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The Jazzomat Graph Analysis on "Billie's Bounce" By Charlie Parker

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Practising improvisation is fundamental in obtaining an ideal desired sound. Some would think that improvisation is impromtu, but in reality, most professional musicians have sufficient knowledge about how improvisation should be carried out. Jazz education has been taught widely in schools and universities by using a combination of codified notation materials, theory, recordings, and ensemble practices. This study aims to find out the way Charlie Parker improvises in terms of using motives towards phrase development in the song "Billie's Bounce". A qualitative and quantitative approach is used by having an analysis of musical notation and the phrasing development. Results were obtained by utilizing the conventional notation and also using the *5 Jazzomat Graph,* which is the extended chordal pitch class graph, pitch-class graph, semitone interval graph, fuzzy interval, and duration classes graph. Based on the score analysis, it is found that Parker begins his solo by starting with a small or simple pattern obtained from the neighbouring tone, chromatic notes and develops a more complex passage later in his solo. The data gathered from the literature review, analysis of the music score, and the graphs help to determine the phrasing and improvisation development of Charlie Parker's improvisation and will be used as a practicing method and guideline for performers.

Key words: *jazz scales, improvisation, practice behavior,*

Introduction

Musicians have always improvised (Frith, 2010). It is true that musicians have always improvised but sometimes we might not realize that we are improvising. Improvisation is a creative artistic process (Tajuddin et al., 2021). Improvisation is not a genre with rules, it comes from deep inside you (Frith,2010). *"Improvisation is like an aural process while the ideas of jazz improvisation are different than making sketches of the notation. This is where aural inspiration takes precedence over the written notation, gives free expression which is a characteristic of jazz"(*Campbell, 1991, p.177) Improvisation makes jazz different from other traditional forms. This is affected by the knowledge, technical virtuosity and the idea to interact with others to create music on the spot.

Thus, if we were to watch performances between two performers, they will not sound alike, as the key of jazz is improvisation; and how they interpret that varies due to the musician's knowledge, skills and experience. The different expressions and feels different in each performance is one of jazz music's values (Palmer, 2013).

Jazz musicians always have their own sound and style which will make it unique. For example, Miles Davis's trumpet playing is different from Louis Armstrong playing. We know that both are great trumpeters, but their style and their produced sound is different. In jazz, we might find that there are numerous recordings of the same song but each of them will not sound the same (Smithsonian Jazz). Billie's Bounce is a jazz composition that was composed by Charlie Parker in 1945. This repertoire is in the form of 12 measures of F blues. This song was said to be dedicated to the secretary of Dizzy Gillespie's agent, Billy Shaw. "The original recording was inducted into the Grammy Hall of Fame in 2002" (Kuvo, 2019). As we all know, most of the repertoire in the past has added some lyrics or new arrangements by the musicians nowadays. That also happened to this song that had been added words and was sung by Eddi Jefferson in his 1999 "Vocal Ease" album (Kuvo, 2019). Other than Jefferson, Jon Hendricks also did write some lyrics for the song and sang it with his daughter on the DVD "Tribute to Parker " (Kuvo, 2019). The original recording was played by a great lineup of musicians, Charlie Parker on alto saxophone, Mile Davis on trumpet, Dizzy Gillespie on piano, Curley Russell on bass and Max Roach on drums

Methods of Data Collection

Qualitative and quantitative methodology were used in the study. The qualitative method is a method that is expressed in natural language. As we are all aware, qualitative, and quantitative are their respective antonyms. Therefore, quantitative expressions are expressed in numbers and in statistical models. This method often focused on particular individuals, events and contexts lending itself to an idiographic style of analysis and also to a nomothetic style of analysis. Qualitative methods are also more likely to focus on the researcher's point of view rather than quantitative methods that can be generalized across a larger population. The inference from qualitative work is based on bits and pieces of non comparable observations that address different aspects of a particular problem. Quantitative methods are very different from qualitative methods but they can work together well. The quantitative method is a systematic investigation of phenomena by gathering Quantifiable Data and performing statistical, mathematical or computational techniques. An example of a quantitative method is by handing out surveys to the participants. In this case, a quantitative method is a way to count motives and the development of improvisation in Charlie Parker's improvisation.

Results

Phrasing is a way to emphasize the concept or the theme, or even the message that is meant to be told from the composer's intention. This is commonly indicated by having a musical notation in the music sheet called phrase marks or phrase marking. In most saxophone pieces, there are no phrase marks so it depends on the musician on how they want to express their music.

Figure 1. Music Score

Figure 1 shows what the music score looks like. The score is in the key D for alto saxophone's key. The concert key is in F dominant. As you can see, the chords represent the blues scale not the major scales. It is because in D major scale, we does not have a G# but in blues scales, we do have G#. In order to know about blues scale, we need to know the formula of the blues scale which is, (1 b3 4 #4 5 b7).

From the original recording, Parker often uses Dmaj7 scales in the first measure although it was supposed to be D7. In the first 7 measures, Parkers often include notes from a guide tone line, voice leading, that follows F# in the tonic chord to the F in the subdominant chord (Peter, 2011). "Parker used a licks-based approach to improvisation but was adept at altering the licks in his vocabulary, in many creative ways. His sense of harmonic placement was flexible, he often seemed to be mentally altering durations of chords, either hitting them early or prolonging them or adding progressions that were not part of the accompaniment." (Peter, 2011))

Improvisation 1

Below is the first solo part from Charlie Parker's improvisation of this song.

