Chapter 3: Anatomy of Timbre

In this chapter, I make six comparisons between different combinations, such as the number of partials, thinness or thickness of sound, range of strongest partials, amount of noise, sharpness of attack, and noisiness of attack, to discover the outcomes. Notice, irregularity of sound is not included.

The progression of number of partials in the flute:

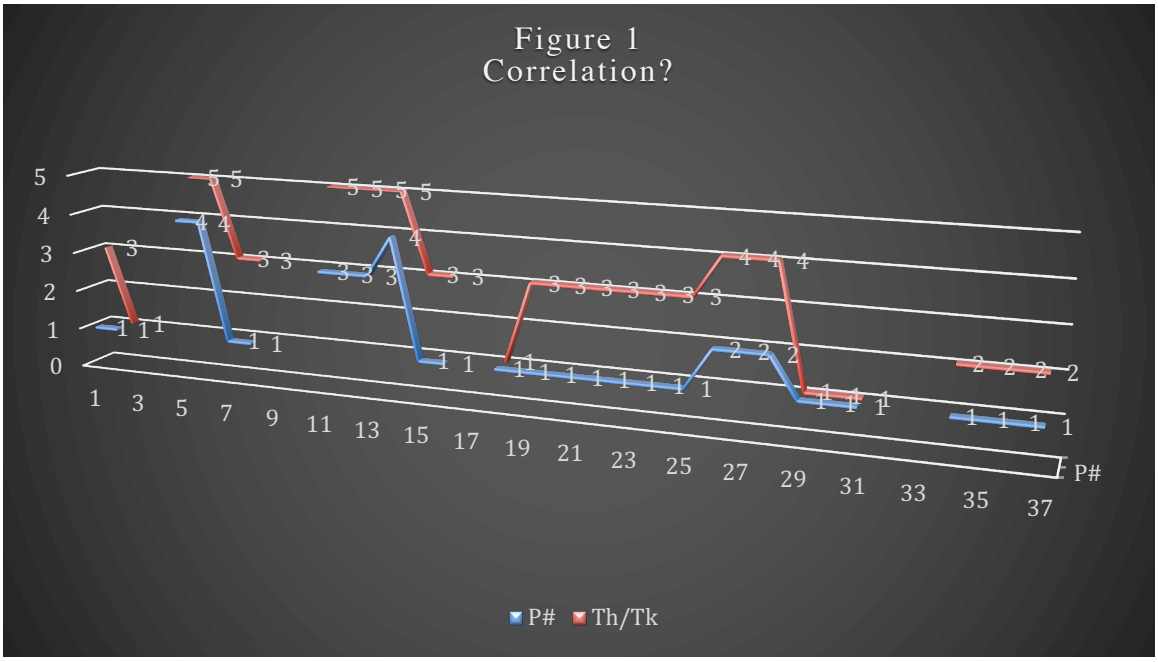


Figure 1 demonstrates the progression of the number of harmonic partials, blue, as well as the thinness or thickness of sound, red, from bar 1 – 37. There is a strong sense of imitation between these two contributing elements of sound. The imitation between these two elements suggests a sense of correlation, which leads to a strong sense of parallelism between the number of harmonic partials and thinness and thickness of sound. The parallelism creates a consonant, agreeable, relation between the above elements and suggests a sense of correlation to the quality

of timbre in Figure 1. The agreeable relationship between the number of partials and thinness and thickness of sound contributes to the creation of phrase and supports the relationship between timbre and form.

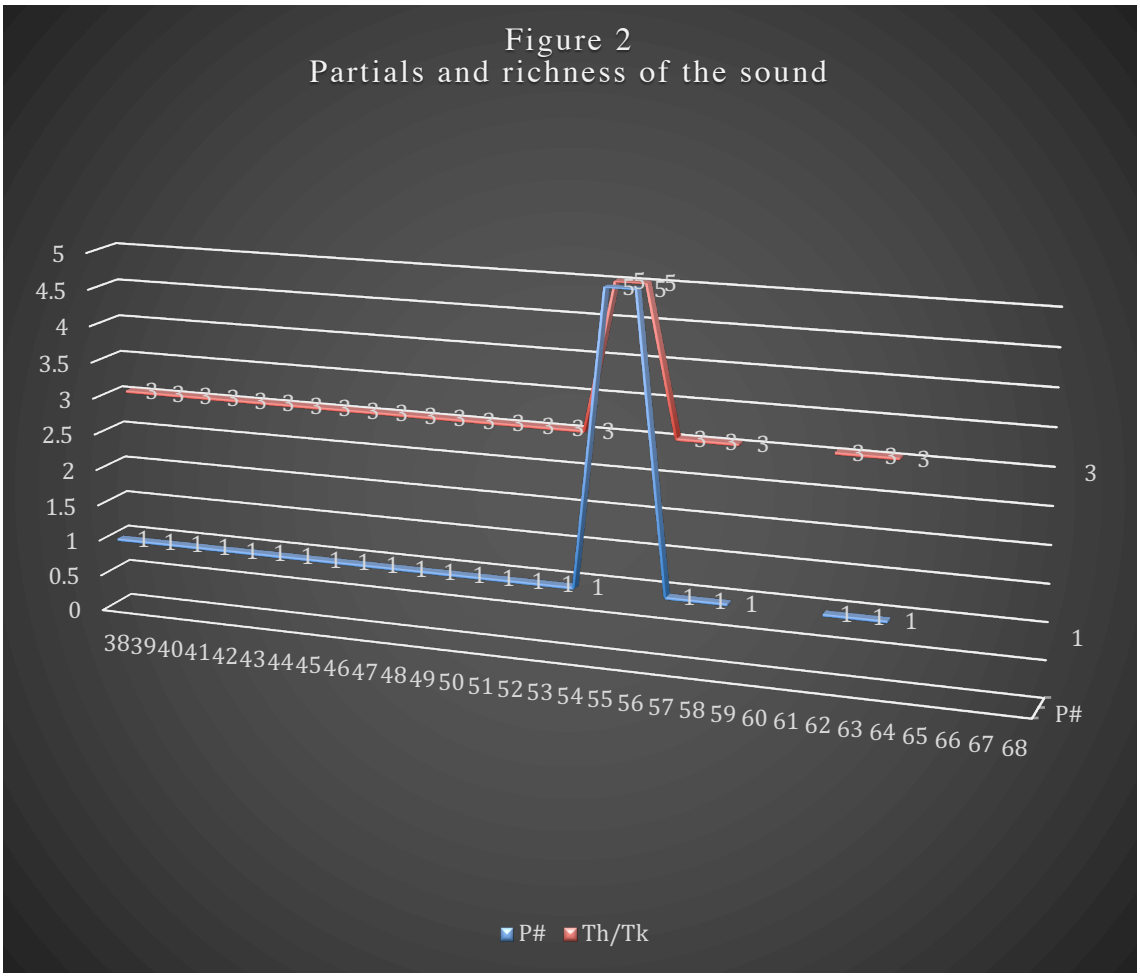
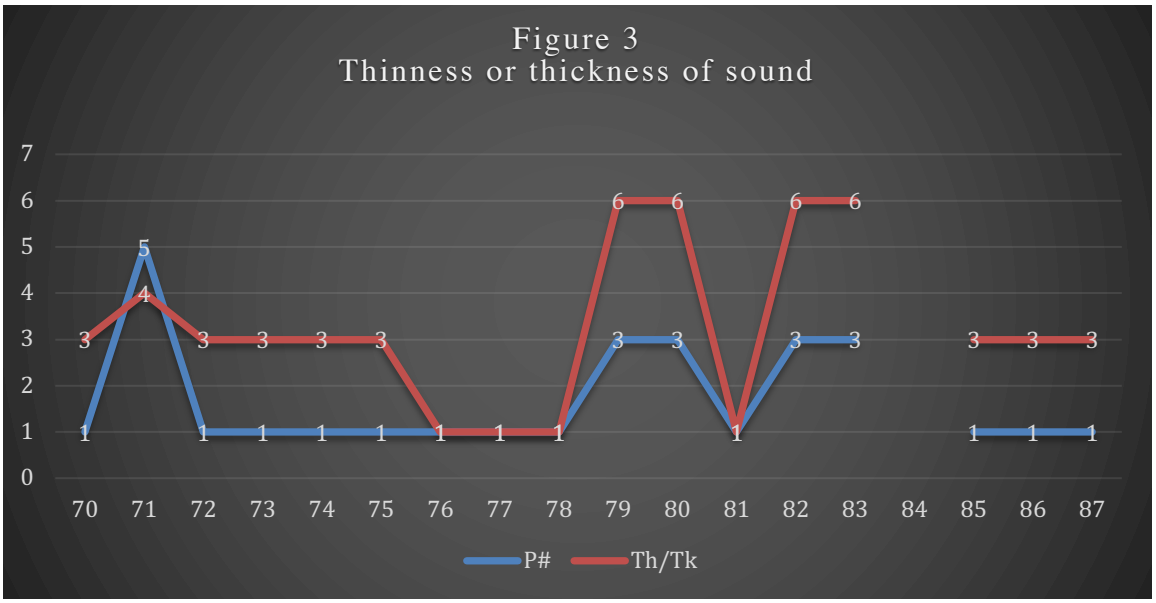


Figure 2 shows the continuation of the correlation between the number of partials and the thinness or thickness of sound in the flute in bar 38 – 69. There direct relationship between these two elements of sounds in Crama. In other words, when the number of harmonic partials increases, the thinness or thickness of sound increases as well.



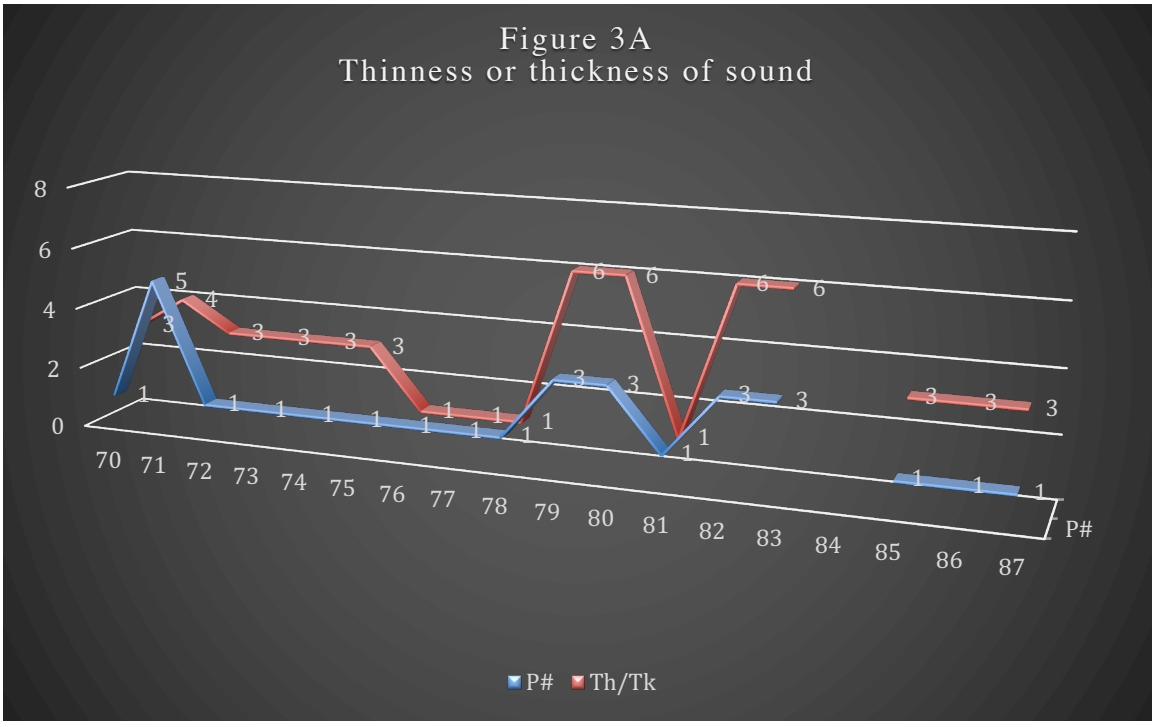
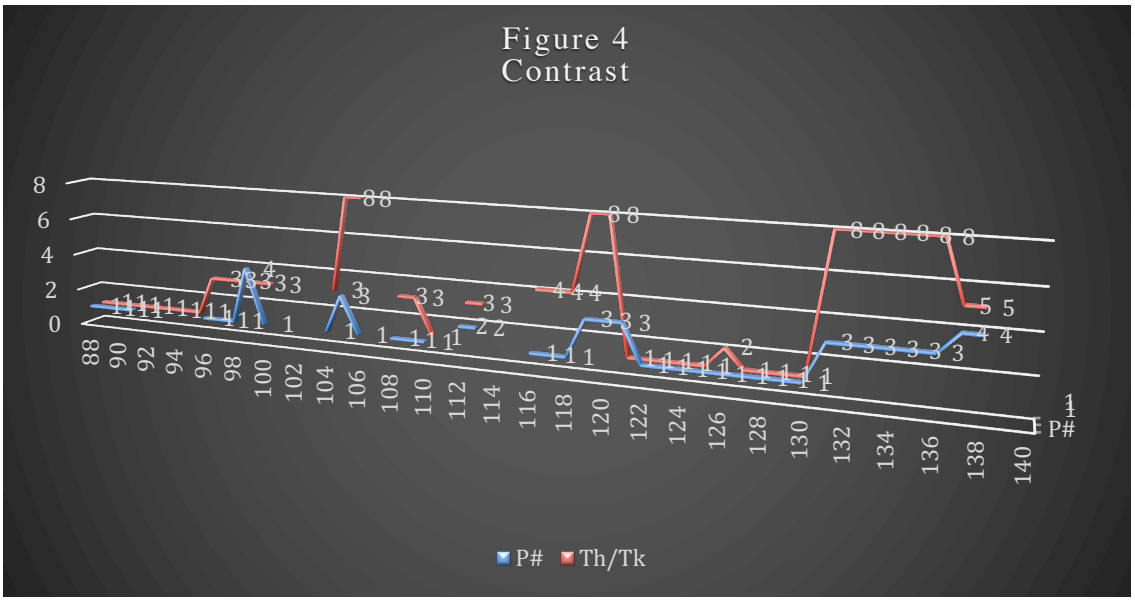
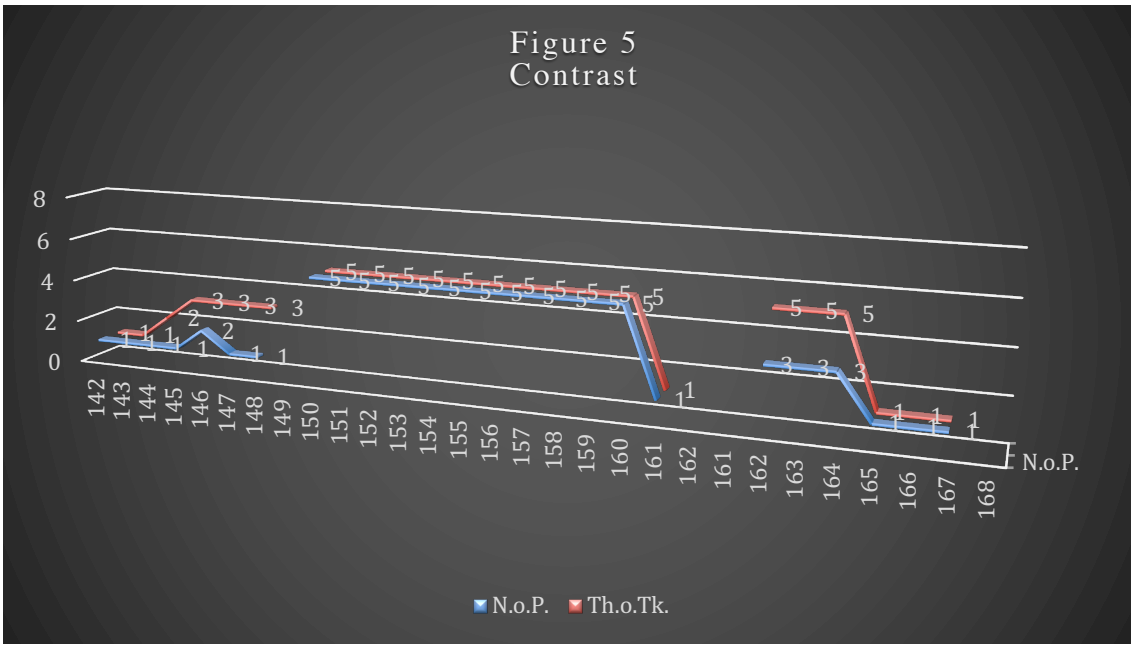


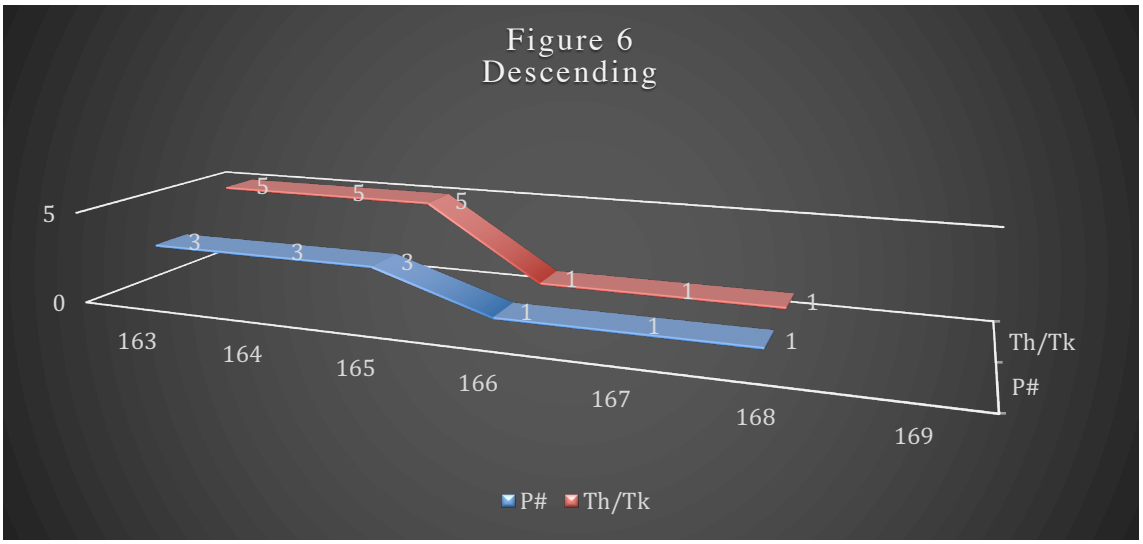
Figure 3 suggests a continued of correlation between the number of patrials and the thinness or thickness of sound in bars 70 – 87 in Crama. This sense of correlation between the two elements of sound has been consistent from bar 1 – 87. This correlation also resonates with the creation of shapes, which have contributed to forming phrases in Crama thus far.



