Chapter 10: The Flute Compared to Other Instruments: Fictitious Timbral Recapitulation

Introduction:

Thus far, comparing different contributing elements of sound in each instrument has revealed different techniques that contribute to the growth of form in Crama.

Reminder and Clarification:

For the next five chapters, only the absolute timbral value of each sound in each bar will be compared to the instruments themselves and other instruments. The "absolute timbral value"[34] of each sound, in each bar is the sum of the seven contributing aspects of sound. As mentioned earlier, each contributing element is assigned a value ranging from 1 to 9, so the absolute value represents the total of timbral saturation. For example, the flute in m.1, breathy sound, is represented by the following numerical values for each contributing element of sound: Number of harmonic partials =1, Thinness and thickness of sound = 3, Range of strongest partials = 3, Irregularity of sound = 6, Amount of noise = 9, Sharpness of attack = 2, Noisiness of attack = 2. Thus, the absolute timbral value of the breathy sound in flute in bar one of Crama is twenty-six.

Furthermore, if the absolute timbral value of the second bar of the flute is determined, then the absolute value difference between these two bars will identify the progression of timber in the flute from bar 1 to 2. If we set the absolute value difference between bar 1 and itself as zero, the

[34] I understand that, <magnitude of the timbral vector> value—determined as the square root of the sum of the squares of the 7 timbral saturation values—is a more accurate measure of total timbral saturation, but that absolute value—determined as the sum of the 7 timbral saturation values—is a more intuitive measure and produces an integer, and so is used here for purposes of easier reader comprehension.

absolute value difference between bar 1 to 2, then 1 to 3, 1 to 4, and … 1 to 170 will generate a line chart which expresses the progression of timber when the timbral value of bar 1 is compared to itself and all the other bars of flute in Crama. In this way, the appearance of zero indicates the return of the total timbral saturation of bar one.

In this chapter, I will apply this process to flute vs. flute, clarinet vs. clarinet… violin, viola, cello, and piano. The final goal is to discover facts that relate to the contribution of timbre to the creation of form in Crama.

In all line charts in chapters 10 – 15, the Y-axis indicates the range of absolute timbral values. The X-axis shows the range of the bar numbers of the comparison.

As previously mentioned, chapters 10 – 15 will compare the absolute timbral value of one instrument to another. For example, the absolute timbral value of the flute, 15, will be subtracted from clarinet, 10, and the answer, 5, will appear in a line chart. As a result, one can observe the timbral progression of the flute in the form of a line as part of a line chart.

What does flute vs. clarinet mm. 38 – 61 mean?

This notation means the absolute timbral value of bar 38 in flute will be subtracted from the absolute timbral value of clarinet in bars 38 – 61 of the clarinet. The result of this comparison will appear as a line in the line chart. This same process will then be applied to compare bar 39 of the flute to bars 38 – 61 of the clarinet. Finally, bar 61 of the flute will be compared to bars 38 – 61 of the clarinet.

Maximum and Minimum values:

As a result of comparisons between different instruments, some values will appear as smaller values, while some will appear as larger values. The minimum values represent those that have more timbral similarities with the instruments against which they are compared. On the other hand, maximum values indicate large timbral differences between the instruments compared.

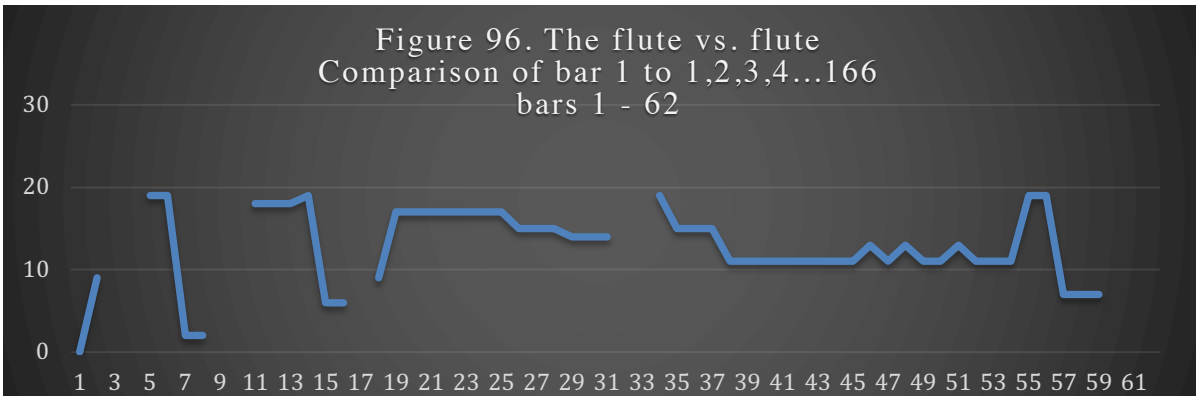
Timbral space:

