# Mining Contrast Patterns in Charlie Parker Solos

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## Abstract

Contrast pattern mining is the process of finding patterns whose frequency differs significantly from one group of data to another (Conklin 2024). In this study, we explore sequential patterns distinctive within the solos of Charlie Parker. Parker is considered a highly influential alto saxophonist in jazz's bebop period, with many later musicians transcribing and learning his recorded improvisations.

## Context

A dataset containing transcriptions from seventeen selected recordings from 1946 and 1951, derived from the Jazzomat corpus of 456 solos (Pfleiderer et al. 2017), was mined to determine the following (number of solos in brackets):

1. whether there are significant patterns contrasting the (17) solos of Charlie Parker with the remainder of the corpus (439 solos);
2. whether or not these patterns in Charlie Parker solos are significant when contrasted only with all other alto saxophonists (73 solos), both prior and later;
3. whether there are patterns contrasting Charlie Parker solos (17) with those of trumpeter Dizzy Gillespie (6 solos), another important soloist and collaborator of Parker's from the same period;
4. whether there are examples of quotation: significant patterns within one Parker solo (out of all 17) that appear in the solos of other performers (439 solos).

## #1 Parker vs all solos

We find ten statistically relevant patterns that occur in Parker as well as other solos in the database. This is done by mining top-10 patterns (Conklin 2024), with Parker as the target group and all other performers as the anticorpus.

All of these ten patterns are subsets of one longer pattern:-1 -2 -1 -9 3 3.

Fig. 1 Pattern #7

Parker presents three variations of the basic pattern over different chords in *Embraceable You* (1947).

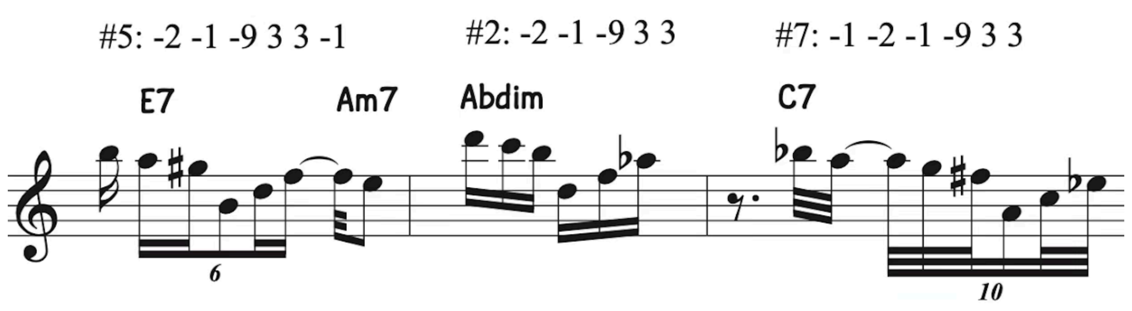


Fig. 2 Three variations of patterns as they appear in Parker solos

Variations of this pattern retain the descending leap and appear in other solos:

**Table 1 Selected patterns in Parker vs all**

| Pattern # | Pattern | # of times in Parker solos (/ 5637) | # of times in other musicians (/ 193960) | Overrepresentation in Parker solos |
|---|---|---|---|---|
| 2 | -2 -1 -9 3 | 19 | 11 | 59x |
| 3 | -2 -1 -9 3 3 | 16 | 5 | 110x |
| 6 | -2 -1 -9 3 3 -1 | 13 | 4 | 112x |
| 8 | -1 -2 -1 -9 3 3 | 12 | 3 | 138x |

The application of these patterns appears in both unusual and more predictable circumstances. For example, in *Embraceable You* it leaps from the raised 11 down to the 13th on a dominant chord. In *Donna Lee* (1947) it leaps from the third down to the fifth on a dominant chord, and it does this three times.

Sonny Stitt uses these exact pitches in his solo for *Blue Mode* (1949), although over different chords.

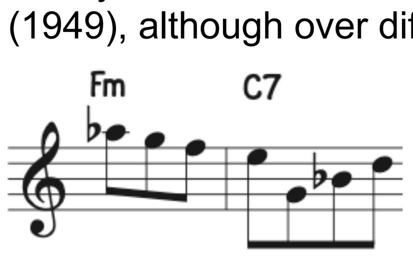


Fig. 3 Pattern #7 as appearing in *Donna Lee*


Fig. 4 Pattern #7 as appearing in *Blue Mode*

While this does suggest that other musicians did copy this unique Parker pattern, it demonstrates that Parker employed a great deal of self-quotation (or repetition) of this particular lick.

## #2 Parks vs other alto saxophonists

Within the top 10 Parker vs. all patterns, all are significant also when contrasted only with all other alto saxophonists. This suggests that Parker's influence was not limited to only the same instrument.

Within the top-20 Parker patterns, one pattern (2 -2 -1) is more significant in alto saxophonists and is not Parker-specific.

Fig. 3 The over-represented alto saxophone pattern

## #3 Parker vs. Gillespie

In those patterns that are over-represented in Parker's solos in comparison to Gillespie, it is the more mundane noodling patterns that are less often heard in the trumpeter's solos.

The pattern (2 3) occurs 97 times out of 5637 places in Parker's solos, whereas it occurs only 8 times in 1802 places in Gillespie's: four times as often in Parker as in Gillespie.

Similarly, (2 2) occurs twice as often in Parker's solos as Gillespie's.


Fig. 4 Two scalar patterns over-represented in Parker in comparison to Gillespie

We instructed the algorithm to restrict attention only to jumping patterns: those occurring only in the corpus and never in the anticorpus.

The following patterns are only found in Parker's solos and not in Gillespie's solos at all.

