

MTO 12.4 Examples: Butterfield, The Power of Anacrusis

(Note: audio, video, and other interactive examples are only available online)
<http://www.mtosmt.org/issues/mto.06.12.4/mto.06.12.4.butterfield.php>

Example 1. Metric Projection

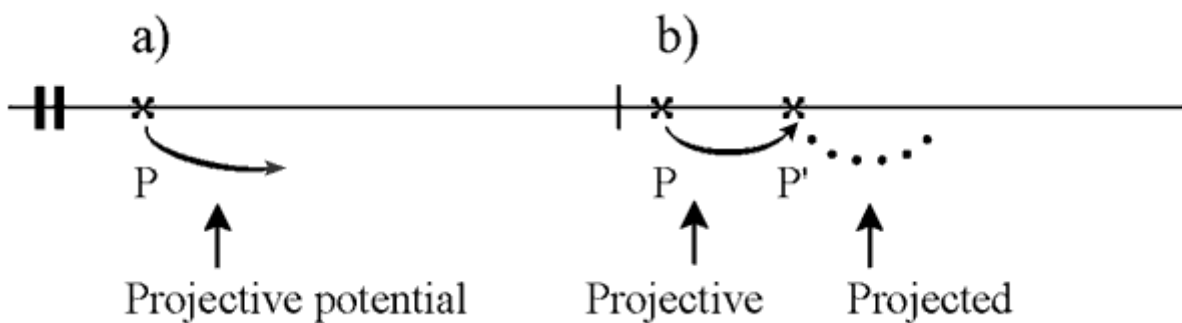
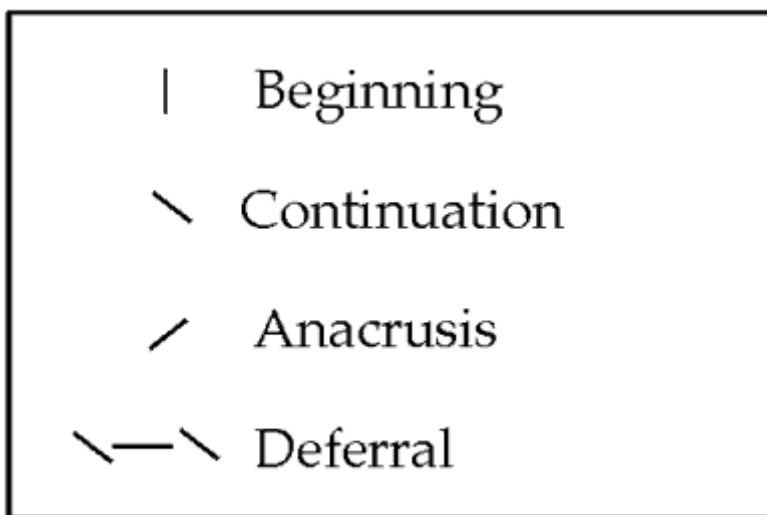


Figure 1. Basic analytical symbols



Example 2. Projection in a simple melody

The image displays a musical staff in 4/4 time, featuring a melody in the key of B-flat major. The notes are: G4 (quarter), A4 (quarter), Bb4 (quarter), A4 (quarter), G4 (quarter), F4 (quarter), E4 (quarter), and D4 (quarter). Above the staff, vertical lines and slanted dashes indicate the placement of notes. Below the staff, three curved arrows labeled P, Q, and R show the projection of notes P, Q, and R respectively. Each arrow points to a dotted line representing the projection path of the note. The labels P, Q, and R are positioned at the start of the arrows, and P', Q', and R' are positioned at the end of the dotted lines.

Example 3. Means of producing anacrusis

Diagram a) shows a musical staff with three vertical bar lines. The first bar contains a quarter note (P). The second bar contains a quarter note (P') with a stem that extends into the third bar. A dotted line continues from P' to the end of the staff. Below the staff, a curved arrow labeled 'Q' starts at the beginning and points to a quarter note (Q') in the third bar, with a dotted line extending from Q' to the end of the staff.