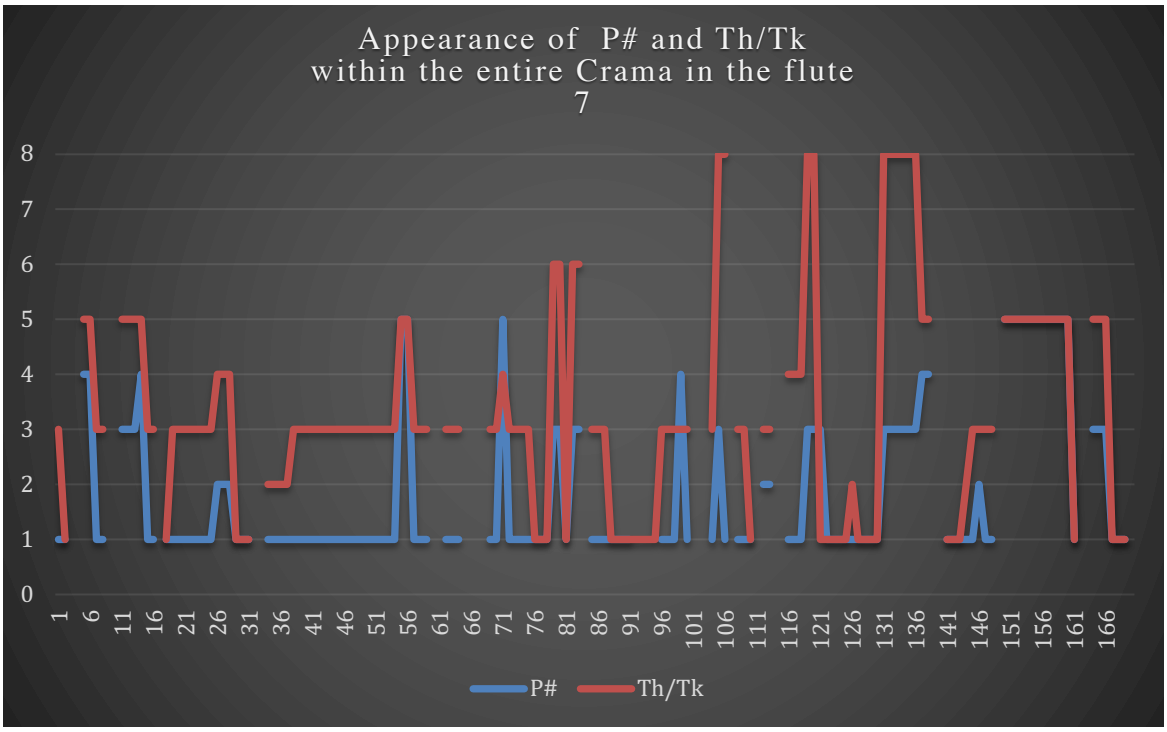


Correlation, imitation, and parallelism continue between the number of partials category and thinness or thickness of sound in Figures 4 and 5. The parallelism is consistent between the number of partials category and thinness or thickness of sound within bars 1 – 169. I expect some amount of unparallelism to create contrast between different sections, but this was not the case. Therefore, we can conclude there is a direct relationship between the number of partials

category and thinness or thickness of sound in Crama. Whenever the number of partials decreases or increases, the thinness or thickness of sound will decrease or increase as well.



The reappearance of values one, three, and five in the last seven bars, as well as the sense of descending between values, is similar to the number of partials category in Figure 1. This justifies the idea of the correlation between the number of partials category and thinness or thickness of sound as part of the quality of sound in Crama.


Appearance of P# and Th/Tk
within the entire Crama in the flute
7
8
7
6
5
4
3
2
1
0
1 6 11 16 21 26 31 36 41 46 51 56 61 66 71 76 81 86 91 96 101 106 111 116 121 126 131 136 141 146 151 156 161 166
P#
Th/Tk

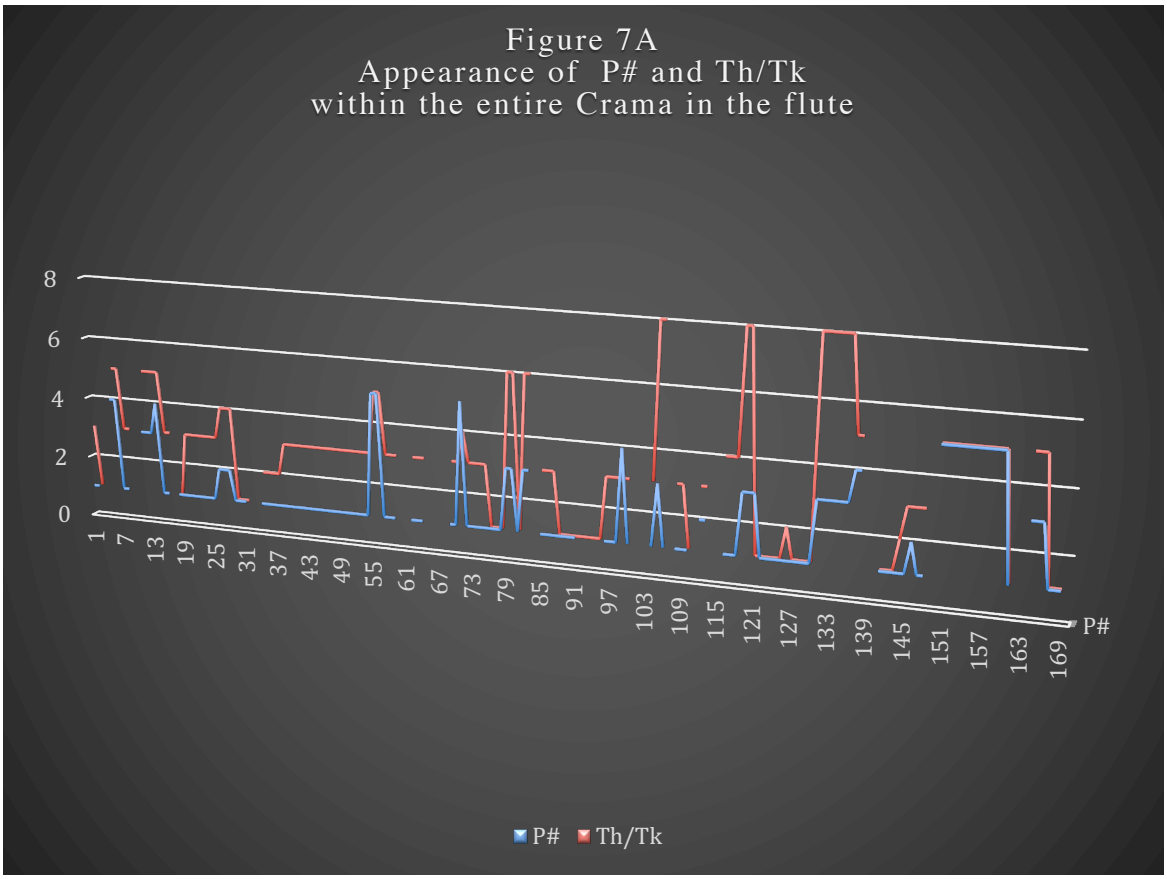


Figure 7A
Appearance of P# and Th/Tk
within the entire Crama in the flute
8
6
4
2
0
1 7 13 19 25 31 37 43 49 55 61 67 73 79 85 91 97 103 109 115 121 127 133 139 145 151 157 163 169
P#
P#
Th/Tk

The progression of range of partials (1 = low, 9 = high) in the flute:

Introduction:

The range of partials in the flute is the third dimension of the sound quality in Crama. So far, I have discovered that, the majority of the time, the flute leans towards a lower number in partials and low to average values in the thinness or thickness of sound. Next, I will focus exclusively on the range of partial category, before studying its relation to its number of partials and the thinness or thickness of sound category.

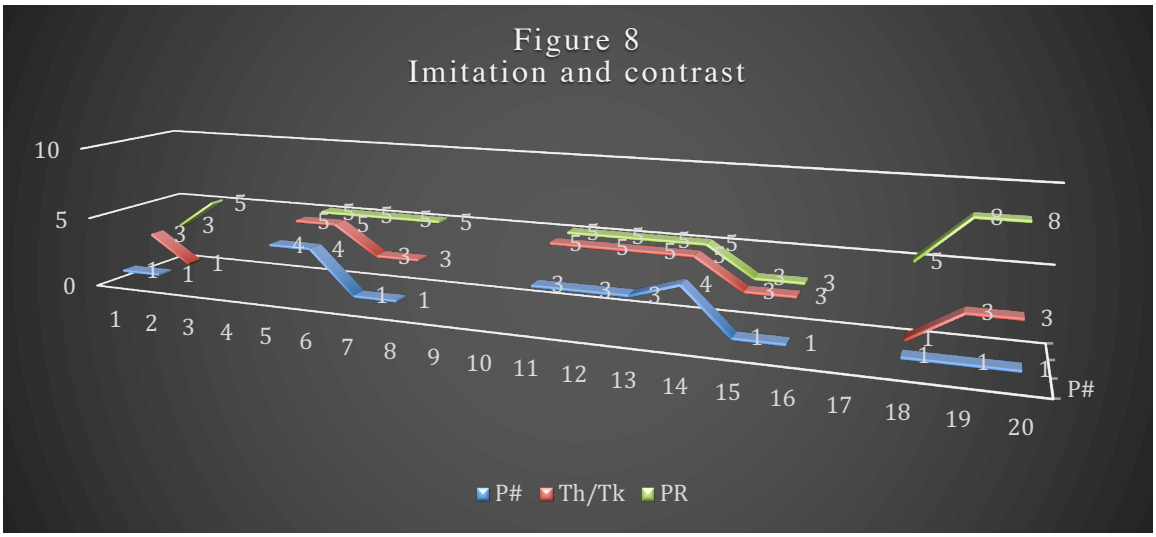
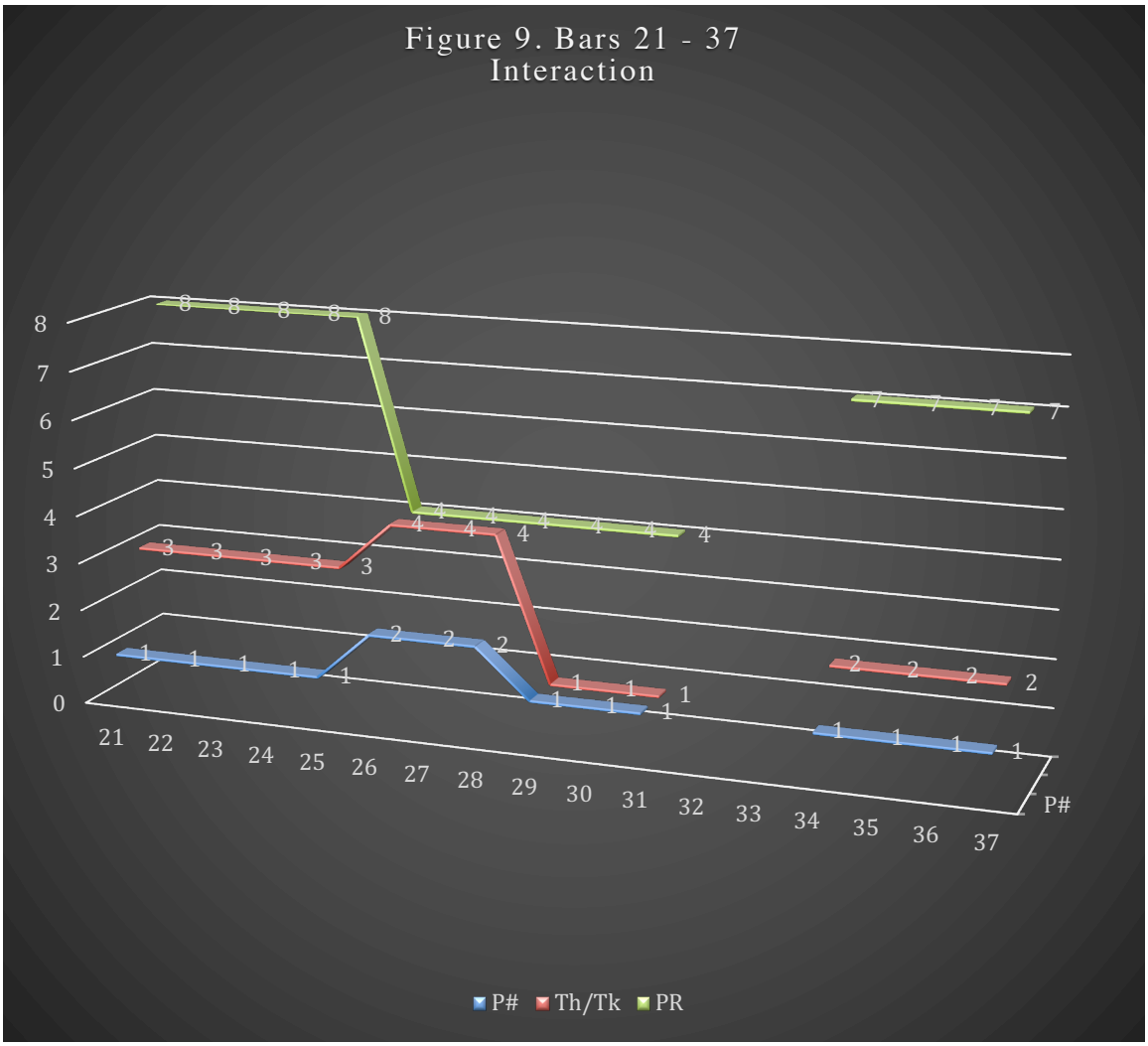
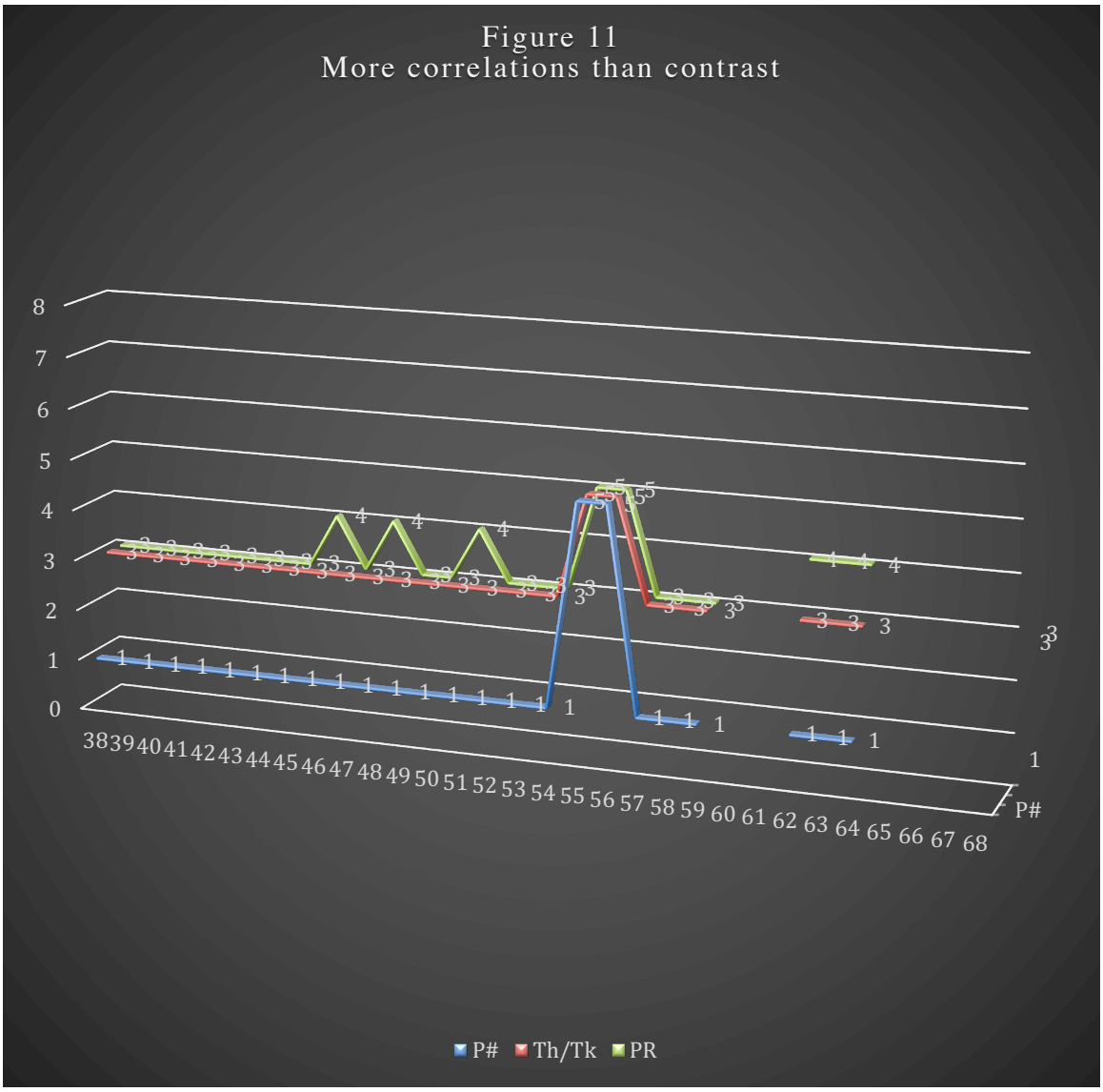


