was certainly valuable on its own terms.

Both the Feldenkrais method and Rolfing seemed to help specifically in developing the embodied practices underlying polyphonic expression. I discovered Rolfing after a car accident that left me with severe back pain (several years before the beginning of this research). During the process of the ten sessions, which led to a full recovery, I was amazed by how the process helped me to directly feel the layers of connections between different parts of my body, and how these connections could be freed through the manipulations of the Rolfer. Several years later, during the beginning of this research, I returned to Rolfing with the goal of building awareness of the layers of movement involved in the playing mechanism, as well as expanding my flexibility of movement. Parallel to these sessions, I also went to see a teacher of the Feldenkrais method, a method that uses exercises or movements to build body awareness. It is difficult to articulate the impact that the combination of these methods made on me, but I can say that I experienced through them a sense of increased freedom and ease of movement as well as a sense of an expansion in my range of movement possibility.

Much more importantly, I also felt a greater sense of *musical* freedom through these methods. The opening and freeing of movement in general opened the sense of freedom in the overarching continuities of coarticulation. The methods also seemed to help untangle a web of interferences that I felt in practicing the divergence of gesture underlying polyphonic expression. The greater sense of freedom I felt from these methods led to a

musical sense of freedom through gesture, which in turn allowed me more flexibility in shaping phrases through musical details.

From the community of practitioners of both Rolfing and the Feldenkrais method, various sources have more specifically suggested the connection between the physical experience and the psychological (beginning with the various writings of Moshe Feldenkrais himself and Ida Rolf herself). Notwithstanding the fact that my own experience with these methods seems to coincide with the claims of each method to affect not only movement but also thought, further research is required to verify this subjective impression. I feel sure, however, that any musician participating in Rolfing or the Feldenkrais method will at minimum develop a greater awareness of movement, and this is already extremely valuable in developing polyphonic expression.

19.5.2 Organ study

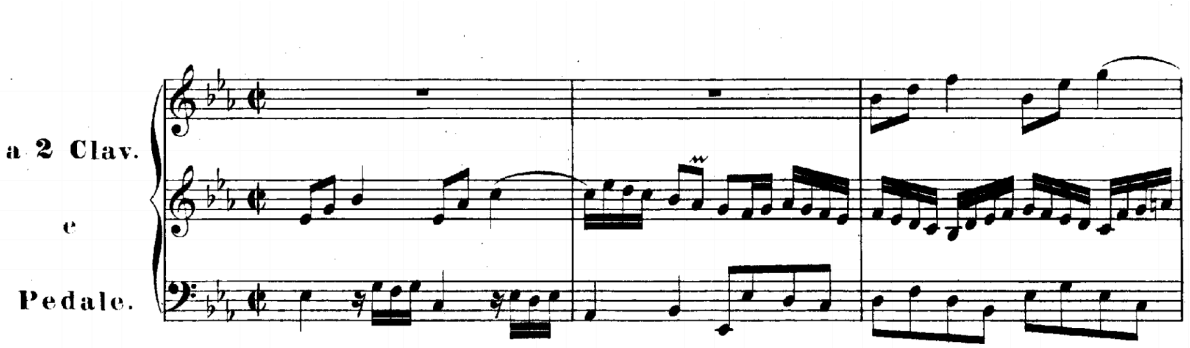
Studying organ helped me immensely in my research process, and I highly recommend organ study for every ambitious young pianist. I began studying organ after I had already finished my piano studies, and as I began the research that led up to this dissertation, it became clear that studying organ would be an immensely useful way to consolidate my views about musical gesture and to expand my polyphonic thinking. As I have already suggested, translation of passages between organ and piano is one valuable practice strategy that pertains directly to polyphonic expression. Going beyond this practice strategy to organ literature, the use of the four additional contact points for the pedal keys (heel and toe of both feet) provided a coordination challenge similar to the challenge faced by young pianists as they learn to coordinate the hands. Through working out this coordination challenge, I could try out the practice strategies that I recommend to

my students, and both sympathise with the coordination challenges they face and help them more efficiently. The general insights and reflections about skill acquisition, coordination, and practice strategies that came up during this period of organ study do not fit into this dissertation.

However, one experience seems particularly relevant. It was my organ teacher Ben van Oosten that pointed out to me, during one of my first lessons with him, that while I was playing the notes in the pedal correctly, I was not listening to them in the same way as to the notes on the manuals. It immediately became clear to me that he was right, that while *aware* of the notes played by the feet, I perceived them differently than the notes in the hands. Upon further reflection, it became clear that the main difference in listening to the pedal notes was that I was listening to them as individual notes, without the same sense of overarching gesture with which I was voicing the manual parts. My musical ears were closely entrained with the activity of my hands and arms, most specifically with the sense of coarticulation of groups of notes, but this close entrainment did not automatically transfer to my feet.

One example of the difference in connection between ear and feet and between ear and hand at this early stage in my organ study occurred in the opening of Bach's Trio Sonata no. 1. I noticed that if I reorganised the opening measure to play it with two hands, the timing of the sixteenth notes on the second and fourth beats of the first measure was slightly different than if I played the sixteenth notes with my feet. If I played as written with left hand and foot, the length of the second beat was slightly shorter than if I played the same passage with two hands. It was as if the timing of this beat when played as written was determined wholly by the manual part, and the sixteenth notes were simply fitted into the time available. The balance in agency between the manual part and the pedal part was skewed heavily towards the manual part. When I played with two hands, the

second beat was slightly longer, as the sixteenth notes were voiced with their own sense of overarching gesture. Once I noticed this, it was relatively easy to correct the problem by practising the passages for the feet with an overarching sense of gesture, which through conscious attention eventually featured equally in the balance of agency between voices.



Example 19.8: Bach Trio Sonata no. 1 in E-flat BWV 525 (Breitkopf, Rust, 1867)

What is interesting about this story is that my musical ear, developed throughout my life, was closely associated with my hands and was not automatically as active in understanding notes played by my feet. In my perception, developing this connection between musical gesture and feet was a very important expansion for my sense of polyphonic thinking through gesture both in organ repertoire (manuals and pedals) and piano repertoire. This perception seems to be supported by the last of the core claims of embodied cognition proposed by Margaret Wilson (see §7 for a discussion of embodied cognition, including the complete list of principles from which this is taken):

> 6. Off-line cognition is body based. Even when decoupled from the environment, the activity of the mind is grounded in mechanisms that evolved for interaction with the environment—that is, mechanisms of sensory processing and motor control. (Wilson 2002: 626)

This principle suggests that developing the sense of musical gesture in the feet and the connection between the feet and the musical ear provides an additional mechanism of sensory processing and motor control, which is available for thought whether or not the feet actually play. It suggests that the expansion of technique to include pedals represents an augmentation of the capacity for polyphonic thinking-through-movement which can be used either at the piano or at the organ. While studying a new instrument might seem like an extreme undertaking, the effort spent on organ study is worthwhile for pianists. The point at which the benefits for polyphonic thinking begin is the moment the feet become involved in the creation of musical gestures which feature equally in importance to the gestures created by the hands in the determination of the overall flow of the music.

19.6 Conclusion

The body schemata underlying polyphonic expression can be developed through exercises, often using existing exercise material. Such an approach serves a second purpose as well: it alleviates the boredom of mechanical repetition of existing exercises, since the realisation of divergent expression requires focus and awareness. Playing through the exercises above is sufficient for a pianist to become aware of the limitations of polyphonic expression caused in part by bimanual interference, and practicing the exercises represents the first step in overcoming them. Body schemata are given (§6.1) in the musical imagination (§9.6.1) and the perception of the musical score (§10.2), and are communicated through musical details (§10.1) in the structure of performance (§14). They underlie the gestural expression that adds grabbiness (§17) to the sounding result. For all these reasons, developing such body schemata through exercises is a step that permeates pre-reflectively through the musical practice of a pianist. In the following section, I will

give some examples of such polyphonic voicings, which in this case are consciously applied (*willed*, §9.7), but which might occur pre-reflectively outside of a research context.

20 A recital program

As a final part of my dissertation, I will give a live performance of a recital program divided between works for piano and organ. In this recital, I will show how polyphonic expression can be highlighted or foregrounded. Polyphonic thinking will be modelled in the sense that various polyphonic affordances of the scores will be made explicit (both in sound at the performance and through the analysis presented here) and the aesthetic balance between polyphonic expression and homophonic expression will be considered.

Polyphonic expression is one part of my practice, and through this research I have made it more central to my practice so that it comes out frequently as simply the way I understand music, without conscious intervention. However, in this research context it is very useful to explicitly analyse the gestural component of polyphonic expression in specific passages, in order to show how this particular kind of musical thinking works.

For each piece or set of pieces, I will present here some reflection about the polyphonic affordances of the piece that I will voice during the performance. I have chosen to focus on certain specific passages from each piece, chosen to show a variety of different situations where polyphonic expression can be employed. This is by no means a comprehensive analysis in the sense that I will not go through every measure of every piece, but serves rather to model example applications of polyphonic expression that I will integrate in a similar way throughout the performance.

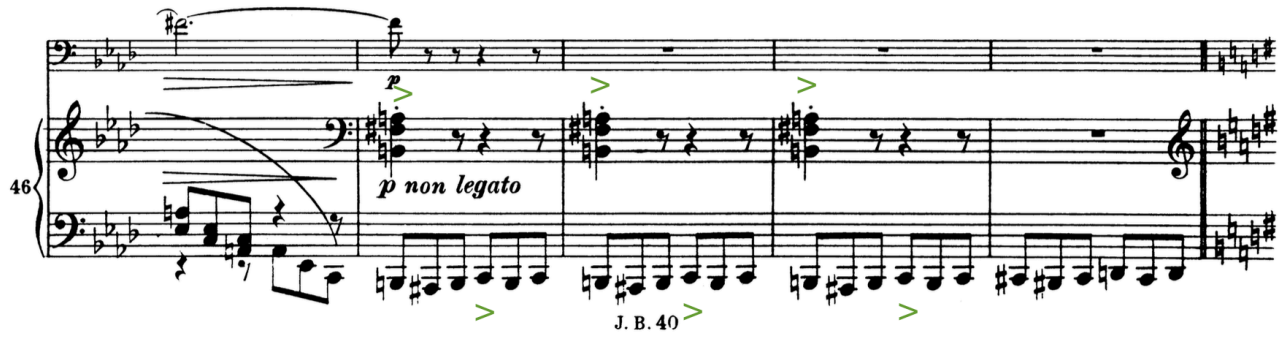
Since it is my goal to think in gesture rather than in musical details, I have mostly used the form of notation presented in the previous chapter for showing gestural shape. While this notation does not describe the *quality* of gesture at all, it does show the prefix and suffix clearly, and thus can show the kind of polyphonic divergence that is intended. How these shapes are communicated remains flexible, and my performance will demonstrate one way of realising these divergences.

The choice of repertoire might seem odd, since rather than focusing on the most polyphonic works, I have simply chosen a selection of pieces from my normal recital repertoire. However, one of the arguments of this dissertation is that polyphonic voicing can be applied to all keyboard music, whether or not it seems highly polyphonic on paper. With that perspective, it is much more interesting to see a representative sample of repertoire, including pieces that are highly polyphonic as well as pieces that are less obviously polyphonic.