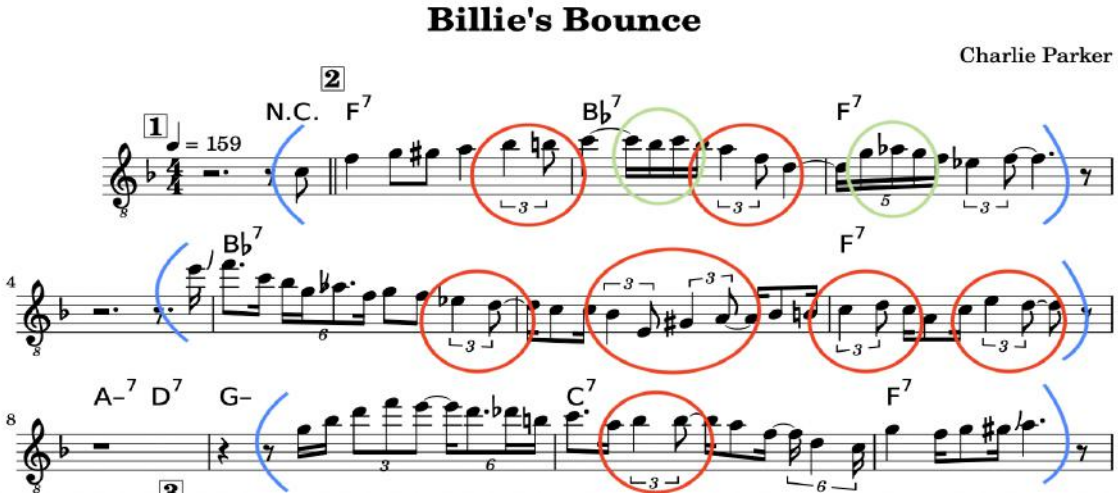

Figure 2. *Billie's Bounce chorus 1*

As you can see the one that is marked in blue is the phrasing that Charlie Parker did in his improvisation and as this song is only in a 12-bar blues, it is found that in this improvisation part, Parker's only have three phrasing of his solo. The first one is on the measure 1-3, second is at measure 5-7 and the third one is at measure 9-11. From this findings, you can see that Parker set his goal to solo on 3 measure then rest one measure which we can also found repetition of Parker's style in producing his solo part which make his solo more consistent and organized.

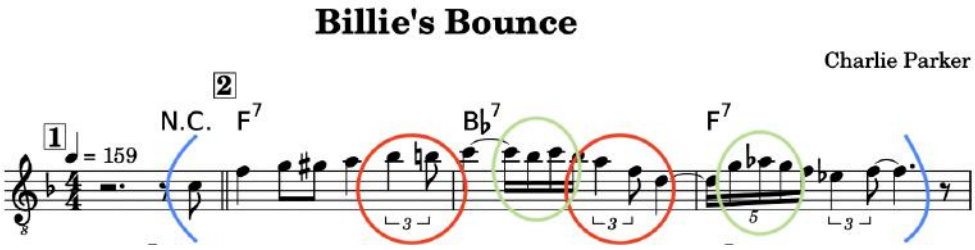

Figure 3. *Billie's Bounce Chorus 1, phrase 1*

In this phrase, Parker's trademark in improvisation can be seen in measure 1 & 2. He also used these licks, 8 years later in his solo on "Now's The Time". Most of his improvisation parts have this line which is quite famous for other musicians as it has its own development of style, the rhythmic structure that can be considered as intermediate and also the choice of notes is not too hard for a saxophonist to play his solo. Other than that, this pattern can also be used by other musicians, not necessary for saxophonists as this pattern can be applied in many other scales.

Below is the example score of Charlie Parker's improvisation in "Now's The Time".

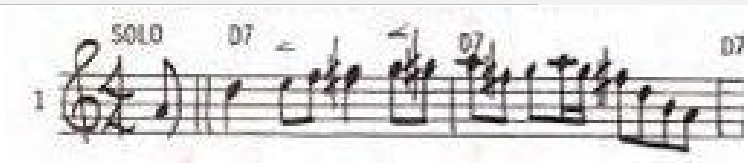

Figure 4. *Now's The Time Solo, measure 1-2*

From the phrase, the choice of notes are varied as Parker used semiquavers in measure 2 and quintuplet in measure 3. Following the rhythmic structure, note F is the most played note in this phrase, which was played 4 times compared to the second most played note which is C, Bb and G.

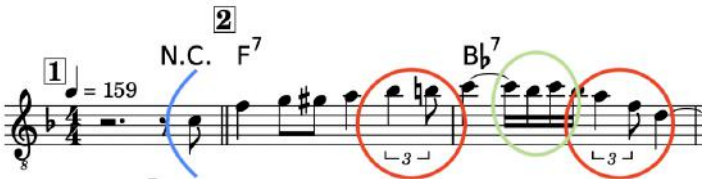

Figure 5. *Billie's Bounce Chorus 1, phrase 1, measure 1-2*

The opening section of this phrase which is the line in measure 1 and 2 is similar to the head of "Ornithology" which was actually written by Benny Harris. It is said that Harris got that opening licks from Parker's solo. There is also a line from the song "Ornithology" on measure 10, as Figure 6.

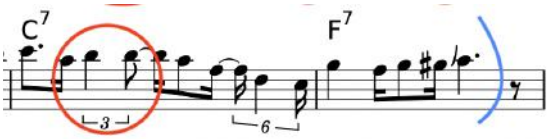

Figure 6. *Billie's Bounce Chorus 1, phrase 1, measure 10-11*

Other than that, there is also a repetition of rhythm in the phrase in beat 4 of measure 1 and in beat 3 or measure 2, the one marked in red.

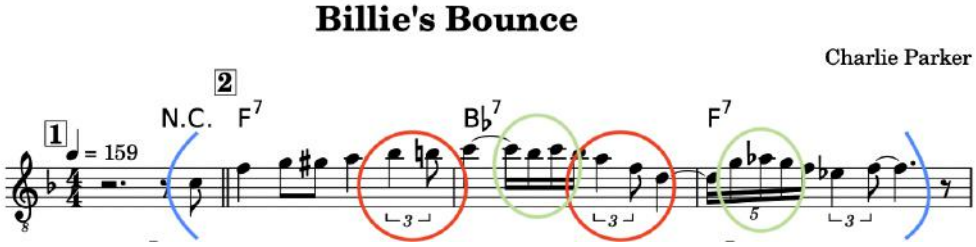

Figure 7. *Billie's Bounce Chorus 1, phrase 1, rhythm*

The repetition of the rhythm is triplet of a crotchet-quaver rhythm. There is also a similar pattern than showed up at beat 2 in the measure 3 but has a longer note as it is tied to a dotted crotchet. There is also a use of chromatic nuggets in the first phrase which is note G# and B in the F7 chord. In this case, it is acceptable to use that note in it as it does not use longer rhythm patterns such as crotchet or minim and it is used as a platform to go to the next note.