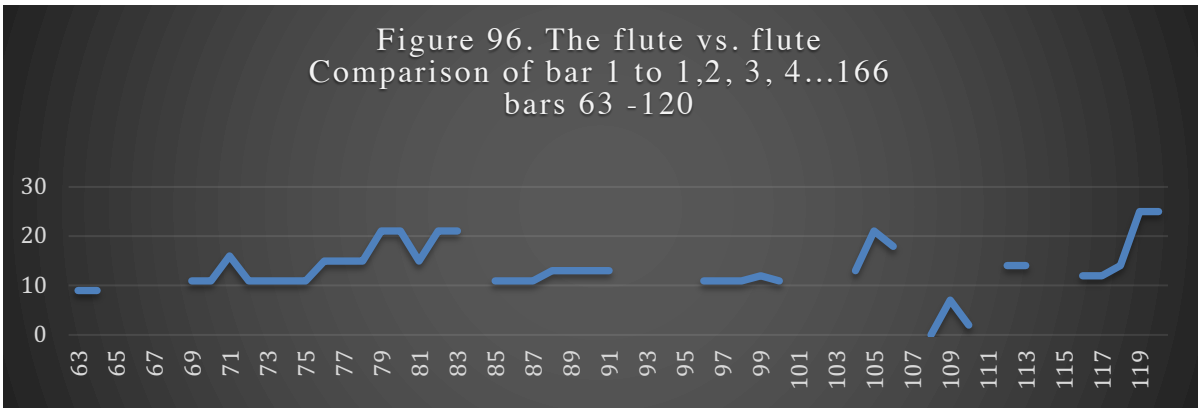
The absolute value difference between the minimum and maximum values, which is derived from comparing either two identical (or nearly-identical) instruments or two very different instruments, can be called timbral space. For example, the minimum and maximum values in Figure 109 are twenty and thirty-eight. Therefore, the timbral space in Figure 109 is 19. Similarities in the absolute timbral values of two instruments result in smaller timbral space values. Large differences in absolute timbral values of two instruments result in a larger timbral space value. In theory, smaller timbral space could be the result of the instruments within the same family, since instruments from the same family have relatively similar timbres. However, this statement is not practically true at all times. Figure 97, flute vs. clarinet mm. 38 – 61, is an exception to this smaller timbral space theory. Also, one might think instruments within two or more families have a higher chance of creating larger timbral space. However, this is also not always true. Figure 101, flute vs. piano mm. 70 – 87, is an exception, as the timbral space between instruments from different families is 18. Therefore, timbral space is affected not only by the mechanics of sound production, but also by the interference of register, dynamic, and articulation.

Two additional considerations about the properties of timbral space are: 1) Timbral space can be considered a tool to create phrases and shapes. For example, the appearance of a larger timbral space can stretch a phrase and create contrast with smaller timbral values. 2) Timbral space can also be used as a sectional contrast. For example, the smaller timbral values in section A contrast with the larger timbral space values in section B. As a result, both of these properties can be considered tools that contribute to the creation of form in a sound-based composition.

Reminder: The structure of analysis in chapters 10 – 15:

In order to analyze the function of timbre and the process of its contribution to form, I divide Crama into smaller sections. These sections, which are slightly different from those in chapters 3 – 9, were chosen based upon the progression, evolution, and transformation of motif and timbre, and how they contribute to structuring the form in Crama.





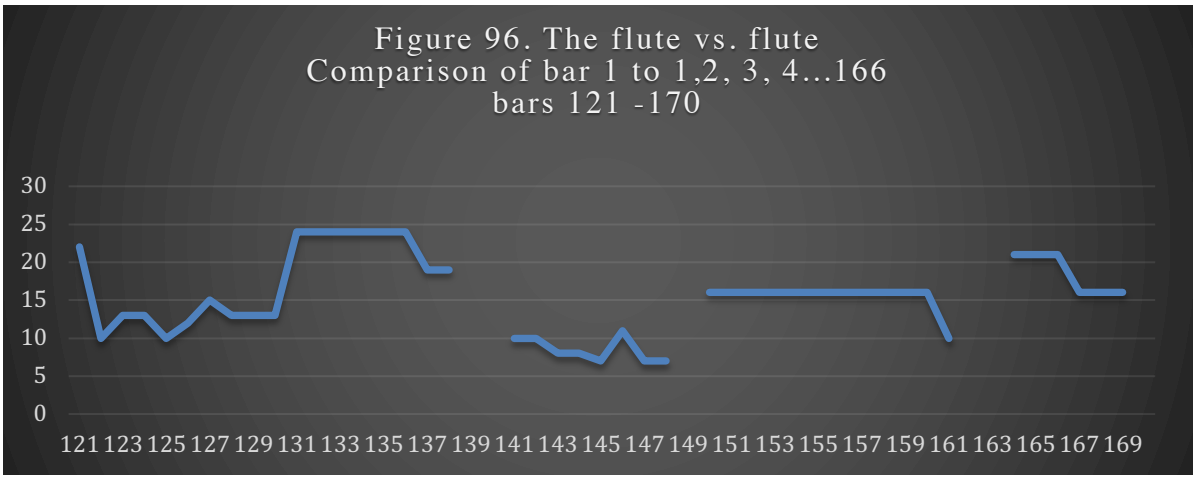


Figure 96 exhibits the timbral progression when the absolute timbral value of the flute is compared to measure one of itself. The minimum and maximum values in this comparison are zero and twenty-four. A closer look reveals the multiple repetitions of the same values, which contributes to the consistency of different timbral values in Crama. For example, bars 11 – 13 repeat the value of eighteen, three times in a row, bars 18 – 25 repeat the value of seventeen, seven times, bars 26 – 29 repeat the value of fifteen, three times in a row. The recurrence of the identical timbral values shows how repetition is a tool that creates consistency, and, in turn, consistency provides organization and logic in the creation of phrase, section, and form. Thus, based on the consistent recurrence of exact absolute timbre values, one can say that repetition contributes to the form in Crama.