Diagram b) shows a musical staff with three vertical bar lines. The first bar contains a quarter note (P). The second bar contains a quarter note (P') with a stem that extends into the third bar. A dotted line continues from P' to the end of the staff. Below the staff, a curved arrow labeled 'Q' starts at the beginning and points to a quarter note (Q') in the third bar, with a dotted line extending from Q' to the end of the staff.

Diagram c) shows a musical staff with three vertical bar lines. The first bar contains a quarter note (P). The second bar contains a quarter note (P') with a stem that extends into the third bar. A dotted line continues from P' to the end of the staff. Below the staff, a curved arrow labeled 'Q' starts at the beginning and points to a quarter note (Q') in the third bar, with a dotted line extending from Q' to the end of the staff.

Diagram d) shows a musical staff with three vertical bar lines. The first bar contains a quarter note (P). The second bar contains a quarter note (P') with a stem that extends into the third bar. A dotted line continues from P' to the end of the staff. Below the staff, a curved arrow labeled 'Q' starts at the beginning and points to a quarter note (Q') in the third bar, with a dotted line extending from Q' to the end of the staff.

Diagram e) shows a musical staff with three vertical bar lines. The first bar contains a quarter note (P). The second bar contains a quarter note (P') with a stem that extends into the third bar. A dotted line continues from P' to the end of the staff. Below the staff, a curved arrow labeled 'Q' starts at the beginning and points to a quarter note (Q') in the third bar, with a dotted line extending from Q' to the end of the staff.

Example 4. Swing eighth notes

Diagram a) shows two eighth notes followed by an arrow pointing to two eighth notes with a '3' above them, indicating a triplet. Below the first two notes is the text 'Swing ratio: 2:1'.

Diagram b) shows two eighth notes with a '3' above them, indicating a triplet. Below the notes is the text '3:1'.

Diagram c) shows two eighth notes with a '3' above them, indicating a triplet. Below the notes is the text '3:1'.

Diagram d) shows two eighth notes with a '3' above them, indicating a triplet. Below the notes is the text '3:1'.

Diagram e) shows two eighth notes with a '3' above them, indicating a triplet. Below the notes is the text '3:1'.

Example 5. Anacrusis in swing eighth notes

a) straight



b) swing



Example 6. Anacrusis in the ride rhythm

Diagram illustrating anacrusis in the ride rhythm. The notation shows two staves: "ride:" and "hh, pedal:". The ride staff has notes with stems and slashes, and a dotted line with an arrow indicating anacrusis. The hh, pedal staff has notes with stems and slashes, and a dotted line with an arrow indicating anacrusis. Below the staves are four lines of notation: L, S, L, S; P, P'; Q, Q'; R, R'. Each line has a dotted line with an arrow indicating anacrusis.

Example 7. Anacrusis in the bass line

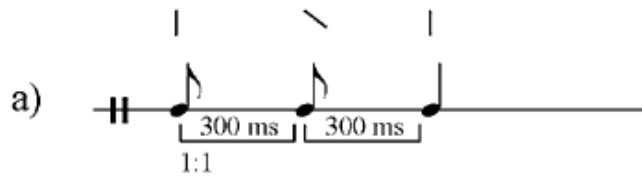
a)

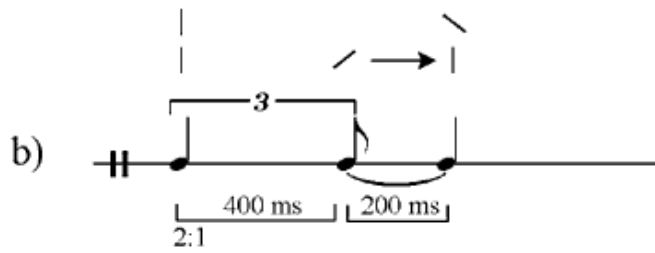
b)