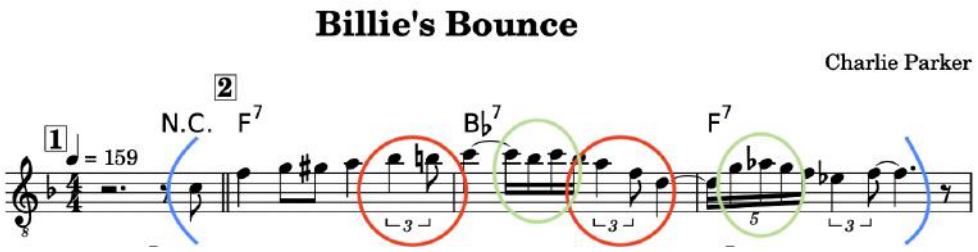

Figure 8. *Billie's Bounce Chorus 1, phrase 1, neighbouring tone*

Next, Parker also use neighbouring tone style, marked in green, which is in the measure 2 and measure 3. In measure 2, Parker use neighbouring tone of note C to Bb while in the measure is the uses of note G to Ab.
Throughout the phrase from measure 1-3, you can see a rhythmic development from using only crotchet and semiquaver going to quintuplet in measure 5.

On the next part of the first improvisation, the same repeated rhythm of a crotchet-quaver triplet appears in beat 4 of measure 5, beat 2 & beat 3 in measure 6 and beat 1 in measure 7.

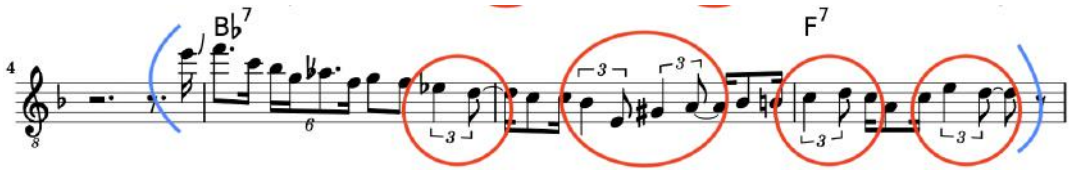

Figure 9. *Billie's Bounce Chorus 1, phrase 2, rhythm*

In this phrase, Parker start using more complex rhythm such as sixtuplet in measure 5 and many more syncopated rhythm. Choices of notes in this phrase are varies but Parker mostly played note C and D as this phrase is a II-V-I progression to A7 so these notes are notes that can be played throughout the phrase.

Moving on to the third phrase, which is the last phrase in the first improvisation part. Below is the score of the line.

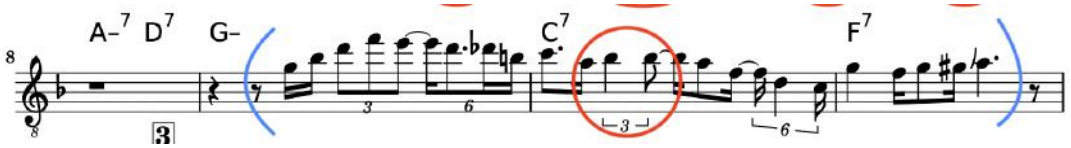

Figure 10. *Billie's Bounce Chorus 1, phrase 3*

Parker use complexity in the opening of this phrase which is on the rhythmic line and also choices of notes. This is because the highest note in this phrase is F which is quiet high for saxophonist. In the measure 9, Parker actually just played chord tone of the G-7 and touch a Db on the sixtuplets in order to lead into the next chord which is C7. On the C7 chord, Parker applies the repeated rhythm again which is quiet common rhythm in the whole improvisation part.

In the notation part, the most played note is the note F and Bb as this repertoire are in the key of F so it is the very basic note that is a good start to improve in this section.

Improvisation 2

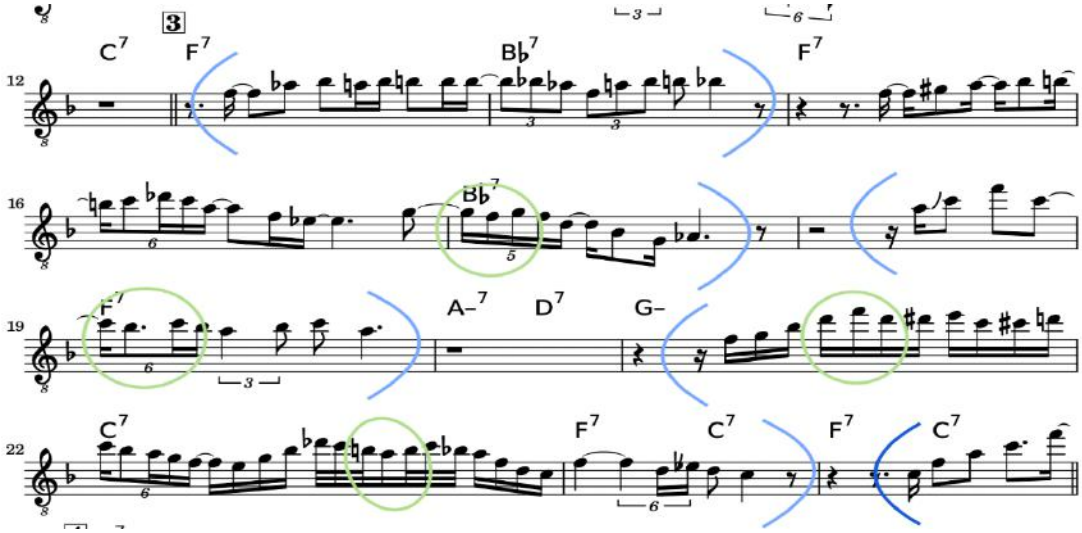

Figure 11. *Billie's Bounce Chorus 2*

Above is the second improvisation in this repertoire. In this improvisation, there are 4 phrases as Parker try to make rest so that he can take a breath to play the next line. The phrasings are marked in blue bracket which is on measure 13-14, measure 15-17, next is on measure 18-19 and the last phrase is on measure 21-23. From this arrangement of solo, Parker played a 2-3-2-3 measures of improvisation contrast with the 3-bar phrasing in the first improvisation part.