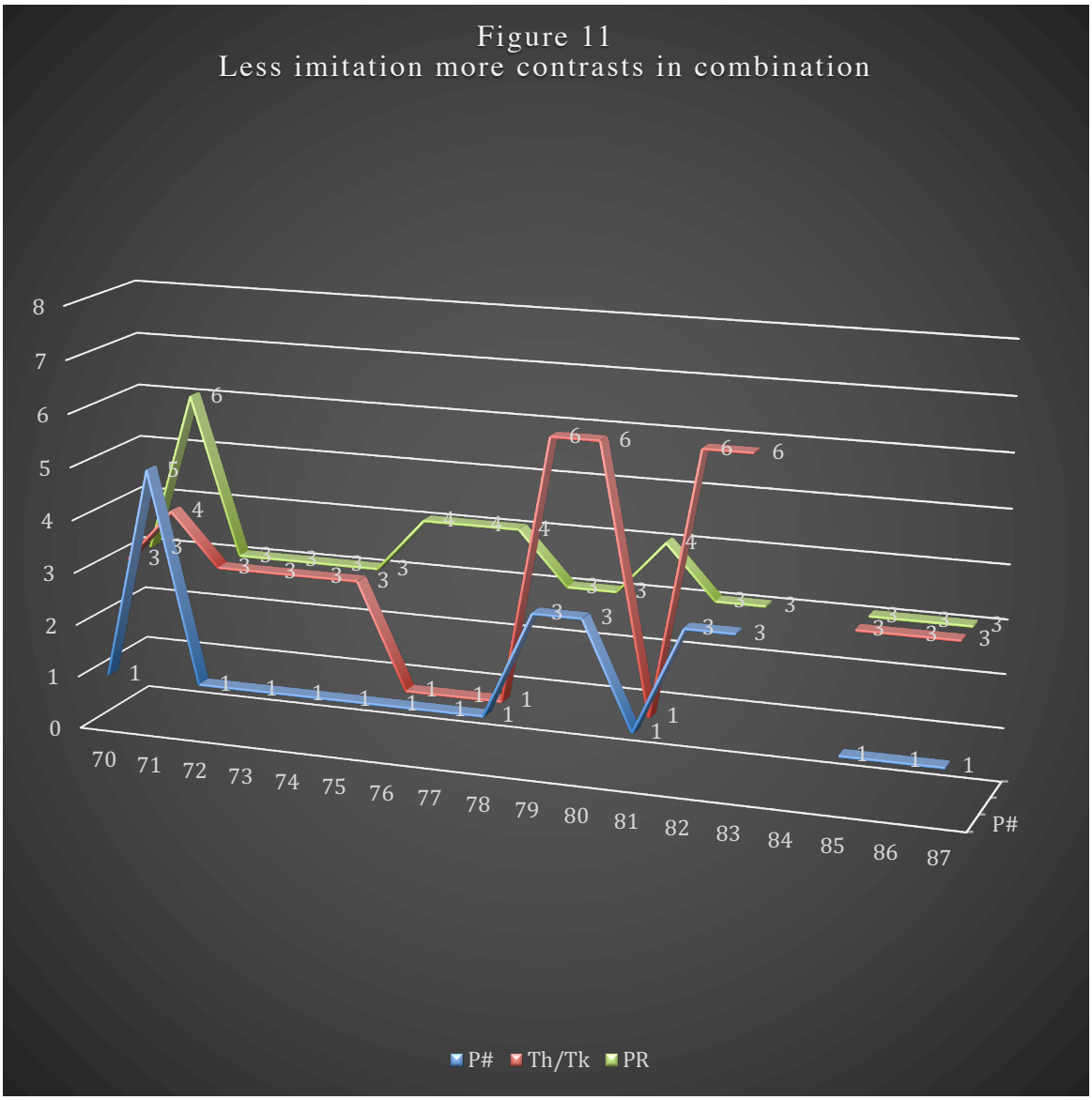
Figure 8 shows the parallelism and contrast between the range of the strongest partials and the other two elements. There is parallelism between the number of partials and the range of partial in bars 11 – 13 and 14 – 16. There is a contrast between the number of partials and the other two categories in bars 18 – 19. In addition, there are a few other instances of contrast between the number of partials category, thinness and thickness of sound, and range of partials. Greater instances of parallelism and fewer of contrast are the primary components in forming this section.



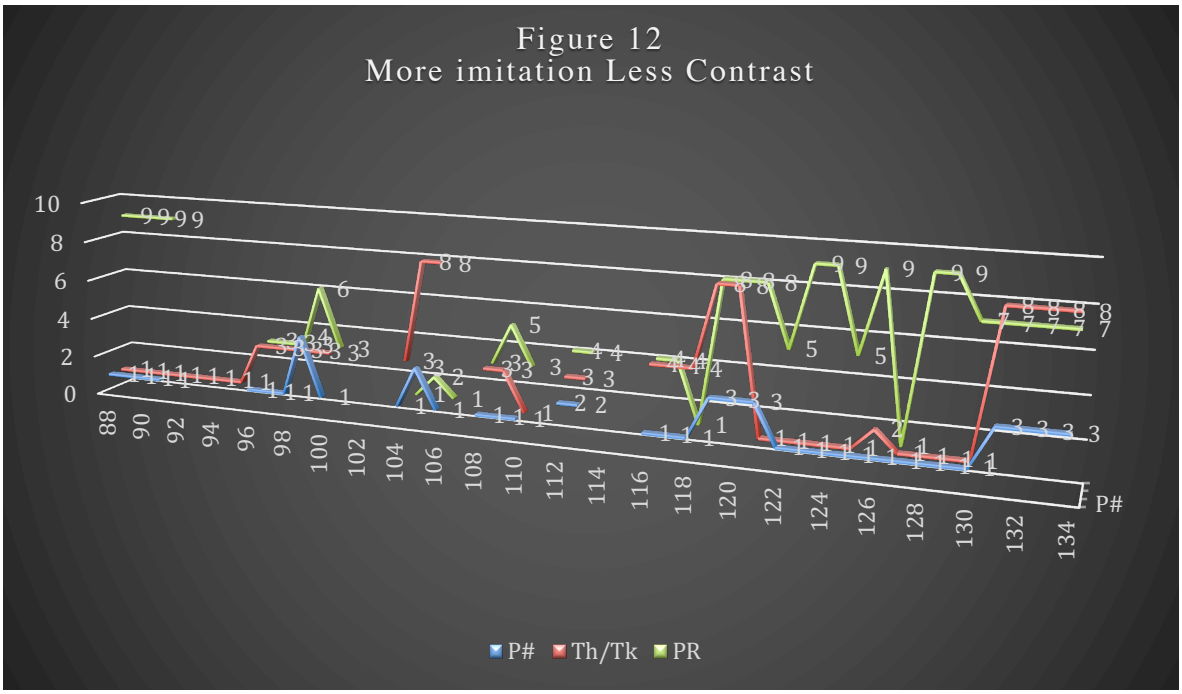
There is parallelism between all three elements of sound in bars 21 – 25. There is also parallelism between the number of partials and the range of partials in bars 26 – 28. Furthermore, there are correlations between the thinness and thickness of sound category and range of partials in 29 – 31. This section begins with parallelism between 3 elements of sound, bars 21 – 25, and ends with correlations between three elements, bars 34 – 37. Bars 25 – 29 do not demonstrate the same parallelism as bars 21 – 25 and 34 – 37. The interaction between different elements of sound in bars 25 – 29 shows this section to have an ABA' structure.



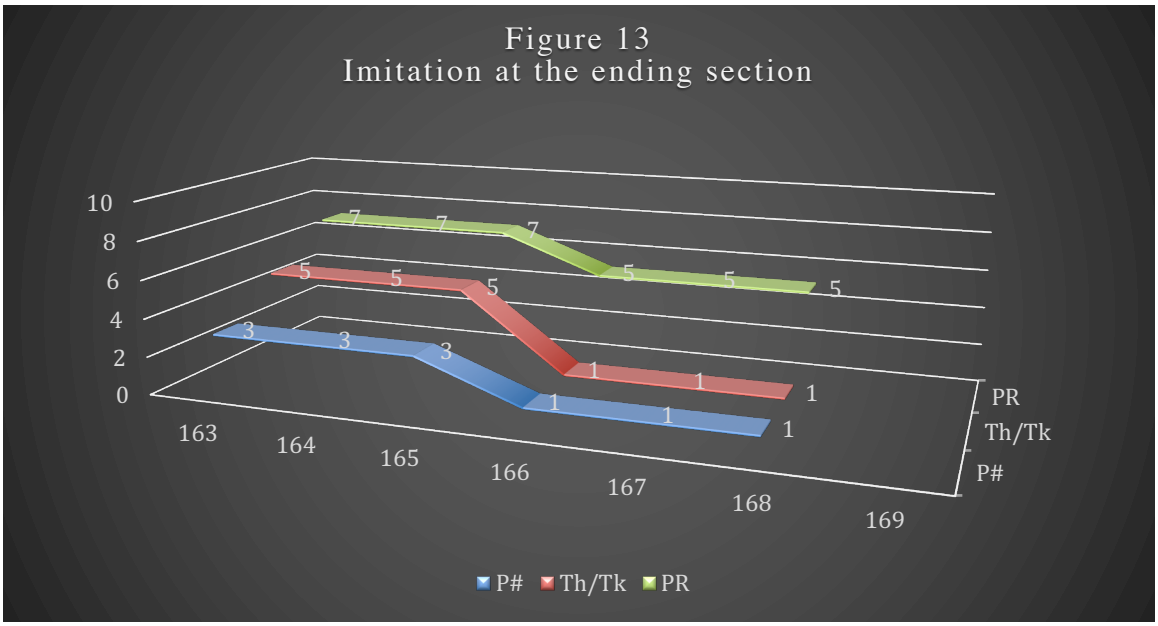
There is parallelism between all three elements from bars 38 – 45 and 57 – 64. There is also parallelism, 54 – 60, between the number of partials, blue, and the range of partials, green. Furthermore, the appearance of value four creates a non-parallelism relationship between the thinness or thickness of sound, red, and the range of partials. This, however, eventually becomes parallel with the range of partials 52 – 54 and creates a parallel relationship with the number of harmonic partials, blue. The above parallel and non-parallel connections contribute to the quality of the sound. As a result, the structure of sound in bars 38 – 64 produces a sense of clarity.



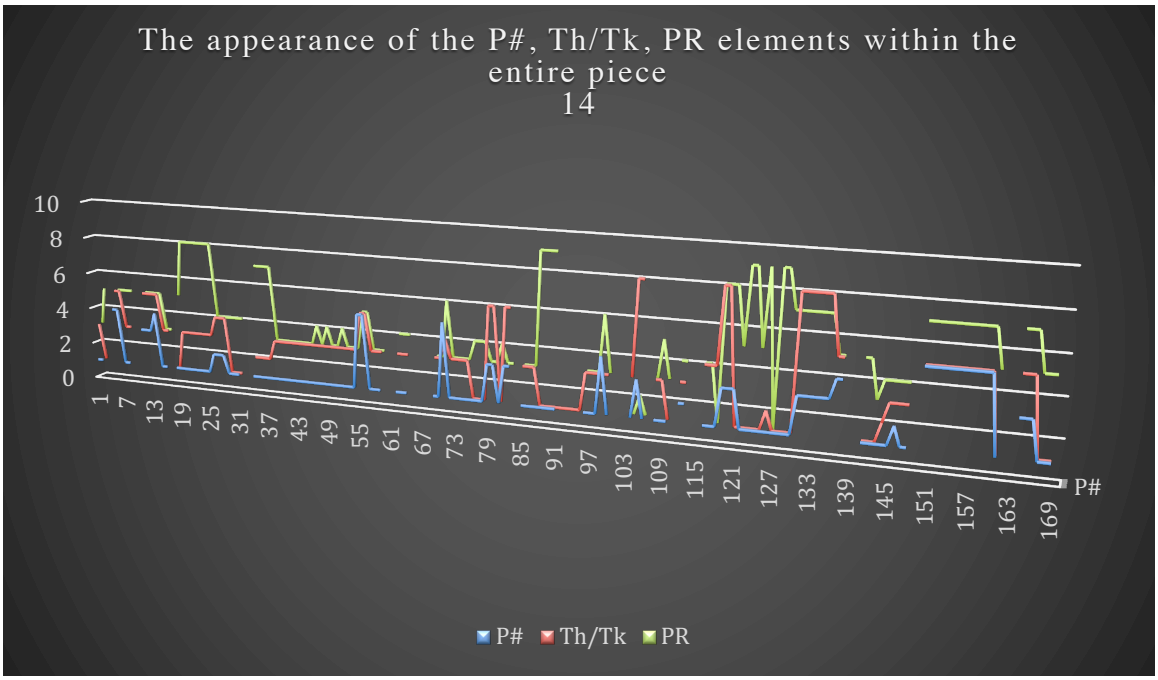
There is only one case of parallelism between all three elements, in bars 70 – 72. The remaining cases are either parallelism between two elements or a combination of contrast and parallelism between several combinations. This is the first occurrence of this type of contrast between different combinations and parallelism between three sound elements. This type of contrast contributes to the overall structure of this section and its contrast with other sections. Additionally, it adds to the complexity and the overall richness of sound in Figure 11.



