

Two Generic Models and the Challenge of Improvisation

Mon Dieu, donnez-moi de la simplicité!

Leo Tolstoy

Besides partial models with emotional, gestural, or analytical rationales, there are two models that comprise all these approaches. We want to briefly present them for completeness, and less because they offer a deeper insight into the complex of problems related to expressive performance.

Although this book is not about improvisation, we believe that it is important to give a short introduction to the perspectives that are opened when classical performance is extended to improvisatory approaches. What are the relevant differences? Can the concept or performance still be applied to improvisation, or do we have to open new conceptual spaces transcending or even negating the model developed so far by contemporary performance research? We address these questions in section 18.3 below and make a case study on Miles Davis' 1964 interpretation [22] of the classical jazz tune *I Thought About You*.

18.1 The GERM Model

The first model is the GERM model. It has been described in 2001 by Anders Friberg, Patrik N. Juslin, and Roberto Bresin [55]. The GERM acronym means

- G = Generative Rules, which function to convey the generative structure in a musical manner; these rules are those given by the Director Musices rules of the KTH system.
- E = Emotional Expression, which is governed by the performer's expressive intention; these were discussed in our discussion of emotion-based expressivity investigated by the KTH school, although the GERM emotion catalog is slightly extended.

- R = Random Variations, which reflect internal timekeeper variance and motor delay variance; these factors stem from motorically and psychologically variable uncontrolled variations.
- M = Movement Principles, which prescribe that certain features of the performance are shaped in accordance with biological motion. This relates to the classical Sundberg-Kronman-Verillo-Friberg-Todd assumptions on retard behavior of tempo.

The model supposes that the above four components are relatively independent factors, although they might be coupled. The model has been implemented on Director Musices and tested empirically with different psychometrical tests.

18.2 Todd's Generic Approach

Neil McAgness Todd's generic approach to semiotic expressivity in performance [136] runs as follows. His performance model is designed upon a bidirectional transformation pairing from a score representation Ψ to a performance P and backwards by means of:

1. a *performance procedure* Π acting on Ψ and an *encoding function* γ :

$$P = \Pi(\Psi, \gamma),$$
2. a *listening procedure* Λ acting on P and a *decoding function* δ :

$$\Psi = \Lambda(P, \delta).$$

In this generality, “the theory... is sufficiently general to cover any variable of expression. At the same time, it is agnostic as to what is being communicated, be it structure, emotion, or extra-musical reference” [136, p.407]. The generic character of Todd's approach hides an asymmetry of the transformation pairing, which is due to its semiotic background. In fact, performance is a poietic process issued by the performer from the composer's score. In other words, a performance is *caused* by its creators and must be *understood* by the listener, not vice versa. Hence, the performance transformation has to be specified as a semiotic mechanism. This is the difficult part of the business, and we have discussed this extensively in chapter 4.

The critical subject of performance theory—a problem which Todd thematizes in the spirit of cognitive science—is a reconstruction problem: Given a performance P , how many representations Ψ and encoding functions γ can you find such that $P = \Pi(\Psi, \gamma)$? In mathematical terms, we are looking for the fiber $\Pi^{-1}(P)$ over P . This is the so-called inverse image of P , and therefore, this branch of performance theory is called inverse performance theory; we shall come back to this topic in chapter 24. The listening procedure in [136] is just a formal setup for a section Λ to Π , i.e., the selection of an element in the fiber over P as a function of the decoding data δ .

Clearly, the fiber cannot be described in effective mathematical terms if one does not assume a well-defined transformation model. And even for very

special models, the so-called locally linear performance grammars [81], fibers turn out to be high-dimensional algebraic varieties. Further, the encoding function must be meaningful enough to reflect the score's structure and its relationship to expressive semantics. Otherwise, performance cannot claim to interpret the selected score. In other words, the big problem of performance theory is to propose models of *adequate generality* that cope with *semiotic expressivity*.

In Todd's singular example to his theory, he restricts to hierarchical grouping data for the shaping of duration. Commenting on the inverse problem of listening procedure, he states: "The durations used in the calculations are from only one metrical level. Much information about tempo is given at metrical levels below the tactus and in the durations of actual notes. The representation needs to be extended downwards to include note timing, which would mean that a rubato handler would have to work in cooperation with a metrical parser, one feeding the other. Clearly, a lot of work is needed in this area." Concluding, he notes: "The known algorithms make no reference to any tonal function. Therefore, a rubato handler could be a vital component of any theory of grouping in the perception of atonal music. A complete theory must of course include dynamics, articulation and timbre."