In this improvisation part, Parker mostly solo with the 16th note rhythm and triplet rhythm. This is because this song is in a fast tempo, relates to the characteristics of bebop and also to something that Parker famous at, precision in fast tempos repertoire.

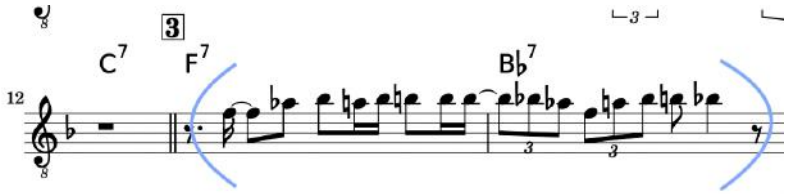

Figure 12. *Billie's Bounce Chorus 2, phrase 1*

Above is the first phrase from this second improvisation part. It is a very short F blues scales licks from Parker which is not common for him to use a blues licks in the first measure. This is because Parker usually plays a dominant chord in the first measure rather than a major chord. This phrase also portrays a repeated rhythm on the beat 3 & 4 in measure 1, which is the quaver-semiquaver rhythm, and triplet in beat 1& 2, in measure 2. From this phrase and compared to the first phrase in

improvisation 1, it is clear that Parker's style of improvising the opening is very similar. He starts with a very simple rhythm then develop into more complex rhythm to show his speciality in fast tempos.

Parker mostly used 16th note and a sixtuplet and quintuplet. There is also a use of chromatic notes which is G# to A and Bb to B natural in measure 15. Use of chromatic tones can help to develop the improvisation by using leading tone to lead to the next chord.
In measure 16, Parker use the Eb, to make the tonic chord sound more like a V7 over IV which puts some push into the Bb7 (IV7) in the next bar. This style has been applied to the beginning of the 12-bar blues form and Parker has many ways to enhance this effect. Firstly is by adding some tension notes like #5, b9 or #9 to the F7 chord. Next is by outlined C-7 to the F7, to set a "ii-V7" sound. Other than that, Parker also enhance this effect by implying Cb7 in replacement of F7 which is a tritone substitution. Lastly is by combining some of the ways above. These ways have the effect of forcing the F7 to sound more like a dominant chord instead of a tonic chord which leads towards a resolution on Bb7 in the next measure. Next is on the third phrase from the improvisation part. This phrase uses the least of notes changes compared to other phrases. Most of the notes are only note C, Bb and A but there is one F note in the measure 18. Basically, these notes are just the chord tone from the F7 and ends with A which fall on beat 4 of measure 19. Use of neighbouring tones also exist in the measure 19, a transition of C to Bb and back to C.

Improvisation
Figure 13 is the next improvisation part in this piece which is the third part.

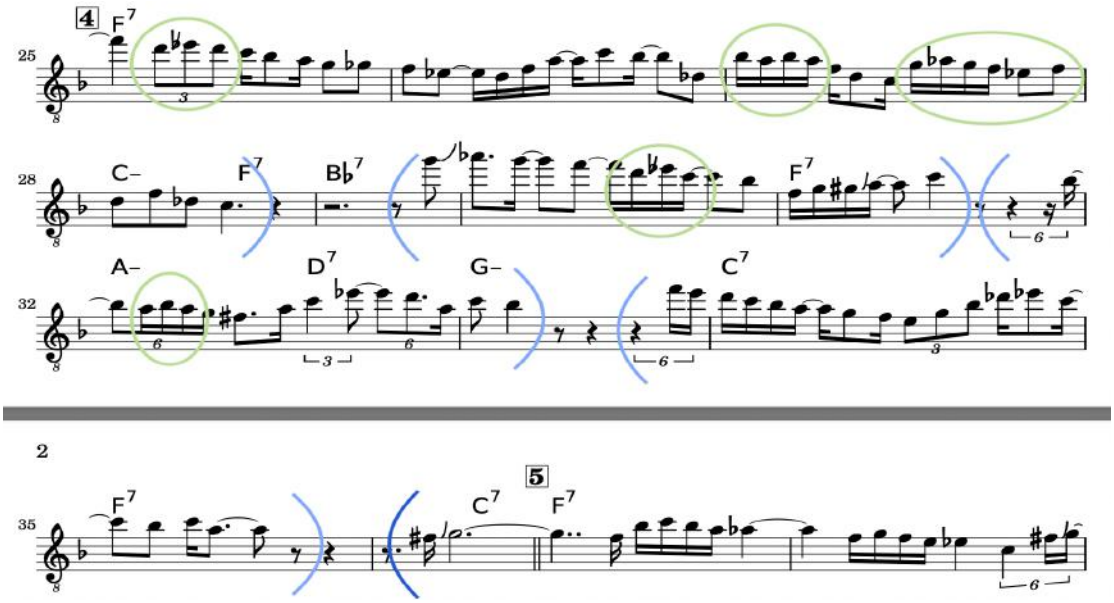

Figure 13. *Billie's Bounce Chorus 3*

From the above score, there are 4 phrases in this improvisation part. The first phrase is the phrase that has a pickup from measure 24 of the second improvisation part. As for the first phrase, which is on measure 24-28, is the longest phrase among all phrases as it took 5 measures of solo. There

are many repeated rhythms that were played but there is also a simple rhythm in the phrase which shows a balance in this phrase. The choice of notes is also not too high and not too low for a saxophonist to play.

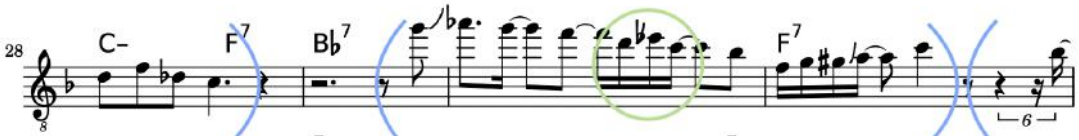

Figure 14. *Billie's Bounce Chorus 3, phrase 1*

In this phrase, use of high notes are applicable and the notes are also quiet high for the saxophonists. Therefore, stabilization of the tuning of the notes are very crucial as we need enough air and good air flow to play that note in tune. On the worst case scenario, it may squeaks which is something that saxophonists need to avoid. There is also one use of neighbouring tone in the measure 30 on the 16th note.

