

**The Structural Implications of Voice-Leading in
Wolfgang Rihm's String Quartet #3, Movement IV**

Wolfgang Rihm's Movement IV of his Third String Quartet elegantly shifts between harmonies and textures with such an elusive quality that the elements which give it coherence seem craftily disguised. This paper will discuss how voice-leading, the net range of the register of pitch events, the choice of harmonic progressions, the harmonic and pitch class adherence of a continuous through-line or "lead melody," and melodic contour help give this piece its consistency. These factors collaborate to create a coherent and satisfying piece while still making an ambiguous sonic world which causes the piece to easily be described as "fleeting" or "ephemeral."

Approach

I have divided the piece into 4 sections based on the articulations I have heard in listening to it (these sections are marked on Appendices 1 – 4 and 6). They are as follows:

<u>Section</u>	<u>Measures</u>
A	1-6.75
B	6.75 – 21.25
C	21.25 – 34.5
D	34.5 – 52 (end)

My approach to understanding this piece has been to analyze its voice-leading and harmonic properties, as I hear these to be the most significant elements which help create structure in the piece. Each section seems to feature smooth melodies which are frequently "hocketed" between the different instruments, but usually within a certain octave range, (although leaps seemed are used sparingly, structurally, and usually with some dramatic flair: more on this in Appendix 5 and 6). My second procedure was to


map the pitches so as to have some visual representation of the piece. Appendix I is a chart of the simultaneity of pitches, or attacks, within the piece. Therefore, each measure on the chart is not necessarily a representation of the time it takes for that measure to occur, but, rather, it is an account of how many attacks occur within that measure. Tied pitches with new events in other instruments occur as continues bars; each downbeat is shown with its pitches even if all events are tied into that downbeat. Also, if one instrument has a tied pitch while another instrument releases a held pitch, the release is considered an “event” and is given a vertical column (if all instruments release together, this is not considered an event and is not given a column). Each instrument has its own color, but when two instruments play the same pitch at the same time, the event is charted as a grey cell with a sign indicating which instruments play that pitch. The pitches are mapped from low to high on the vertical axis and this helps understand the registral development of the music.

Simultaneity Chart (Appendix 1)

My first discovery upon looking at the simultaneity chart with the sections shown is that each section, as I hear it, is articulated with low C’s and G’s in the cello (this, of course can also be see in the score). These low pitches usually come where low music had not recently been heard (from looking at the simultaneity chart it may be easy to conclude that the low G and C in measure 33-34 occur very recently after the other lower music in 29-31: this is because measures 29-34 have relatively few events and therefore appear shorter in time). Furthermore, section A, C and D all feature a kind of wave pattern of the general registral contour using a wave with the following shape:



Section A starts with low pitches in the cello and is answered

by higher pitches in the second violin, and then generally lower pitches in all instruments; section B starts with low pitches in the cello, is answered by higher pitches in the viola and first violin, and then lower pitches in the cello and second violin; section D starts with a fuller span but quickly turns to lower pitches in the cello, and then is answered by higher pitches in all voices. Section C, in contrast, features more of a “U” shaped design  starting with nearly the fullest range of register in pitch events, answered by lower music in all instruments through measures 32, and then quickly answered by higher music. This relation between the general contours of sections A, B and D would appear to help give the piece a sense of coherence in terms of the thickness of the orchestration, and implies a loose translation of these contours into an AABA form.

Net Range of Register Chart (Appendix 2)

With each pitch mapped on the simultaneity chart, I was then able to create the Net Range of Register Chart (Appendix 2). Each pitch on the simultaneity chart is given a number, starting with the low C on the cello as #1 and going up to the high B on the first violin (which occurs in measure 22) as #77. To plot the points on the register chart, I took the net difference between the highest pitch and lowest pitch within each simultaneous event. So, for example: the first event on the simultaneity chart features A3 in the second violin, which is pitch #34, and Bb1 in the cello which is pitch #11. The difference between these is 23, and, therefore, this is the first point on the register chart. With the differences between each event from the simultaneity chart mapped on the register chart, changes in thickness of register are easily seen. It is important to understand here that a higher event on the register chart may not necessarily be an

important event to note: a more interesting occurrence on the register chart is one where great shifts in register occur; for example the 38 → 0 shift in measure 2. Seeing these shifts will help understand articulations as they are heard in the music, as these shifts undoubtedly have a dramatic effect in the aural world of the piece which generally features more consistent register shifts throughout.