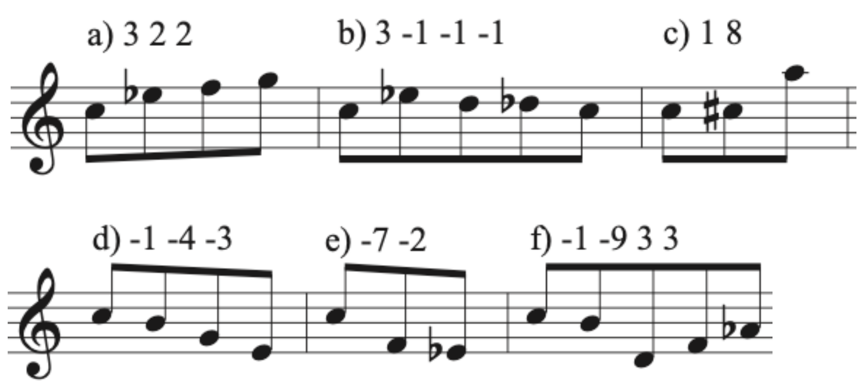


Fig. 5 "Jumping" patterns that only appear in Parker and not in Gillespie

Some (a, d) are basic scalar patterns (noodling); others (b, c) are chromatic inflections of one simple intervallic idea; the last two could be considered more as licks due to their internal leaps.

More study is required to examine Gillespie's solos for intervallic structure to determine if he did indeed favour leaps or scalar steps.

## #4 Parker quotations

Here we consider examples of quotation if there is direct quotation of a Parker pattern in other soloists. This query is answered by finding all significant patterns that occur in exactly one Parker solo and in at least one non-Parker solo.

We see that Parker uses repetition of his licks, playing the exact same melodic pattern over the same chords in a single solo. The following seven-note pattern, clearly a rehearsed lick, appears three times in *Out of Nowhere* (1947):

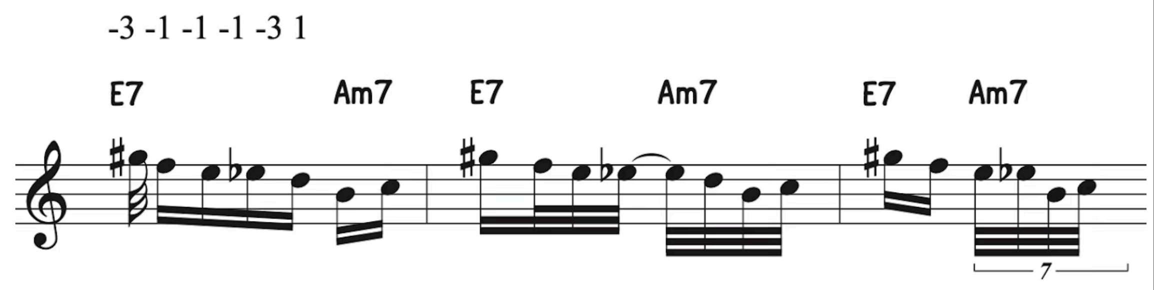


Fig. 6 Pattern 1 appears three times in *Out of Nowhere*

Wynton Marsalis quotes this pattern in his solo for *Cherokee* (1986); although it is placed over a different chord, it appears at the beginning of a phrase, thus suggesting it is a purposeful lick.


Fig. 7 Pattern 1 as appearing in Wynton Marsalis' solo in Cherokee

The following pattern (3 2 2 3 -1 -1 -1 -2 -2) appears in Parker's solo for *Koko* (1945) three times, once again on the same pitches over the same chords.

A variation of the pattern (3 -1 -1 -1 -2 -2 -1 -4 2), missing some of the ascending pitches and extending the descending line, appears in the same solo:


Fig. 8 Patterns 3 and 6 as appearing in Parker's solo for Koko

The former pattern is quoted by Michael Brecker in *Confirmation* (1981); the latter is quoted by Joe Henderson in *U.M.M.G.* (1991).

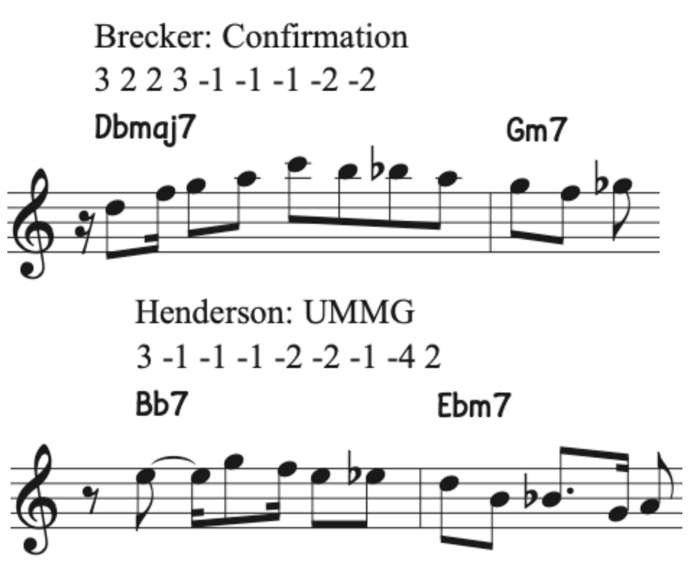


Fig. 9 Patterns 3 and 6 as they appear in solos by Michael Brecker and Joe Henderson, respectively

## Conclusion

We have found several instances of Parker self-referencing patterns within the same solo, and these patterns appear in other performers' solos.

Of interest is the lack of quotation by Gillespie of Parker's patterns.

As hoped, we found several clear instances of direct quotations of Parker's licks in other performers' solos.

## References

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