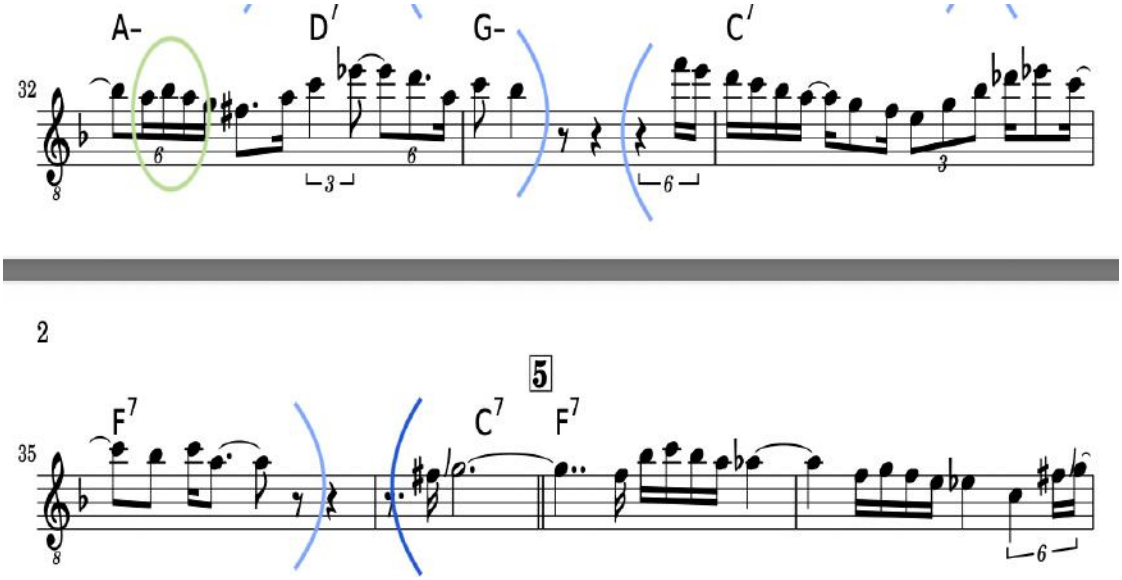

Figure 15. *Billie's Bounce Chorus 3, phrase 2*

In measure 34, Parker uses a b9 and #9 lick on the beat 4 which is one of the favourite device that use chord extensions. On the last measure of this phrase which is on measure 36, Parker pause on note G on beat 2. G is the fifth of the C7 and Parker hold this note to go into the next improvisation part.

Improvisation 4

Below is the last improvisation part from all the four parts of 12-bar form.

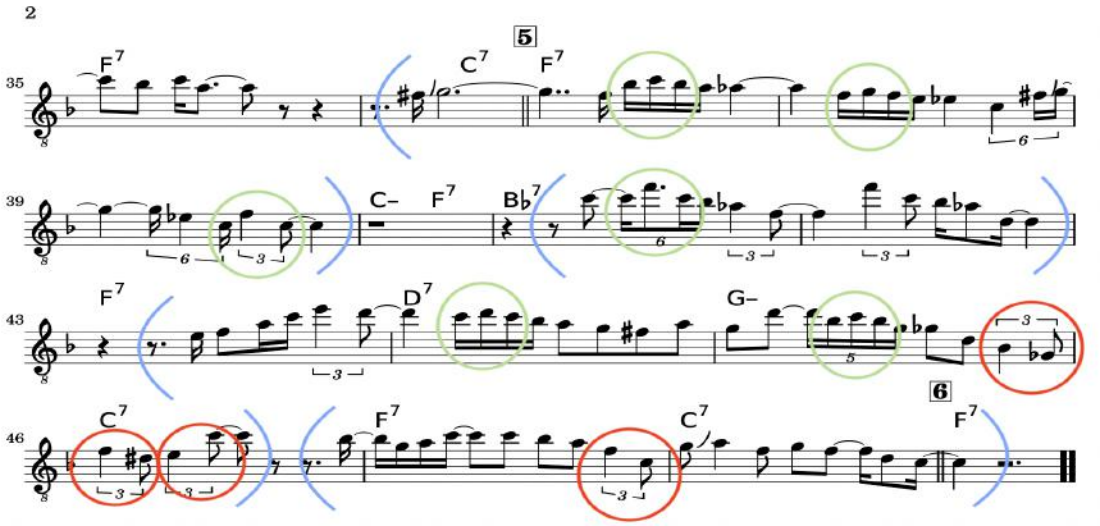

Figure 16. *Billie's Bounce Chorus 4*

From the above score, it is stated that there are four phrase in this improvisation part. The four phrase are pickup from the measure 36-39, measure 41-42, measure 43-46 and the last phrase is on measure 47-49. Below is the explanation for the respective phrase.

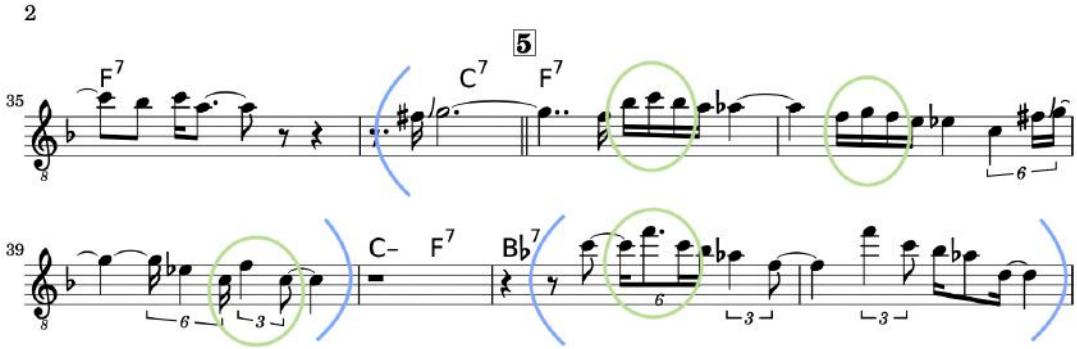

Figure 17. *Billie's Bounce Chorus 4, phrase 1 & 2*

From this phrase, we can see the style of Parker that play into the changes is where he did the pickup to the new improvisation part. Throughout this phrase, Parker mostly played a guide tone over the chord and the rhythmic development also not too complex like the previous improvisation part which mostly used the 16th note. This phrase use the concept of neighbouring tone on beat 3 in measure 37, on beat 2 in measure 38 and on a syncopation beat in measure 39.