Furthermore, notice the return of identical or virtually identical values. For example, timbral value fifteen returns in bars 76 – 78, timbral value sixteen returns in bars 167 – 169, timbral value eighteen returns in bars 35 – 37, and timbral value seventeen, virtually identical, returns at the end of Crama in bars 150 – 160. The recurrence of timbral value zero in bar 108 suggests a sense of the return in bar 108 of the first bar. The reoccurrence of identical timbral values in different sections, therefore, contributes to the consistency and form in Crama.

Figure 97
The flute vs.clarinet mm.38-61

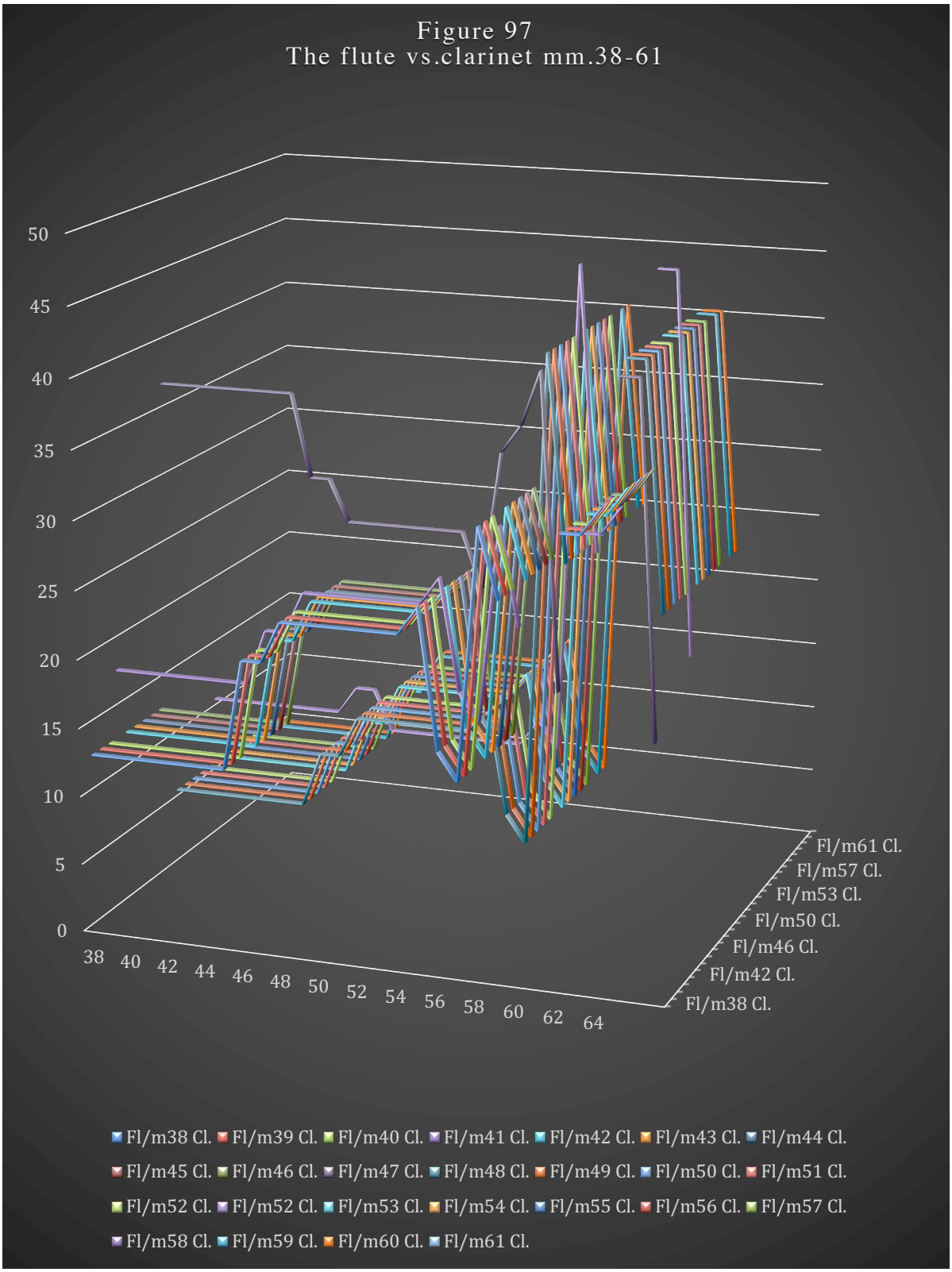


Figure 97 presents a comparison between bars 38 – 64 of the flute and bars 38 – 64 of the clarinet. There are three subsections from bars 38 – 64: 1) 38 – 45, which shows the appearance of timbral state A and its transformation via the sequence of timbral values to 2) timbral state B in bars 46 – 55, which transforms to 3) timbral state C in bars 56 – 60. Each of these sections can be considered a variation of the next. It seems each timbral state transforms to another via the sequence of previous timbral values. Also, there are many more instances of parallelism than contrast in Figure 97. Therefore, the sequence of different timbral values along with parallelism are the main component of the transformation in Figure 97.

The minimum and maximum values are five and forty-six. Notice the dramatic difference between the maximum and minimum values in Figure 97. Since the flute and clarinet are from the same family of instruments, they hypothetically should not have such a dramatic difference between the minimum and maximum values. However, a closer listen reveals that the appearance of a spike in the vicinity of bars 55 – 58 is the result of the appearance of flute in the C#6 register with ***ff*** dynamic while the clarinet is in C4 register with ***mp*** dynamic. Notice, the timbral difference between flute and clarinet can be quite close, timbral value 5, and far apart, timbral value forty-six. The timbral space between these two instruments is stimulated by the use of register and dynamic, and therefore, regardless of the appearance of instruments from similar or dissimilar families, timbral space can change by the interjection of register and dynamic.