One structural factor noted on the register chart is that sections A, B, and D feature relatively few dramatic shifts in register, while section C features many. This seems to fall in line with the implied AABA form from the simultaneity chart, where section C is the same “B” from before. We may expect the sections to begin with dramatic shifts in register (since each section starts with low pitches in the cello, as seen from the simultaneity chart), but, surprisingly, they do not. Only section D starts with a dramatic registral shift, which occurs after the C cadence in 34 and continues with the high Ab in the first violin.

Lead Melodies and Harmony Segmentations (Appendix 3)

After many listenings I decided that I heard several solo through-lines in the piece which were usually carried by several instruments. Understanding the piece, therefore, to generally have a homophonic texture, I also heard the accompaniment to be easily segmented vertically. In other words, at any given moment, except for the “lead melody,” there are very few other linear melodic elements of this piece: all other music is generally heard as vertical sonorities. Furthermore, although most sonorities do not feature strict triadic components and often have other “clustery” or “extended” elements (such as a b9 or #11 over a triad), these vertical sonorities seemed easily categorized with traditional chord symbols based on the strength of the pitches played which outline the

triads. I realize that this is a subjective choice: not everyone will hear these sonorities as I have heard them. The preponderance of strict triadic references in the piece, however, deemed this an acceptable choice in my judgment, and it proves useful as it leads to some interesting discoveries about how the piece functions.

First, I outlined on the score the melodic through-line I heard in the piece without segmentation into specific “melodies”. Next, I decided where I heard relevant articulations that seemed to complete a melody: “cadences” if you will. These cadences usually do not function in any kind of traditional tonal sense (for example, Melody II ends with a Db sus4→#11 chord which has been prepared by a C maj/min 6 chord: not the traditional dominant we might expect), although gesturally speaking, they seemed like important articulations. Next I numbered the melodies that were created by inserting these cadences or “breaks” into the through-line. It should be understood that all resultant segmentations do necessarily sound like “melodies” per se, although from listening I’ve decided that they do have some kind of melodic nature. The overall character of this piece is that of an aural world from which these melodic fragments emerge: sometimes the piece sounds more lyrical than other times. For the purposes of this paper, I will not, however, discuss the piece’s lyricism or what makes a melody in this piece sound more or less “melodic:” I am only interested in understanding what I perceive to be a through-line of melodic material which helps give the piece coherence.

Statistical Analysis (Appendix 4)

In addition to segmenting the piece into traditional triadic-based harmonies, I also determined the pc sets for each of these segmentations (more on this later). Now I had the raw data to begin creating Appendix 4. The first section of the statistics chart shows

the harmonic progressions and the number of half steps each harmony occurs from the previous harmony. For this section of the chart I chose a prime-6 categorization. This means that movement from C#maj to Emaj would be categorized as 3 half-steps, and from C#maj to G#maj would be 5 half steps. This prime-6 categorization prevented the necessity of analyzing specific pitches and allowed an analysis of the general movement of the pitch classes that make up a specific harmony.