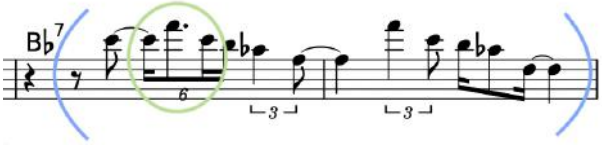

Figure 18. *Billie's Bounce Chorus 4, phrase 2*

Above is the second phrase that is found in this improvisation part. There is a use of neighbouring

tone in this phrase and also the use of syncopated rhythm which adds the variety to the line. This phrase also use a guide tone of pitch D and this line is a repeated licks from the improvisation part 1 in the measure 5. The choice of notes in this phrase also not too many as this is a short phrase but the only difficulty to this phrase is the rhythm. As this song is in a fast tempo, syncopated rhythm can be a bit confusing.

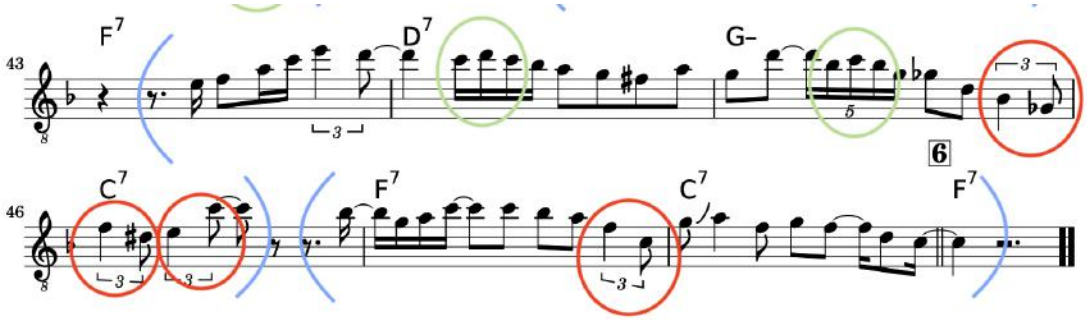

Figure 19. *Billie's Bounce Chorus 4, phrase 3 & 4*

Moving on to the next phrase which is in the measure 43-46. On the opening of this phrase, quite different from previous opening as Parker likes to use a dominant chord instead of the major chord but in this opening, he makes a clear statement of the major chord by emphasizing the pitch E. Next is on the measure, Parker use neighbouring tone on the 16th note and on the next measure on the quintuplet rhythm. Other than that, Parker also use a repetition of the same syncopated rhythm as from the first chorus which mostly applied in the whole improvisation part. On the measure 45 & 46, it is another (ii-V7) elaboration which consists of voice-leading line which is notes G, F#, F and E. This is a way that will embellish the (ii -V7) chord that has been used by Parker from time to time in various guises.

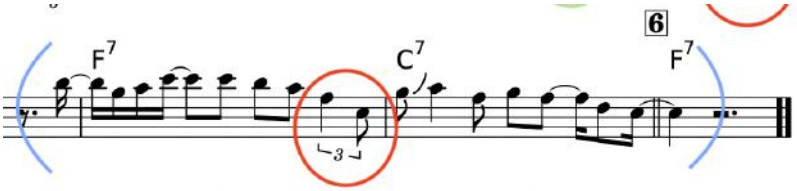

Figure 20. *Billie's Bounce Chorus 4, phrase 4*

As we can see from above, the rhythm of this phrase are not as complex as before anymore since this is the last phrase so Parker decided to play a standard line. There is also the appearance of the famous syncopated rhythm that was found throughout the whole improvisation part. Another Parker's style to start a phrase is by playing a note on the beat 4 from the previous measure to lead in his solo to the next chord progressions.

Graphs

Below are the graphs that has been obtained from The Jazzomat Research Project from the web as these graphs is very detailed on the improvisation part. In this section, there are five graphs which is the extended chordal pitch class graph, pitch class graph, semitone interval graph, fuzzy interval and duration classes graph. The explanation of the respective graphs are explained in Figure 21.