Methodologically, this approach is tightly bound to cognitive science in that any algorithm is first of all tested upon its immediate fitting into human perception mechanisms, within real-time constraints, say. We believe this is a too-narrow approach for two reasons. First of all, the investigation of general structural facts must be carried out before any relevance to human perception is taken into account. There is the general problem of getting an overview of possible models and their classification. Second, the cognitive knowledge is all but settled. More precisely: We do not know the processes by which cognition of performative expression is handled in the human brain. It could happen that a rather abstract invariant of the geometric structure of a mathematically complex fiber $\Pi^{-1}(P)$ can easily be detected by the cognitive machinery, but that this invariant would not have been detected if we were only permitting fibers that allow an immediate access by the cognitive capacities. For example, the mathematical structure of a Möbius-strip-shaped fiber may be too complex to be grasped by the cognitive machinery, whereas its lack of orientation may be an easy task to be tackled by a small test routine built on a neuronal basis.

18.3 The Challenge of Improvisation

This book is not about improvisation, but we should nevertheless embark in a short discussion of why the present approach to performance theory would miss improvised music making, and what this failure looks like in detail. There are many reasons to exclude improvisation from performance theory. We shall discuss some of the most evident theoretical arguments and then also illustrate them in an analysis of a prototypical improvisation, namely Miles Davis' March

1964 recording (♩ 18) of Jimmy Van Heusen's popular 1939 song *I Thought About You* (lyrics by Johnny Mercer).

The nature of lead-sheet-driven improvisation in jazz derives from the fact that the lead sheet is a symbolic score that will not be performed as is, but must undergo a series of delicate symbolic transformations before the sounds emerge from the improvisers' playing. The question here is how such a transformational process can be described. To begin with, it fits perfectly in our model of multi-agent communication described in section 4.11. The composers' field is no longer occupied by the classical score composer but results from a multi-layered activity that eventually leads to the production of sounds. This improvisational process is far from amorphous spontaneity however. The lead sheet, with its reduced symbols comprising the basic melodic shapes and the metrically displayed chord symbols that drive the improviser's harmonic changes, is enriched in a quite logical layering of improvisational spaces with a successively richer ambient structure of strategies and actions.

When we look at those layers, we recognize as input the mechanical data of the lead sheet and then as output the notes, which will be played on the instrument to yield the improvisation's sounds. The entire transformation process is a symbolic one in the sense that the improviser constructs the output on a mental level. This construction is well known among jazz musicians and is called the "inner score" ("partion intérieure," also the title of an excellent jazz theory book [128]). We shall see in the subsequent analysis of Miles Davis' 1964 recording of *I Thought About You* that the nature of this symbolic activity is however not executed as an algorithm on the level of note symbols. These symbols are given, but their creation lives in the stratum of gestural embodiment. In other words: The improvisational process is a complex gestural activity. It relates to the factorization of performance as discussed in section 4.6 and illustrated in figure 4.6.

The immediate question arising from this approach relates to the space where such gestural activity takes place. We have given a first approximation to this question in section 4.12. The improviser's creative space is that realm of artistic presence that we called "imaginary time-space." The artist's activity is a gestural movement, a dancing gesture that acts upon the given lead sheet symbols and moves them into the final output according to well-defined strategies of embodiment. If one had to insert this creative activity into our scheme of shaping operators, it would be a system of symbolic operators (a small set of elementary symbolic operators is implemented in the PerformanceRubette of Rubato, see section 15.3).

The gestural character of this process becomes evident from the movement that the improviser constantly applies to the given material in his/her shaping of the played notes. The output resembles an embryonic growth movement of a living body; it is the body of time that is being shaped and whose dynamic anatomy is being created. In what follows, we shall learn about this improvisational realm, which we call *improvisational time-spaces*. From the above reflections, it follows that these time-spaces live in the imaginary time-space.

And it follows that such an improvisational style is everything but blind spontaneity. It is a highly developed cultural code within embodied thinking in the flow of creation.

18.3.1 Expansion of Improvisational Time-Spaces

Lead-sheet-driven jazz improvisation is most often governed by a basic melodic line, harmonic structure of chord changes, and metered time. The concept of time can be understood from the combination of tempo and meter with emphasis of strong and weak beats, but, as we shall see, extends to a more in-depth phenomenon when shaped by the creative improviser. Most Jazz standards contain regulatory phrases of four to eight measures in length and are derived from popular songs. This is also true about Jimmy Van Heusen's tune *I Thought About You* and will be the basis of the following analysis of the expansion and evolution of improvisational time-spaces; see figure 18.1 for Lisa Rhoades' transcription of the 1964 recording. The lower staff shows the original melody, the upper staff shows Miles Davis' performance.

Traditionally, an instrumentalist finds *improvisational space* in a jazz standard where the melody is at a resting point. But we shall describe the improvisational process in more detail, strongly including shaping of time, since Miles Davis' performance unfolds way beyond the traditional space.