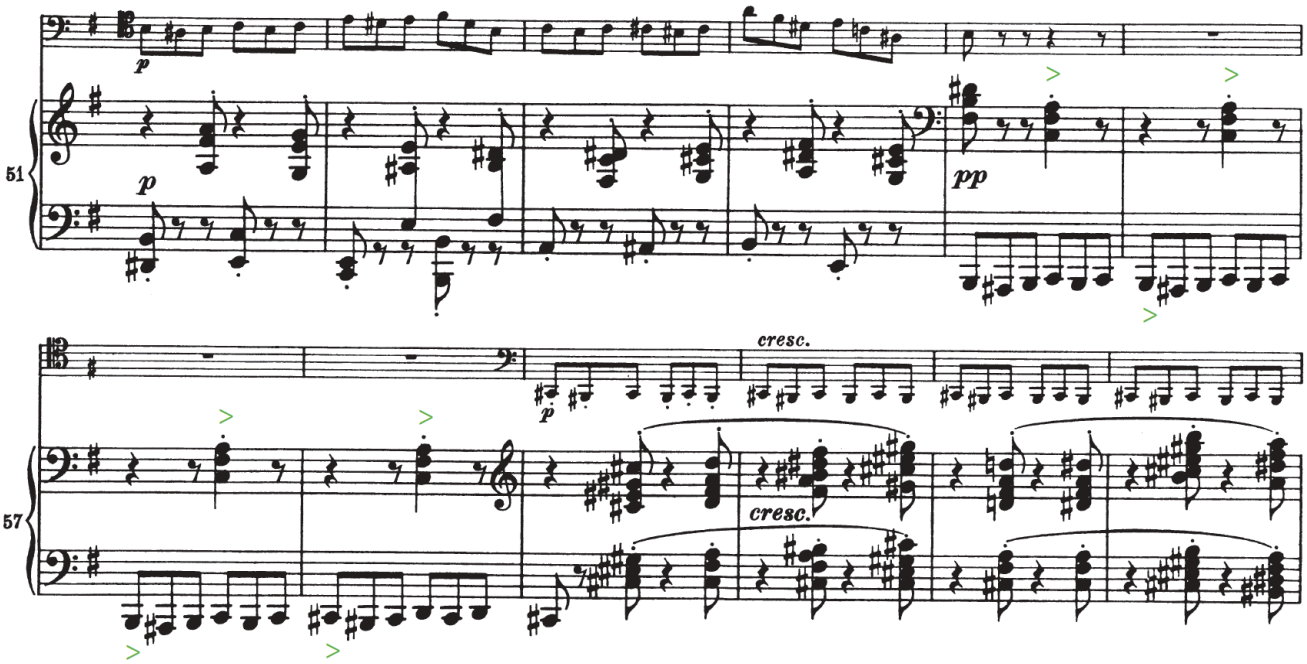
Certain features of each instrument lead to general principles for polyphonic playing. For example, the fact that the sound of the piano decays after the attack gives a predetermined shape to long notes. Two thoughts come up regarding this fact: 1) the decay can be mitigated by the way other voices are shaped; 2) playing longer note values louder often makes sense to make sure their sound balances sufficiently through their full length. This decay in the sound of single notes is an instrumental feature that figures into the appraisal of affordances for polyphonic expression in piano music. Similar organ-specific qualities influence the application of polyphonic expression to the organ pieces.

Besides the qualities of the instrument, polyphonic expression is of course dependent on the affordances of the musical passage at hand. First, the structure of the lines in the score limit options for polyphonic voicing. For an elementary example, consider these passages from Brahms's Cello Sonata in F Major (Example 20.1, measures 47-50, Example 20.2 measures 55-59, Example 20.3 measures 81-84). If we view this passage in two parts (left hand and right hand) we notice that in all three passages, the eighth notes in the left hand part are the same (except of course they are transposed in the third example). However, the rhythmic pattern in the right hand is different. If we are to find a polyphonic voicing for all three passages, it has to be determined by the rhythm of the right hand. This is because the only viable reading of the right hand is that the chords

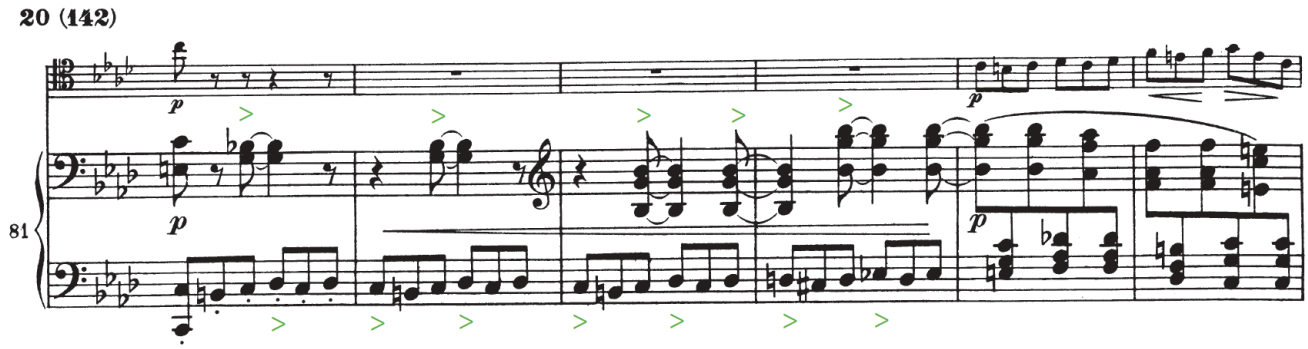
represent points of emphasis, and the rests represent points of de-emphasis. The left hand, therefore, must be shaped differently in each case to provide the polyphonic expression. While it may be possible to find a polyphonic voicing on a longer timescale, it would be much more difficult to project. This is, therefore, the best affordance for polyphonic voicing in these passages. I have marked points of emphasis with green accent marks.



Example 20.1: Brahms Cello Sonata in F major (Gál, Breitkopf, 1926)



Example 20.2: Brahms Cello Sonata in F major (Breitkopf, Gál, 1926)



Example 20.3: Brahms Cello Sonata in F Major example (Breitkopf, Gál, 1926)

Because the points of emphasis in the right hand of this example are simply single chords, the characteristic overarching gesture of coarticulation can be collapsed onto the moment of attack alone. The example, then, is not particularly illustrative of the gestural divergence underlying polyphonic expression, while it does on the other hand offer a clear picture of the interaction between voices that makes polyphonic expression possible. The left hand part, while identical across the three excerpts (except for its transposition) receives a radically different voicing in each case in response to the rhythmic profile of the right hand. Of course, this example is also extremely simple, and many passages in the following pages have alternative plausible polyphonic voicings.

It is therefore not my point to argue that the analyses presented here show the only polyphonic voicings for the passages that I examine, but rather to propose these as options for polyphonic voicing which demonstrate the practice of polyphonic expression in its application. In previous sections, I have written about the relationship between factors of rhythm and contour (§15.2.4), and how these relate to musical gesture in the performance of lines. The overarching trajectory shapes of coarticulation constitute continuities (§9.3) of gesture, which in turn depend on such factors (§15.2.1). Legato (§15.2.1.1) and voicing (§17.3) thus also do. One could imagine voicings in the following examples where the connection between gesture and, on the other hand, contour and rhythm is deliberately broken. While such voicings might offer a radically different performance result, this

innovation would come at the expense of such overarching continuities and would diminish the immediacy in expression of each line, since the performative intonation and the contours and rhythms would no longer would work together. Moreover, such an approach would cerebrally override the subjectivity of each individual line, a subjectivity born from the performer's embodied understanding of the music rather than his conceptual faculties. On the other hand, multiple alternative polyphonic voicings exist that do consider the contour and rhythm in its gestural embodiment, and it is within this field of options that I have chosen to work in the following examples, since these options are themselves under-explored by performing musicians.

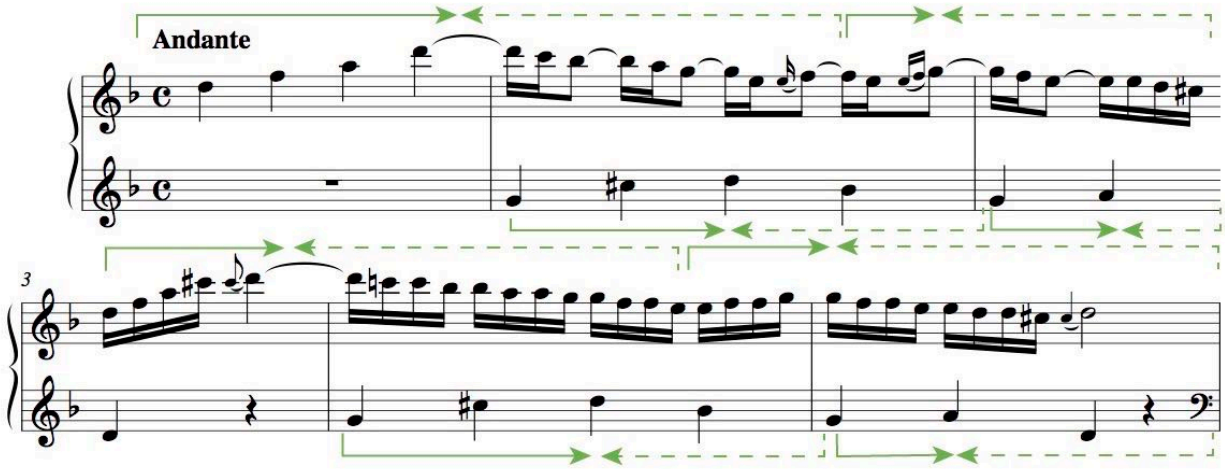
In some examples, an analysis of the musical gesture involved (showing prefix and suffix) is sufficient to show the underlying polyphonic expression. However, the scope of this type of gestural analysis is limited since it only accurately describes passages that have a relatively simple shape. In other examples, it is more productive to describe the polyphonic divergence from the perspective of the temporal flow of voices and from the spatiality of vertical sonorities. For this reason, I will discuss each piece slightly differently; for some, I will use excerpts with an analysis of polyphonic expression through gesture, and for others I will present my more general reflections on creating a polyphonic voicing.

20.1 Scarlatti: Sonata in D Minor

Playing Scarlatti on the piano is not historically accurate but it is very common and extremely beautiful. It is my view that the sound possibilities of the piano (such as pedal, dynamic range) should be fully employed without any feeling of restraint. This approach gives great freedom to the performer, since there are very few expressive markings in the score. With such freedom, it is easy to find a polyphonic voicing for this music. I have

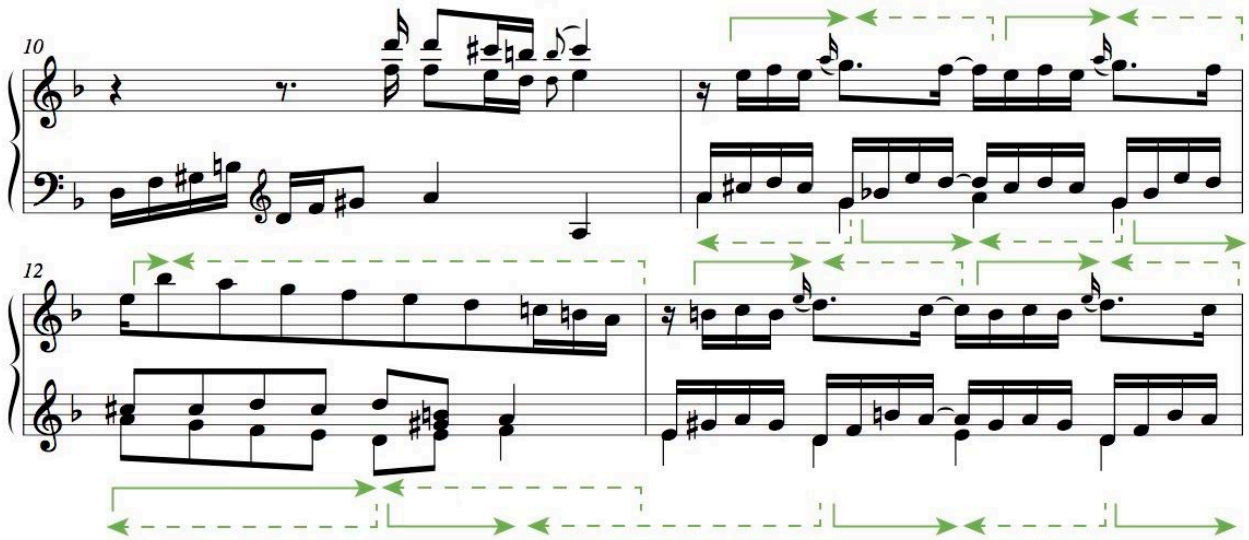
selected a few passages below to give an example of the different kinds of musical material that make up the sonata and how these materials can be polyphonically voiced.