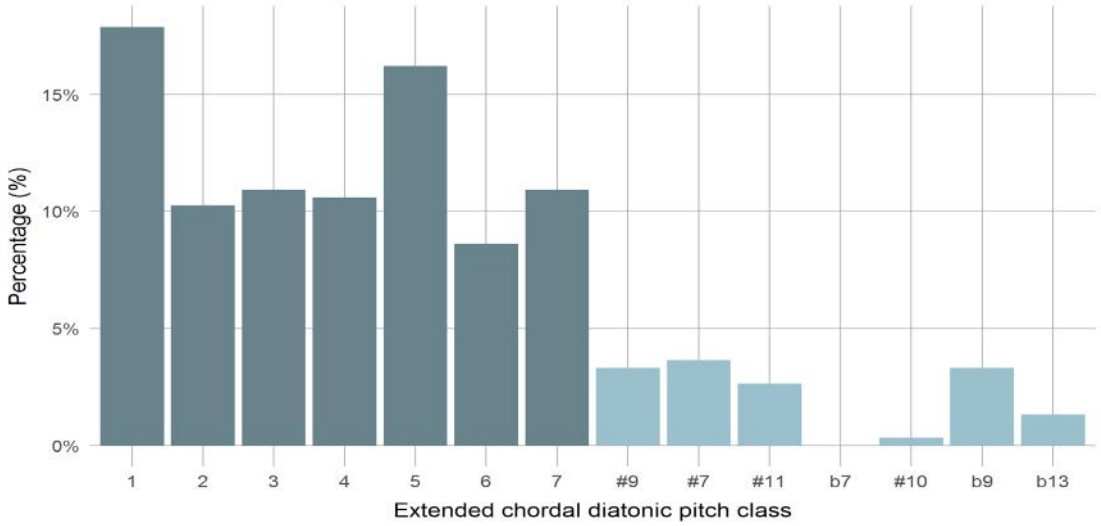

Figure 21. *Extended Chordal Diatonic Pitch Class*

Above is the graph that indicates uses of extended chordal diatonic pitch class histogram. Refers to the graph above, it is stated that more that 15% uses of tonic notes throughout the improvisation part. The use of note 2, 3, 4 and 7 are around the same percentage which is 10%-11% while the use of note 6 is below that 10%. Other than that, note 5 have been used for more that 15% but lower compared to the tonic note. Next is a #9, #7, #11 and b9 also have a similar percentage use throughout the improvisation part which is below than 5%. Lastly, #10 is like almost to never use because it only appears one time while there is no use of b7 in the improvisation part. This extended chordal diatonic pitch class is calculated in reference to the underlying chord.

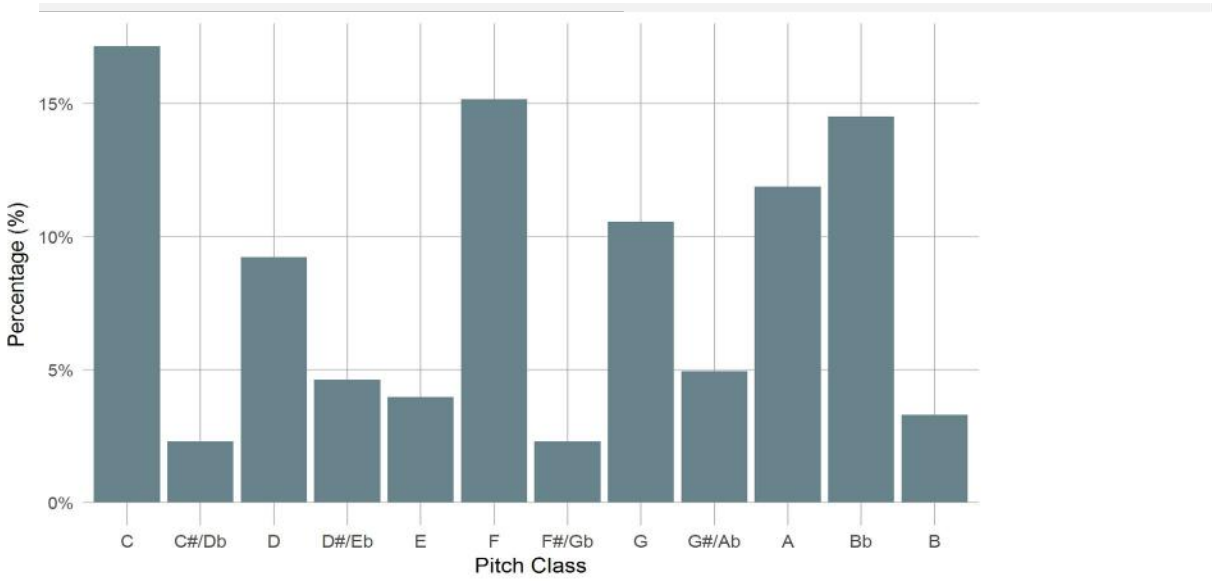

Figure 22. *Pitch Class*

Figure 22 is the graph that stated the percentage for the use of pitch class in this improvisation part. In conjunction with the extended chordal diatonic pitch class graph above, there is a similarity in the use of note C and F, which is F is the tonic note and C is from the dominant chord. These notes are the tonic note of their respective chord. Next, note C# and F# have a similar percentage use in this improvisation which is around 2% while note B is a bit higher on the 3%. Pitch D#, E and G# also have a similar percentage of use in this improvisation part which is 4%-5%. Use of pitch G and A are in the middle compared to the other pitch which is 10% and 12% respectively while pitch Bb is used for almost 15% throughout the improvisation part.

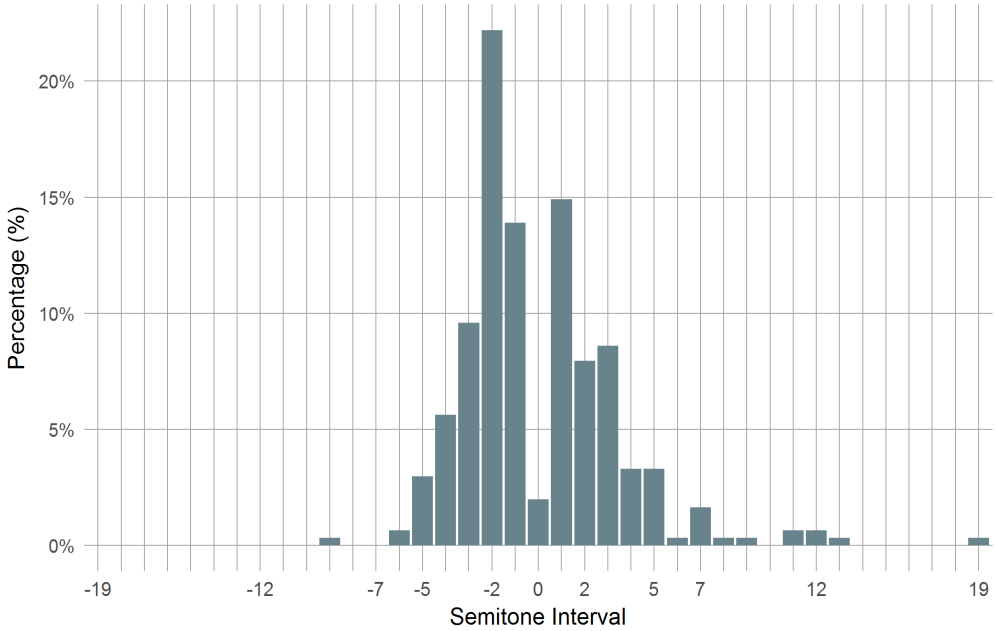

Figure 23. *Semitone Interval*

Next is the semitone interval graph. As Figure 23, the highest percentage is 23% which is the use of (-2) semitone in this improvisation part. Following with the second highest percentage is at 15% which is the use of (1) semitone but the use of (-1) semitone also similar but it is a bit lower that 15%. Semitone interval of (-3), (2) and (3) also have a similar percentage which is 9.7%, 8% and 8.5% respectively. Other than that, semitone interval of (-9), (-6), (-5) and (0) are less use in this improvisation part which in the percentage below that 5%. Similar to them, the semitone of (4) to (9), (11) to (13) and (19) are also below than 5%, which is around 1%-3%.