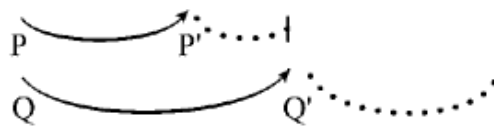
c)

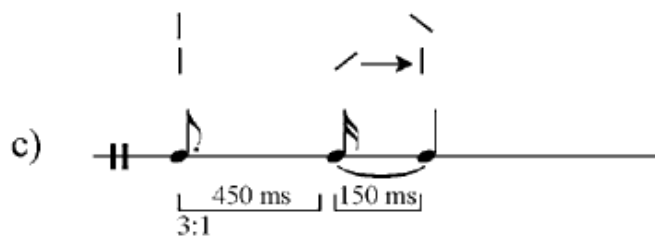
Example 8. PDs and category perception

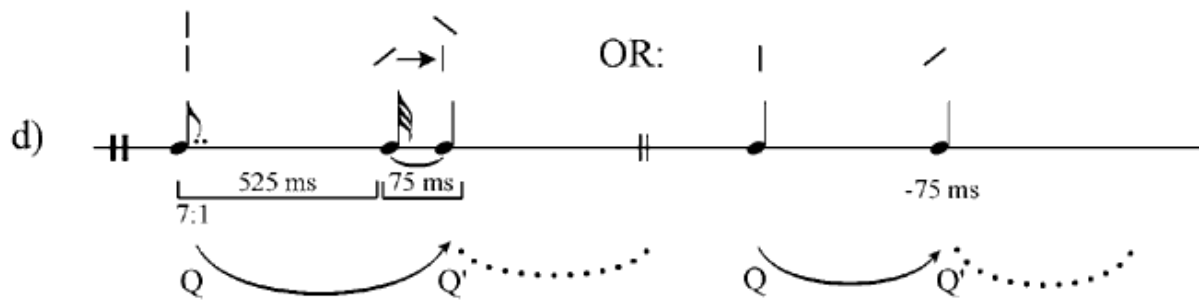
$\text{♩} = 100$

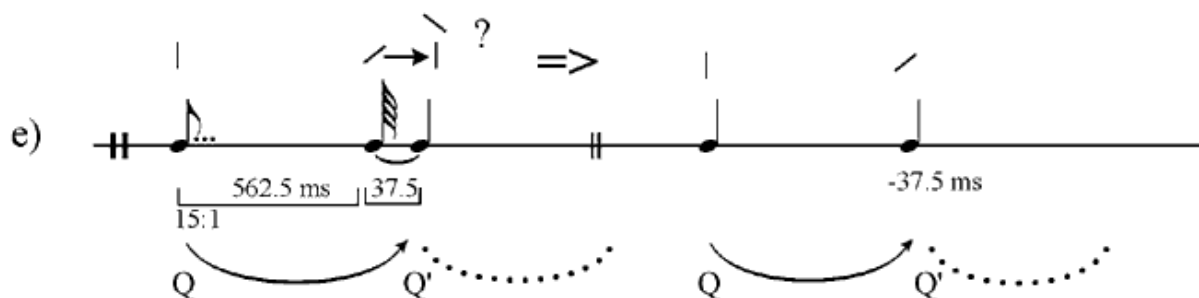
a) 

b) 

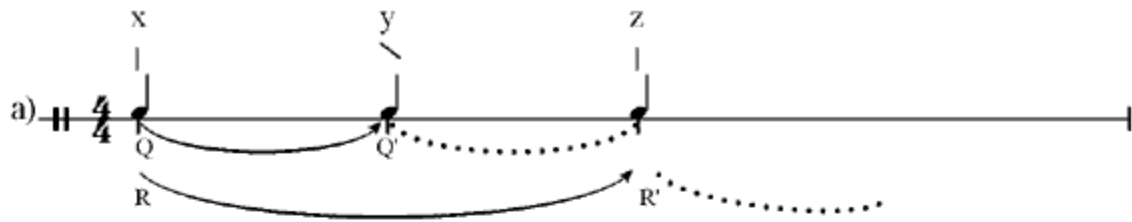


c) 