Because this music has relatively few notes, it is easy to show the structure of gesture that creates the polyphonic voicing. While this clearness is definitely beneficial for the purposes of the exposition of research, it also can lead to a rather over-worked or inflexible performance. It is again important to note the difference between interpretation and understanding: playing these passages while consciously trying to project the gestures as written is a very different experience from assimilating those gestures through practice and then allowing them to emerge in performance, without conscious intervention. The difference from the first person perspective is that in the first case, the performer is playing through conscious thinking about the abstraction notated in the score, while in the second case he is playing by the remembered feeling and sound of the gestures, already ingrained through practice. In this research context, of course I will play with enough thought to make sure that I actually do project the polyphonic voicing that I have written (notated with the green arrows §14.4). However, in a normal concert practice, these types of polyphonic voicings should emerge naturally from an embodied instrumental practice that is primed with polyphonic gesture, so that the polyphonic voicing remains flexible and dissolved in the flow of the artistic process.



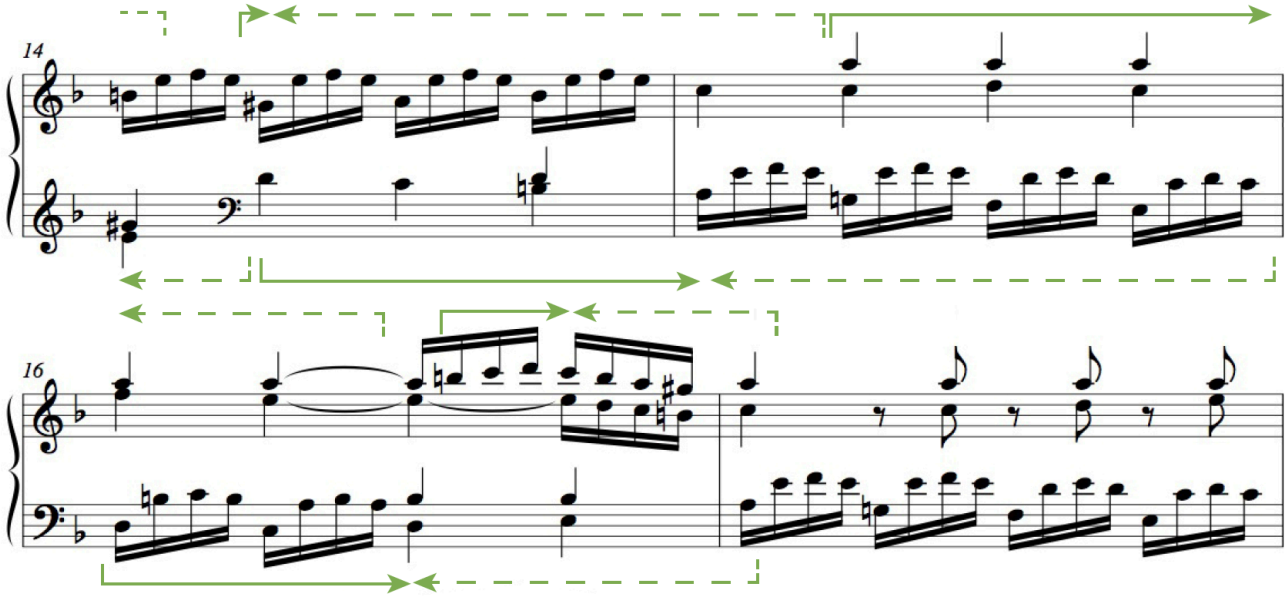
Example 20.4: Scarlatti Sonata in D Minor K. 213 L. 108 (Les Éditions Outremontaises, Gouinn, 2013)[72]

In Example 20.5, please note that of the two sets of arrows below measure 12, the top arrows apply to the middle voice and the bottom arrows to the lower voice. A similar construction occurs in measure 25 of Example 20.6.

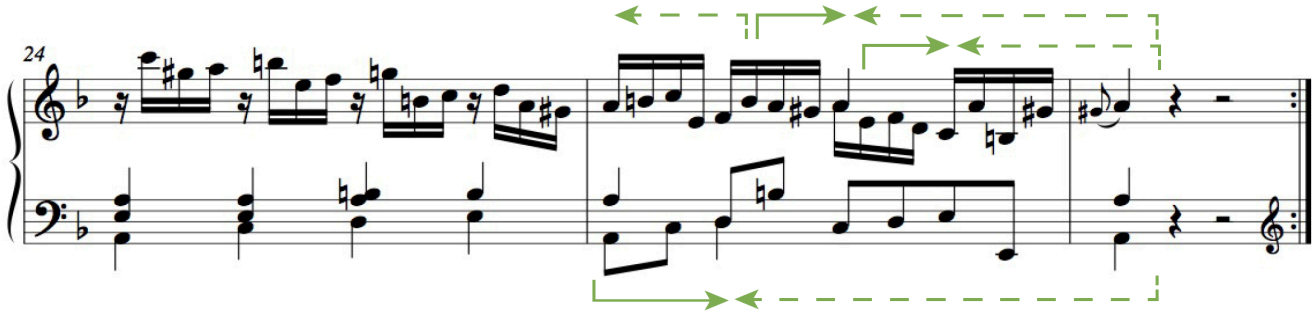


Example 20.5: Scarlatti Sonata in D minor K. 213 L. 108 (Les Éditions Outremontaises, Gouinn, 2013)

[72] Retrieved from <http://imslp.org/wiki/Keyboard_Sonata_in_D_minor,_K.213_(Scarlatti,_Domenico)> accessed Feb. 21, 2016



Example 20.6: Scarlatti Sonata in D minor K. 213 L. 108 (Les Éditions Outremontaises, Gouinn, 2013)



Example 20.7: Scarlatti Sonata in D minor K. 213 L. 108 (Les Éditions Outremontaises, Gouinn, 2013)

20.2 Beethoven: Eroica Variations

As I have described, the act of presenting research through performance is one step removed from artistic practice in the necessity for conscious thought to make sure that the research is projected through the performance. In Beethoven's Eroica Variations op. 35, I decided to take this research component one step further. For a few of the examples, I will

provide an alternative recording of a non-polyphonic performance. Since polyphonic voicing can seem subtle, especially to novice ears, it is useful to have an immediate comparison.

Below is some discussion of possible polyphonic voicing in the first eleven sections of the piece. I feel this gives a good overview of the kind of polyphonic divergences I use, and these are similar in subsequent variations. For the last variation before the fugue and the fugue itself, there are no repeats, so I will use a normal and more flexible mix of voicings, emulating a more normal concert situation where the structure of voicing is not pre-determined. It is my hope that by this point in the piece, both the minds and the ears of the listeners will be primed to hear these polyphonic voicings as they emerge.

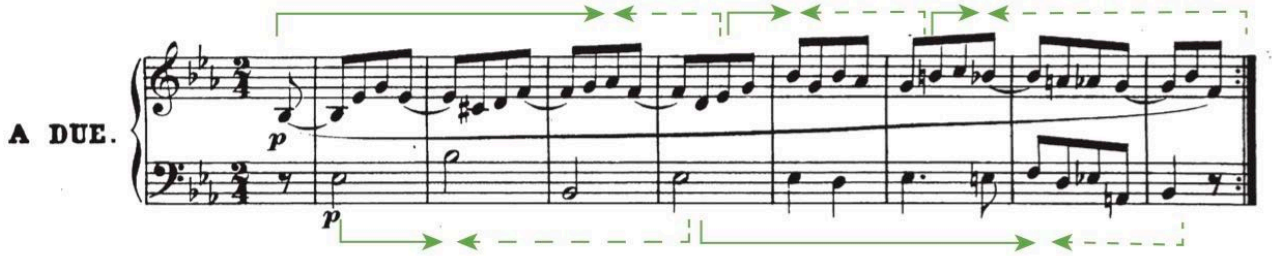
Introduzione col Basso del Tema

Example 20.8: Beethoven Eroica Variations op. 35, *Introduzione col Basso del Tema* (Breitkopf, 1862-90)

In this introduction, the contour and rhythm of the lines moving in parallel octaves is identical, so no polyphonic expression is suggested by these details. However, polyphonic expression can be superimposed on the lines, so that each octave has a distinct

shape. This gives the effect of colouring each octave vertical slightly differently and giving a sense of dynamic movement for individual lines while the overall dynamic remains constant. The effect is subtle but audible, and it gives a sense of liveliness to this section. Since this sound effect is not grounded in the contour or rhythm of the notes in the score, I have not specifically notated it here. I prefer to use it rather flexibly, shaping the sound of each individual instrument.

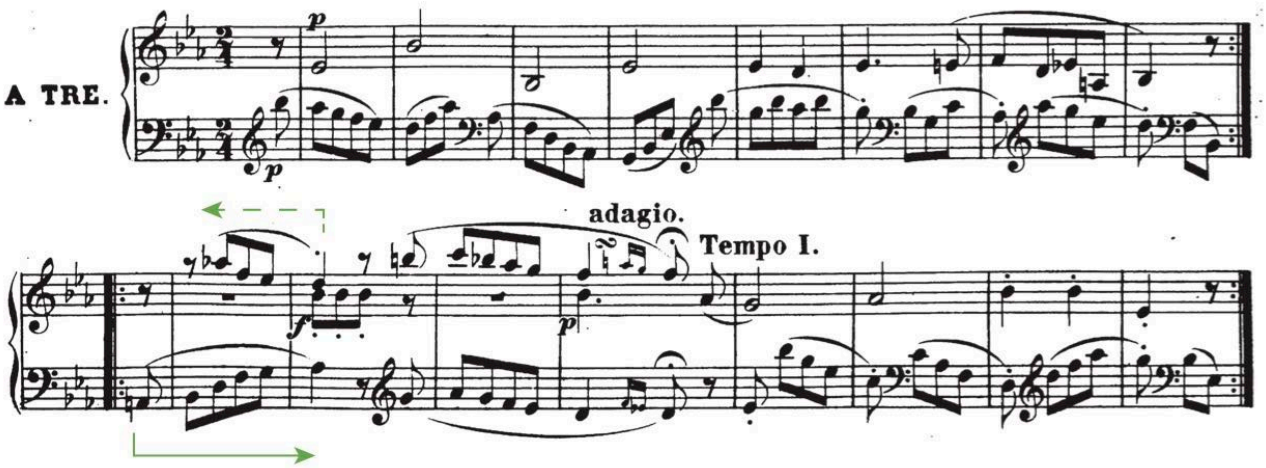
A due



Example 20.9: Beethoven Eroica Variations op. 35, *A due* (Breitkopf, 1862-90)