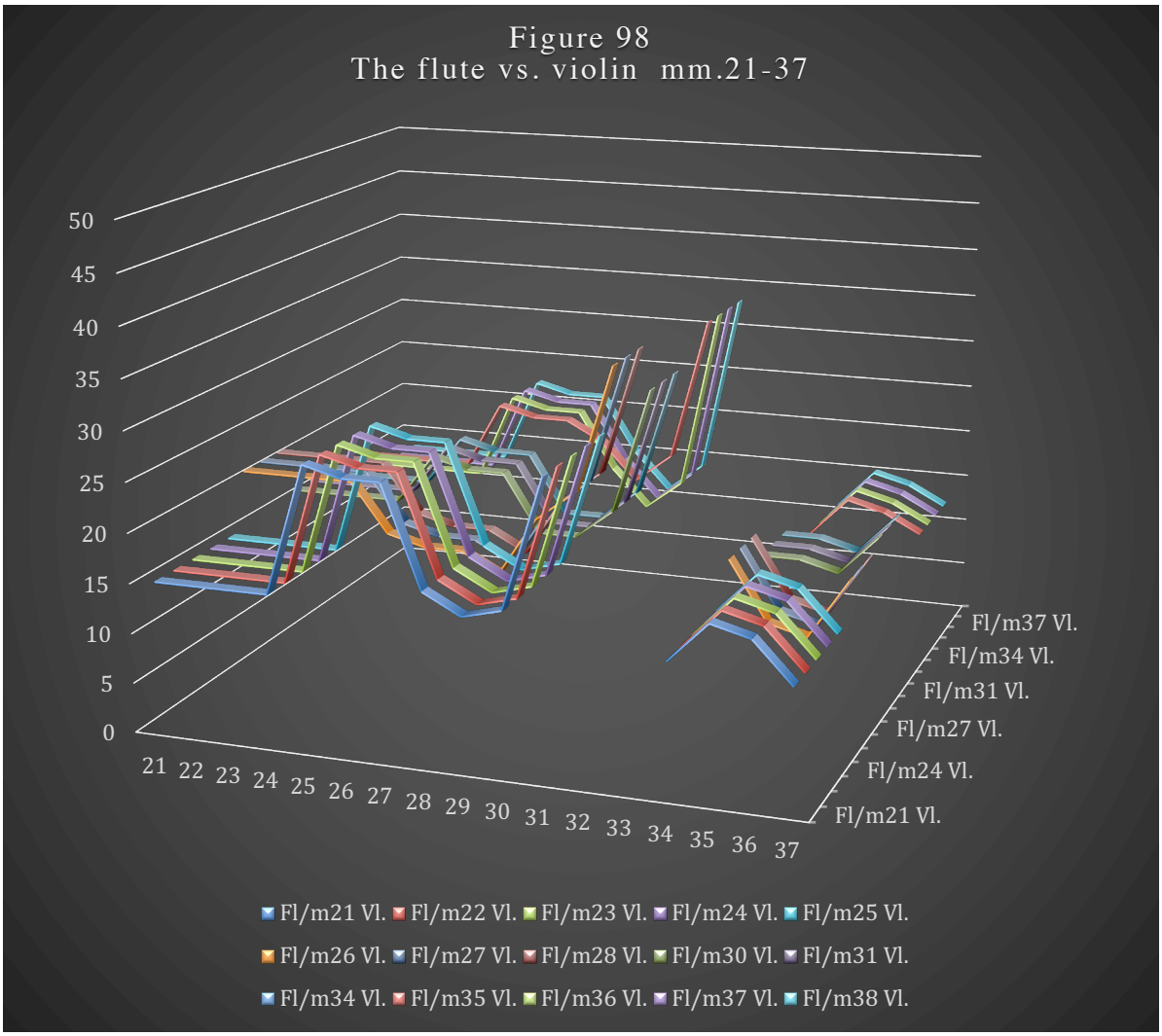


Figure 98 demonstrates the comparison between bars 21 – 37 of the flute and violin. The minimum and maximum values are fluctuating between thirteen and thirty-five. There are three noticeable facts about Figure 98. 1) Notice the significant amount of parallelism as opposed to the contrast between the comparisons. 2) Notice the parallelism between different comparisons, which proves the similarities between timbres in flute and violin in Figure 98. 3) Notice the lack of ABA or ABA' structure but the clarity in the appearance of variation to this section. These variations, bars 33 – 37 is a variation of 27 -29, can be linked to the transformational variation as a structural procedure in Crama.

The appearance of "xSP,"[35] in violin in bars 28 – 29 results in the initiation of a dramatic spike in bars 29 – 31. The minimum and maximum values are eleven and nineteen in bar 29. There is a dramatic drop in maximum values from bar 29, as the maximum value of twenty-seven drops to the minimum value of fifteen. Note how the appearance of the flute is in F6 register and the violin performing a glissando is between B5 and C#7 registers. The very wide range of glissando with the extreme sul ponticello contributes to the extreme squeaky sound, which is the result of the appearance of a dramatic spike between bars 29 – 31 in figure 98.