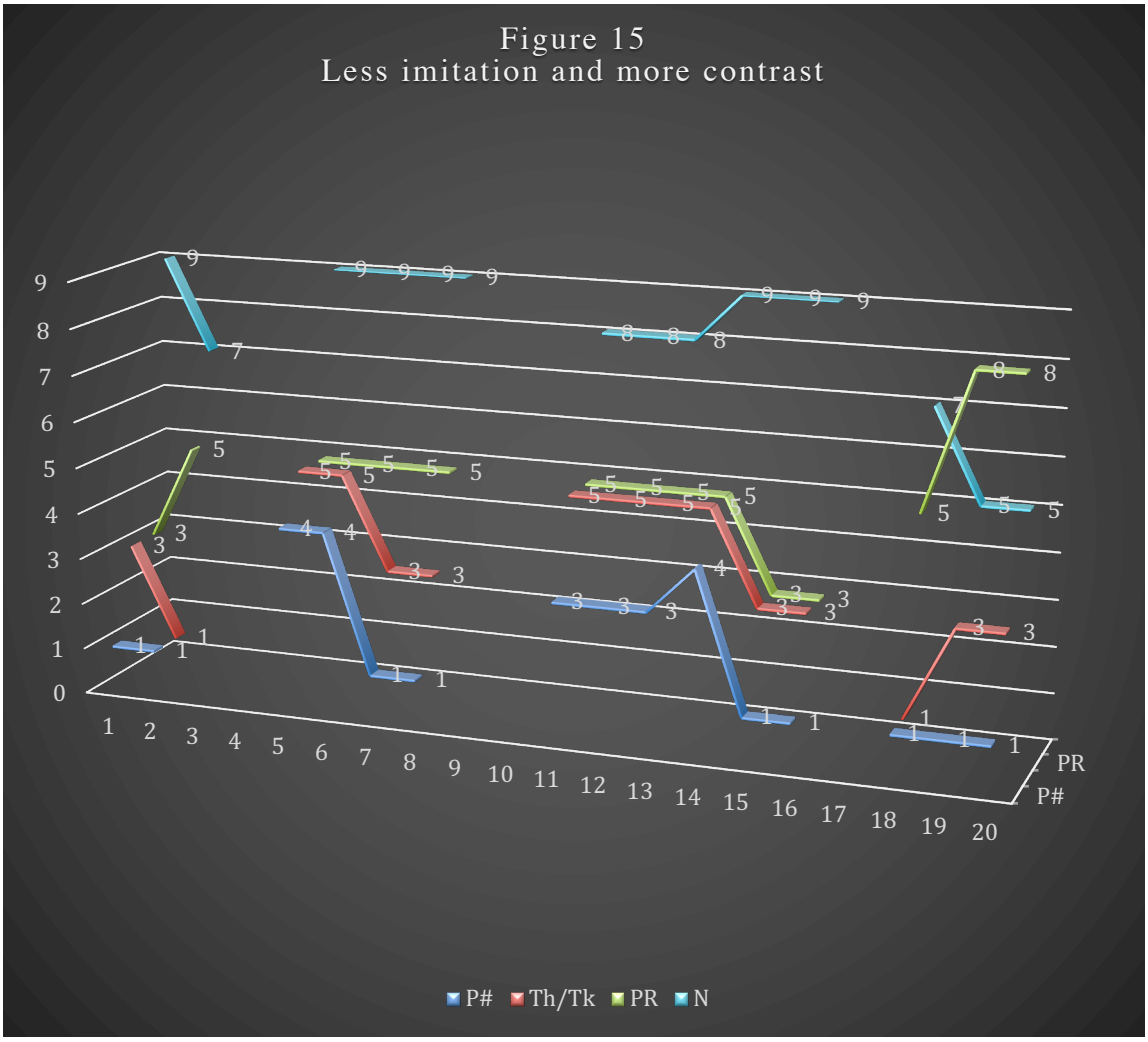
Unlike Figure 11, Figure 12 exhibits the independence of the range of partials from the other parameters. This independence sometimes will result in parallelism (for example 98–100), but other times they just seem to be independent – not contrast, not parallel.



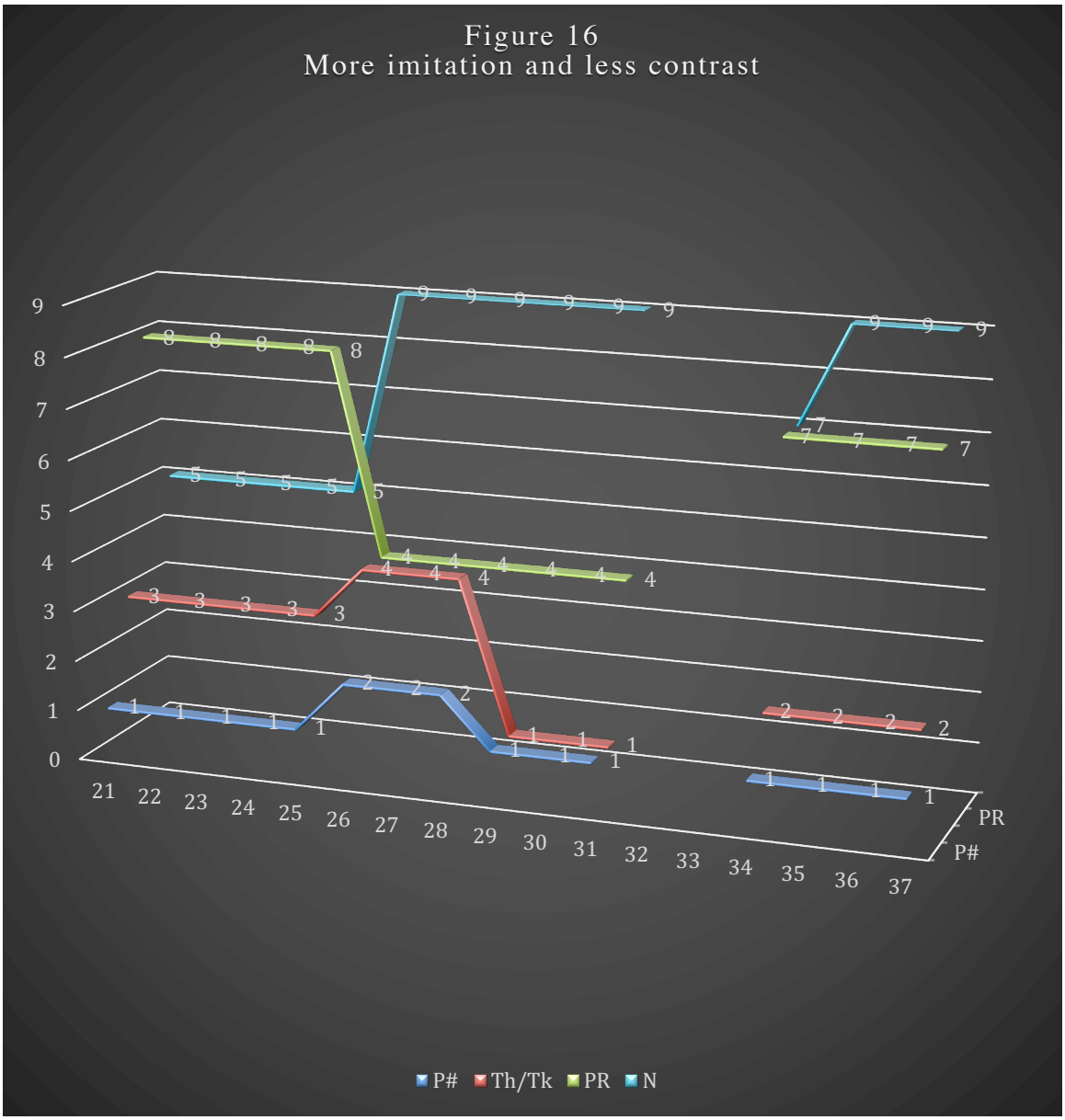
The ending section exhibits the sense of falling in all three quality of sound categories. Also, it proves the consistent reappearance of the same values from the opening section in all categories. This is a piece of evidence which refers to the importance of consistency between the opening and ending sections. As a result, this contributes to the overall form in Crama.



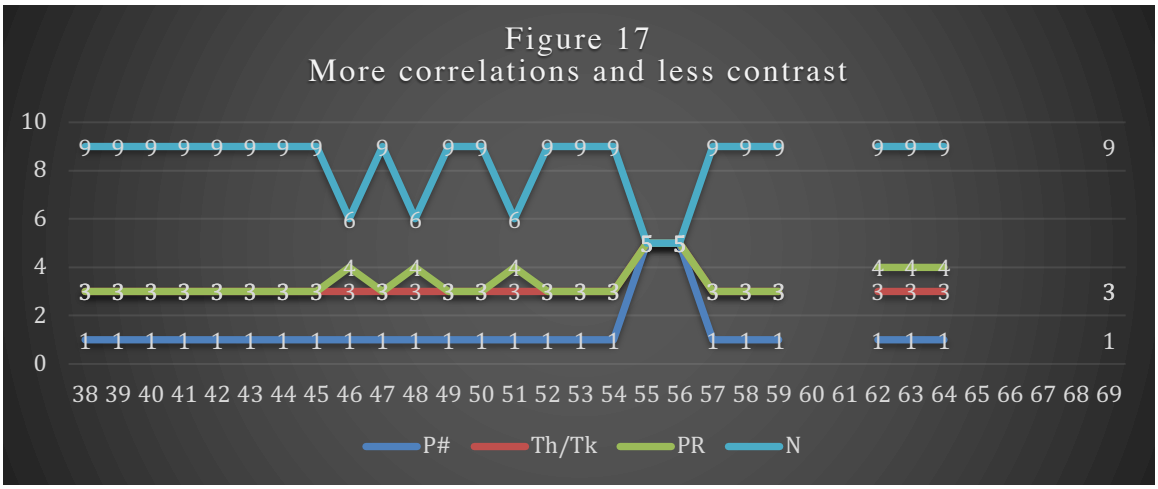
The progression of amount of noise (1 = clean, pure, 9 = noisy) in the flute:



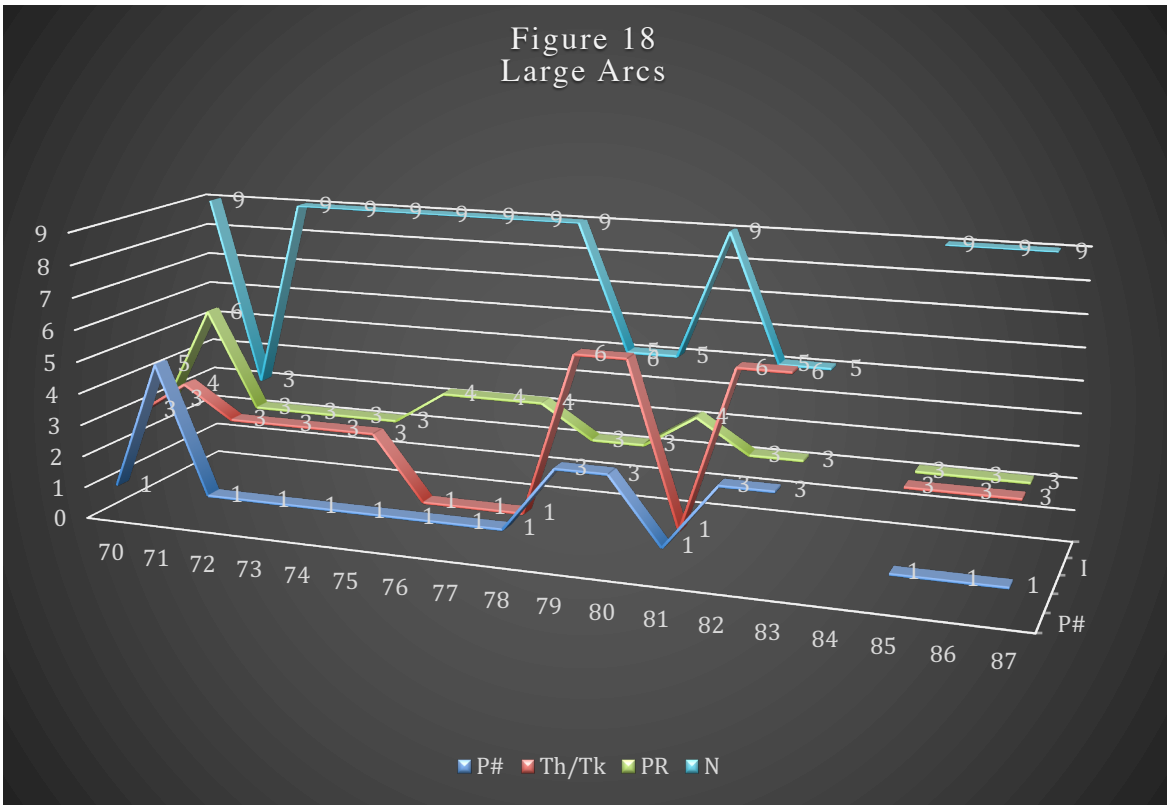
There are about 6 bars, out of 11 active bars, not counting the rests, that have parallel imitation between all four elements of the quality of sound. These are bars 5 – 6, 7 – 8, 11 – 13, 15 – 16, and 19 – 20. The remaining 5 bars, 1 – 2, 6 – 7, 13 – 15, and 18 – 19 are non-imitative. This non-imitative relationship creates a contrast with the other elements of sound, and the relationship between imitative and non-imitative contributes to the quality and overall richness of sound. As a result, these relationships contribute to the overall construction of sound within the entire section in Figure 15.



There are 10 out of 16 bars that offer parallel motion between all of the contributing elements of the sound. Those bars are 21 – 25, 29 – 31, and 31 – 37. Conversely, three bars contribute to the non-parallel relationship between all the elements of sound. Those are bars 25 – 26, 28 – 29, and 34 – 35. Compared with Figure 15, the level of parallelism is increased by four bars, and the level of non-parallel motion is decreased by 2 bars. As a result, the increase and decrease across different elements of sound contribute to the growth and balance of sound from Figures 15 to 16.



There are 12 bars of parallelism between all four elements within all 21 active bars of this section. These are bars 38 – 45, 55, 57 – 59, and 62 – 64. Therefore, as previously mentioned, the increase and decrease between different elements of sound contribute to the growth and balance of sound between different sections in Crama.



There are 9 bars, out of the active 16 bars, which suggest parallelism between all four elements of sound. Those are bars 72 – 76, 76 – 78, 79 – 80, 82, 83, and 85 – 87, which show the heightened level of contrast in the correlation between Figures 18 and 17.

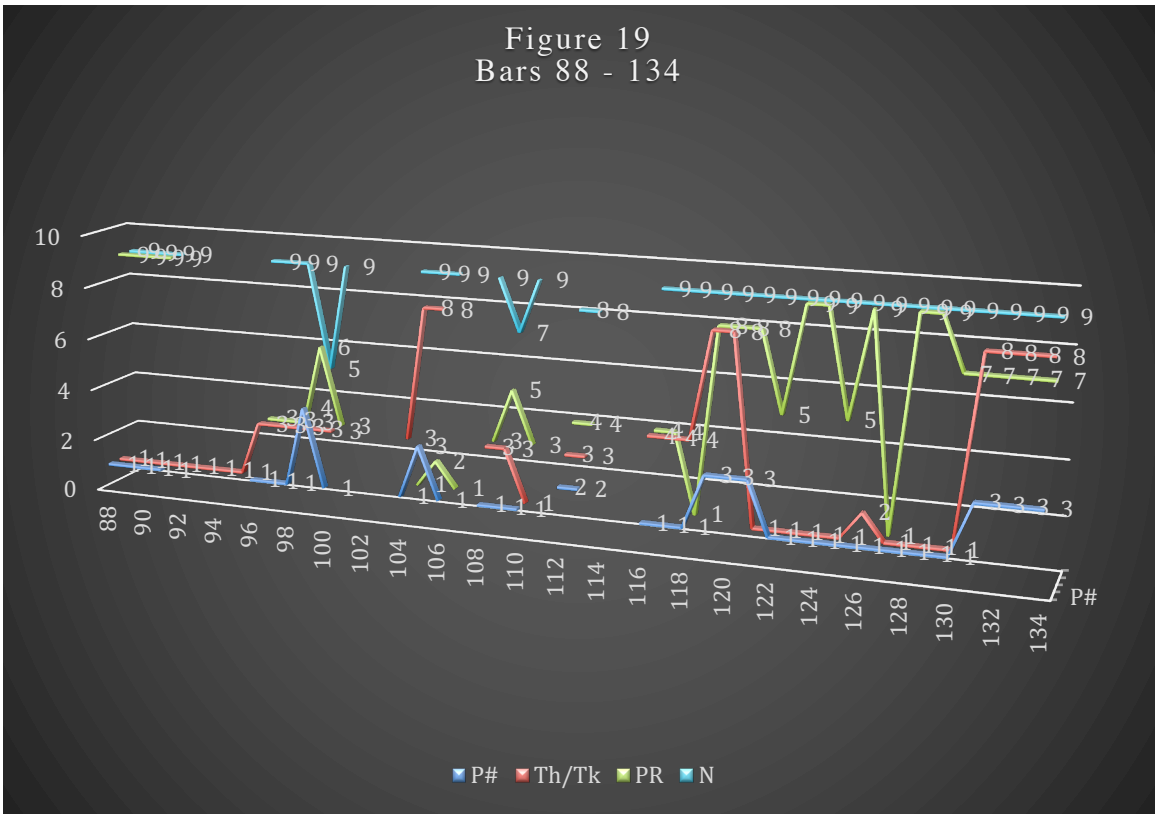


Figure 19
Bars 88 - 134
10
8
6
4
2
0
88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126 128 130 132 134
P#
P# Th/Tk PR N