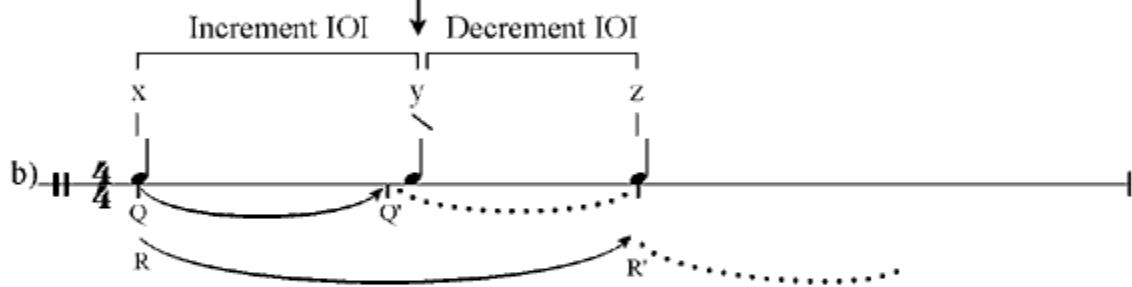
d) 

e) 

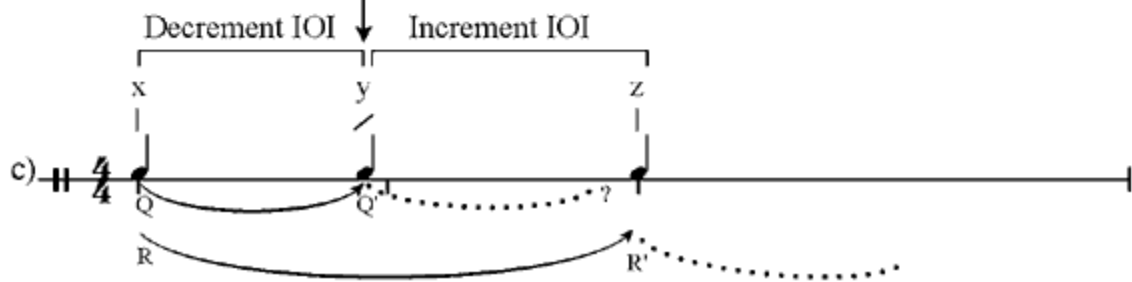
Example 9. Effects of PDs on projection



"In the pocket" attack

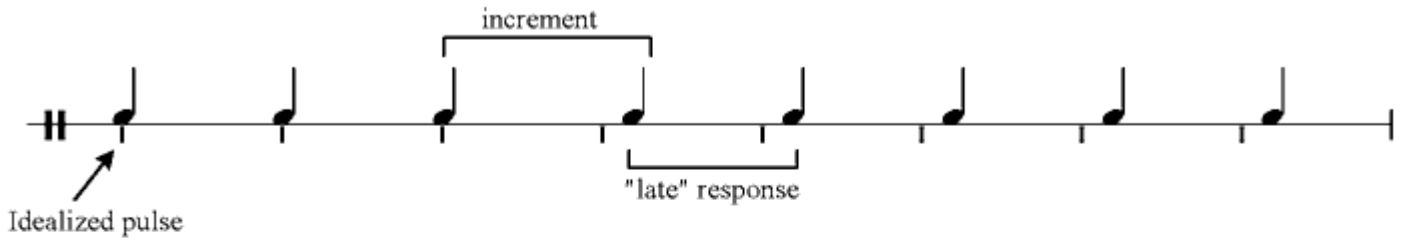


On-top attack



Example 10. “Late” responses in Repp (1998)

