

# Comparative studies of jazz improvisations

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2<sup>ND</sup> INTERNATIONAL  
JAZZOMAT RESEARCH WORKSHOP

**Perspectives for  
Computational  
Jazz Studies**

**DFG**  
Deutsche  
Forschungsgemeinschaft



**Jazzomat**

## Overview:

1. Motivation and methodological considerations
2. Comparing two alternate takes – Fats Navarro „Good Bait“ (1948)
3. The Jazzomat Research Project:
  - achievements and failures so far
  - research plans
4. Conclusion

## 1. Motivation and methodological considerations

### Comparison:

- at least two objects
- which are comparable in some respect.
- They could be judged similar or different in this respect.
- If there is an object, there is also a subject who compares.

Solos over the same chord changes  
within the *Weimar Jazz Database 1.2* (299):

1. Same chord changes – different recording – different musicians:

-> twelve different pieces with 30 solos. e.g., „Body and Soul“

-> ca. 60 solos over blues changes (different tunes)

2. Same chord changes – same recording – different musicians:

-> 42 recordings with ca. 90 solos

3. Same chord changes – same recording – same musician:

-> two successive solos with one recording (18 pieces)

-> alternate takes: Fats Navarro „Good Bait“

-> *two versions*: John Coltrane „Impressions“ (1961 / 1963)

Nicholas Cook: “Computational and Comparative Musicology”, in: *Empirical Musicology. Aims, Methods, Prospects*, ed. by Eric Clarke and Nicholas Cook, pp. 103-126.

“(…) that recent developments in computational musicology present a significant opportunity for disciplinary renewal: (…) there is potential for musicology to be pursued as a more data-rich discipline than has generally been the case up to now, and this in turn entails a re-evaluation of the comparative method.” (103)

“The value of objective representations of music, in short, lies principally in the possibility of comparing them and so identifying significant features, and of using computational techniques to carry out such comparisons speedily and accurately.” (109)

Nicholas Cook: “Computational and Comparative Musicology”, in: *Empirical Musicology. Aims, Methods, Prospects*, ed. by Eric Clarke and Nicholas Cook, pp. 103-126.

“But the value of the analysis consists primarily in the lengthy process of making it, deciding which notes go with which, which are more important than others, and so forth; the process is lengthy because it involves a vast number of interpretive judgments, requiring you to weigh up different factors in relation to one another. At the end of it, you have a knowledge of the music—you might call it an intimacy—that you did not have at the outset, and there is a sense in which the final graph [*of a Schenkerian analysis, MP*] is significant mainly as a record of this learning process. With any kind of computational approach, by contrast, all of this happens automatically, and in some cases almost instantaneously; the only output is the graphic or numerical representation of the music that results.” (107)

Similar learning processes while transcribing music:

“(…)the primary usefulness of transcription is the process, not the product. For me, the act of transcription is a form of meditation. (…) I feel that the music is shaping me, changing me, as I go along. I am being transformed by the music; I am living inside it.”

(Peter Winkler: “Writing ghost notes. The poetics and politics of transcription”, in: Keeping score. Music, disciplinarity, culture, hrsg. v. David Schwarz, Anahid Kassabian und Lawrence Siegel, Charlottesville / London, S. 169-203, here: p. 200).

-> analysing music, making objective representations (e.g., graphs) and transcribing from recordings etc. as individual learning processes and aesthetic experiences

-> the (graphical) results helps to communicate one's findings and understanding

## Style analysis in jazz research

“(…) analysing and interpreting the features of a given improvisation demands that the analyst takes into account everything he has learned from other improvisations by the same musician. The significance of general pronouncements on the stylistic features of an improviser, from whom one has just a single solo at hand, is minimal, while the likelihood of drawing false conclusions is very great” (Ekkehard Jost: *Free Jazz*, NY 1975: 14).



## 2. Comparing two alternate takes – Fats Navarro „Good Bait“ (1948)



Fats Navarro: two takes of “Good Bait”, rec. August 29, 1948,

Fats Navarro (tp); Allan Eager (ts); Rudy Williams (as); Tadd Dameron (p); Curly Russell (b); Kenny Clarke (dr).

From CD *From Swing to Bebop, Double Talk, Fats Navarro*, CD 1.