I THOUGHT ABOUT YOU

(MILES DAVIS, 1964)

JOHNNY MERCER

JIMMY VAN HEUSEN

Fig. 18.1. Lisa Rhoades' transcript of Miles Davis' 1964 performance of the jazz tune *I Thought About You*. See text for details.

The conceptual synthesis of time and improvisational space into one term is specific to the type of improvisational development that we will examine. We shall screen this synthesis as a layering of four time-spaces: 1. Metro-nomic Time-Space, 2. Emergence Time-Space, 3. Progression Time-Space, 4.

Advancement Time-Space. In Rhoades' transcription, figure 18.1, the instantiation of such time-spaces is indicated by circled numbers ①, ②, ③, ④.

① **Metronomic Time-Space**

The first time-space is the mechanically driven or unvaryingly regular space in rhythmic and harmonic patterns. It consists of the formal background and structures of the tune as defined by the lead sheet.

② **Emergence Time-Space**

The second time-space is identified as a direct extension of the metronomic time-space. In our tune, this can be described by the use of a tritone substitution (the shift $T^6(X)$) sharing the same 3rd and 7th of the original seventh chord X , albeit reversed; for example $X = C^7 = \{C, E, G, B_b\}$, and substitution $T^6(X) = G_b^7$. So time is still the original one in this layer, only harmony moves on an extended gesture.

③ **Progression Time-Space**

In this time-space, time is reshaped: In our tune, we observe the emergence of a new meter, such as 6/8 over 4/4 in measure 4, by the extension of a triplet figure inherent in the original. This space creates tension and propels the improvisation to open a new time-space of rhythmical progression. The ensemble seems to be playing "out of time" in this third space, which we will therefore refer to as the Progression Time-Space. Here, the gestural flip-flop of micro and macro meter that the musicians play and react to causes a temporal shift. The acute listener can still determine the regular metronomic beats, but it becomes far more distant and is less important in the music making.

④ **Advancement Time-Space**

The fourth time-space is referred to as the Advancement Time-Space. It is created from the Progression Time-Space when the entire ensemble has broken away from the Metronomic Time-Space through the tension created by a number of temporal shift gestures. The Advancement Space can be described by attaching to every event in the new position (as played by Miles Davis) an arrow relative in direction and size to the original position. The fourth space's temporal shift causes the tension/force of the original, and the arrows represent the distance and direction, like a deformation of a "rubber strip of time." This one has variable "temporal elasticity," enforcing variable tensions that are reacting to the strength of the original metric positioning of the note(s) played.

In the first measure, Davis' trumpet states the melody, and he stretches time easily, because there is no rhythm section player behind him delivering a metronomic beat. Also, the melody's formal rhythm of a quarter note triplet is a rhythmic motif that leads itself to a spatial interpretation. On beat 2 in measure 11 and measure 12, Davis achieves the Advancement Time-Space through the use of quarter tone lifts and bends that flow above a predetermined rhythmical space. The space is thus extended through the next measure by the same lifting of tonal integrity and "breath."

In examining the traditions and innovations of jazz music, a musician will gain insight and pinpoint key areas for further improvisational development. Before we do the analysis of the tune, we should briefly comment on jazz education today, since this strongly relates to the work to be performed in the above time-spaces. Some examples of methods and strategies of jazz education used in collegiate instruction are Jamey Aebersold's play-alongs, playing by ear, transcription of jazz solos, and the "etude method" of distributing favorite jazz lines over chords in tunes and freely improvising around them; see [3] for the first of more than 128 volumes (!) of Aebersold's library. These methods focus on building a linear language of jazz and are quite successful. However, for many players that gain a wealth of jazz language and memorized riffs, it happens that their own voice remains vacuous and they lack the innovative inspiration of improvisation that is the essence of jazz expression. But innovation is most often made possible by musicians deeply rooted in their tradition and having their own identity within the tradition that enables them to absorb its secrets and create something new. Through research and analysis of jazz traditions and innovations, as presented in our transcription and analysis of the expansion of improvisational time-spaces in Miles Davis' recording, we hope to help jazz improvisers evolve and deepen their understanding of the high culture of improvisation. Through the analysis of our transcription of Davis' performance, the musician can discover expansive improvisational time-spaces and ingenious use of linear and harmonic nuances.

18.3.2 The Analysis

The tune *I Thought About You* is in ABAB form with a lovely melody based on a descending half step within a series of *ii, V, I*'s (e.g. measures 2-3, 8-9, 15-16). The A sections are identical and the B sections are varied with the B section ending on the tonic *F*. Our transcription only includes ABA because in Davis' performance, the second B section is in the beginning of his solo.

