An Analysis of Boulez's
Le Marteau Sans Maître, 6th movement,
"Bourreaux de solitude" mm. 1-14

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An Analysis of Boulez's *Le Marteau Sans Maître* 6th movement, "Bourreaux de solitude" (mm. 1–14)

Until recently, most people believed that Boulez had relaxed his serial methods in *Le Marteau Sans Maître*, but in a recent study, Winick and Wentzel suggested that the methods have the presence of a carefully controlled serialization of pitch and duration, and dynamic and attacks respectively. This piece is obscured by analyzing regarding the 12-note organization. Therefore, the analysis of the aspects of Pitch / Duration Association (PDA) and Dynamic / Attack Association (DAA) is suitable for this piece. This paper will explore PDA and DAA in Boulez' *Le Marteau Sans Maître*, the beginning measures (mm. 1-14) of the 6th movement "Bourreaux de solitude".[1]

PDA associates pitches of an ascending chromatic scale with durations which increase arithmetically by small increments. For example, if the smallest note value is a sixteenth note and associated with the pitch C, then the durations increase by sixteenth notes according to the ascending chromatic scale as follows:

PDA=C, unit=♪   →   C=♪   C♯=♪   D=♪.   D♯=♩   etc.

DAA associates dynamics with the attacks. This system of DAA is serially coordinated with PDA in this piece.

In mm. 1-14 of this piece, ♪ is a unit of PDA. Therefore, the row of pitch-duration in this piece is as follows:

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1   The concept of PDA and DAA presented in this paper is from the following references: Steven Winick, "Symmetry and pitch-duration associations in Boulez' *Le Marteau Sans Maître*", *PNM*, Vol. XXIV/2 (spring-summer 1986): pp. 280-321; Wayne C. Wentzel, "Dynamic and attack associations in Boulez's *Le Marteau Sans Maître*", *PNM*, Vol. XXIX/1 (winter, 1991): pp. 142-170.

1=♪	4=♩	7=♩ ♪.	10=♩ ♪
2=♪	5=♩ ♪	8=♩ ♩	11=♩ ♪.
3=♪ ♪	6=♩ ♪	9=♩ ♪	12=♩ ♩

For the convenience of analysis, this opening section can be divided into six subsections regarding the PDA. The division into six subsections is based on the pitch starting the unit of PDA which is actually a sixteenth-note in this piece. Six subsections are as follows:

Measures	PDA (unit = ♪)
mm. 1-2	PDA=D
mm. 2-4	PDA=G#
mm. 3-5	PDA=A#
mm. 6-8	PDA=C#
mm. 8-11	PDA=A
mm. 10-14	PDA=E

Boulez's *Le marteau Sans Maître,* after text by René Char, is written for alto voice, flute, viola, guitar, vibraphone, and percussion. Before analyzing this piece, it is necessary to consider the instrumentation because the durations important in PDA are closely related to the characteristics of the instrumentation. For example, the long durations are not suitable for the Xylorimba because of the characteristics of it while the Vibraphone has no limits on any durations because the Vibraphone has a pedal itself. <Ex. 1> shows the orderings of PDA on each instrument. But it is necessary to omit the maracas part from the PDA analysis because of the pitchless nature of the maracas as well as no dynamics and attacks in this piece.

<Ex. 1>

|	D=♪	G#=♪	A#=♪	C#=♪	A=♪	E=♪
Flute in G	3 6	11	12	4 5	7 1 9	5 7
Xylorimba	1 2	2 1	1 3 2	(3 1) 2	3	2 1
Vibraphoone	8 12 10	8 10 · 3	8 7	12 11	6 8 12	3 8 (11 9)
Guitar	7 4	9 6 7	(4 10) 6 9	6 7 10	2 5 10	12 6
Viola	9 11 5	4 5 12	5 11	8 9	11 4	10 4

(Parentheses mean the sounding simultaneously)

In <Ex. 1>, the Xylorimba just plays the durations of 1, 2, or 3♪s because the Xylorimba doesn't play longer durations. But, the others have no limitations on durations: all of the instruments except for the Xylorimba play any durations.