# Good Bait

Fats Navarro

♩ = 147

1 B $\flat$  maj $^7$  G $^-7$  C $^-7$  F $^7$  B $\flat$  maj $^7$  G $^-7$

4 C $^-7$  F $^7$  B $\flat$  maj $^7$  B $\flat$  $^7$  E $\flat$  maj $^7$  A $\flat$  $^7$

7 D $^-7$  G $^7$  C $^-7$  F $^7$  B $\flat$  maj $^7$  F $^7$  B $\flat$  maj $^7$  G $^-7$

10 C $^-7$  F $^7$  B $\flat$  maj $^7$  G $^-7$  C $^-7$  F $^7$

13 B $\flat$  maj $^7$  B $\flat$  $^7$  E $\flat$  maj $^7$  A $\flat$  $^7$  D $^-7$  G $^7$  C $^-7$  F $^7$

16 B $\flat$  maj $^7$  B $\flat$  $^7$  E $\flat$  maj $^7$  C $^-7$

18 F $^-7$  B $\flat$  $^7$  E $\flat$  maj $^7$  C $^-7$

20 F $^-7$  B $\flat$  $^7$  E $\flat$  maj $^7$  Eb $^7$  A $\flat$  maj $^7$  D $\flat$  $^7$

23 G $^-7$  C $^7$  F $^-7$  B $\flat$  $^7$  E $\flat$  maj $^7$  F $^-7$

25 B $\flat$  maj $^7$  G $^-7$  C $^-7$  F $^7$  B $\flat$  maj $^7$  G $^-7$

28 C $^-7$  F $^7$  B $\flat$  maj $^7$  B $\flat$  $^7$  E $\flat$  maj $^7$  A $\flat$  $^7$

31 D $^-7$  G $^7$  C $^-7$  F $^7$  B $\flat$  maj $^7$  F $^7$  B $\flat$  maj $^7$  G $^7$

# Good Bait (Alternate Take)

Fats Navarro

♩ = 146

1 N.C. B $\flat$  $^6$  G $^7$  C $^-7$  F $^7$  F $^7$ /E $\flat$  D $^-7$  G $^7$

4 C $^-7$  F $^7$  B $\flat$  maj $^7$  B $\flat$  $^7$ /D E $\flat$  maj $^7$  E $^o$

7 D $^-7$ /F G $^7$  C $^-7$  F $^7$  B $\flat$  $^6$  F $^7$  B $\flat$  $^6$  G $^7$

10 C $^-7$  F $^7$  F $^7$ /E $\flat$  D $^-7$  G $^7$

12 C $^-7$  F $^7$  B $\flat$  maj $^7$  B $\flat$  $^7$ /D E $\flat$  maj $^7$  E $^o$

15 D $^-7$ /F G $^7$  C $^-7$  F $^7$  B $\flat$  maj $^7$  B $\flat$  $^7$ #5 9 13 E $\flat$  $^6$  C $^7$

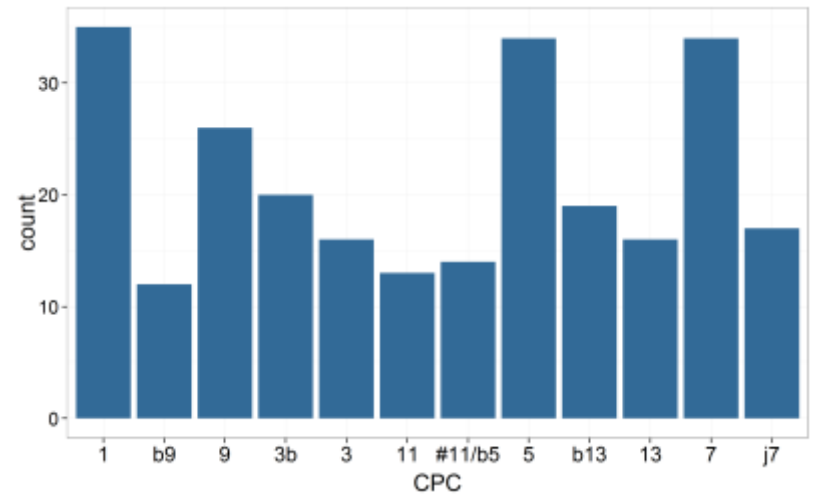
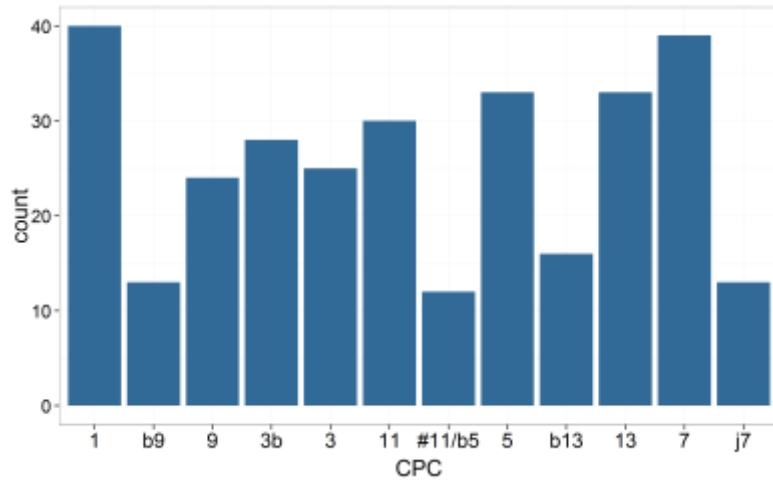
18 F $^-7$  B $\flat$  $^7$  B $\flat$  $^7$ /A $\flat$  G $^-7$  C $^7$  F $^-7$  B $\flat$  $^7$