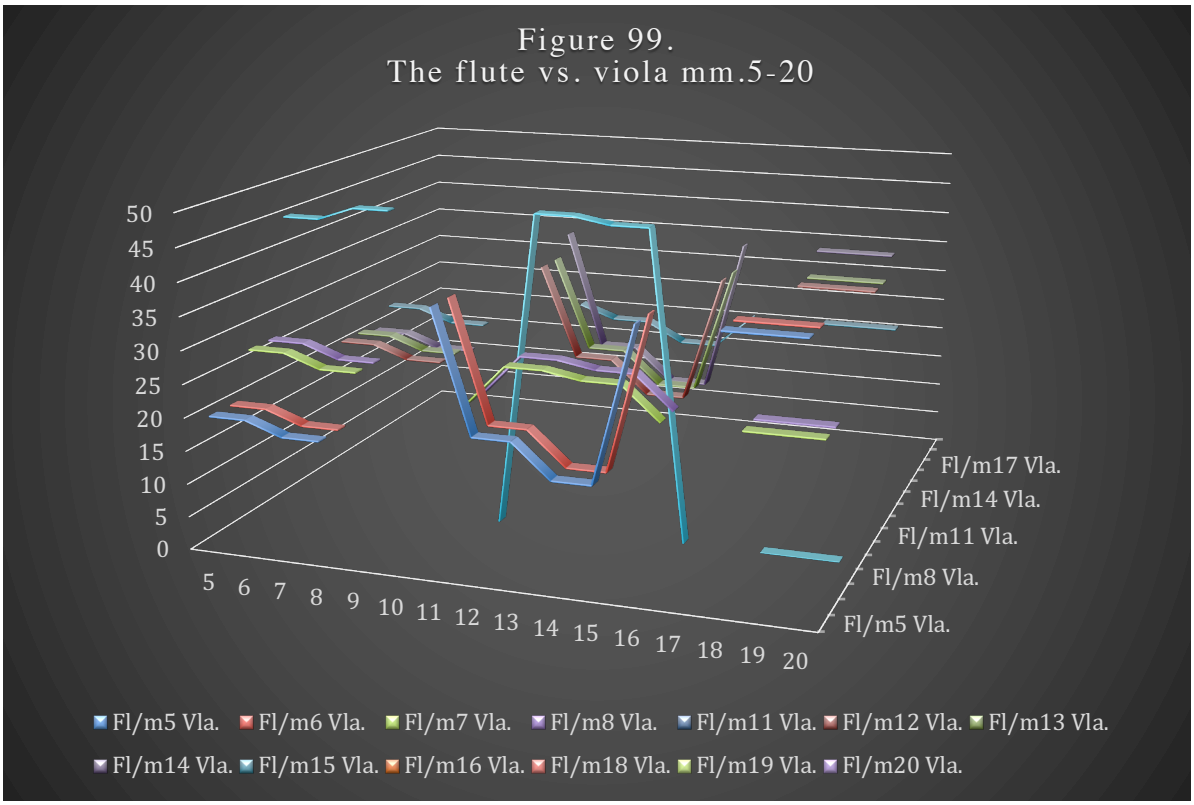
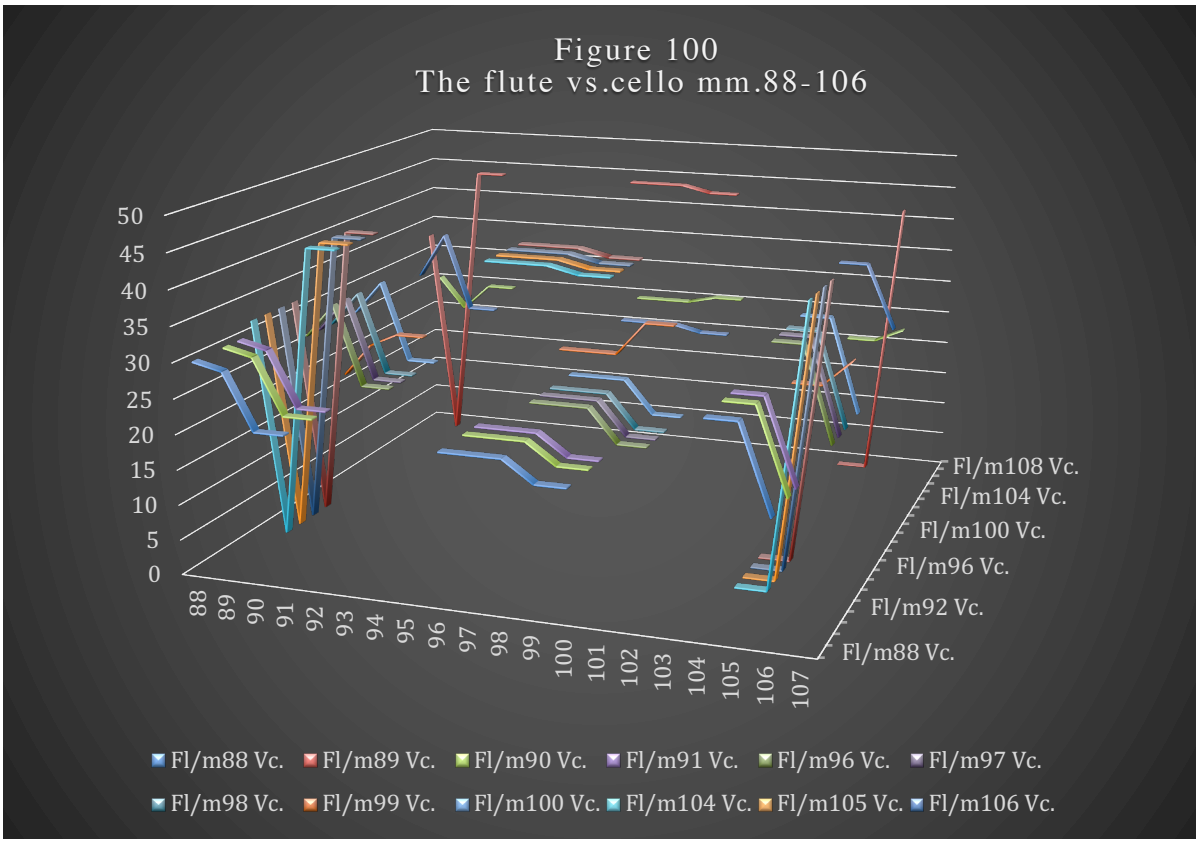