1. Analysis on the aspects of PDA

In mm. 1-2 (PDA=D), PDA is exactly used. So to speak, all 12 chromatic pitches and all 12 durations from D=1♪ through C#=12♪s are utilized without exception. <Ex. 2> shows that durations increase arithmetically by sixteenth note increments with an ascending chromatic scale starting on D: D has one sixteenth note; D# has the value of two sixteenth-notes and so forth.

<Ex. 2>: regular durational ordering
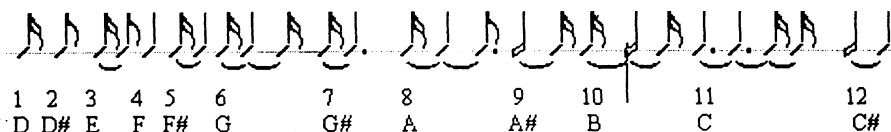
Mm. 2-4 (PDA=G#) also uses PDA which is transposed from D to G#, but this PDA is utilized less strictly than PDA=D (mm. 1-2). The increments of duration in the case of two pitches are changed. <Ex. 3> shows that the duration of guitar's D has eight sixteenth notes instead of seven and that of the vibraphone's F has only nine sixteenths instead of 10. That is to say, the duration of the guitar is one

sixteenth note longer than the regular duration while that of the vibraphone is one sixteenth-note shorter than the regular duration.

This change of duration might be Boulez's intention because the durations transformed into eight and nine instead of seven and ten sixteenths on D and F are so symmetrical that too much long duration on D is compensated for the short duration on F. By using this way, Boulez tried to avoid using the tedious repetition of regular duration.

<Ex. 3> $PDA = G\#$

8 instead of 7 sixteenths   9 instead of 10 sixteenths

1	2	3	4	5	6	7	8	9	10	11	12
G#	A	A#	B	C	C#	D	D#	E	F	F#	G
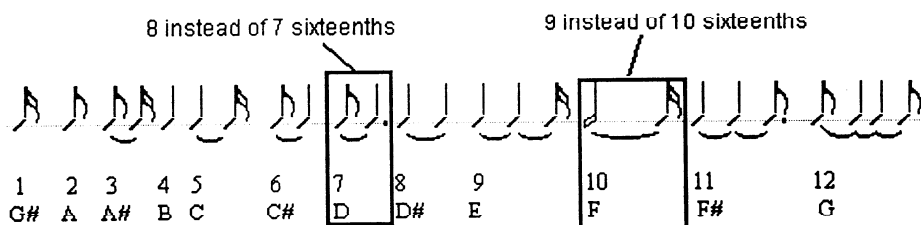
In mm. 3-5 (PDA=A$\#$), PDA is exactly employed from A$\#$=1♪ through A=12♪s with all 12 chromatic pitches like in mm. 1-2. Using the regular duration is also the Boulez's intention because the return of the regular duration and the transformation of duration occurring on just before subsection (mm. 2-4) are alternated.

In mm. 6-8 (PDA=C$\#$), the transformation of durations again occur after in mm. 2-4. That is to say, durational values don't exactly follow the system of sixteenth note increments in here. But the transformation of durations of mm. 6-8 is more intricate than that of mm. 2-4. <Ex. 4> shows how the durations of mm. 6-8 change from the regular duration. The upper score of <Ex. 4> is the PDA in mm. 6-8 and the bottom score of that is a regular durational ordering.

The durations of only four numbers of durational ordering, 4, 6, 8, and 12 in mm. 6-8 are suitable for regularly used durational ordering. The rest durations are more or less transformed. Especially, the first three durations in mm. 6-8 are irregularly varied. The third durational ordering number in mm. 6-8 is shorter than

the second one. In addtion, this third durational ordering number is the same as that of the first one. This transformation of duration is also Boulez's intention on using the chord.

Even though a small degree of inaccuracy might occur in the analysis, the notes written under triplet signs (PDA=C♯) would be considered as the notes not written under triplet signs which are the regular durational ordering.