A tre

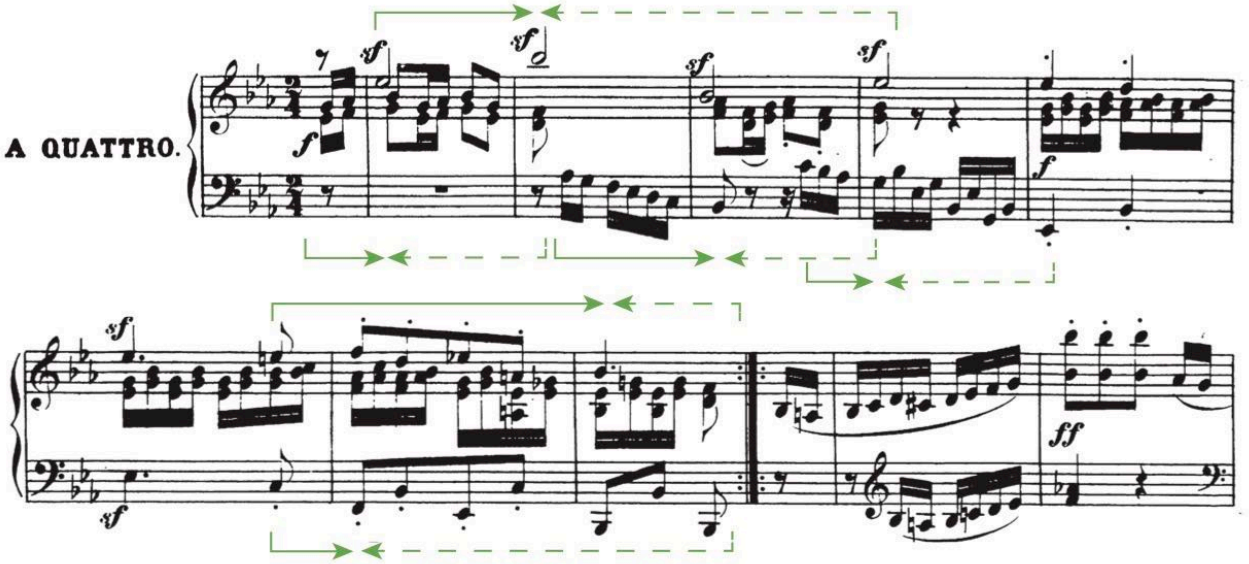
In this section, the jumps of the left hand have the effect of creating a separation in timing between the segments written in treble clef and the parts written in bass clef. This creates a sense of distance that gives the effect of a dialogue, which is grounded by more continuous rhythm of the bass line (played by the right hand). At the beginning of the second half, the polyphonic divergence notated gives an enhanced clarity to the separation between the three voices.



Example 20.10: Beethoven Eroica Variations op. 35, *A tre* (Breitkopf, 1862-90)

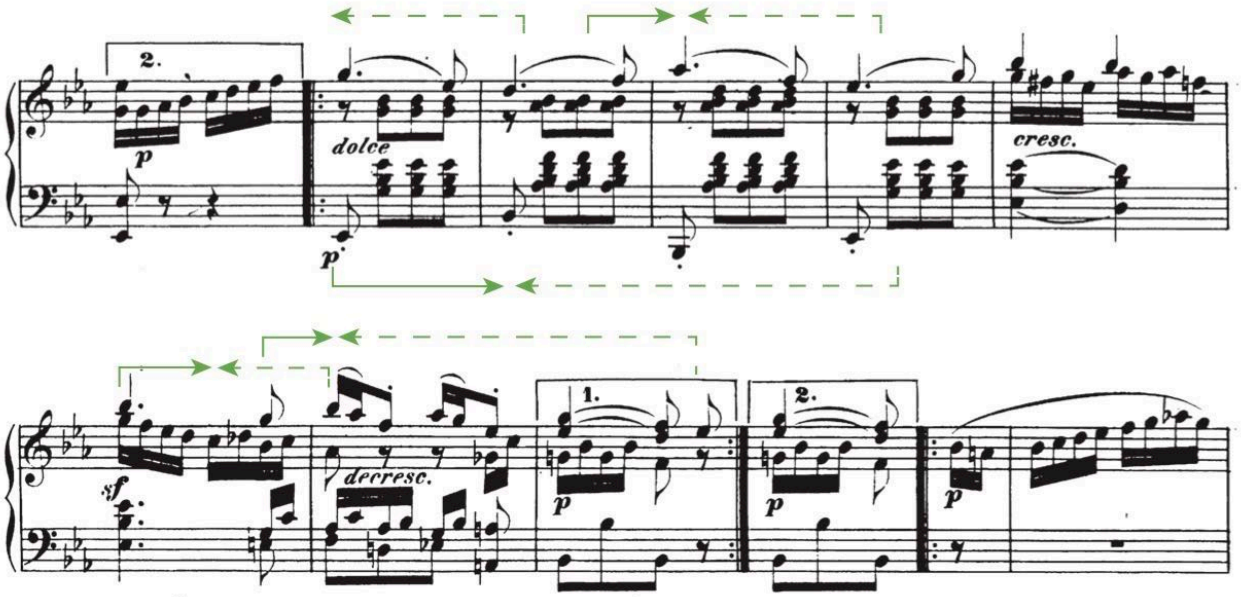
A quattro

In this section, the arrows below the first line apply to pair of voices moving in thirds and to the sixteenth notes written in the bass clef, which diverge in the third measure. Against these voices, the bass line, now in the soprano, is divergently shaped.



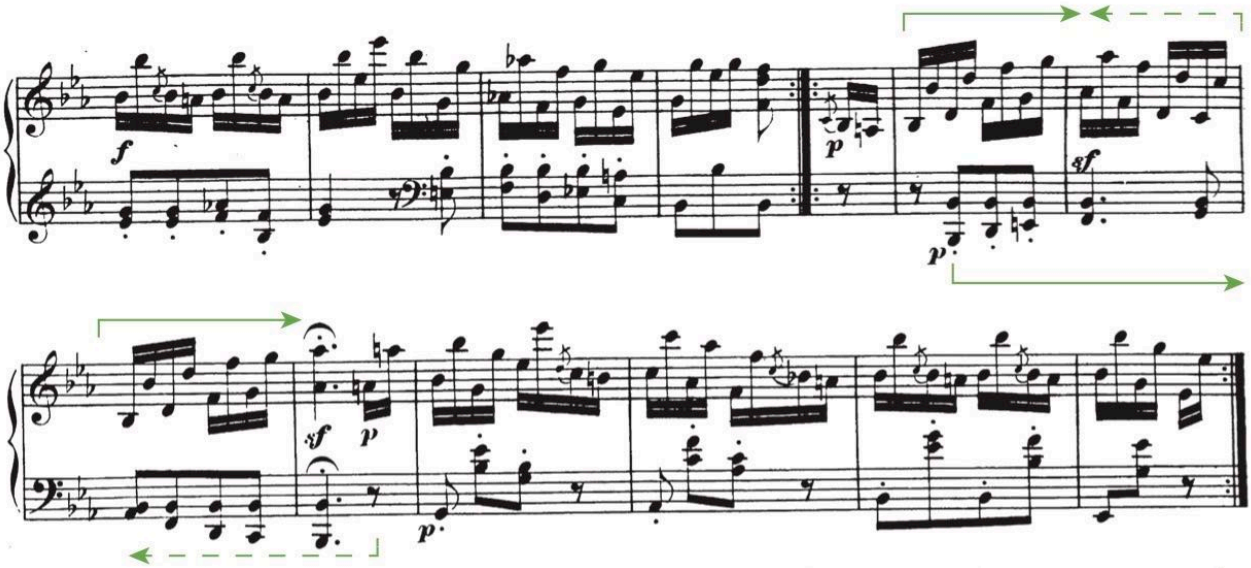
Example 20.11: Beethoven Eroica Variations op. 35, *A quattro* (Breitkopf, 1862-90)

Tema



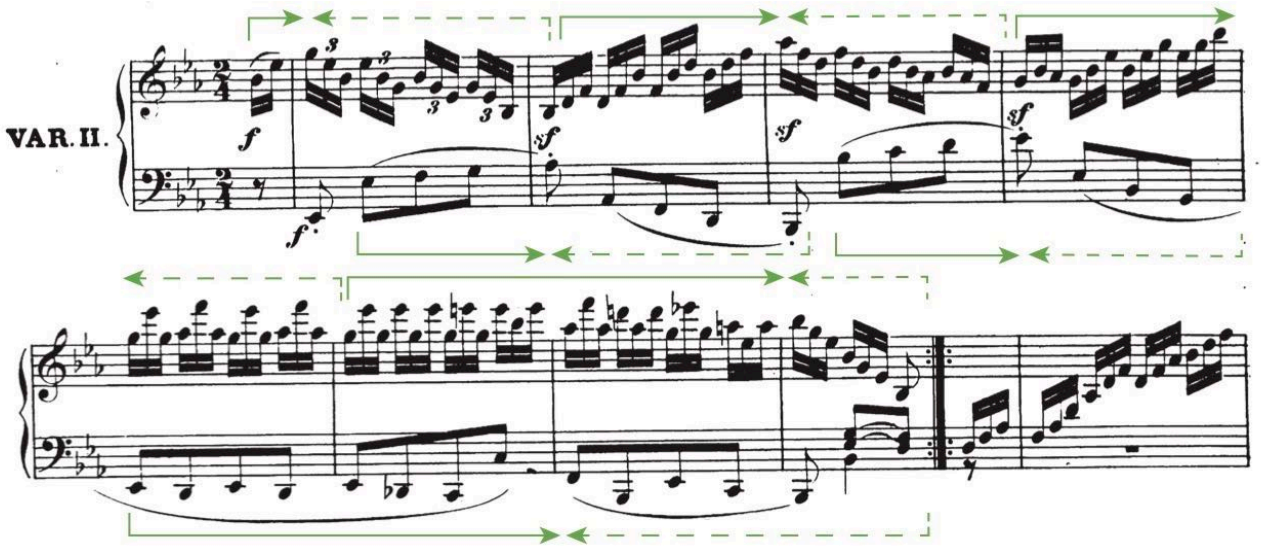
Example 20.12: Beethoven Eroica Variations op. 35, *Tema* (Breitkopf, 1862-90)

Variation 1



Example 20.13: Beethoven Eroica Variations op. 35, *Variation 1* (Breitkopf, 1862-90)

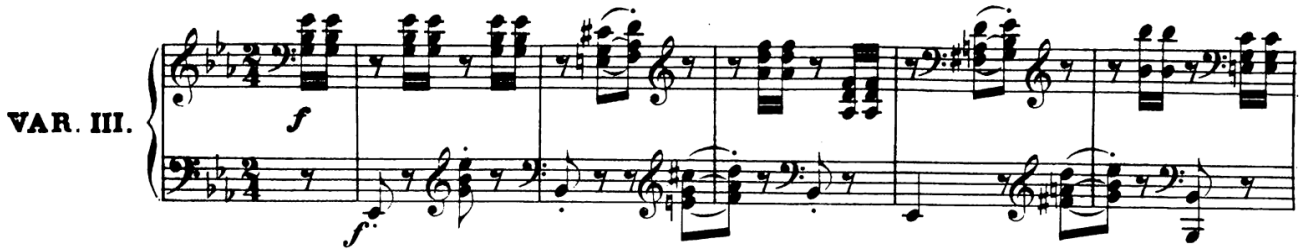
Variation 2



Example 20.14: Beethoven Eroica Variations op. 35, *Variation 2* (Breitkopf, 1862-90)