Figure 99 shows a comparison between bars 5 – 20 of the flute to the viola. The minimum and maximum values are zero and forty-seven. Zero returns in bars 11, 16, 18, 19, and 20, whereas

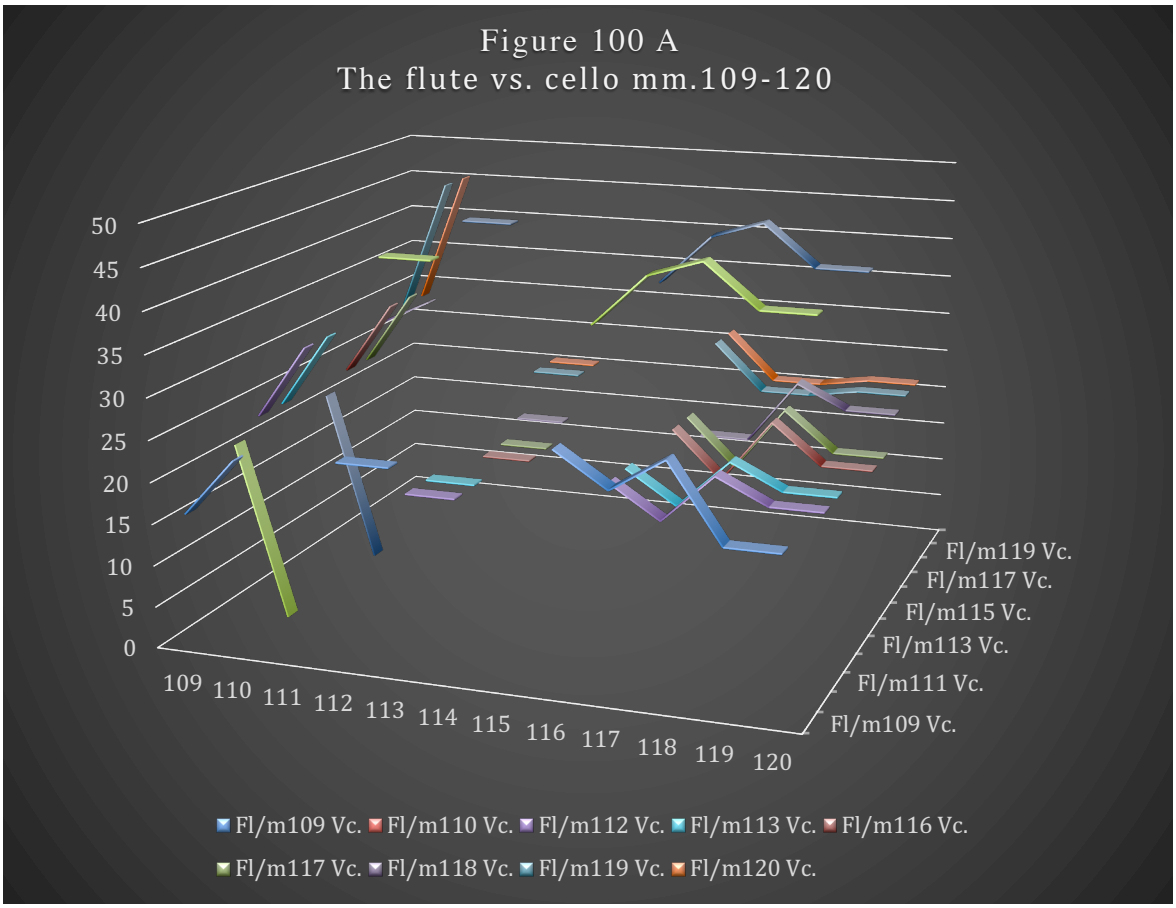
[35] "Extreme sul ponticello, bow as near to the bridge as is practical (some bow hairs might touch the bridge); the sound is filled with dissonant overtones which give it an unearthly, glassy, metal-scratchy quality." From page 5 of the preface in Crama.

the maximum value appears in bars 7, 8, 12, 13. A closer listen to Crama confirms that there is a timbral imitation between the flute and viola, and, as a result, there is less contrast between them. This is not unexpected, due to the introductory character of this section, since introductory sections do not aim to create contrast with other sections.

Notice the dramatic appearance of minimum and maximum values between bars 11 – 16. A closer listen to bars 11 – 16 reveals that the appearance of "whish sound,"[36] very squeaky noise, contributes to the appearance of a dramatically larger timbral space in this section. Otherwise, bars 1 – 8 and 18 – 20 do not display a large timbral space in relation to bars 11 – 16.