<Ex. 4>

In mm. 8-11 (PDA=A), the regularly used durations return after using the transformed durations. The durational ordering is exactly used from A=1♪ through G♯=12♪s with all 12 chromatic pitches.

In mm. 10-14 (PDA=E), some of the durations are again transformed, but intensities changed are reduced comparable to the durations of mm. 6-8 (Ex. 5). The unit of PDA is a triplet-sixteenth note and a plain sixteenth note. The first duration in mm. 10-14 is a triplet-sixteenth note instead of a plain sixteenth note. Some of the ordering numbers of PDA, 2, 3, 4, 5, 6, 7, 10, 12, are the same as the regular durational ordering with the PDA unit of sixteenth note. The durations of the others in mm. 10-14 are shorter than those of the regular ordering. But, like the PDA of mm. 6-8, the notes written under both triplet sixteenths and plain sixteenths would be considered as the notes written under only plain sixteenths even though a little of inaccuracy might occur in the analysis.

<Ex. 5> *PDA = E*

In the opening measures, mm. 1-14, of "Bourreaux de solitude", the regular ordering and transformed ordering of durations are presented alternately. In other words, the regularly used durations and transformed durations occur by three times, respectively. Among three transformed durations, the second one (T_2) is the most transformed.

mm. 1-2	2-4	3-5	6-8	8-11	10-14
R	T_1	R	T_2	R	T_3

(R: regular T: transformed)

2. Analysis on the aspects of DAA

Not only are the pitch and duration used in mm. 1-14 systematically, but the dynamic and attack also are employed serially.

In the first PDA (mm. 1-2), the dynamics are presented in pairs as follows:

Serial order:	1 2	3 4	5 6	7 8	9 10	11 12
	mf	*mp*	*p*	*pp*	*ff*	*f*

The first dynamic of each pair has a particular attack while the second dynamic of each pair has no attack indication as follows:

Serial order:	1 2	3 4	5 6	7 8	9 10	11 12
	>	>	–	–	*sfz*	*sfz*

<Ex. 6> shows the associated dynamics and attacks based on D (PDA=D) in mm. 1-2. The ordering of DAA may be simplified as 1-2-3-4-5-6 given in the below box, because the two items of each pair are never separated.

<Ex. 6>

In mm. 2-4 (PDA=G$\natural$), DAA is almost in the same order (1-6) as that of mm. 1-2 with just one exception.   One exception occurs in the first dynamic of second pair which is serial number 3: *mp* is represented without >.   But, the order of DAA in mm. 2-4 might be 1-2-3-4-5-6 even though a slightly changed exception happens because it is so trivial (Ex. 7).

<Ex. 7>

> is not represented
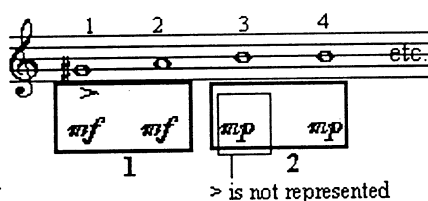
The ordering of PDA in mm. 3-5 (PDA= A$\natural$) is rotated: the first note, A#, has *p* and *tenuto* which are the members of the first dynamic and attack of the third pair in regular ordering of DAA; the second note, B, has *pp* which is not the member of the second dynamic of the third pair; the third note, C, has the first dynamic and attack of the fourth pair; the fourth note, C#, has the second dynamic and attack of the fourth pair; and so on.   Even though there is one exception on the second note, B, the ordering of DAA in mm. 3-5 is simplified as 3-4-5-6-1-2 (Ex. 8).

<Ex. 8>

In mm. 6-8 (PDA=C$\natural$), the ordering of DAA is also rotated.   In other words, the first note C$\natural$, which is starting note, has the *f, sfz* and ^ which are the members of the first dynamic and attacks of the sixth pair.   Therefore, the ordering of DAA in mm. 6-8 is 6-1-2-3-4-5.   Likewise, mm. 8-11 (PDA=A) and mm. 10-14 (PDA=E)

are also rotated: 2-3-4-5-6-1 and 3-4-5-6-1-2, respectively.