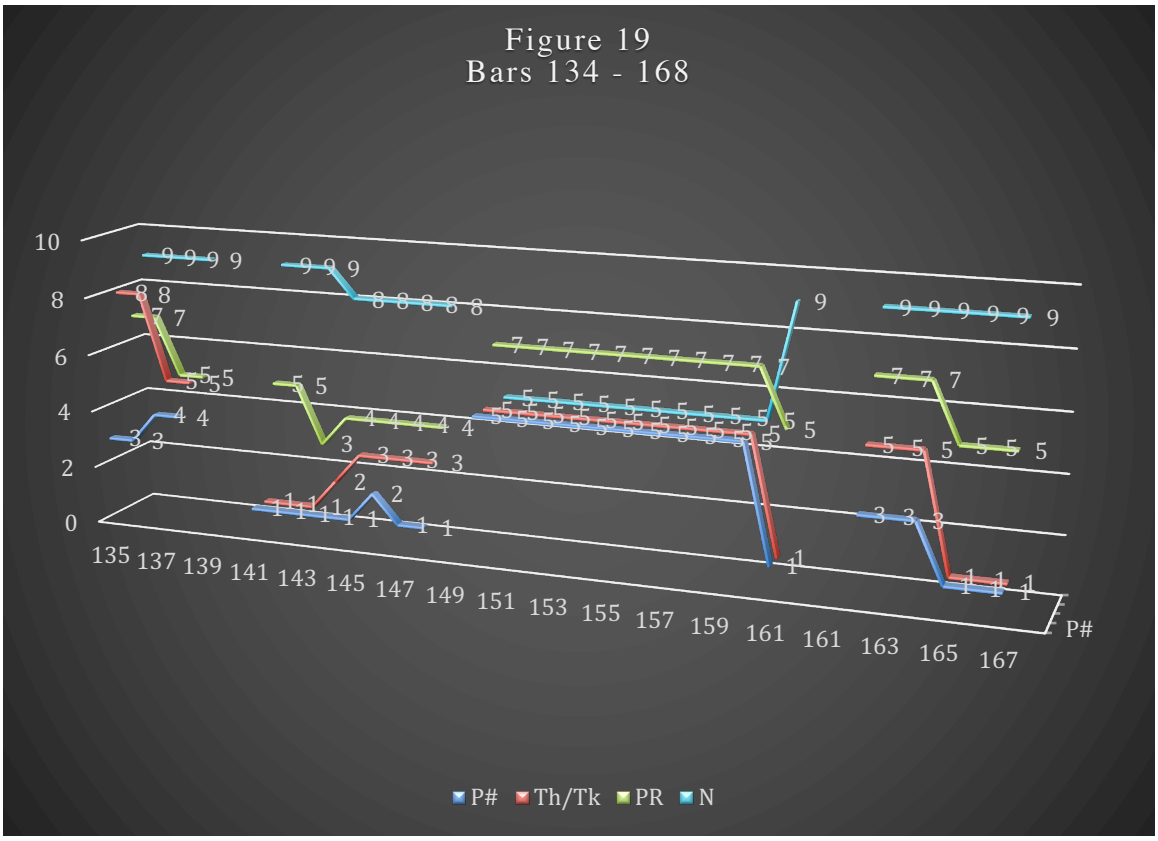
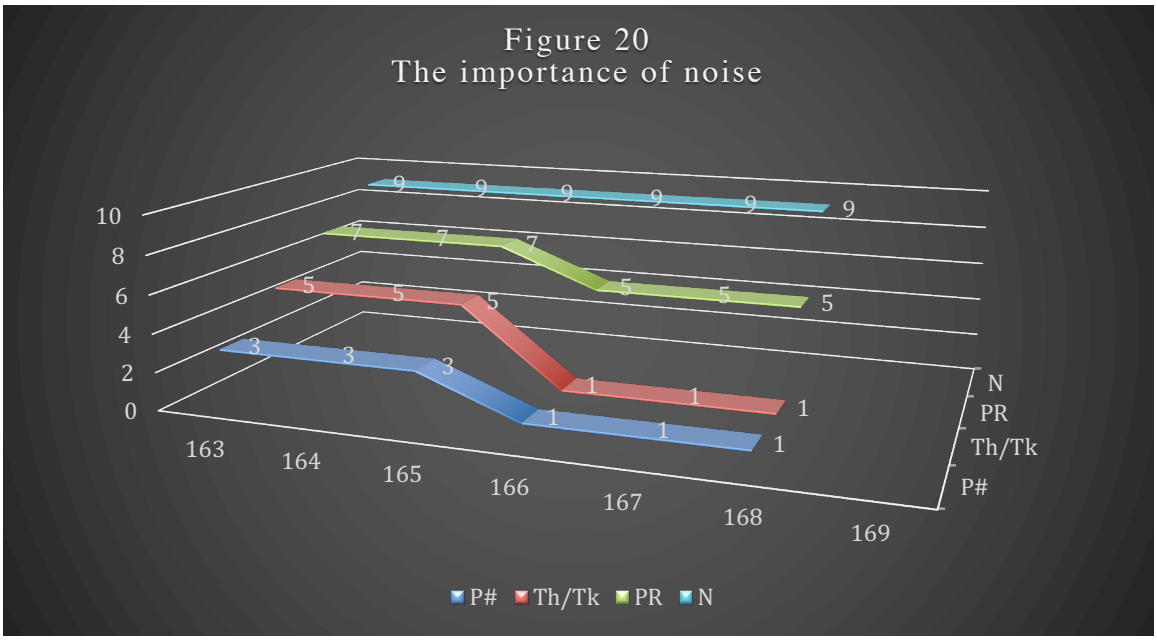


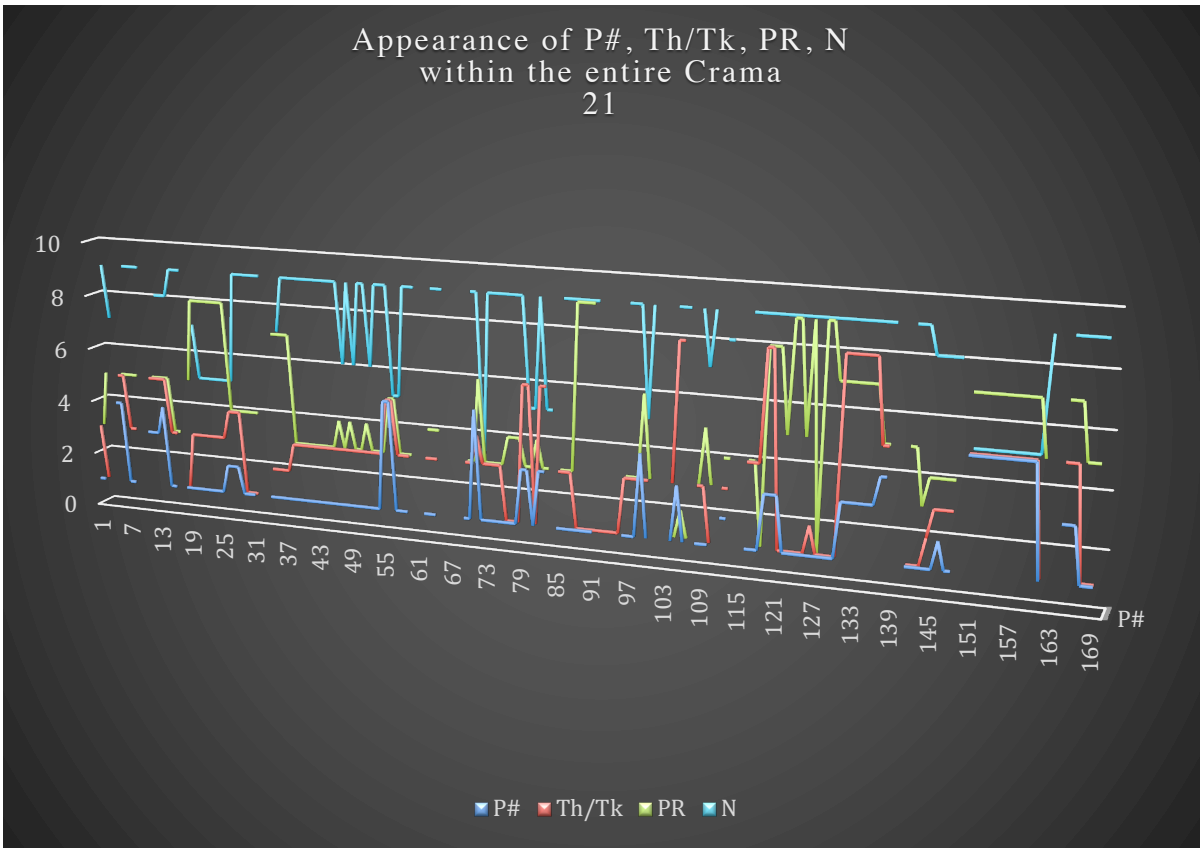
Figure 19
Bars 134 - 168
10
8
6
4
2
0
135 137 139 141 143 145 147 149 151 153 155 157 159 161 161 163 165 167
P#
P# Th/Tk PR N

Figure 19 begins and ends with the same values, one and nine. Note the simultaneous appearance of these values through the discourse of this section. Due to their consistent occurrence, one and nine are the most critical values in Figure 19. The regular appearance of these two values relates to two observations about Figure 19: 1) The number of partials is almost always one, meaning the disappearance of harmonic partials is essential to the existence of this section. 2) The amount of noise category, series five, is almost always at nine, showing the presence of noise to be crucial in this section. A closer look reveals the consistent appearance of either very high values, seven, eight, and nine in all categories, or very low values, one and three. This consistency proves the importance of the disappearance of harmonic partials, the density, and the level of noise in a sound-based composition such as Crama. In addition, the repetition of one and nine proves that repetition is a crucial element to form in a sound-based composition.

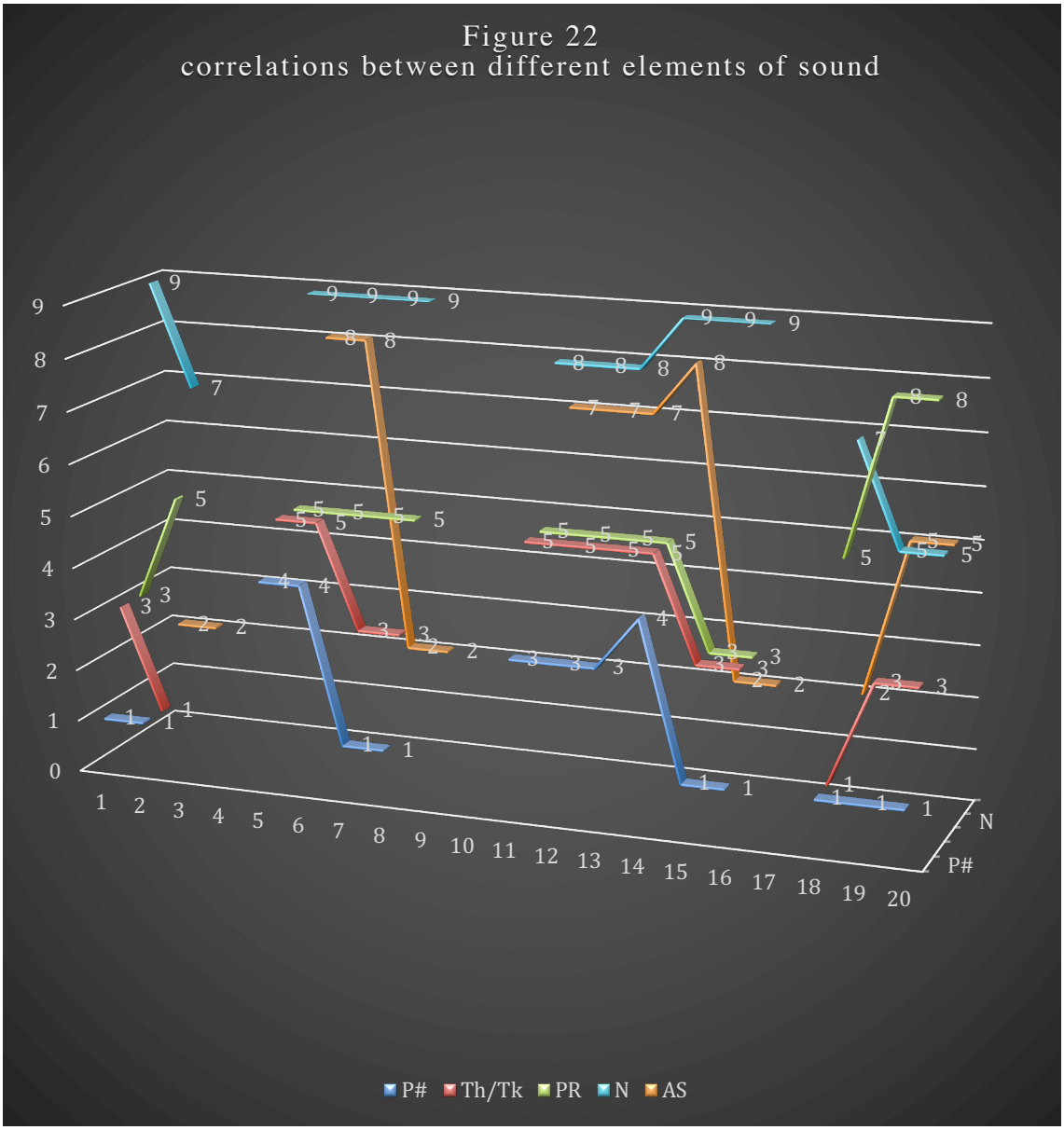


Unlike the other elements of sound in Crama, the noisiness of the flute stays at number nine, as high as possible. Also, unlike the other elements in Figure 20, the level of noisiness does not

drop. Kokoras's choice not to drop the level of noise at the end of Crama is evidence that noise is an essential aspect of the piece. Because Crama is a sound-based composition, timbre or noise functions as the primary element of form.