Section A shows frequent movement in 2's, section B in 0's (implying more chords which have the same root as the previous chord but have new added extensions, such as a b9 or #11) and 4's, section C in 1's and 2's, and section D in 1's and 5's. The grand totals on page two of the chart show the following hierarchy of harmonic movements: 1 (16), 4 (12), 5 (11), 3 (10), 0 (9), 2 (9), and 6 (1). Although the differences between these numbers are not extreme, two interesting factors are to be noted: A majority of the harmonic movement occurs with half-steps, 4ths and 5ths (these movements total 39, while other movements together total only 29). In addition, there is only one movement of a 6 which occurs in measure 32 after the cadence on F#min (sus4). It should be noted that on this C harmony the ensemble plays only C's with no other harmonic support. These C's might therefore be interpreted as a function of some other harmony, such as a #11 of the previous F# chord. However, given where the C's lead and that they seem to begin a new melodic through-line, no other interpretation seemed logical, and I decided to "just call it what it is." While this F# → C harmonic progression may be questionable as a "progression," it is still the only movement of 6 half-steps in the piece.

Although there are more 1, 4's and 5's than other harmonic movements, the harmonic motion of the piece does not appear to have any structural implications other

than of creating a consistent “sound bed” from which other elements may arise. Therefore, I would interpret the overall harmonic motion to have a “grounding” effect on our perception of the piece rather than an articulatory one. This falls in line with my listenings: no particular chord or harmony sticks out as particularly unexpected or as more unprepared than any other harmony. Nearly every harmony, understood without the effects of voice-leading or melody, seems somewhat arbitrary.

However, once I mapped the lead melodies that I had segmented for Appendix 3 onto this statistical analysis chart, I made some interesting discoveries. I wanted to analyze how the lead melodies might be functioning within each harmony, so I tracked the pitches used for the melodies and their placement over the harmonies using a “moveable-do” system (for each chord). In other words, if the harmony is a C# major chord and the melody features an E natural, then it would be coded as a 3. If the harmony were C# major chord and the melody features B natural, it would be coded as a 10. Notice that this is the usual prime-12 categorization that the chromatic scale employs, rather than the prime-6 of the harmonic progression section of Appendix 4.

Now, with each pitch of the melodies categorized based on the harmonies over which they occur, some structural implications can be seen: section A features more 7's than other pitches, section B more 5's, section C more 0's (which is the root of the chord), and section D more 0's and 7's. This outlines what could be seen as an ABCA form (not entirely unlike the AABA form we saw from the melodic contour and register analyses). The grand totals show that a majority of the lead-melody pitches (59%, or 108 out of 181) are 0's (34), 3's (21), 4's (16), and 7's (37). This implies that the melodies primarily outline the root and 5ths of the chords and secondarily outline the 3rds (major and minor). The overall conclusion that can be made from this data is that, through all of the

harmonic shifting and the elusive aural world that is created with these “clustery” elements played over more triadic-based harmonies, the lead melody helps to outline the predominant harmony at any given moment. This effect may help give coherence to the piece and help create a “singable” quality of the melodies, perhaps giving it a more lyrical or emotive character (especially considering the tempo of the piece which is very slow and gives each sonority and pitch of the melody a moment to be heard).

One other thing to be noted from this traditional harmonic analysis is that the melodies feature more minor thirds (21) than major thirds (16). This falls in line with how I perceive the piece: it has a more “minor” sound to it than a major sound. Indeed, several important cadences end in minor chords, such as the F# minor at 28 and 32, the C minor at 42, and the Ab minor at 49. This “lean” towards minor intervals can also be seen in the number of lead melody pitches outlining the 7ths of chords: 11 minor and 6 major.

For the pitch class segmentation section of Appendix 4 I analyzed each harmonic segmentation in terms of its pc set. Next, I mapped the lead melodies on to these pc sets and determined what part of the pc set the melodies used. So for example, if the harmony heard is a Bbsus4 chord, which contains the pitches (heard by the entire ensemble) a, a#, b, c, d, d#, f, and f#, this is categorized as a 01235689 pc set (I used the website <http://www.ling.lu.se/persons/Marcusu/music/pcsetanalyser/index.html> created by Marcus Uneson of Lund University to figure these pc sets, although once I used the website to calculate the sets I also checked them manually). If the lead melody heard over this pc set contains the pitch events Bb, F, A, A, C, C, D, D, and Eb (capital letters are used to delineate it as a melody rather than a pc set), and if we take the pitch classes above from the pc set to be in prime form, then the melody contains the following pc

events: 180033556 (one occurrence of Bb, which is the 1, one occurrence of F, which is the 8, two occurrences of the A, which is the 0, two occurrences of D, which is the 5, and one occurrence of Eb, which is the 6). Finally, the number of pc events per pc class (and per melody) were tallied.