a) Increment detection task



b) Decrement detection task

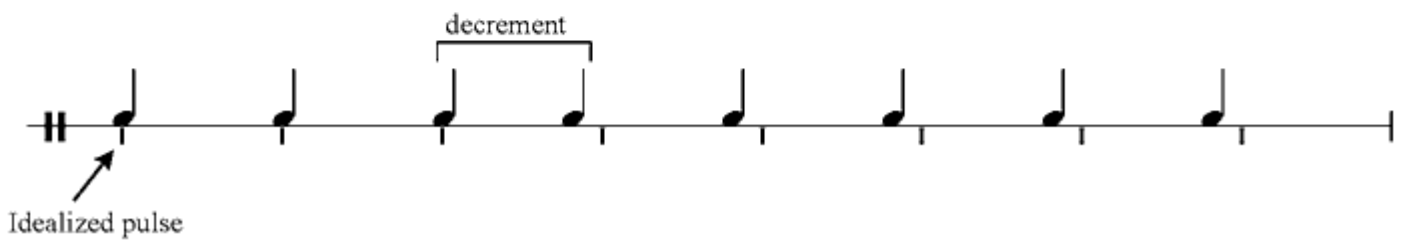


Figure 2. Additional symbols

$\nearrow \rightarrow $	Virtual realization of projection in a syncopated context
\cong	Strongly continuative
$\not\cong$	Strongly anacrusic
\succ	Weakly continuative
\prec	Weakly anacrusic

Example 11. PDs in the ride rhythm

a) backbeats on top

The notation shows two staves. The top staff is labeled 'ride:' and the bottom staff is labeled 'hh, pedal:'. The ride cymbal part consists of a steady eighth-note pattern with accents on the backbeats (beats 2 and 4). The hi-hat/pedal part consists of a steady eighth-note pattern with accents on the downbeats (beats 1 and 3). Vertical dashed lines indicate the downbeats, and double slashes indicate the backbeats. The word 'etc.' is written at the end of the ride staff.

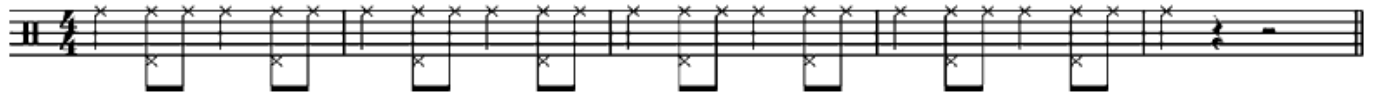
b) backbeats behind the beat

The notation shows two staves. The top staff is labeled 'ride:' and the bottom staff is labeled 'hh, pedal:'. The ride cymbal part consists of a steady eighth-note pattern with accents on the backbeats (beats 2 and 4) that occur slightly after the downbeats. The hi-hat/pedal part consists of a steady eighth-note pattern with accents on the downbeats (beats 1 and 3). Vertical dashed lines indicate the downbeats, and double slashes indicate the backbeats. The word 'etc.' is written at the end of the ride staff.

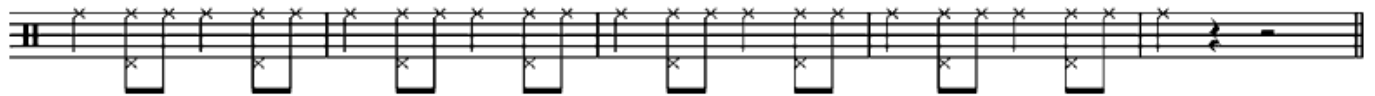
Audio Example 1 / Transcription 1. PDs in the Ride Rhythm

♩ = 132

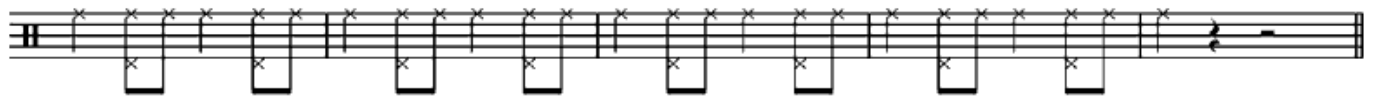
Segment 1: Idealized backbeats (no adjustment)