[36] "Whish Sound: Play the bow at xSP area and the Left Hand should move within the area from the xST to xSP. The limits of glissando are indicated by the parenthesized (xSP), (ST), and the direction by the line labeled 'LH gliss'.The effect is a very high, scream-like sound. [b.5]" From page 6 of the preface in Crama.

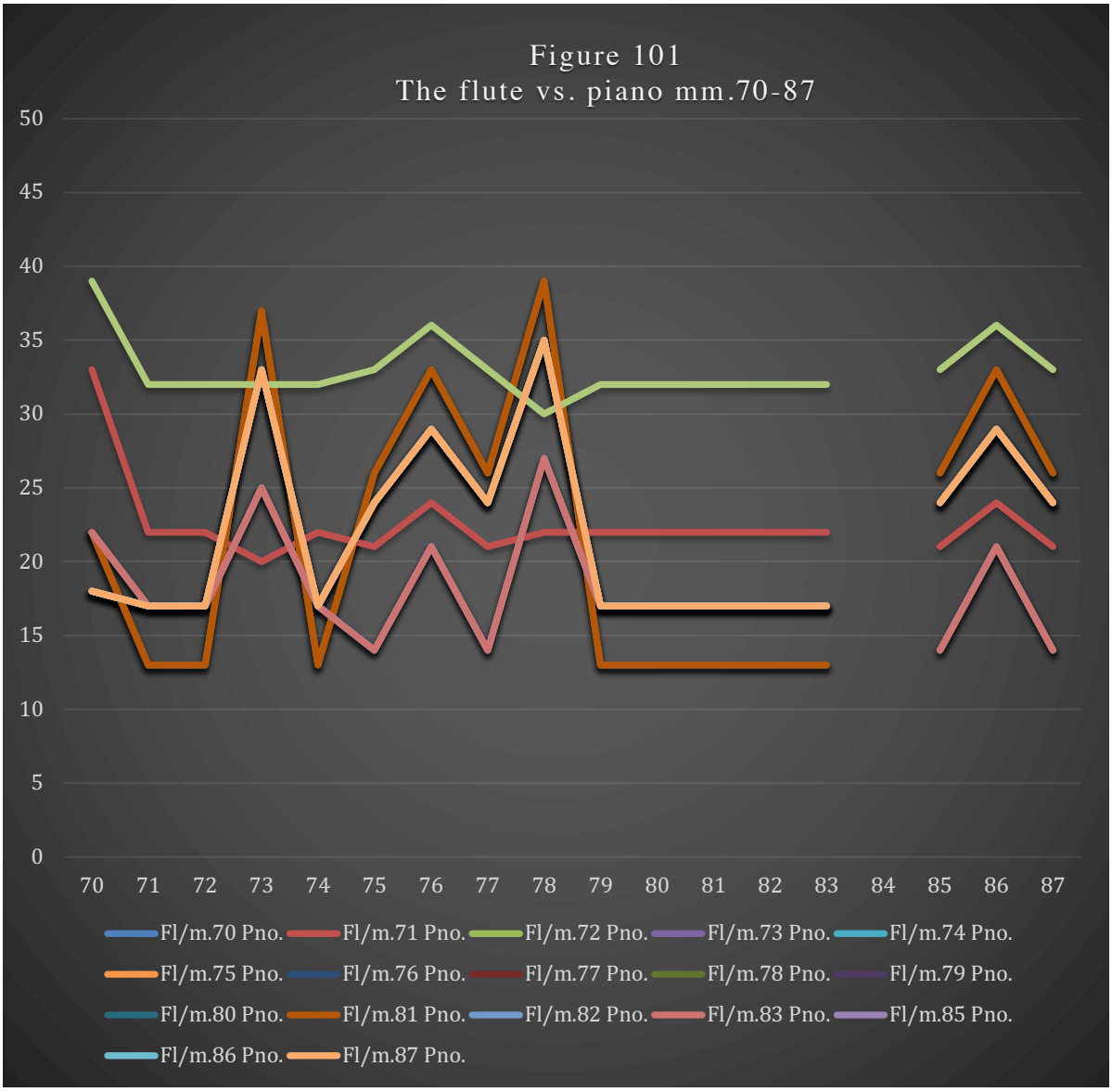


Figures 100 and 100A demonstrate the comparison of the flute to cello in bars 88 – 120. The minimum and maximum values are zero and forty-eight. There are no instances of direct spikes between zero and forty-eight, but there are spikes between zero and forty-three. These large fluctuations contribute to the shape of each of the section's three subsections: 1) bars 88 – 100, which shows a spike between zero and forty-three; 2) bars 104 – 110, which shows a similar spike; 3) bars 112 – 120, which shows spikes between eleven and fifty-eight.

The spikes in bars 88 – 91 and 105 – 106, are interrelated. The shapes of these three spikes suggest a set of shape variations. The horizontal straight lines in bars 96 – 100, 112 – 113, and 119 – 120 contrast with the spikes. Therefore, in addition to the variation between spikes, there is

a contrast between straight lines and spikes. The contrast between the shapes of the spikes and the straight lines contributes to form in Figures 100 and 100A.

Notice the broad range, zero to forty-eight, derived from the comparisons between the absolute timbral values of flute and cello. Since the absolute timbral value between these two instruments is dissimilar, there is a broad timbral space as a result of this comparison.