Like Dinah Washington in her recording of the song in 1954, Davis creates a bluesy ambience of a classic "torch song," a sentimental love song in a setting of a nightclub at 2 a.m. In the third measure of the tune (②), Davis plays an A_b , which is the minor 3rd, blue note, of the song's *F* major tonality. The ingenious quality of this note choice is that the G^7 chord is still sounding, then chromatically resolves up to A_b^7 . The listener hears the halfstep clash but naturally relates it to the melodic phrase in *F* major as a blue note. Davis states the melody as a vocal line of a torch song by his rhythmic displacement of almost every entrance of a phrase except for the beginning of the first measure and beat 4 of measure 12. This allows his lines to breathe and swoon in a sentimental fashion that is a traditional characteristic of a torch song. The high point of note *E* of the first phrase (measure 1, ③) is rhythmically displaced and introduces a new improvisational time-space on beat 4. The result of this new time-space creates anticipation in the listener and room for new possible improvisatory development.

In the beginning of measure 2 the Advancement Time-Space is created by hinting at the next original phrase that begins on $B\flat$ on beat 4. Davis achieves this new-time space by playing the $B\flat$ as a grace note on beat 1. In measure 3, Davis plays a rhythmic diminution of triplets of the original phrase ($B\flat-A-F$) that begins on beat 3 of measure 2. The beat 4 rhythmic placement of the triplet figure emphasizes the “swing” feel.

In measure 5, Davis introduces a new time-space again with rhythmic displacement and diminution. This time Davis delays the entrance of the phrase and masks the melodic outline by traditional bebop ornamentation, which is to approach or leave the goal note by a half step and surround the next goal note, creating what is called a *turn*. This ornamentation most always resolves to the second goal note from a whole or half step above. Davis also extends the melodic line up to a high F at the end of measure 5 and extends the harmonic chord structure of the F^7 , which sounds on beat 4 of measure 5. Davis outlines the Fm^7 chord by descent to resolve on the melodic note A .

The extremity of diminution and the hint of bebop in this line propels the rhythm section to increase in speed. The entire ensemble plays together on beat 1 of measure 7 and naturally relaxes with Davis playing a half step melodic motif that is played in half notes and restated in quarter notes ending on the augmented 4th scale degree of a Cm^7 chord. It should be noted that the augmented 4th scale degree is particularly characteristic of Davis's style of playing. Playing a sharp 4th scale degree over any given chord allows it to be heard as a chord tone, whereas the natural 4th scale degree will be heard as a wrong note. Also, note that hearing the 4th scale degree as a chord tone expands the linear structure of the original scale and adds a new sonority. This is where a player can delve deeper into this new harmonic space by playing a tritone substitution. This completes the initial analysis of the A section.

The first phrase motif of the B section begins with a rhythmic displacement of a sixteenth note and is tastefully stated in diminution, ending on beat 2. The original phrase motif begins on the & of beat 1 in measure 9 and ends on beat 3. Miles introduces “swing” feel in measure 10 with triplets, where the original is stated by a quarter note followed by two eighths and another quarter note. Davis continues to introduce new improvisatory time-spaces (③) by these triplets as part of the same syncopated feel of his first phrase of the B section and the next phrase.

Davis cleverly states the melody as a transposition of a fifth above the original in measure 11. He begins by outlining the D^7 chord and then ascends to his transposed quotation of the melody. The high G is the 7th of the A_7^7 chord on beat 3 of measure 11. The 7th and 3rd scale degrees are the two scale degrees that define the chord's quality. Finally, Davis places beat 4 in the same rhythmic position as the original melody in measure 12. He then deviates from that rhythmic unity by scooping up to beat 1 of measure 13 and descending in quarter notes followed by two triplet figures. Davis states the original melodic phrase of measure 11 in measure 15 in triplets. In measure 16, Davis rises from

a scoop of the note *A* to *B* and descends chromatically to note *G* of the melodic line. This technique introduces a new harmonic space and time-space (②).

Miles plays his highest note once again as an extension of the restatement of the initial melody in the A section. Without notice, Davis erupts with a double high *F* in double-time feel to complete the last four bars of the first phrase. This high *F* is followed by an arpeggiation of descending quarter notes and repeated low note *F*s in syncopated triplets. The listener might expect Davis to rest on low *F*, but instead he energizes them with his syncopated eighth note triplets. It must be noted that Davis deliberately deviates from the traditional form and begins his solo in the last four measures of the last A section. The listener traditionally would listen to another B section of repeated melody as well. This deliberate move to begin soloing before the melody is traditionally completed suggests another new time-space (④).

In Marshall Bowden's review of the Miles Davis CD set *The Complete Miles Davis at Montreux* [7], he states, "The 1960s quintet featuring Herbie Hancock, Ron Carter, Wayne Shorter, and Tony Williams had taken traditional jazz forms to as abstract a place as was possible." Davis was searching for a new stream to take his music and get away from the traditional theme/improvisation/theme scheme of jazz. The tune *I thought About You* is a pivotal example of Miles Davis' vision and concept of melody, rhythm, and form.