21 E $\flat$  maj $^7$  E $\flat$  $^7$ /G A $\flat$  maj $^7$  A $^o$  G $^-7$  C $^7$  F $^-7$  B $\flat$  $^7$

24 E $\flat$  $^6$  F $^9$  B $\flat$  $^6$  G $^7$

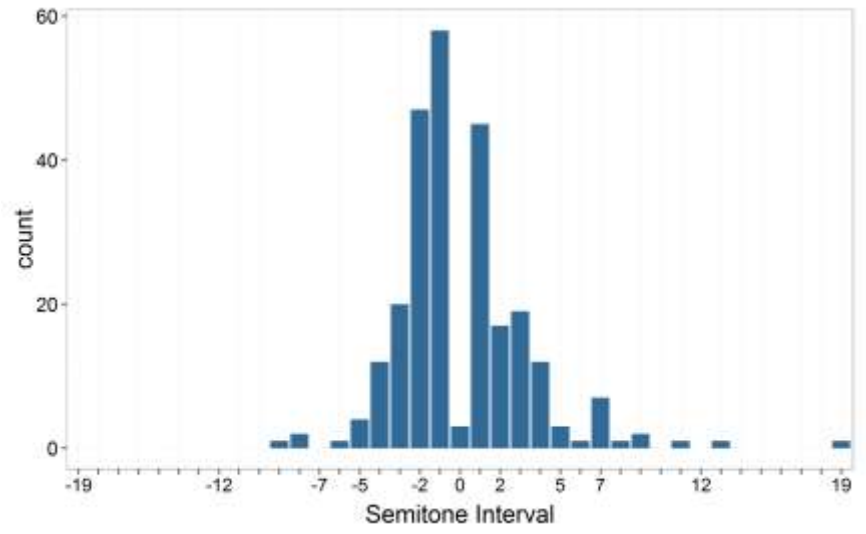
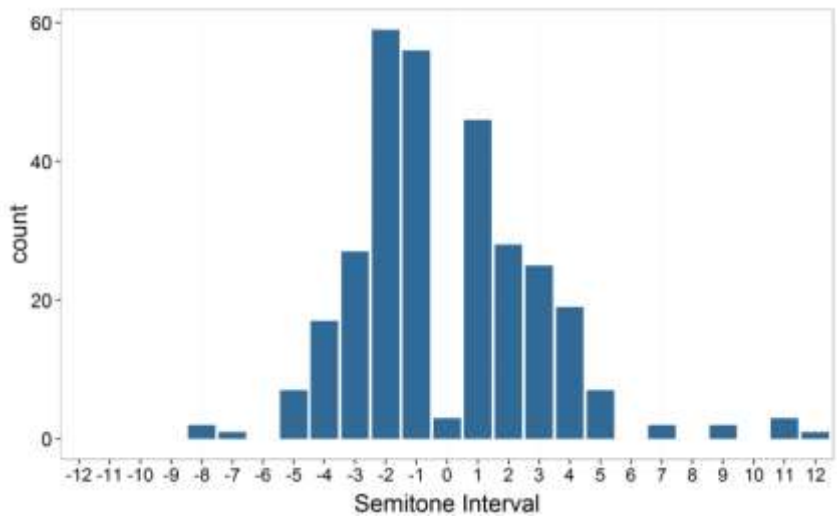
26 C $^-7$  F $^7$  F $^7$ /E $\flat$  D $^-7$  G $^7$  C $^-7$  F $^7$

29 B $\flat$  maj $^7$  B $\flat$  $^7$ /D E $\flat$  maj $^7$  E $^o$  D $^-7$ /F G $^7$  C $^-7$  F $^7$  B $\flat$  $^6$