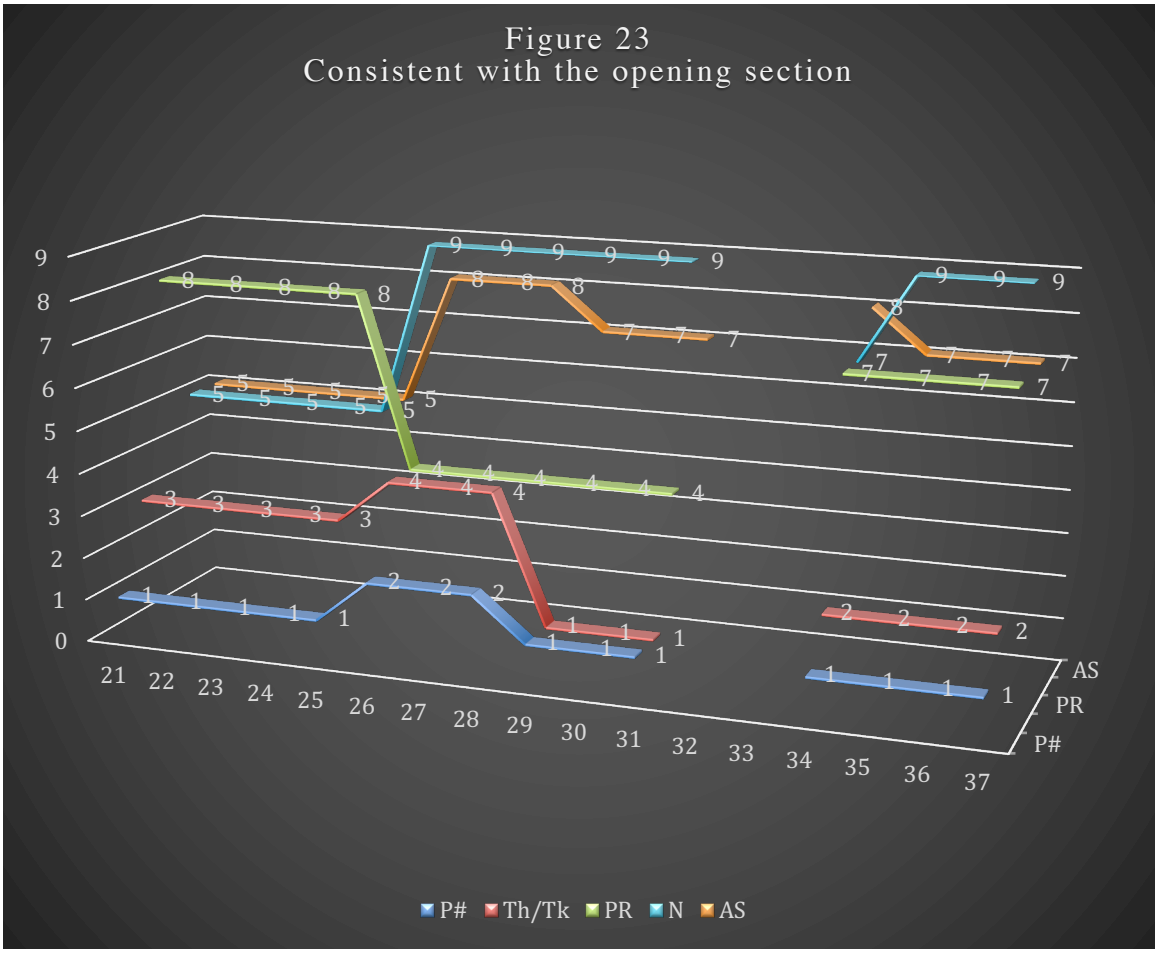


The progression of sharpness of attack (1 = gentle, 9 = sharp) in the flute



The new element, the sharpness of attack, orange, imitates the movement of some of the other elements. This new element has parallelism and contrasts with others, resulting in a sense of correlations between different aspects of sound. Thus, the complex relationship between different elements of sound adds to the quality of the sound in the flute. Notice the proximity between the number of partials and thinness and thickness of sound in bars 11 – 16, as thinness

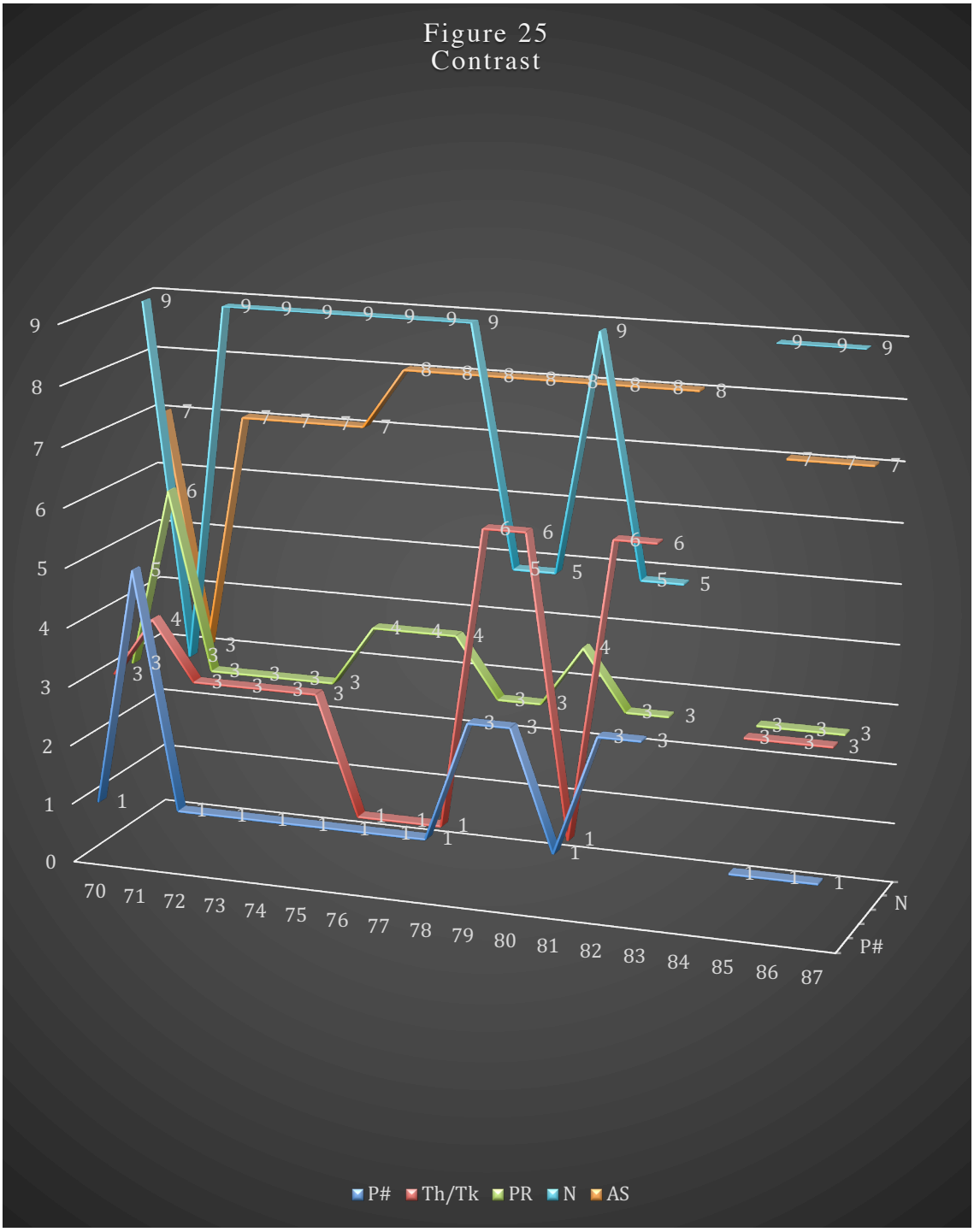
and thickness of sound category disappears.



Similar to Figure 22, the correlations between different elements of sound reappears in Figure 23. There is consist creation of sound across these two sections. The unity of sound production in Figures 22 and 23 contributes to the importance of timbre as a form-bearing element in sound-based composition Crama.

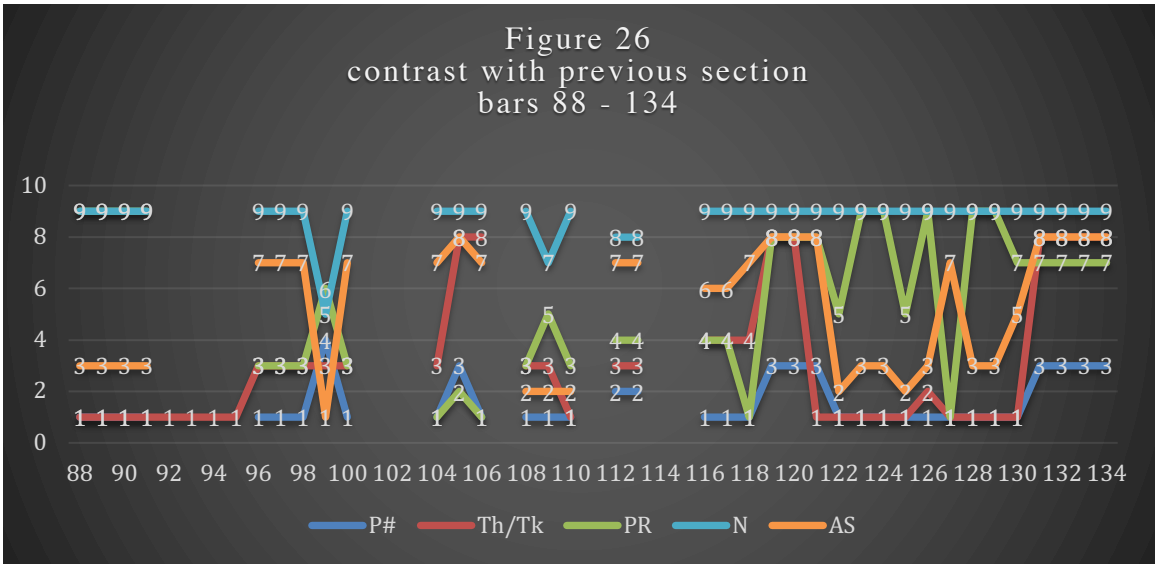
The imitation, correlation, and contrast between all five elements of the sound continues. This continuity contributes to the construction of sound in the flute. Thus far, all sections suggest consistency in terms of the correlation between different elements of sound, promoting the idea

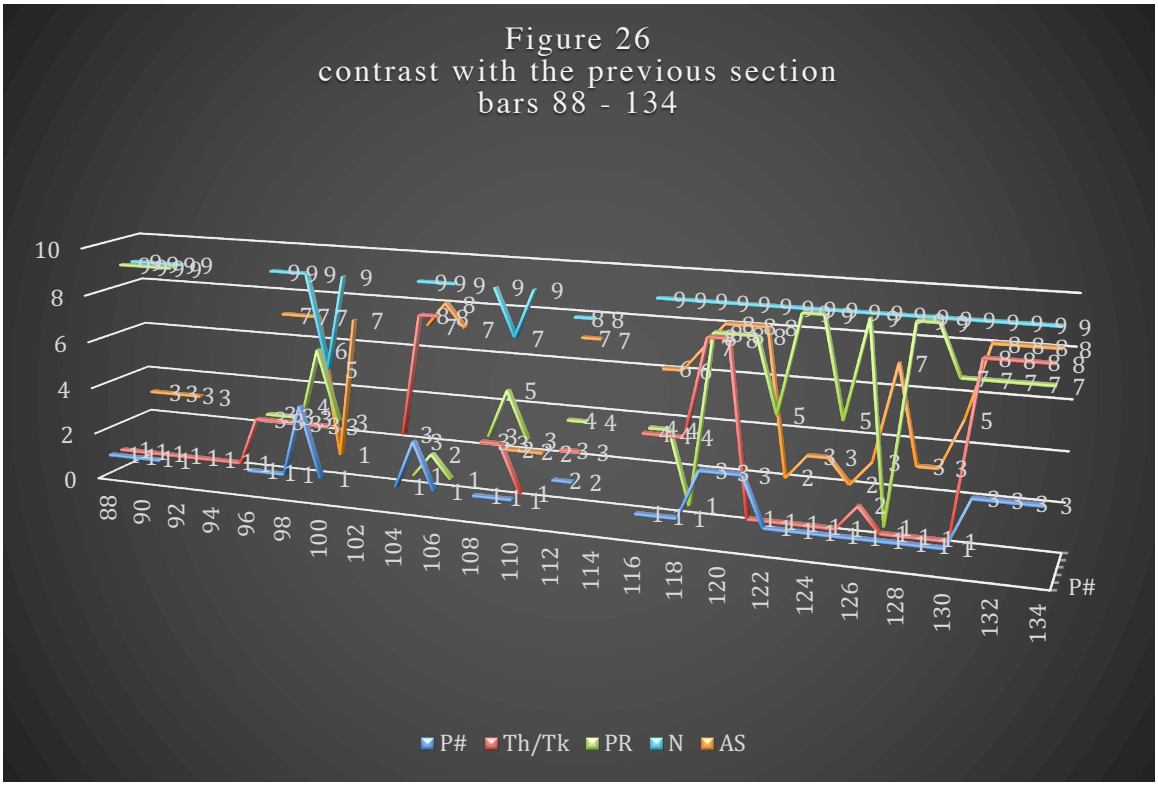
that the choices were not random in the construction of sound, which is true not only within each element but also correct when comparing different elements.



In Figure 25, the level of parallelism and contrast is almost a variation of Figure 24. The notion of change from one section to another resonates with transformational variation as a fundamental

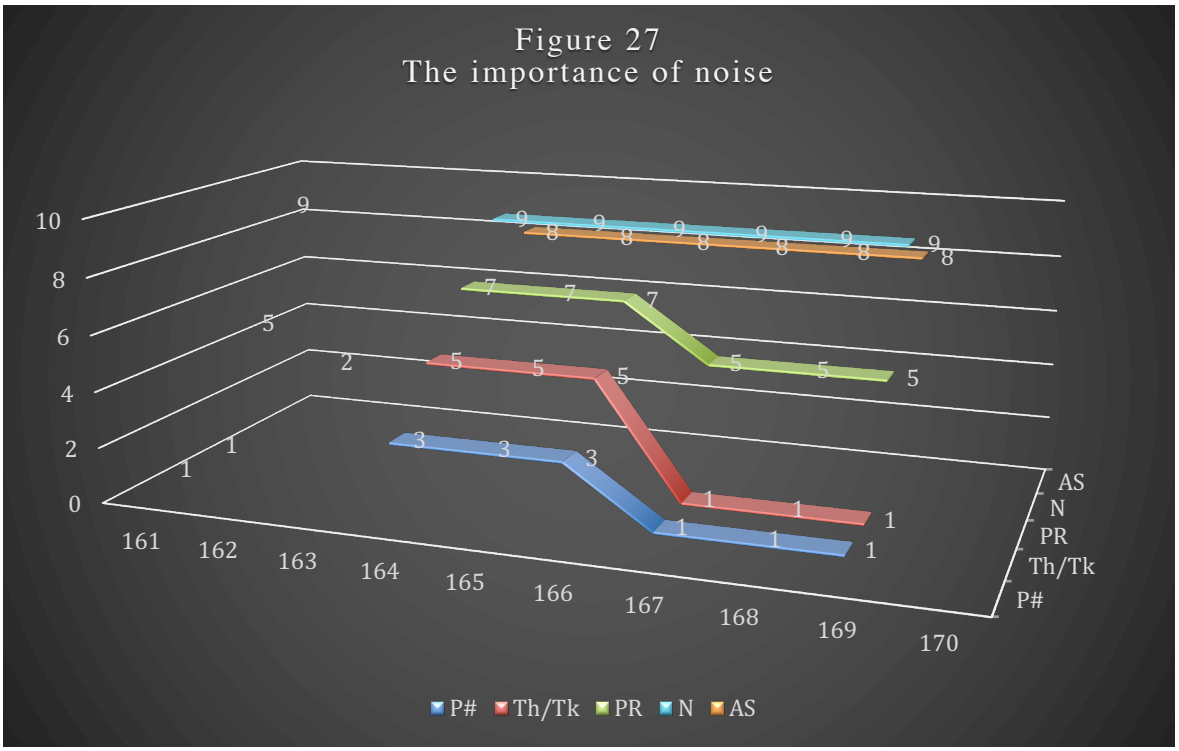
process in this piece. Additionally, the variation between Figures 24 and 25 contributes to the continuity of sound, which supports structuring form in Crama.





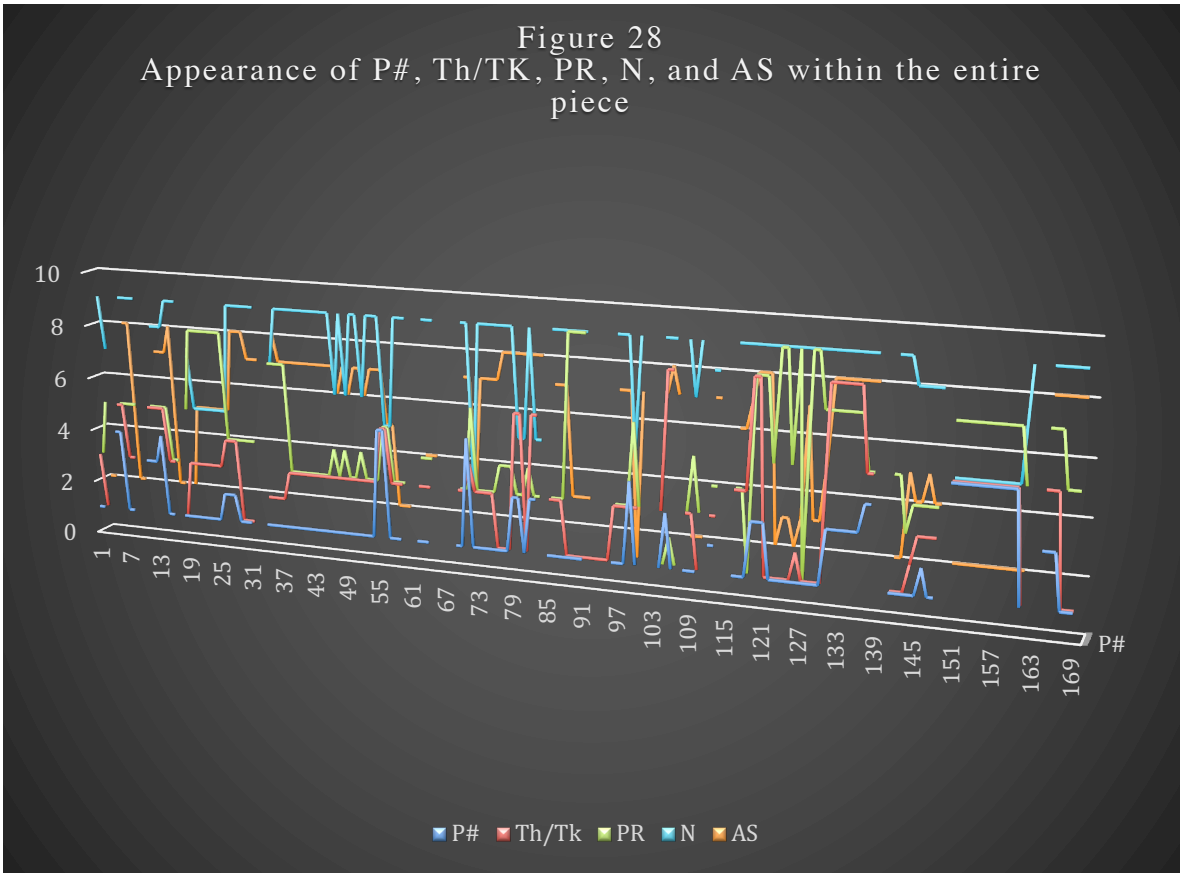
There are more parallelism and less contrast between the contributing elements of sound in this section. This contrasts with Figure 25, which presented more contrast and less parallelism

between the contributing elements to the sound. In other words, there is a contrast between the timbre in Figures 26 and 25, and thus, the contrast contributes to the creation of the form in Crama.