Interestingly, the totals for each section, and the grand totals for all sections, show more 0's than any other pc set member (36, while the closest second is 1's at 25). It is also interesting to note that there are relatively few 6's and 9's, and no t's or e's (because, of course, there are no pc sets with more than 8 members). The more frequent occurrence of 0's implies that, over a given harmony, the lead melody highlights the pitch which is closest in intervallic relationship to the other pitches within the vertical harmony. If we look only at the 0's – 5's, however, the occurrences appear to be more evenly spread, implying that the lead melody may highlight any member of the pc sets over which it occurs (although a majority of the pc sets in the movement have five or fewer members, helping to explain the more frequent occurrence of 0-5 melody pitches over these pc sets). The overall conclusion I can draw about this pc set analysis is that, despite significantly more occurrences of 0, the occurrence of the pitches over the pc sets is fairly evenly spread, perhaps also implying a “grounding” quality that the harmonic movement analysis showed in the first section in Appendix 4.

Lead Melody Pitches and Contours, and Formal Implications (Appendices 5 and 6)

With each melody segmented from the steps to create Appendix 3, my next procedure was to examine more closely the specific voice-leading properties inherent in the melodies themselves. For Appendix 5, I charted each pitch (with an octave number per pitch: middle C = C3) and determined the number of half-steps each pitch is from the

last pitch. In addition, any leaps which were greater than an octave were highlighted for further analysis. I did not determine the number of half-steps the first pitch of a melody occurs from the last pitch of the previous melody, as I do not believe that the shifts from one melody to another help create the contour *within* a specific melody, and the nature of these contours is what I was solving for here. All melodies except for 3 show several leaps which are greater than an octave. Generally speaking, these are near the middle or end of a melody.

Appendix 6 shows each melody charted by simultaneity in a similar manner as Appendix 1 charted all pitch events by simultaneity. The overall contour of the melodies taken together as one through-line is a gradual climb from the low Bb in the cello to the highest point in the first violin (the B in measure 22), and then a gradual descent back to the low C in 34. The music starting at 35 proceeds this completed final descent to nearly the last octave 1 pitch event in the piece (that same low C), and, therefore, has a kind of ancillary feel to it, as if it might be a coda (a very long coda!). An analysis of the melodies also reveals a very interesting characteristic: Melodies I and II have a similar contour: they begin within a more limited range and then fan out more quickly at the end or at the end of the middle of the melody. Taken together, Melodies III, IV, V and VI follow this same shape (this implies a kind of AA form of this first half of the piece). If we group Melodies VII, VIII and IX together, they have two large sweeps, one at the beginning and one at the end (unlike I, II, and III-VI, implying a B section. Finally, Melodies X and XI together resemble the contour of the first two melodies (and III-VI together). Therefore, the general composite form of these melodies resembles the same AABA structure that was prevalent in the simultaneity chart, the register chart, and in the analysis of adherence of the lead melody pitches to the harmonies over which they occur.

<u>Melodies</u>	<u>Form</u>
I	A
II	A
III-VI	B
X-XI	A

Conclusion

Rihm's musical choices appear to be sophisticated and thoughtfully made, as is apparent by the complexity of the musical language in which the piece is written and by the resultant feeling of satisfaction the movement gives. These resultant effects are very elusive, and undoubtedly a more detailed pitch and rhythm analysis of the music would reveal many more cohesive properties of Rihm's choices. However, as we have seen, the voice-leading and registral properties of the music also have significant effect on creating the form of the piece and help make important structural contrasts that "stick out" when listening to it.