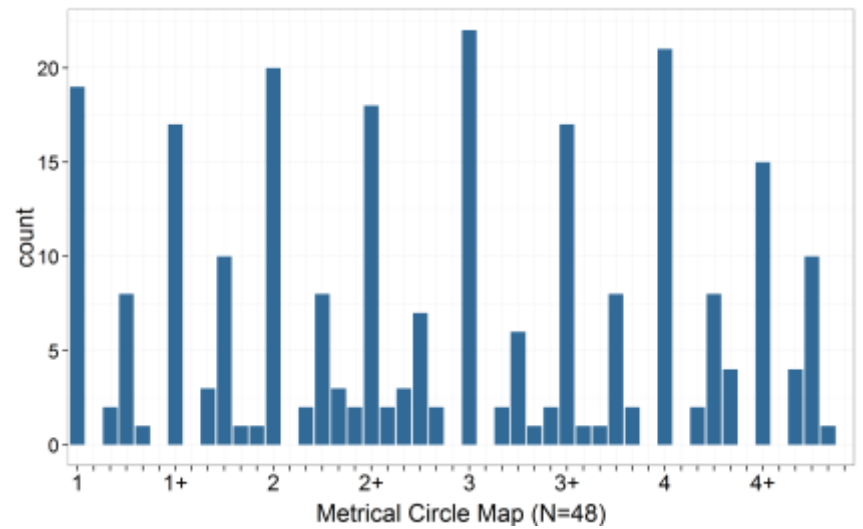
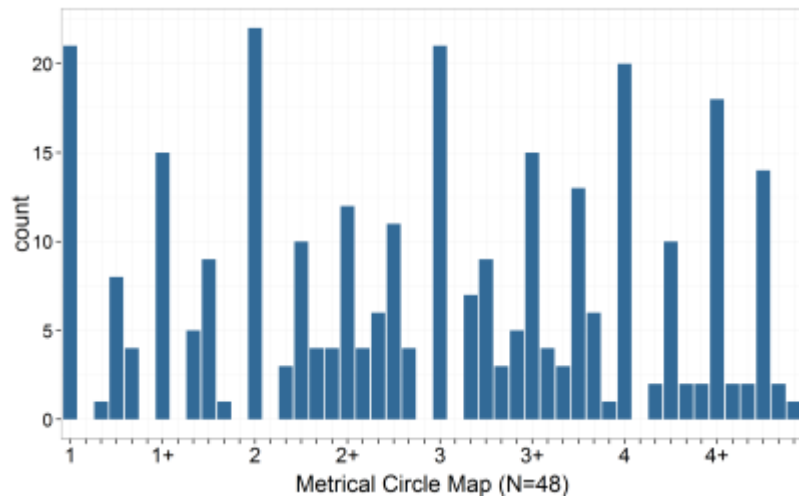
Cpc = chordal pitch class distribution

within Fats Navarro: two takes of “Good Bait”



Interval distribution

within Fats Navarro: two takes of "Good Bait"



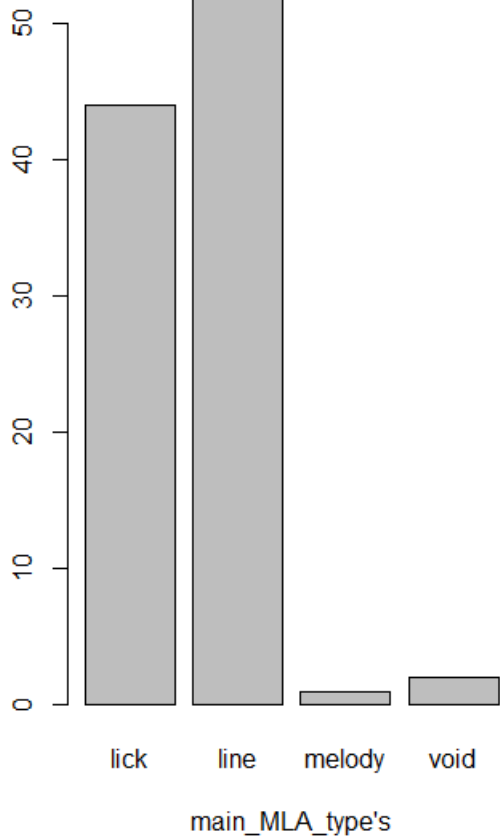
Metrical circle map (histogram of onsets on metric points)

within Fats Navarro: two takes of "Good Bait"