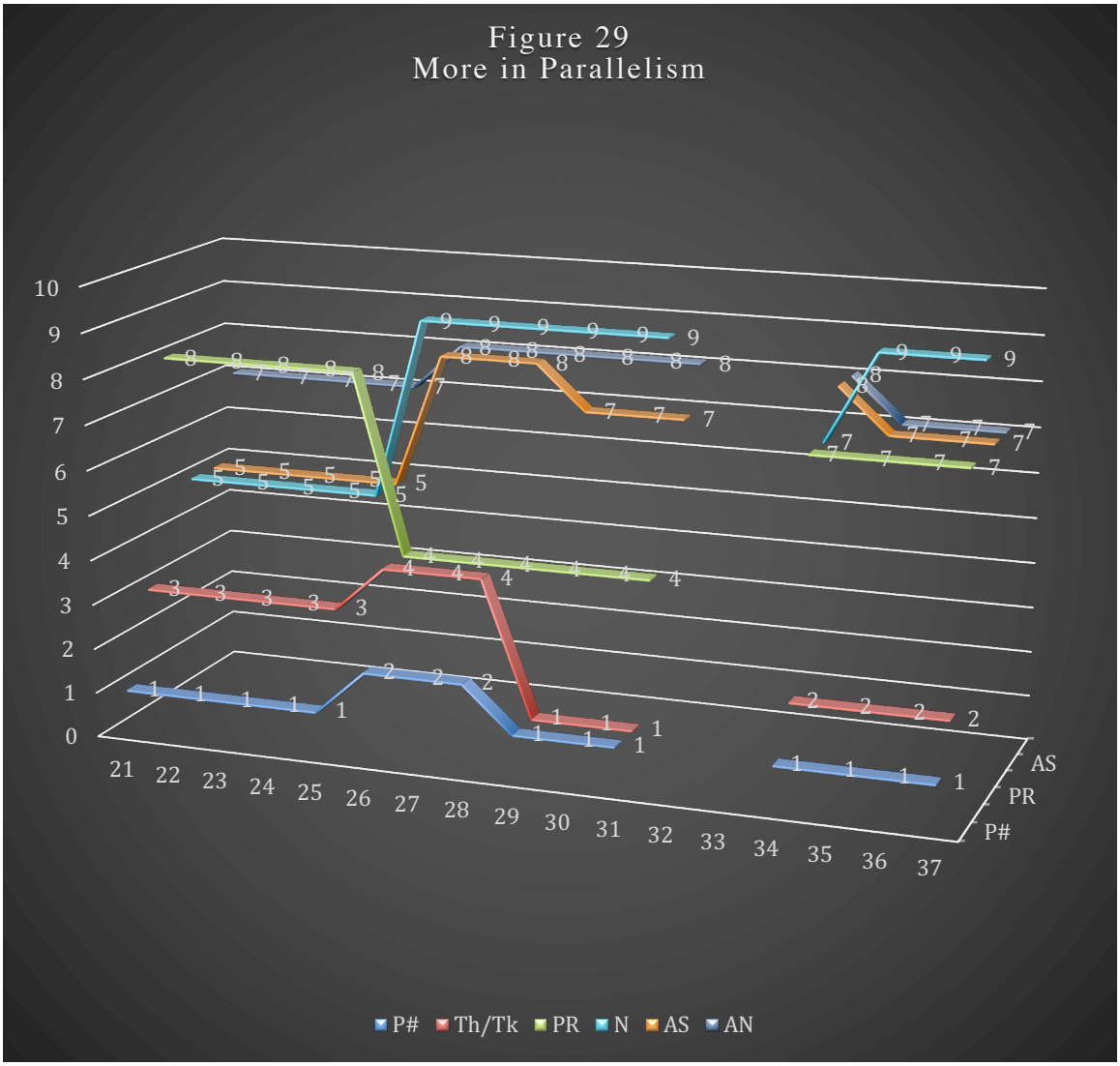


The sharpness of attack category stays stagnant in bars 164 – 170. We have observed the lack of spikes and drops numerous times in the flute in this category. This can bring two points to the fore: 1) The importance of the nature of the attack and its contribution to creating noise as part of timbre. 2) The contrast in activity between this category and others helps create the construction of timbre in the flute. These points suggest, therefore, that the sharpness of attack is an essential element in the creation of noise in the flute in Crama.

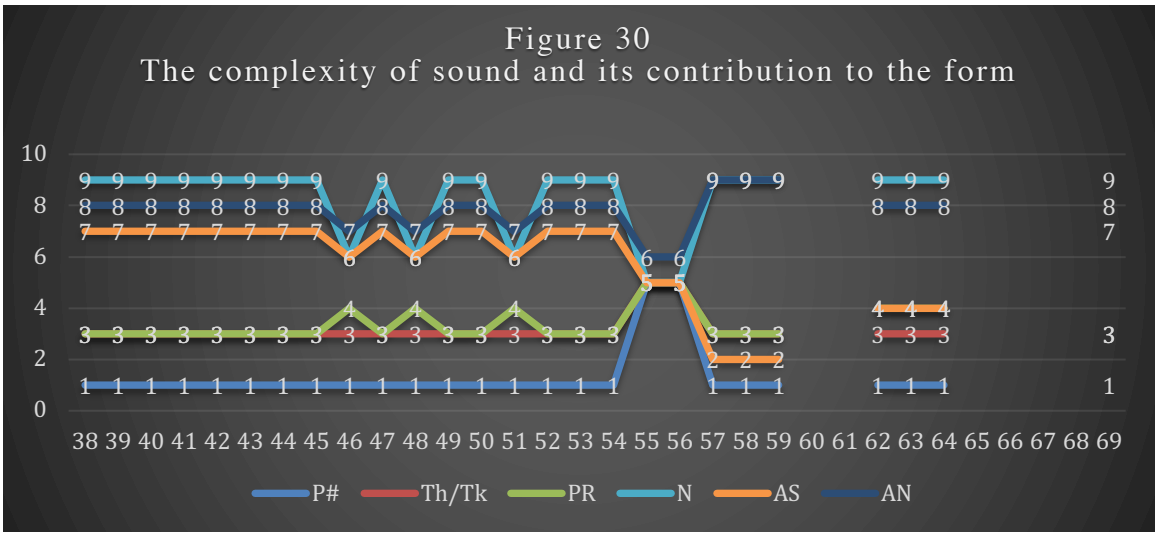
Figure 28
Appearance of P#, Th/TK, PR, N, and AS within the entire piece

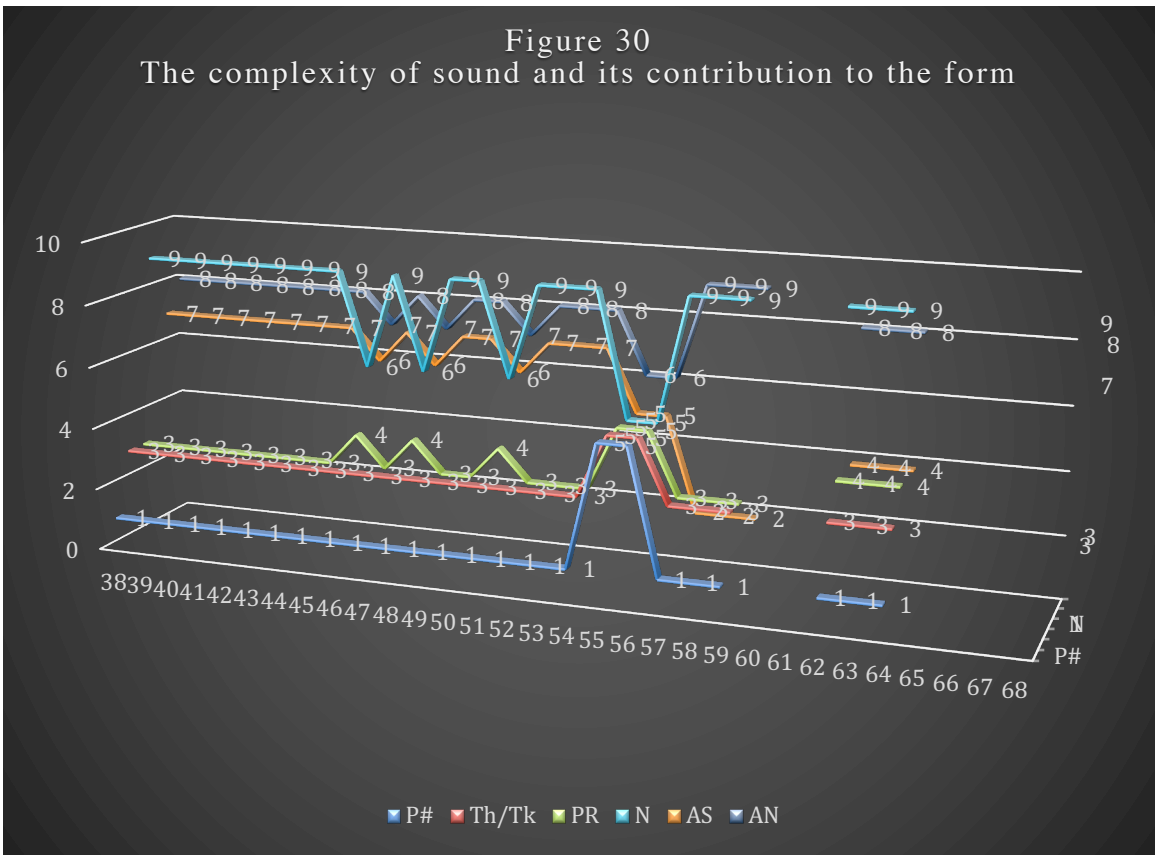


The progression of noisiness of attack in the flute (1 = non-noisy attack, 9 = noisy attack):



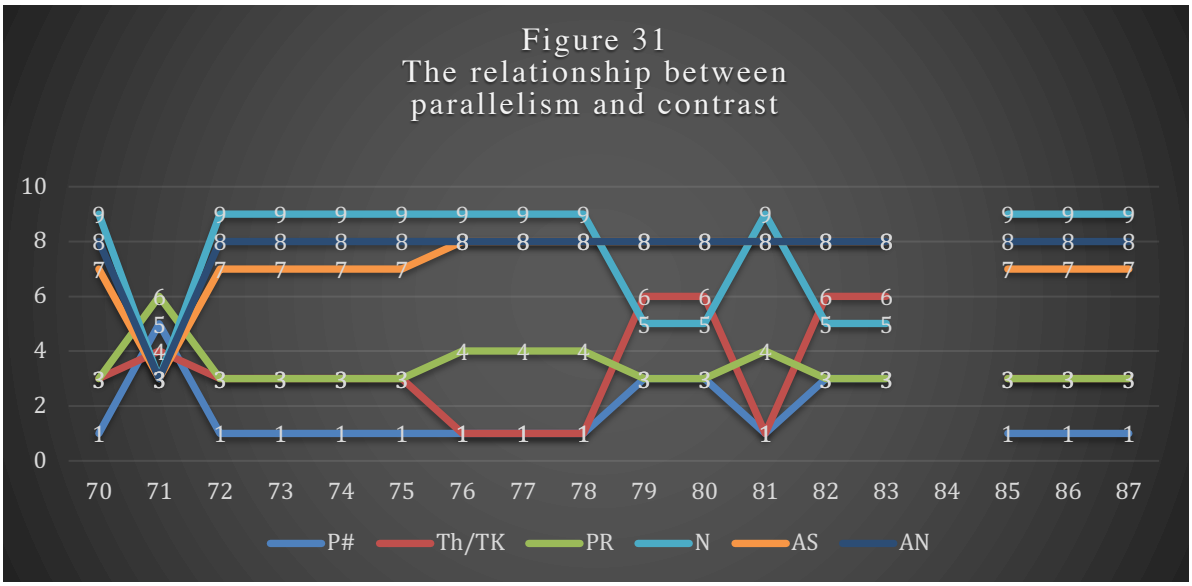
The amount of parallelism and imitation is greater than the amount of contrast in Figure 29. Moreover, the amount of parallelism and imitation in Figure 29 is more than in Figure 22. This shows consistency in parallelism between bars 1 – 20 and 21 – 37. The repetition of a low ratio of parallelism to contrast from Figure 22 to 29 supports the importance of parallelism and imitation in these two sections. This repetition also helps the continuity of noisiness of attack in the sound of the flute.

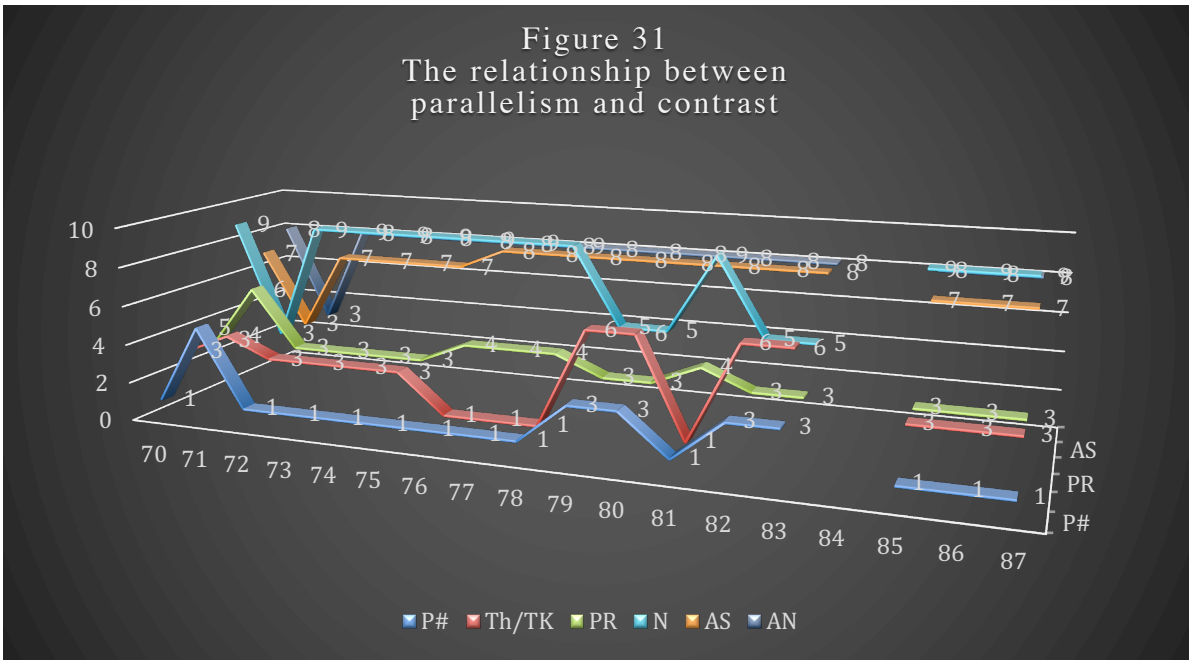




The levels of parallelism and contrast between different elements of sound continue to evolve in this section. There are many different relationships between different elements of sound in Figure 30. For example, whenever the number of partials is at its lowest, the level of noise is at its highest, nine. As the number of partials increases, the level of noise decreases, showing an

inverse relationship. However, this relationship does not follow in all sections. The direct and indirect relationships between different elements of sound contribute to the modification of timbre. These relationships create similarities and contrast between different sections in Crama.