Therefore, in mm. 1-14, the ordering of DAA in mm. 3-14 is rotated. But in each ordering case rotated, even though the starting number is different, the sequence of ordering is retained. For example, the ordering of DAA, 6, starts in mm. 6-8 and 2 is started in mm. 8-11, but the sequence of ordering in both cases is retained as follows:

mm. 1-2	(PDA=D)	1 - 2 - 3 - 4 - 5 - 6
mm. 2-4	(PDA=G$_\sharp$)	1 - 2 - 3 - 4 - 5 - 6
mm. 3-5	(PDA=A$_\sharp$)	3 - 4 - 5 - 6 - 1 - 2
mm. 6-8	(PDA=C$_\sharp$)	6 - 1 - 2 - 3 - 4 - 5
mm. 8-11	(PDA=A)	2 - 3 - 4 - 5 - 6 - 1
mm. 10-14	(PDA=E)	3 - 4 - 5 - 6 - 1 - 2

The analysis of PDA and DAA will reveal some of the closely connected aspects between PDA and DAA. PDAs on D, G$_\sharp$, A$_\sharp$, C$_\sharp$, A, and E are quite discernible in mm. 1-14. First, the transposition of the PDA is related to DAA. So to speak, whenever PDA is transposed, the starting ordering of DAA is changed. If PDA=D and DAA starts from 1, in PDA=D$_\sharp$, then DAA starts from 2, in PDA=E, DAA from 3, et cetera. Because 1 through 6 of DAA are completed at G, the numbers are then repeated up to a tritone. The chart below shows the relationship between PDA and DAA.

PDA	Starting order of DAA
D and G$_\sharp$	1
D$_\sharp$ and A	2
E and A$_\sharp$	3
F and B	4
F$_\sharp$ and C	5
G and C$_\sharp$	6

As the chart above shows, two PDAs share one starting order of DAA. So, PDA=A$_\sharp$ and PDA=E in mm.3-5 and mm. 10-14 have the same starting order of DAA, 3.

With the chart above as a starting point, the entire series of PDAs with dynamics and attacks may be presented in the matrix shown in <Ex. 9>. It seems that PDA=C starts because dynamic levels decrease systematically from *ff* down to *pp*, and the attacks decrease from *sfz* to > to -.

<Ex. 9>
(Wentzel, "DAA in Boulez's *Le Marteau Sans Maître*", p. 147)

Second, the relationship between PDA and DAA can be found through the interval succession. The transpositional pitches of the PDAs, D, G♯, A♮, C♯, A, and E consist on 6-z43 (012568) and have "1-1-3-1-2" interval succession on normal form [89t124]. This interval succession is related by the interval of starting number of each dynamic-attack series. In DAA, the intervals between two sets of DAA are also the same as interval succession of PDA.

The chart below shows the relationship of interval successions between PDAs and DAAs. The interval of PDAs between G♯ and A is "1" which is the same as that of DAA. Likewise, the interval of PDAs between A and A♯ is the same as that of DAA. And so on.

<div align="center">

<Interval successions of PDAs>

D,   G♯, A♮, C♯, A, E

↓ (normal form)

G♯, A, A♮, C♯, D, E

1   1   3   1   2

</div>

<Successions of DAAs>
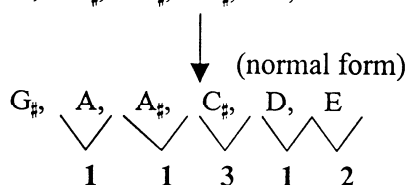
G♯,	:	1	2	3	4	5	6	⟩ 1
A	:	2	3	4	5	6	1	⟩ 1
A♮,	:	3	4	5	6	1	2	⟩ 3
C♯,	:	6	1	2	3	4	5	⟩ 1
D	:	1	2	3	4	5	6	⟩ 2
E	:	3	4	5	6	1	2	

This opening measures of "Bourreaux de solitude" are filled with systematic PDA and DAA, and these PDAs and DAAs are closely related to each other. Whenever PDAs are transposed, DAAs are also rotated or transposed. But, the interval successions of PDAs are the same as those of DAAs even though PDAs are transposed.

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