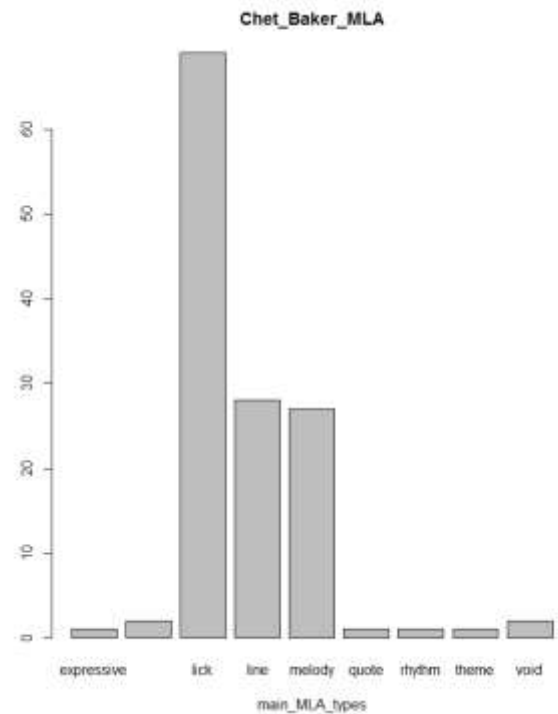
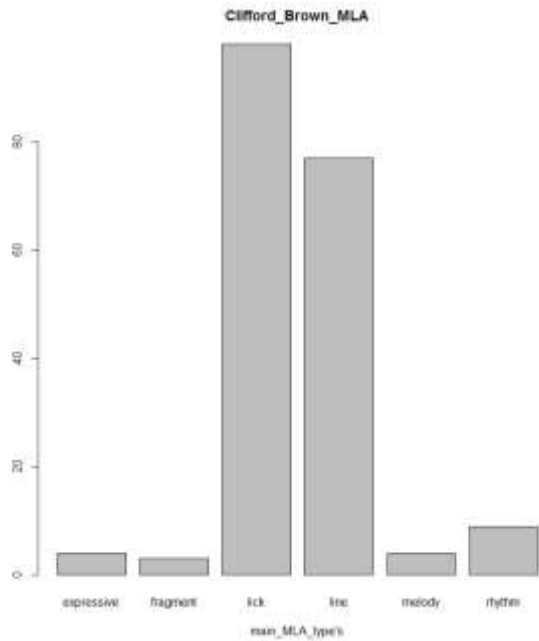
## Comparison of some specific values within solos of Fats Navarro

title	key	year	avgtempo	notes	event_ density	ratio_chromatic_ sequences	mean_ swing_ratio	metric_ complexity	syncopicity	extrema_ _count	extrema_ _ratio
<i>Good Bait</i>	Bb-maj	1948	146,2	261	<b>4,90712</b>	0,185185	1,69693	0,126864	<b>0,394636</b>	107	0,409962
<i>Good Bait (alternate)</i>	Bb-maj	1948	147,4	298	<b>5,65772</b>	0,182094	1,69398	0,114422	<b>0,291946</b>	132	0,442953
<i>Anthropology</i>	Bb-maj	1948	300,7	379	7,46623	0,173077	1,49283	0,184426	0,277045	148	0,390501
<i>Double Talk</i>	F-maj	1948	225,8	660	6,33869	0,114478	1,36676	0,155855	0,20303	249	0,377273
<i>Our Delight</i>	Ab-maj	1948	200,7	208	5,39627	0,169082	1,32849	0,161569	0,235577	85	0,408654
<i>The Skunk</i>	Db	1948	163,8	162	4,68761	0,204969	1,49938	0,145733	0,401235	55	0,339506

Navarro\_MLA's



Comparison of mid-level-units (main types) between Fats Navarro (7 solos), Clifford Brown (7) and Chet Baker (8)



### 3. The Jazzomat Research Project (2012-2016): achievements and failures



#### a. Weimar Jazz Database

- collection: still too small, many gaps
- automatic transcription -> not reliable
- automatic beat detection -> not reliable
- score-informed source separation -> loudness values
- bass chroma per beat -> harmonic context





### 3. The Jazzomat Research Project (2012-2016): achievements and failures



#### b. Software tools

MeloSpySuite / MeloSpyGUI:

*MelFeature* for feature extraction

*MelPat* for pattern mining

*MelConv* for data conversion

Looking for motives and variations

automatic detection

-> too complicated

-> pattern search

-> mid-level unit annotation (MLA)

*MelHarm*: automated annotation of local harmony / scale probabilities -> to do!

### 3. The Jazzomat Research Project (2012-2016): achievements and failures



#### c. Research plans:

##### Journal papers:

- Classification of individual styles of musicians
- Feature history of jazz
- Pattern archeology
- Studies on musicians's sound, micro-timing, theory of improvisation ...

##### Project publication (monography):

- Introducing the Jazzomat Research Project
- Case studies of single solos

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*if you get lost in the data ...*

*... listen to the music!*

*Thank you!*

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