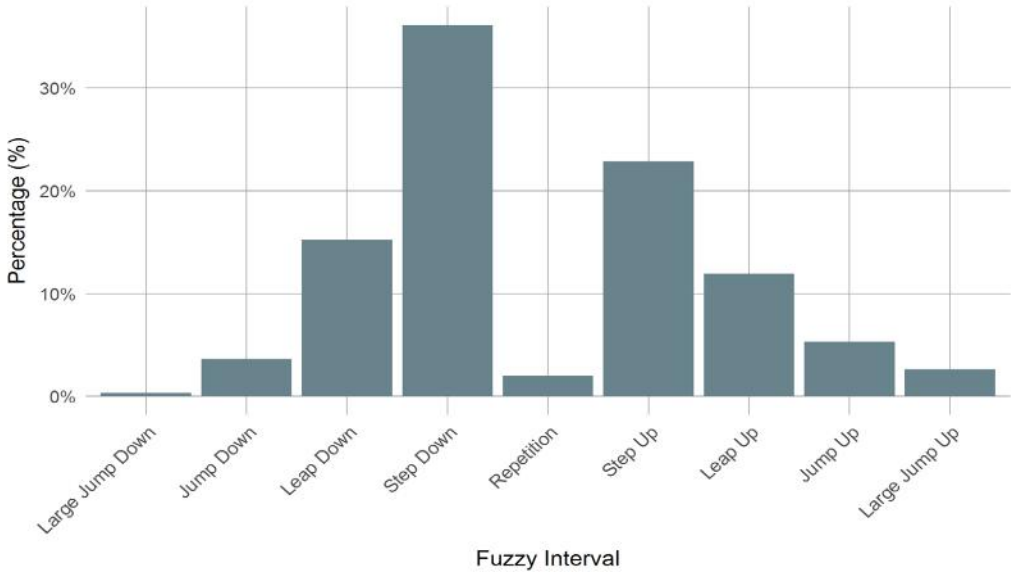

Figure 24. *Fuzzy interval*

Moving on to the next graph is the fuzzy interval graph which shows the percentage of the interval that appears in the improvisation part. This graph is also called a refined contour graph which also means interval classification graph. From the graph it is stated that the highest percentage is the use of step down interval which is 33% while the second highest is the use of step up interval which recorded at 21%. That is a big gap between them which means that step down interval is greatly used in this improvisation part. Following them is the leap up and leap down intervals which are at 15% and 12% respectively. Next is jump up, jump down and large jump up are at a similar percentage which is around 3% while repetition and large jump down is lower than that.

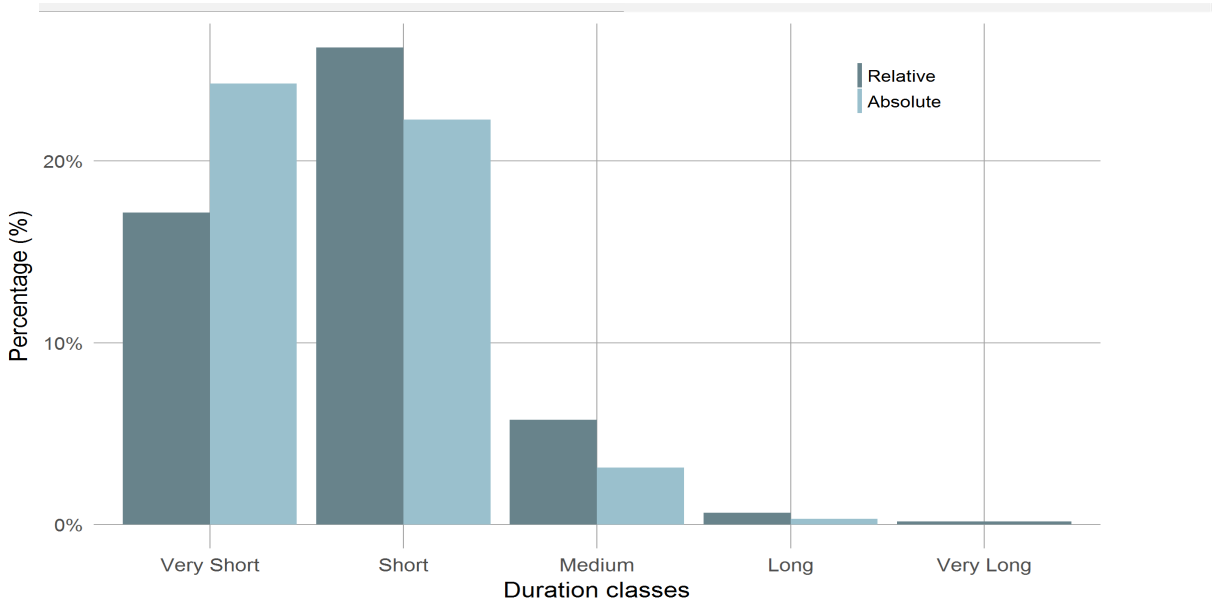

Figure 25. *Duration Class*

The last graph shows the relationship between the duration classes and their percentage. Relative duration of classes are defined based on the duration of the beat. In relative mode, the reference of the duration is actually the beat duration of the surrounding beat. The beat duration is in a tempo of 120bpm which corresponds to the value of 500ms used in absolute mode. Based on this graph, short duration classes are at the percentage of 25% on the relative duration while 22% on the absolute duration. Other than that, very short duration classes have a different statement than the short duration class. The relative duration for short class is higher than the absolute duration while the relative duration for very short class is lower than its absolute duration which is almost similar to the short class at 24%.

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