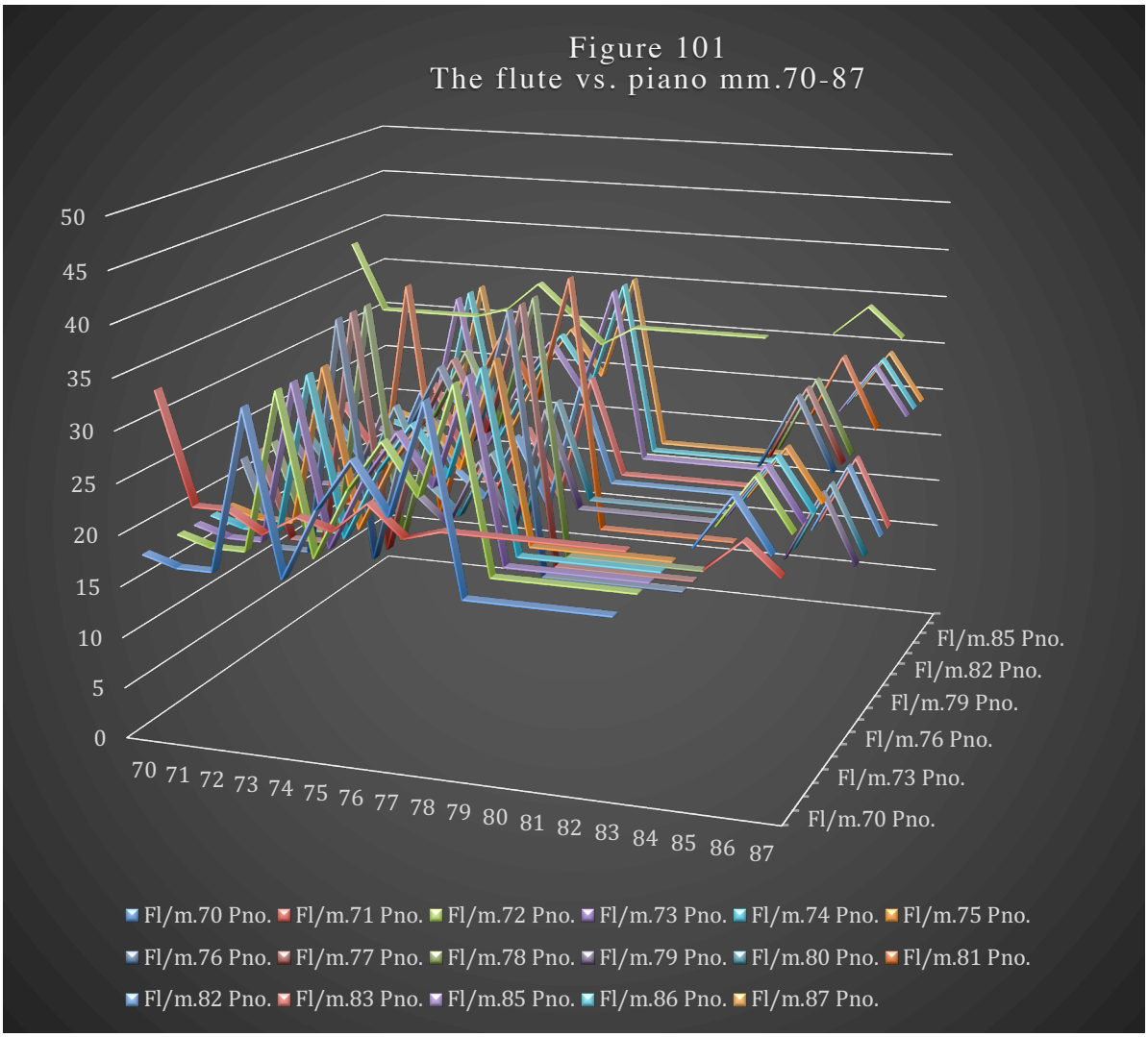


Figure 101 exhibits the comparison between bars 70 – 87 of the flute to the piano. The minimum and maximum values fluctuate between eleven and thirty-nine. The absence of zero may indicate the timbral difference between the piano and the flute. Also, notice the maximum difference values are substantially lower than between the flute and the cello and are lower than between the flute and all the other instruments.

The piano in bars 70 – 87 performs pitches, whereas the flute performs mostly noise or pitch-less material almost at all times. The difference in the timbre value between the piano and the flute is

the main reason for the absence of zero in Figure 101. Also, notice the relatively low maximum value, which indicates the similarities between the timbre of the piano in the C7 register and the noisy timbre, "breath gesture,"[37] in flute, as compared with other comparisons thus far in this chapter.

The timbral difference between these two instruments contributes to the lack of clear organization and construction of timbre in this section. The timbral difference resonates with Pierre Schaeffer's idea of the organizing sound and its relation to the form. "In his description of Solfege de l'objet Sonore, Schaeffer proposes seven morphological criteria":[38] "mass, harmonic timbre, dynamic, grain, allure, melodic profile, and profile of mass. Under these criteria, the whole structure gets clearer and smoother direction through unified and coherent sound identities."[39]

[37] "BREATH GESTURE: The first part of this gesture can be related to the inhalation with an increased effort towards the end of the inhalation and a very short pause. The second part can be related to the exhalation with an attack at the beginning although it should be softer than the end of the first part. A glissando is combined with the decrescendo. Note that you should not inhale or exhale in the instrument, you play normally and simply the articulation of the gesture should imply the process of inhalation and exhalation." From page 5 of the preface in Crama.

[38] Panayiotis Kokoras, *Morphopoiesis: An Analytical Model for Electronic Music*, 2005.
[39] Pierre Schaeffer, *In search of Concrete Music* (A la recherche d'une musique concrete), 201.