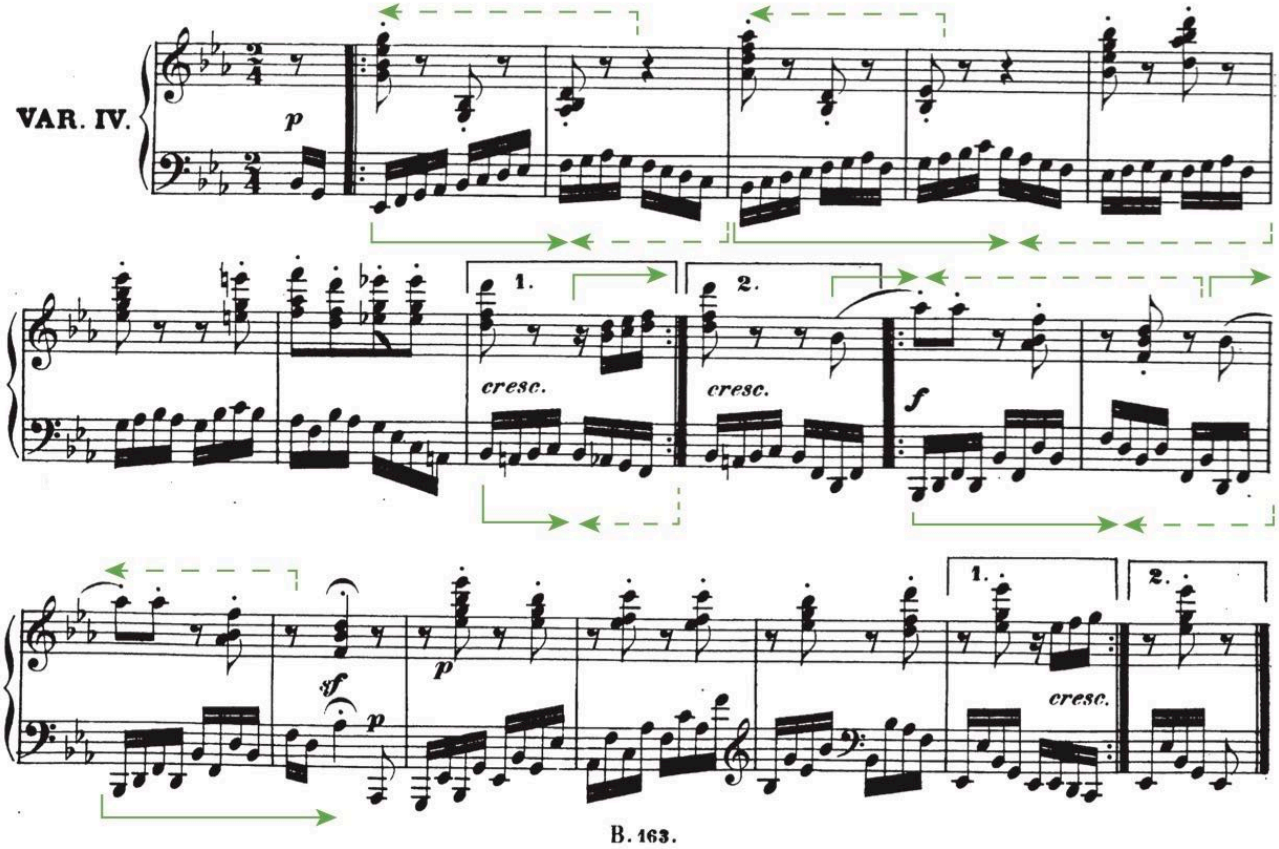
Variation 3

In this variation, a slight separation in timing and colour between the material in the first measure and the eighth-note triads is sufficient to give the sense of spatial separation between these two dialoguing voices. What is interesting to note is that the divergence does not happen with voices that sound simultaneously, but rather in the temporal flow of the music suggested by their gestural unfolding. The slight subversion of expectation in the temporal placement of these eighth-note triads, while still maintaining tempo within this group of triads, give a spatial or antiphonal effect.



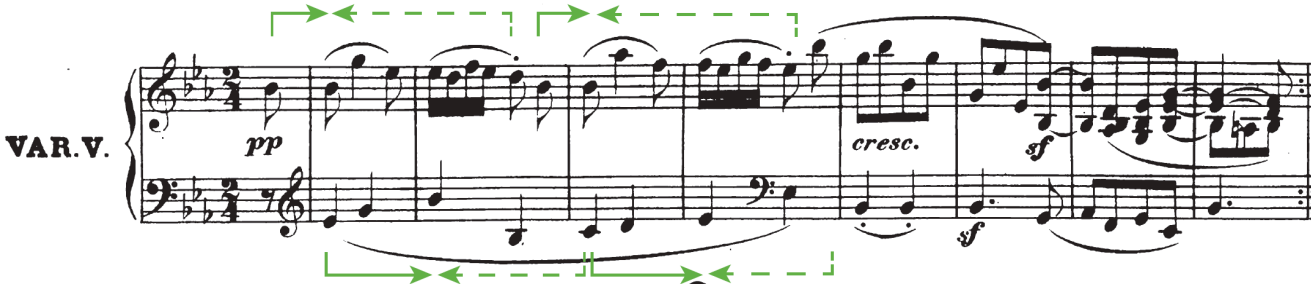
Example 20.15: Beethoven Eroica Variations op. 35, *Variation 3* (Breitkopf, 1862-90)

Variation 4



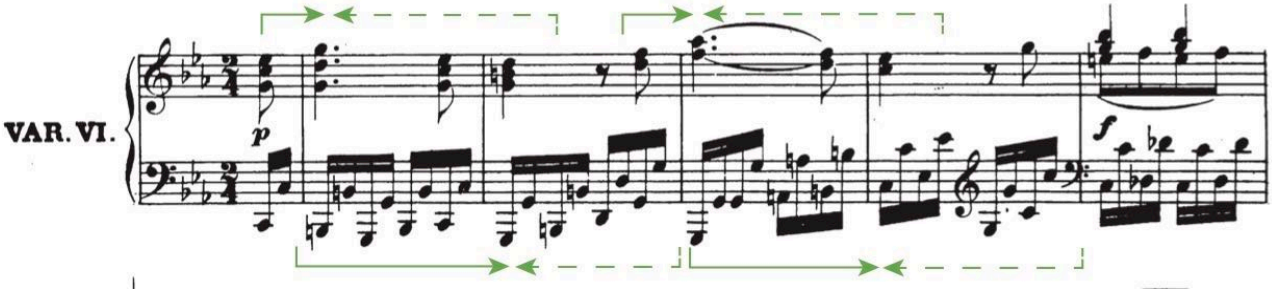
Example 20.16: Beethoven Eroica Variations op. 35, *Variation 4* (Breitkopf, 1862-90)

Variation 5



Example 20.17: Beethoven Eroica Variations op. 35, *Variation 5* (Breitkopf, 1862-90)

Variation 6



Example 20.18: Beethoven Eroica Variations op. 35, *Variation 6* (Breitkopf, 1862-90)

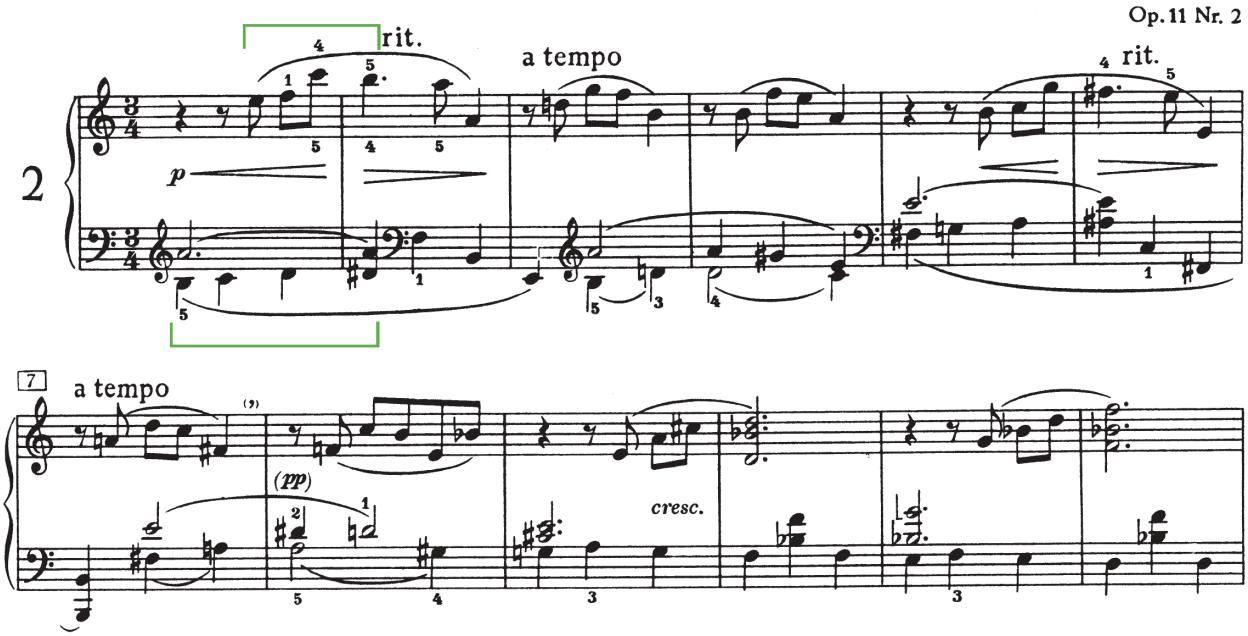
20.3 Scriabin: Prelude op. 11 no. 2

The polyphonic affordances of this prelude are more difficult to summarise with notation of gestures. The relatively simple appearance of the notes on the page belies the complexity of voicing in a successful performance. This complexity is partly caused by the compound nature of the lines, and partly by the possibility of the pedal to provide a sonority into which voices can disappear and out of which voices can emerge. The gestures themselves seem to have less defined moments of arrival, and while prefix and suffix might be felt, a notation that puts a definite moment of arrival seems too definitive. It is therefore easier to describe the polyphonic voicing in terms of temporal flows. These temporal flows

reflect an underlying gesture without separation into prefix and suffix. This more rounded and less focused view of gesture seems to fit the flexibility of this music.

In the first measure, I have marked two such flows with brackets. The separation or unity between the flows of gesture in performance is given by their temporal indissolubility or solubility into each other. The progression of quarter notes, shaped by a temporal envelope of movement, suggests a subdivision into which the eighth notes can fit. If the eighth notes in the upper bracket fit into such implied subdivisions, the two flows of gesture are soluble into each other, and there is no temporal separation in the flow of the two gestures. However, I can suggest a polyphonic voicing through the indissolubility of the two temporal flows. One effect of such a polyphonic voicing is that many vertical alignments are dislocated.