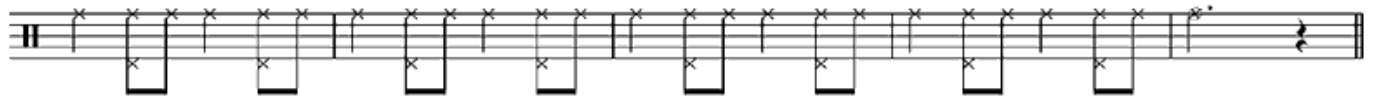
Segment 2: "In the pocket." Backbeats 10.665 ms behind (6 ticks)



Segment 3: "Drive." Backbeats 19.551 ms on top (11 ticks)

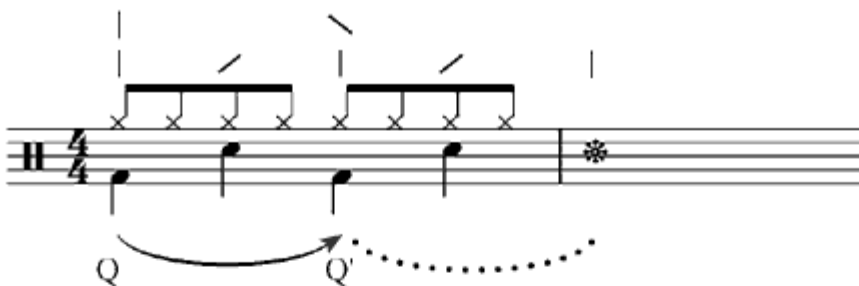


Segment 4: "Nervous." Backbeats 30.215 ms on top (17 ticks)

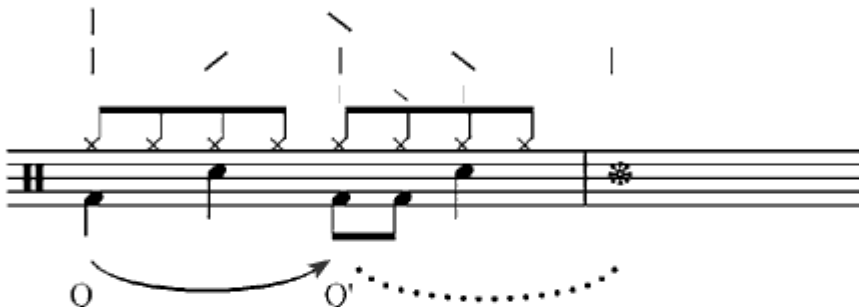


Example 12. Basic rock groove


Two-beat rhythm

a) 


Basic rock groove

b) 

Rock groove, backbeats on top

c) 

Rock groove, backbeats behind

d) 

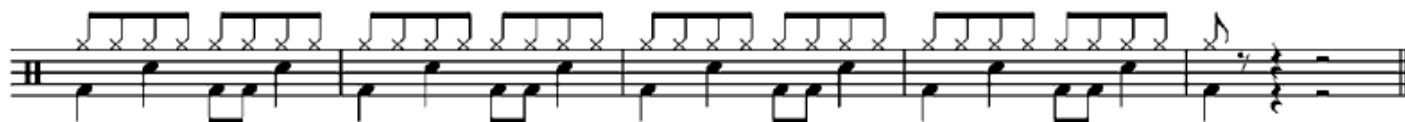
Audio Example 2 / Transcription 2. PDs in a Basic Rock Rhythm

♩ = 132


Segment 1: Idealized backbeats (no adjustment)