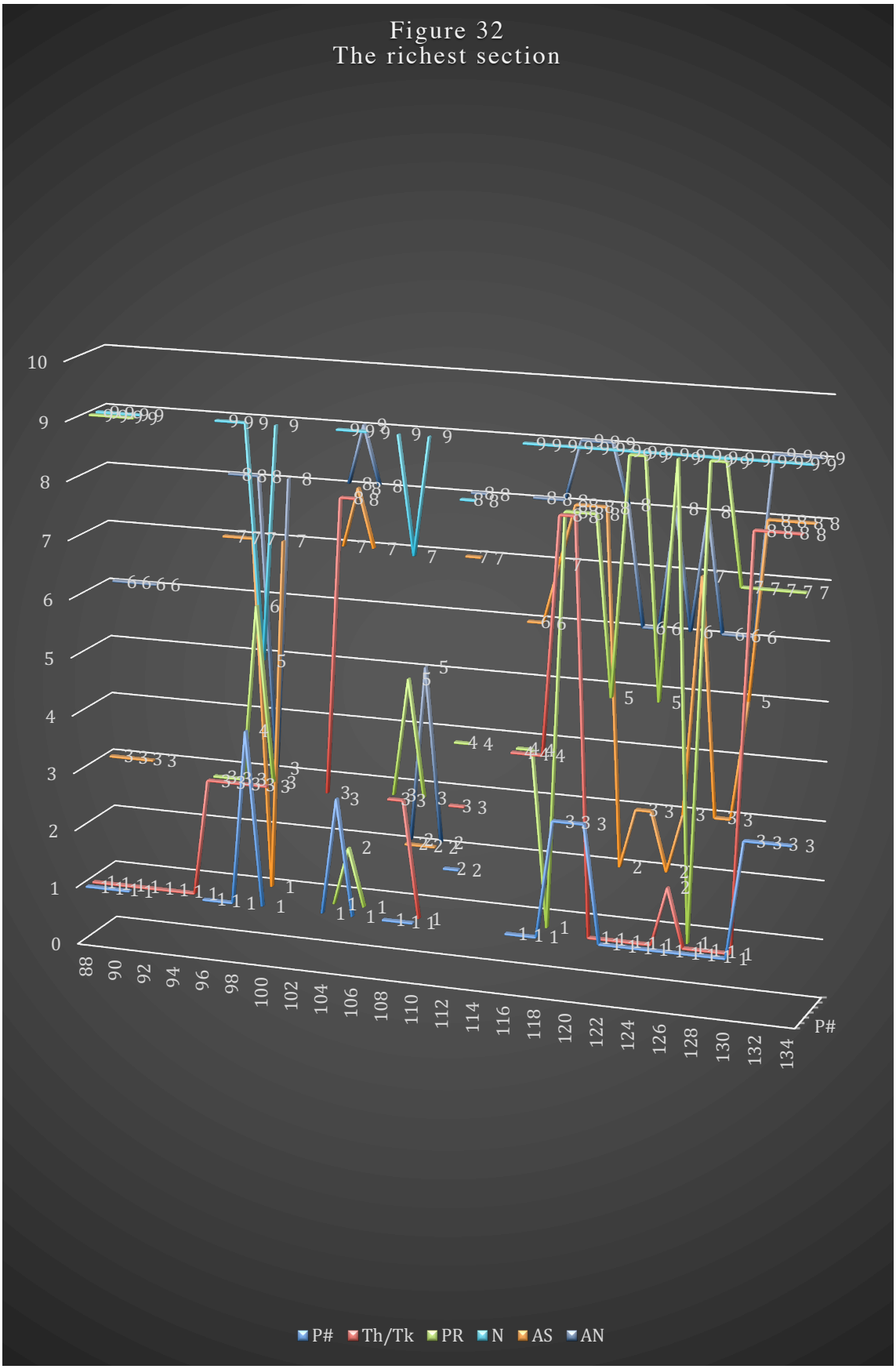


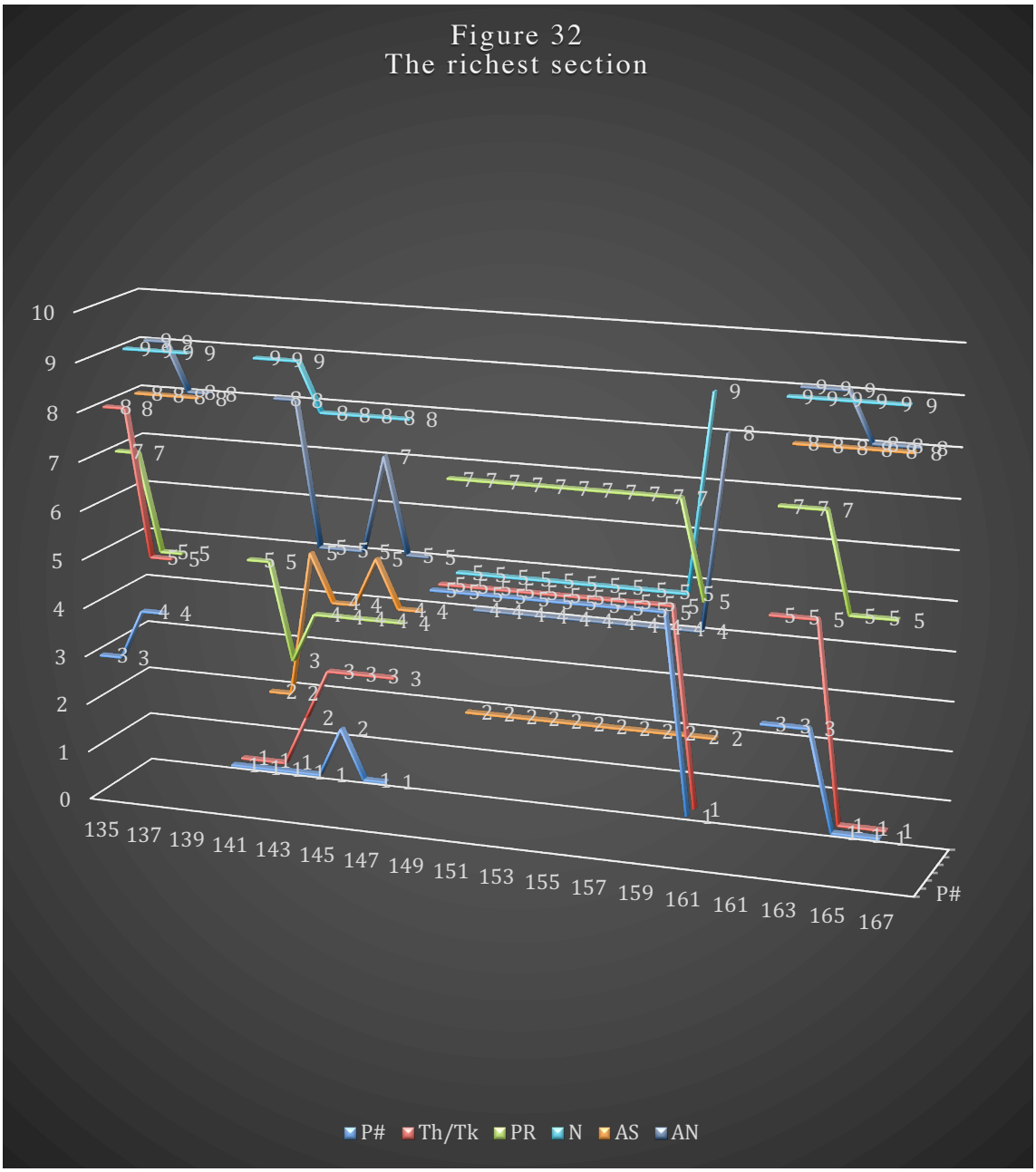
The level of parallelism remains highly active between the contributing elements to the quality of sound in Figure 31. The level of contrast balances the parallelism in this section, as it does in

almost all sections in Crama. There are 9 bars of parallelism, bars 72 – 75, 76 – 78, 79 – 80, 82 – 83, and 85 – 87, and six bars of contrast, 70 – 72, 75 – 76, 78 – 79, 80 – 82 between the contributing structural sound elements in Figure 31.

The balanced relationship between parallelism and contrast contributes to the anatomy of timbre in all sections. This evolving relationship creates shapes, phrases, sections, and form in Crama. Therefore, in a sound-based composition, the relationship between parallelism and contrasts can foundationally contribute to shaping form.

Figure 32
The richest section





As previously mentioned, Figures 32 is the richest sections in terms of arc variety. This variety is the result of an evolving relationship between the parallelism and contrast of different contributing elements of sound. Thus, the relationship between parallelism and contrast is not only one of the perquisites of shaping phrase—and timbre as the primary element of phrase—but it also contributes to the form of sound as well. In this way, parallelism and contrast are among the tools essential to creating sounds as well as forms.

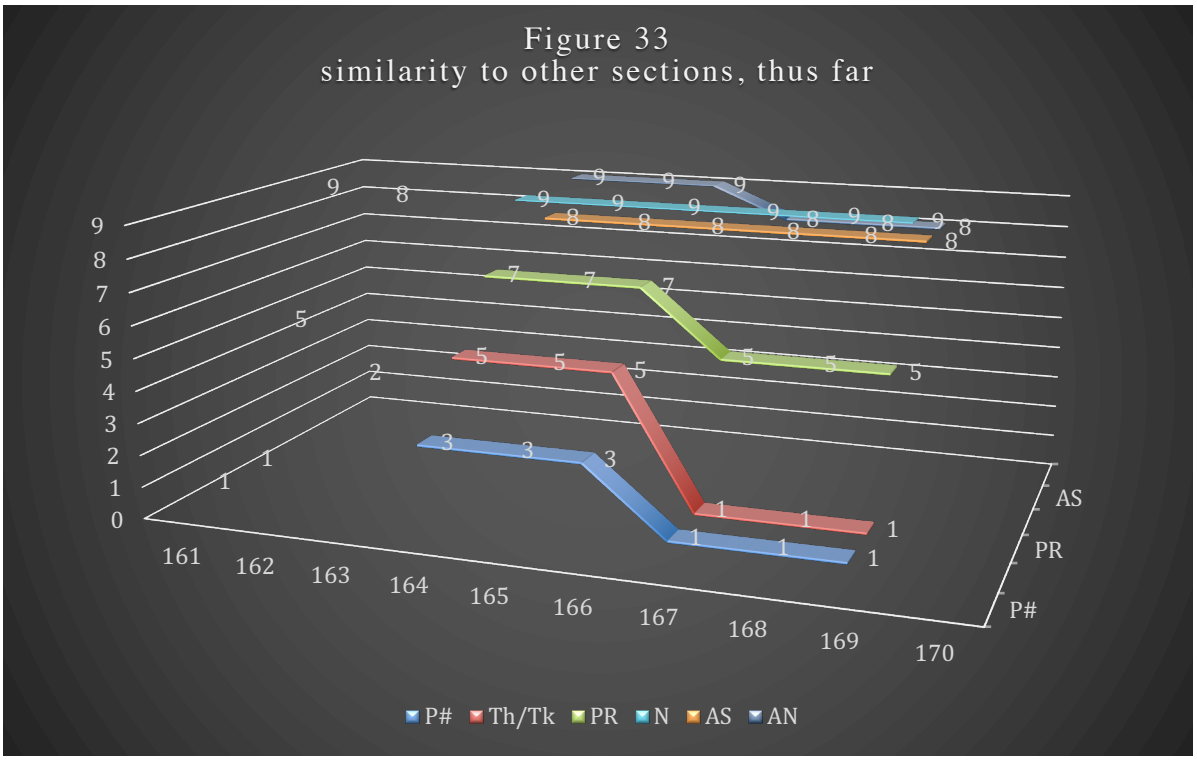
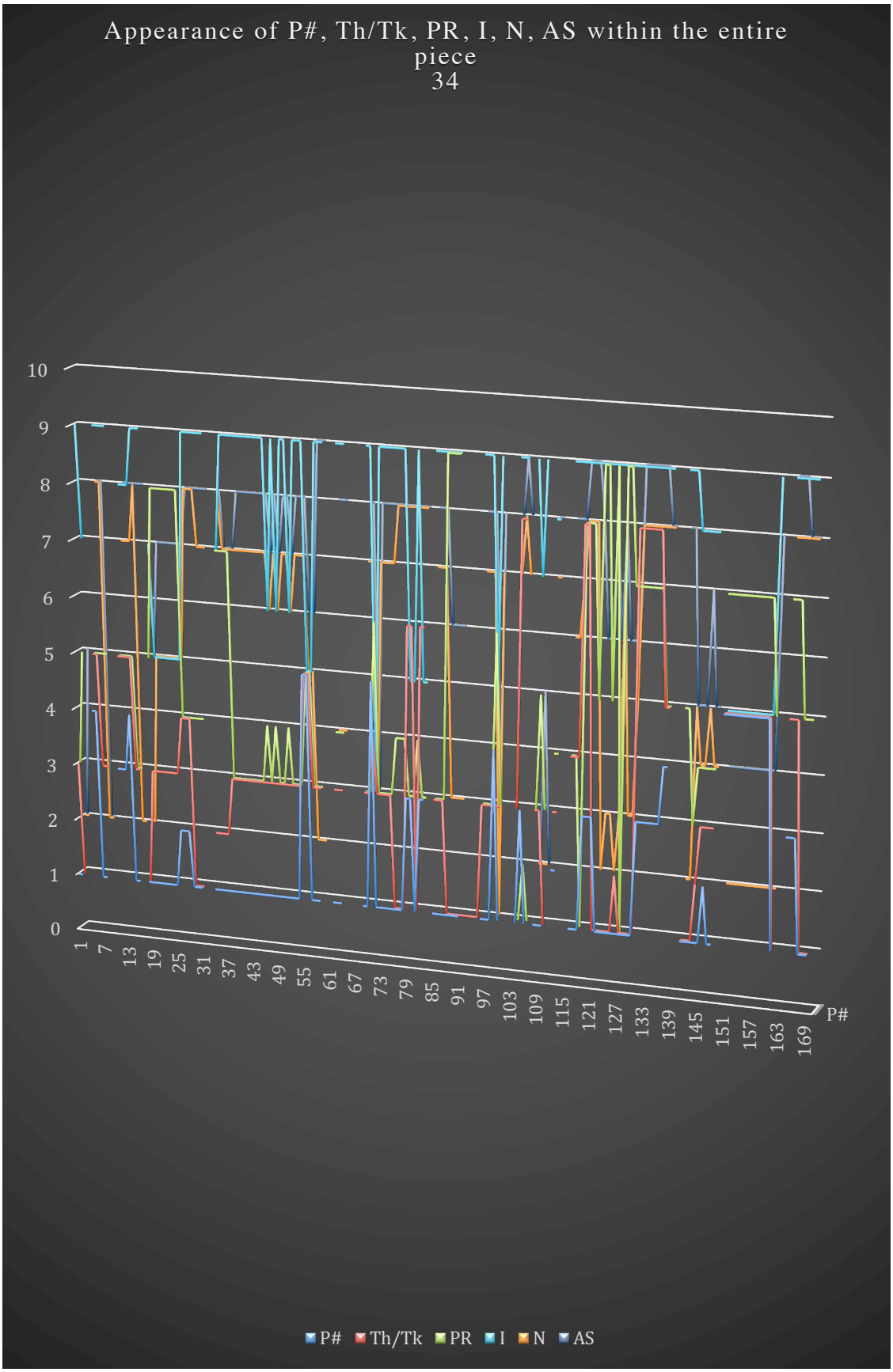


Figure 33 demonstrates a decrease, from nine to eight, in the noisiness of attack category and the sharpness of attack category. However, this is a mild drop when compared with number of partials, thinness and thickness of sound category and range of partials category. As the number of partials, thinness and thickness of sound, and range of harmonic partials drop, the amount of noise, sharpness, and noisiness stays essentially stagnant. This relationship is similar to ones in Figures 19 and 11. The similar and consistent behavior in the ending section relates to the consistent importance of noise through a sound-based composition like Crama. A closer look reveals that number eight is the most repeated value in Figure 26, the opening section. Figure 29 also ends with value eight. The way in which the number eight bookends the section argues for a logic behind this consistency, and how it is essential to form. The repetition connecting the beginning and ending relates to timbre as a critical element of the form in Crama.


Appearance of P#, Th/Tk, PR, I, N, AS within the entire piece
34
10
9
8
7
6
5
4
3
2
1
0
1
7
13
19
25
31
37
43
49
55
61
67
73
79
85
91
97
103
109
115
121
127
133
139
145
151
157
163
169
P#
P#
Th/Tk
PR
I
N
AS