The sense of gesture behind such flows is created by the sense of manipulation of time, which causes the feeling of progression in the gesture - moving forwards in time or holding back in time. While this sense of flow is difficult to capture on paper, I will try to do so in order to describe it and at the same time in order to show the various problems with defining it through analysis. We can define the prefix and suffix of the lower bracket as:



Example 20.19: Scriabin Prelude op. 11 no. 2 (first edition: Leipzig, M.P. Belaieff)

The gestural flow of the quarter notes (the lower bracket) must move against a temporal frame of reference. After all, just playing the notes slightly faster gives the impression of a faster tempo, but not the sense of progression or movement within the temporal flow. To show this progression, the notes must begin slower. Due to the relatively small number of notes, this must occur more or less on the first note, after which the temporal flow spanning the four-note segment will begin. A revised analysis of the structure of gesture thus might include as sense of gestural suffix on the first note, followed by the prefix towards the D#. However, such an analysis seems to give a strong emphasis to that note by suggesting both a prefix and a moment of arrival. In performance it is the sense of *movement toward* the D# that I wish to capture, not an actual emphasis on that note, so I might rather deflect away from accenting it. Shifting the moment of arrival to one note earlier is hardly a sufficient fix, since it does not feel right to include the D# as part of the suffix. Even if I could adjust this kind of analysis to reflect the complexity in expression of these four notes, it quickly becomes cumbersome when layered with longer timescales. For example, the first four quarter notes (the lower bracket) form the

beginning of a line that can be heard as continuing with the B on the second beat of the third measure. In my vision for the character of the piece, which is suggestive rather than concrete, the various temporal flows during this longer phrase suggest movement or gravitation, but not clearly defined moments of arrival.

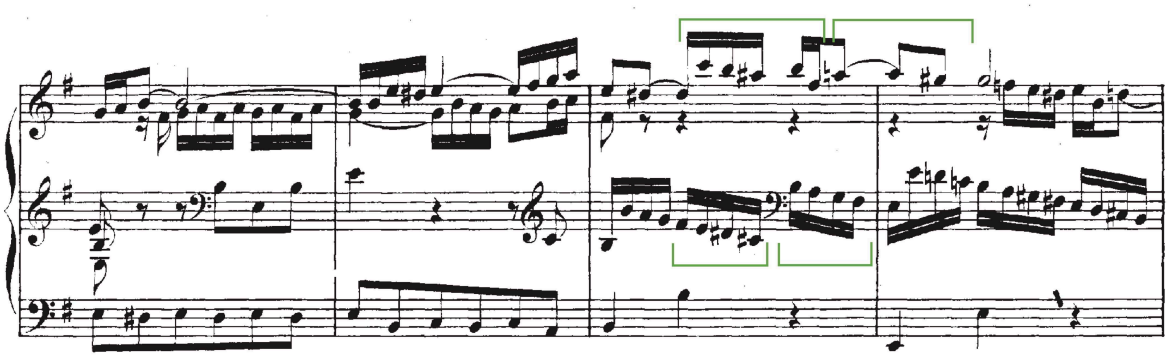
Such temporal flows reflect musical gesture, but this gesture resists clear demarcation into prefix and suffix. The complex layering of hierarchically nested flows and the flows that seem to voice the connections between parts of compound lines are by themselves easy to feel but difficult to define on paper. This complexity is intensified by polyphonic expression, which causes the separation of flows into layers that are indissoluble within each other. What emerges is a three dimensionality of movement, whereby gestures are suggested in temporal flows but are not given clear points of arrival, at least not in the sense of strong emphasis. The difference in flows between a non-polyphonic voicing and a polyphonic voicing is easily heard and felt.

20.4 Bach: Prelude and Fugue in E Minor BWV 548

Foreground grouping of individual lines can create polyphonic voicing in the organ works of Bach because it can be used to show divergence in both the rhythmic profile and the contour of lines. In works on two manuals, the polyphonic layering is already audibly demarcated by difference in registration. An enormous amount has been written about Bach performance practice, particularly from a historical perspective. According to scholars, Baroque fingerings, revolutionised by Bach, give historically-informed options for grouping structure, often resulting in pairs of notes (Swinkin 2007). It is not my purpose to comment on such ideas, but only to point out that there are often key decisions about grouping that can bring about a polyphonic voicing. In this section I will describe two such decisions from the Prelude and Fugue in E Minor BWV 548.

To begin with, the musical details of articulation and timing express gesture on foreground timescales. For example, a grouping of four notes is heard when, roughly speaking, the first two notes are more connected in legato, and the last two are more non-legato. These degrees of articulation range from very separate to over-legato. The grouping structure can be hierarchically nested, so groups of two notes, four notes and eight notes can be simultaneously be expressed. This kind of grouping can be used to make the rhythmic structure of the music clear insofar as it is suggests a sense of underlying coarticulated rhythmic gesture. While one hierarchical level of grouping often emerges as the most salient grouping for a given passage, other levels are often expressed at the same time.

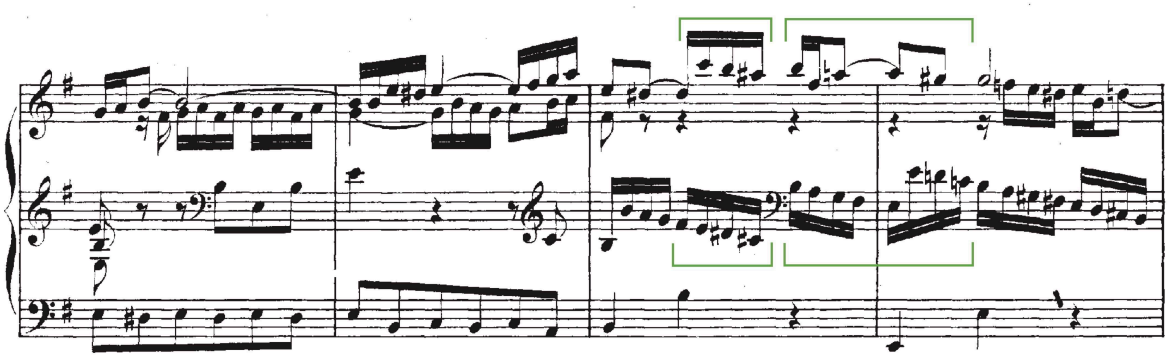
Groupings and the musical gestures that express them can create many different voicings, and the divergence of such groupings can create polyphonic voicing. In this passage from the Prelude, the continuous descending sixteenth notes could be played as one continuous stream since the metrical structure of the passage as a whole is anyway very clear. However, a grouping of four can serve as a gestural counterpoint to a divergent grouping in the right hand:



Example 20.20: Bach Prelude and Fugue in E minor BWV 548 (Breitkopf, Rust, 1867)

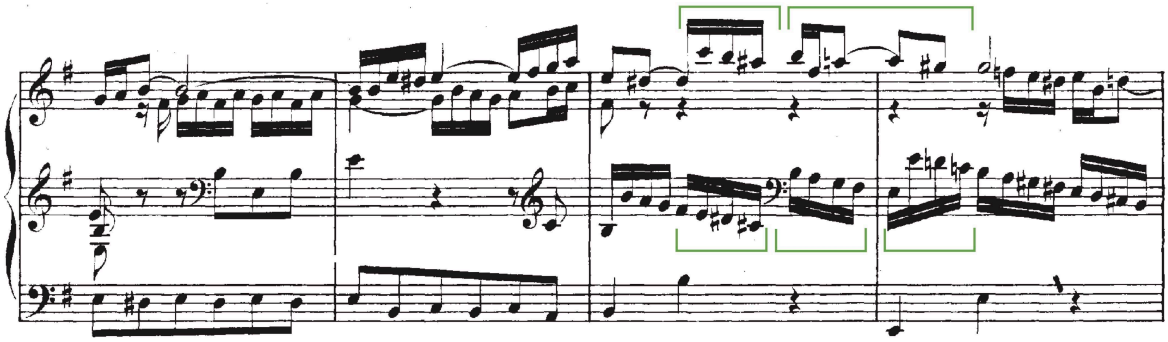
It is interesting to note that the degree to which these groupings can be articulated is quite large, since at each of the moments of articulatory and temporal separation

between groupings, continuity in the other voice holds the texture together. A contrasting non-polyphonic voicing might be either a voicing played *without* groupings (all notes played equally legato or non-legato) or it might be a monophonic voicing like this, where the groupings are identical between the two hands:



Example 20.21: Bach Prelude and Fugue in E minor BWV 548 (Breitkopf, Rust, 1867)

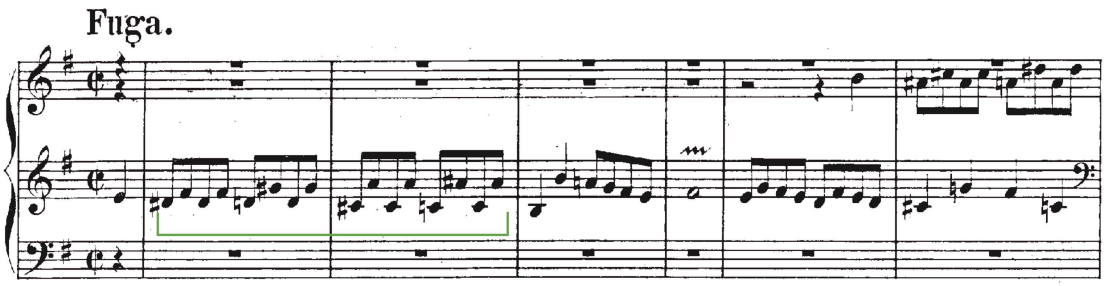
Or a homophonic voicing like this, where the groupings nest into each other:



Example 20.22: Bach Prelude and Fugue in E minor BWV 548 (Breitkopf, Rust, 1867)

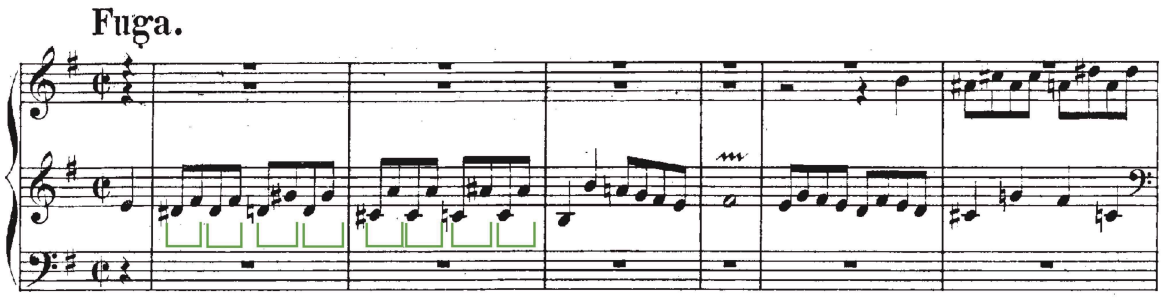
In the fugue, there are various options in shaping the opening eighth notes of the subject which reflect different hierarchical grouping structures. These options are heard in various recordings of the piece, and again it is not my purpose to evaluate these options based on historical performance practice, but rather to point out that one such option leads to a polyphonic voicing. Here are the options:

1) No overarching structure - all the eighth notes are played equally in articulation and timing.