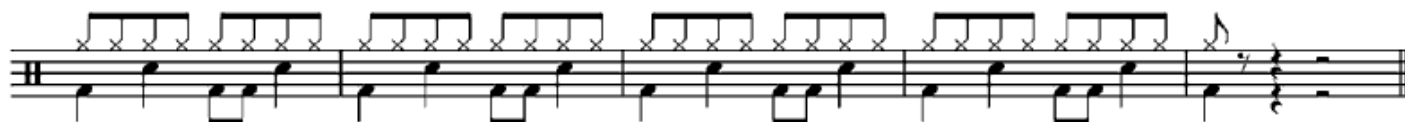
Segment 2: "In the pocket." Backbeats 10.665 ms behind (6 ticks)



Segment 3: "Drive." Backbeats 19.551 ms on top (11 ticks)



Segment 4: "Nervous." Backbeats 30.215 ms on top (17 ticks)



Example 13. Bass & drum groove in Herbie Hancock's "Chameleon"



Example 14. “Chameleon,” bass line

a)

Diagram illustrating the bass line for Example 14a, showing various articulation marks (accents, slurs, slurs with dots) and lettered annotations (P, P', Q, Q', R, R', S, T, T', U, U') indicating phrasing and dynamics. The notation includes a bass clef, a key signature of three flats, and a 4/4 time signature. Vertical dashed lines mark specific measures. Slurs with dots connect notes across measures, and arrows indicate phrasing directions. Letters P, P', Q, Q', R, R', S, T, T', U, U' are placed below the staff with arrows pointing to specific notes or groups of notes.

b)

Diagram illustrating the bass line for Example 14b, showing an 'on top attack' annotation. The notation includes a bass clef, a key signature of three flats, and a 4/4 time signature. Vertical dashed lines mark specific measures. A double slash with an arrow points to a note, with the text 'on top attack' written below it.

c)

Diagram illustrating the bass line for Example 14c, showing a 'delayed attack' annotation. The notation includes a bass clef, a key signature of three flats, and a 4/4 time signature. Vertical dashed lines mark specific measures. A double slash with an arrow points to a note, with the text 'delayed attack' written below it.

Example 15. “Chameleon,” drum part

a) Basic rock groove

Musical notation for a basic rock groove in 4/4 time. The drum part consists of a steady eighth-note pattern on the snare and bass drum. The snare plays on beats 2 and 4, and the bass drum plays on beats 1 and 3. The notation is shown on a single staff with a treble clef and a common time signature.

b) Basic funk groove

Musical notation for a basic funk groove in 4/4 time. The drum part features a steady eighth-note pattern on the snare and bass drum. The snare plays on beats 2 and 4, and the bass drum plays on beats 1 and 3. The notation is shown on a single staff with a treble clef and a common time signature. The letters "S L" are written below the staff, indicating snare and bass drum.

c) Chameleon groove

Musical notation for the Chameleon groove in 4/4 time. The drum part features a steady eighth-note pattern on the snare and bass drum. The snare plays on beats 2 and 4, and the bass drum plays on beats 1 and 3. The notation is shown on a single staff with a treble clef and a common time signature. The letters "S L" are written below the staff, indicating snare and bass drum.

d) Chameleon groove, backbeats on top

Musical notation for the Chameleon groove in 4/4 time, with backbeats on top. The drum part features a steady eighth-note pattern on the snare and bass drum. The snare plays on beats 2 and 4, and the bass drum plays on beats 1 and 3. The notation is shown on a single staff with a treble clef and a common time signature. The letters "S L" are written below the staff, indicating snare and bass drum. The time offsets are -20 ms.

e) Chameleon groove, backbeats behind

Musical notation for the Chameleon groove in 4/4 time, with backbeats behind. The drum part features a steady eighth-note pattern on the snare and bass drum. The snare plays on beats 2 and 4, and the bass drum plays on beats 1 and 3. The notation is shown on a single staff with a treble clef and a common time signature. The letters "S L" are written below the staff, indicating snare and bass drum. The time offsets are +20 ms.