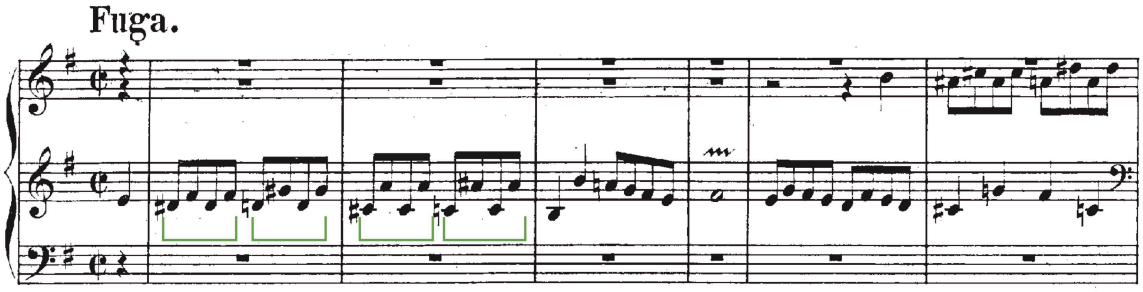
Example 20.23: Bach Prelude and Fugue in E minor BWV 548 (Breitkopf, Rust, 1867)

2) Grouping in twos - notes are articulated in pairs



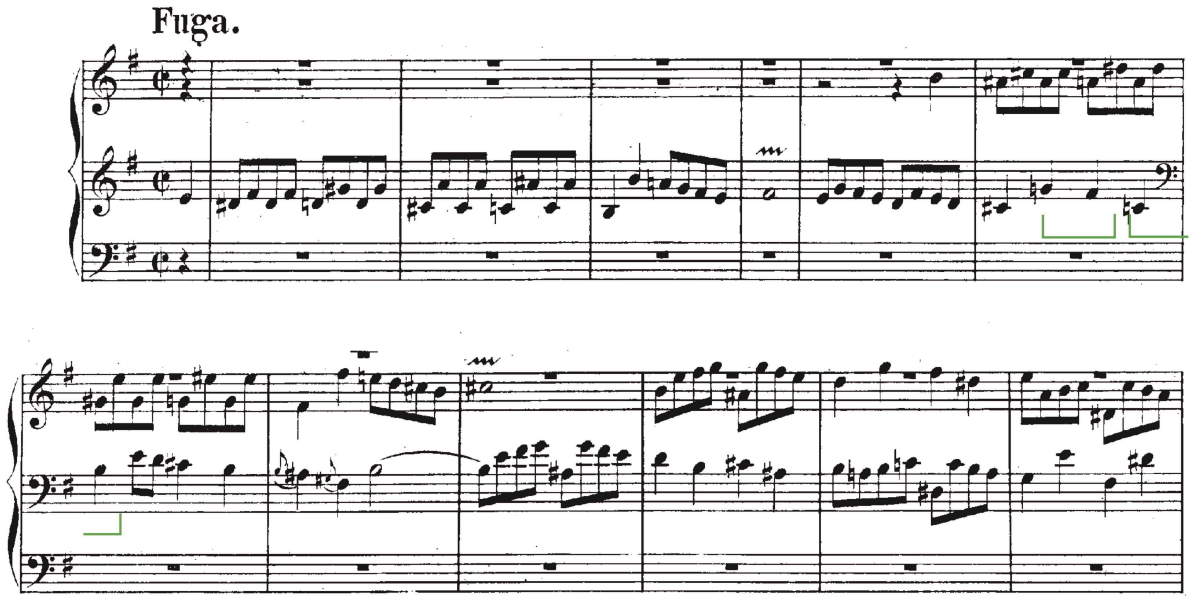
Example 20.24: Bach Prelude and Fugue in E minor BWV 548 (Breitkopf, Rust, 1867)

3) Grouping in fours - notes are articulated in groups of four, and possibly sub-grouped into two note slurs.



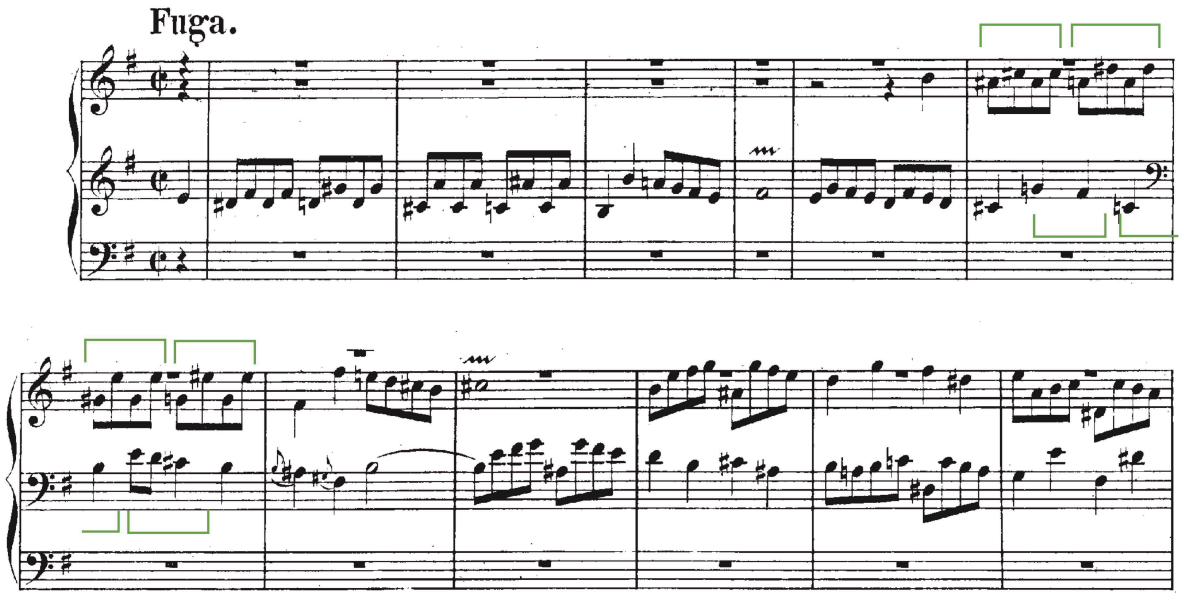
Example 20.25: Bach Prelude and Fugue in E minor BWV 548 (Breitkopf, Rust, 1867)

The countersubject takes the opening motive of the descending chromatic pair of notes to create a very clearly defined grouping:



Example 20.26: Bach Prelude and Fugue in E minor BWV 548 (Breitkopf, Rust, 1867)

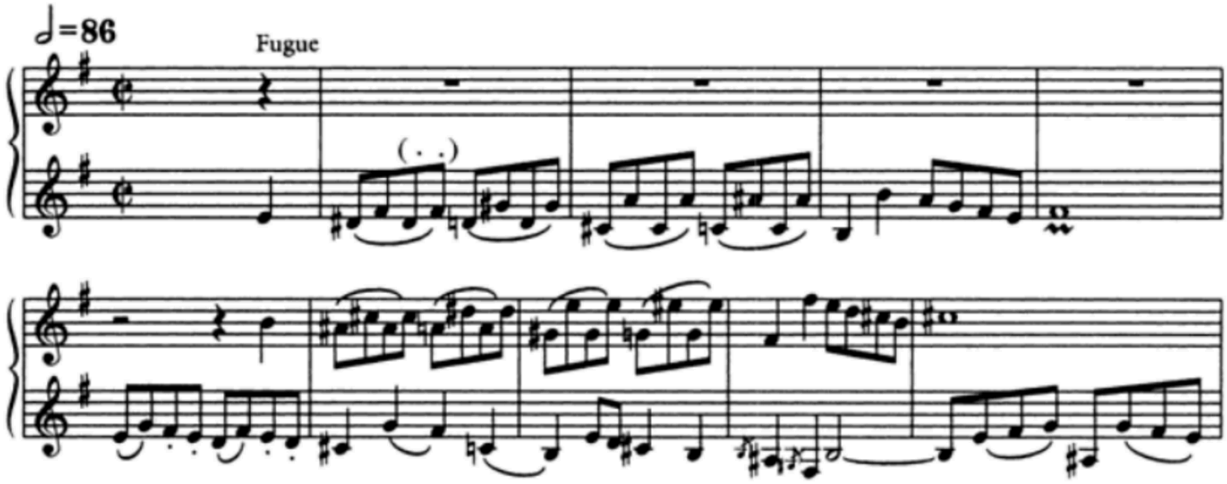
Since this countersubject's most obvious affordance is the grouping by pairs of quarter notes, we can use this to decide upon the grouping of eighth notes in the subject that will result in a polyphonic voicing. The legato connection between the two quarter notes results in the first note sounding longer, and thus creating a sense of emphasis. This emphasis occurs on the timescale of a half-note falling on the off-beats. A clear polyphonic voicing is created by voicing the eighth notes of the subject in groups of four, therefore with a half-note timescale but with emphasis on the strong beats of the measure.



Example 20.27: Bach Prelude and Fugue in E minor BWV 548 (Breitkopf, Rust, 1867)

This is indeed a rather obvious voicing for the passage. In my observation, most organists play the pairs of quarter notes in the countersubject legato as I have notated. But it is interesting to note that relatively few organists group the eighth notes in fours, and if they do, they give up after the first presentation of the subject.

To give one example, consider the recordings and discourse from Bach-specialist and keyboardist Anthony Newman. In his book *Bach and the Baroque* (1995) he notates more-or-less the same articulation that I have suggested:



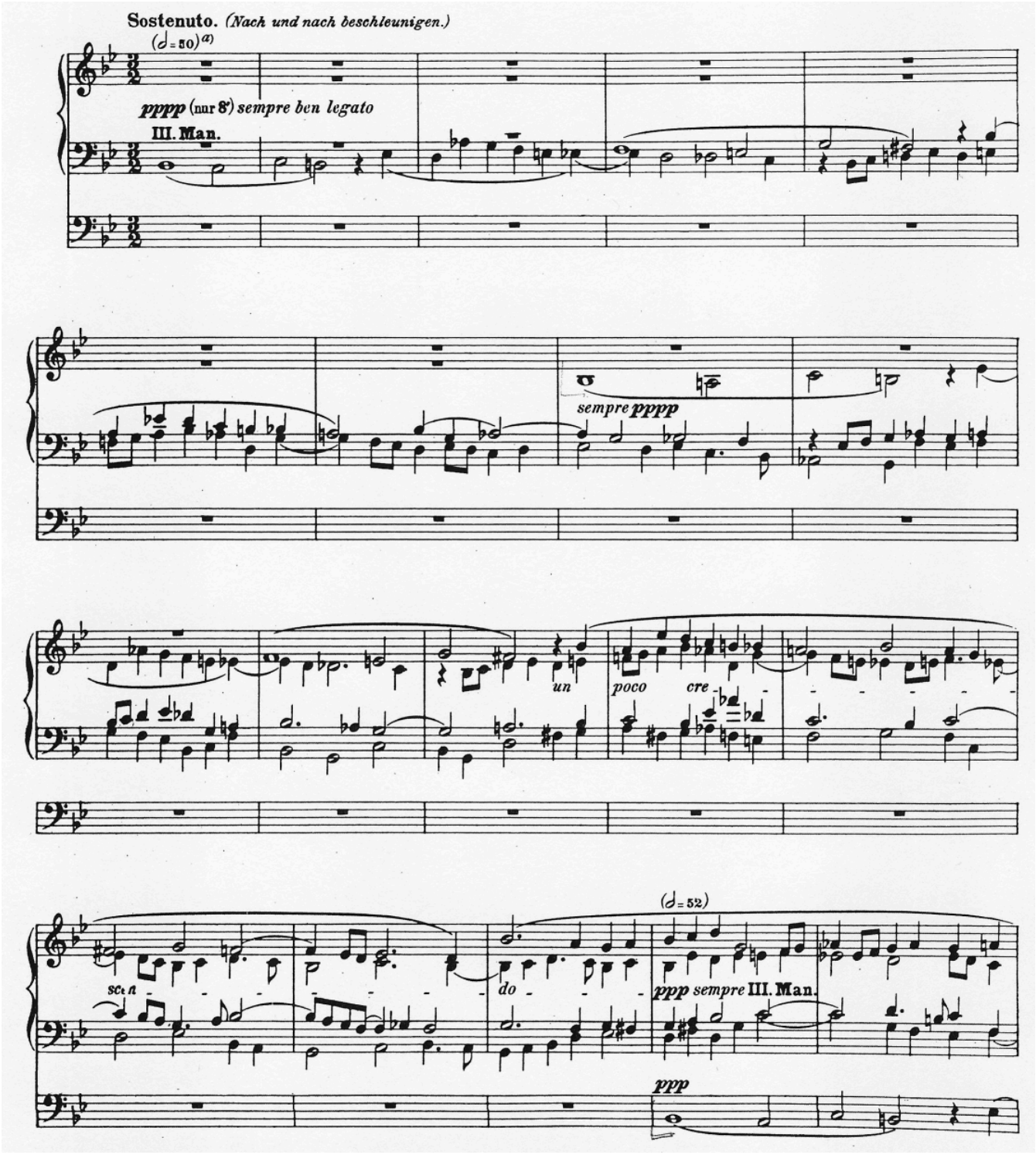
Example 20.28: Bach Prelude and Fugue in E minor BWV 548 (Newman 1995: 232)

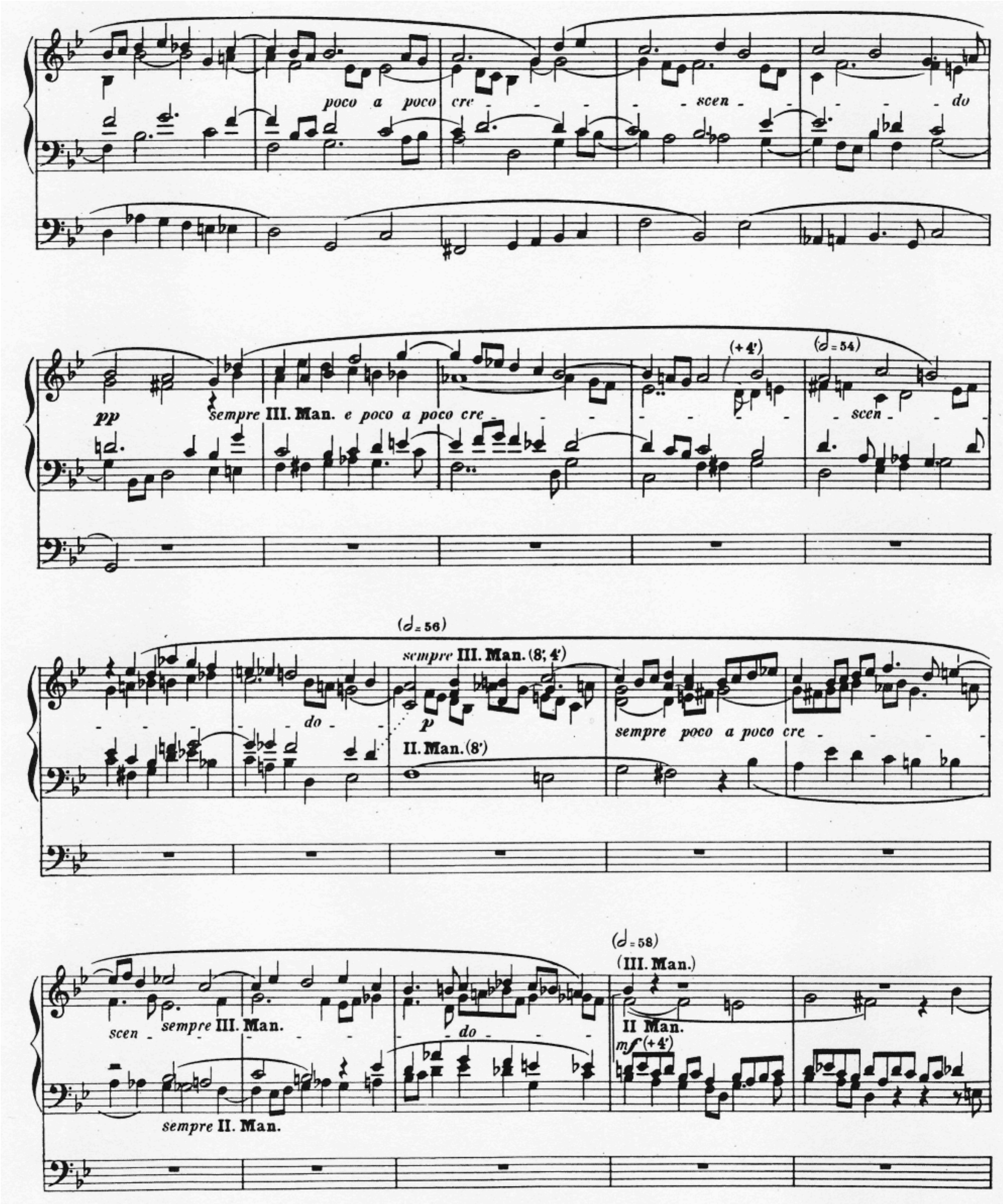
It looks wonderful on paper. But in his own recording of BWV 548 he does not play with this polyphonic articulation. Without asking him, one cannot know the reason for this discrepancy but I speculate that the reason for this might be that, as I have previously explained (§19), polyphonic gesture is cognitively more expensive. In any case, this structuring of the subject and countersubject persists through the fugue, and voicing it polyphonically can be achieved wherever it occurs.

20.5 Reger: Phantasie und Fuge über BACH

In the layered recordings experiment I made for a passage of this piece (§18.3.4), the temporal divergence between voices rendered the music unintelligible since the vertical alignment of harmonies was broken. In examining the same passage, I can use the tendencies of the voices to movement in relation to each other to shape *slight* dislocations of vertical alignment that spatially open the chords, while remaining subtle enough that the vertical alignment of each chord is still felt as one gestural entity. This sort of subtle dislocation is most often used in piano playing and rarely used in organ playing, since the

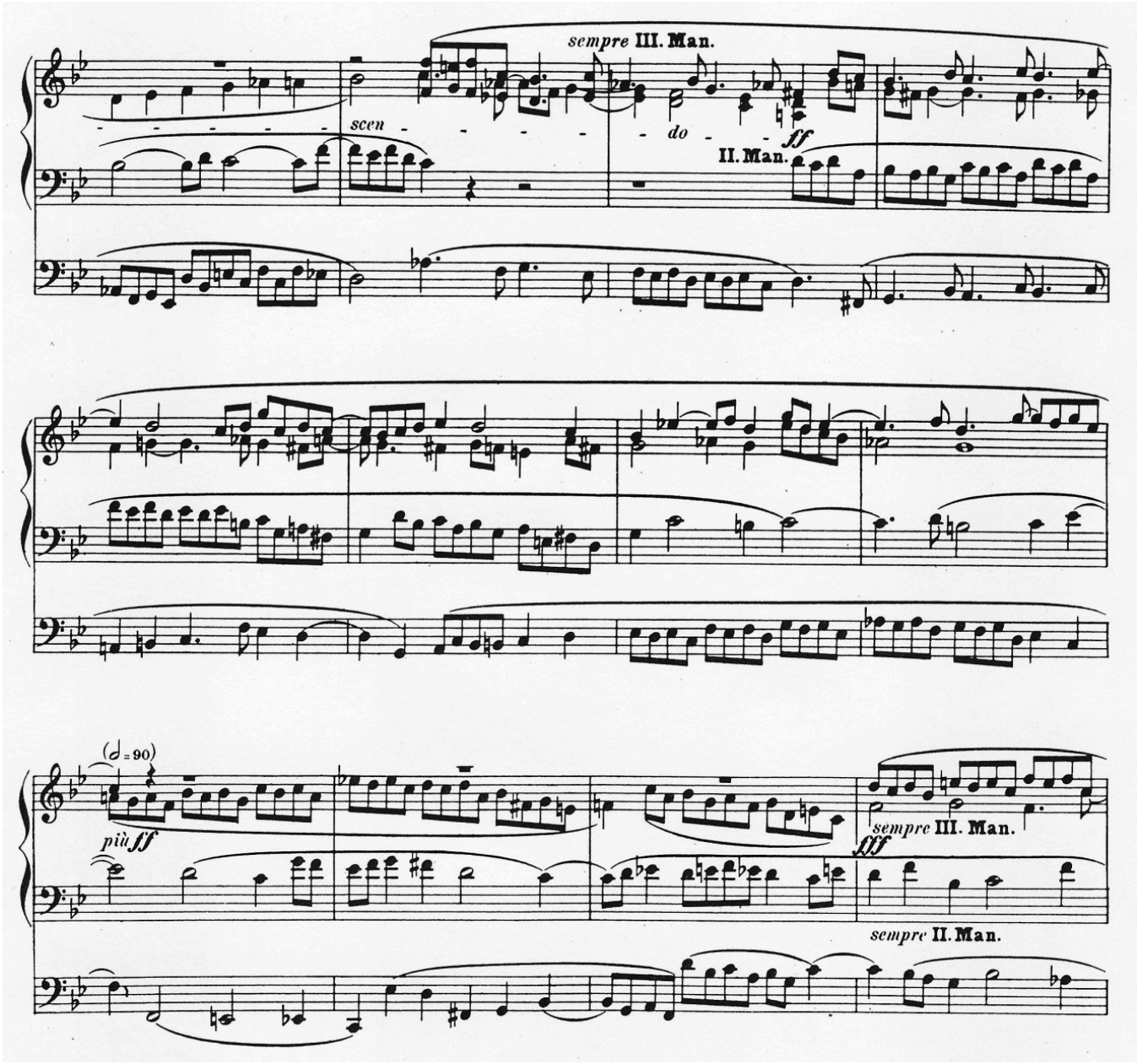
spatial spread of the organ itself is much greater than that of the piano. Obviously such dislocation has to take into account the mechanism and sound of each individual organ. In this piece, slight dislocations can enhance the feeling of musical tension as the tempo gradually rises since they can voice divergence. The result is that voices are heard as being spatially separated. This effect can be used most effectively used in slower passages, such as the first 71 measures of the fugue.


Sostenuto. (Nach und nach beschleunigen.)
(♩= 50)a)
pppp (nur 8') sempre ben legato
III. Man.
sempre pppp
un
poco
cre
(♩= 52)
do
ppp sempre III. Man.
ppp



Example 20.29: Reger Phantasie und Fuge über den Namen B-A-C-H (Universal, Aibl, 1900)

Using polyphonic expression should always be judged aesthetically, and one of the reasons that I included this example is that certain passages are complex enough that only a *limited* amount of polyphonic expression is desirable. In the following passage, the difference in registration between the two manuals and pedals provides enough separation between lines, and very little polyphonic expression is needed. Any divergence that might skew the vertical alignment of eighth notes can easily render such an already complex passage unintelligible.



Example 20.30: Reger Phantasie und Fuge über den Namen B-A-C-H (Universal, Aibl, 1900)

However, the slurs marked by the composer suggest interesting polyphonic divergences which are seldom heard in recordings of this work. Articulating the slurs by lifting the hand between phrases is already more than most performers do, but the audibility of such a lift is rather questionable, considering the resonant acoustic of most organ performance spaces as well as the complex nature of the overall texture. I find that combining such a lift with a change in registration makes the divergence audible. The

general crescendo can be built by adding at these phrase divisions since the voices are spread over two manuals and pedal. These registration changes are handled by registration assistants, who must be alert to pull out the stop on time. The lift between phrases and the slight extra time that it suggests provide a cue which, though not particularly audible to the audience, helps the registrants to place the changes at the right moment.

In writing about this recital program, I have shown only a selection of examples of polyphonic voicings, all of which exist as merely one of many alternatives. Taken alone, some of these voicings are subtle. The listener might only hear the polyphonic voicing when an excerpt is juxtaposed to an alternative voicing, and although the listener might hear (or feel) the difference between the alternatives, he might not be aware of what precisely constitutes the difference. Taken together, however, many such details give a noticeable colour to each piece and to the recital program as a whole.