Audio Example 3 / Transcription 3. PDs in "Chameleon"

J = 100

Segment 1: Idealized backbeats (no adjustment)

Segment 2: "In the pocket." Backbeats 9.375 ms behind (4 ticks)

Segment 3: "Snap." Backbeats 9.375 ms on top (4 ticks)

Segment 4: "Drive." Backbeats 21.084 ms on top (9 ticks)

Table 1. Bass line timings, mm. 1–4

Bar	Beat	Bass note	Onset	IOI	Bar length	"Ideal" 16th notes	Timing	Projected bar length	Projected 16th notes	Projected Timing
0	&	G ²	0.651	0.333						
	uh									
	4	A ^{b2}	0.984	0.311						
	ee									
	&	A ²	1.295	0.346						
uh										
1	1	B ^{b2}	1.641	0.501	2.600	1.641		2.640	1.641	
	ee					1.804			1.806	
	&					1.966			1.971	
	uh	A ^{b3}	2.142	0.497		2.129	0.013		2.136	0.006
	2					2.291			2.301	
	ee					2.454			2.466	
	&	B ^{b3}	2.639	0.632		2.616	0.023		2.631	0.008
	uh					2.779			2.796	
	3					2.941			2.961	
	ee					3.104			3.126	
	&	C ³	3.271	0.330		3.266	0.005		3.291	-0.020
	uh					3.429			3.456	
	4	D ^{b3}	3.601	0.328		3.591	0.010		3.621	-0.020
	ee					3.754			3.786	
	&	D ³	3.929	0.312		3.916	0.013		3.951	-0.022
	uh					4.079			4.116	
	2	1	E ^{b3}	4.241	0.504	2.626	4.241		2.600	4.241
ee						4.405			4.404	
&						4.569			4.566	
uh		B ^{b3}	4.745	0.482		4.733	0.012		4.729	0.017
2						4.898			4.891	
ee						5.062			5.054	
&		D ^{b4}	5.227	0.640		5.226	0.001		5.216	0.011
uh						5.390			5.379	
3						5.554			5.541	
ee						5.718			5.704	
&		G ²	5.867	0.322		5.882	-0.015		5.866	0.001
uh						6.046			6.029	
4		A ^{b2}	6.189	0.329		6.211	-0.022		6.191	-0.002
ee						6.375			6.354	
&		A ²	6.518	0.349		6.539	-0.021		6.516	0.002
uh						6.703			6.678	
3		1	B ^{b2}	6.867	0.470	2.559	6.867		2.626	6.867
	ee					7.027			7.031	
	&					7.187			7.195	
	uh	A ^{b3}	7.337	0.478		7.347	-0.010		7.359	-0.022
	2					7.507			7.524	
	ee					7.667			7.688	
	&	B ^{b3}	7.815	0.628		7.827	-0.012		7.852	-0.037
	uh					7.987			8.016	
	3					8.147			8.180	
	ee					8.306			8.344	
	&	C ³	8.443	0.329		8.466	-0.023		8.508	-0.065
	uh					8.626			8.672	
	4	D ^{b3}	8.772	0.307		8.786	-0.014		8.837	-0.065
	ee					8.946			9.001	
	&	D ³	9.079	0.347		9.106	-0.027		9.165	-0.086
	uh					9.266			9.329	
	4	1	E ^{b3}	9.426	0.500	2.598	9.426		2.559	9.426
ee						9.588			9.586	
&						9.751			9.746	
uh		B ^{b3}	9.926	0.468		9.913	0.013		9.906	0.020
2						10.076			10.066	
ee						10.238			10.226	
&		D ^{b4}	10.394	0.628		10.400	-0.006		10.386	0.008
uh						10.563			10.546	
3						10.725			10.706	
ee						10.887			10.865	
&		G ²	11.022	0.323		11.050	-0.028		11.025	-0.003
uh						11.212			11.185	
4		A ^{b2}	11.345	0.335		11.375	-0.030		11.345	0.000
ee						11.537			11.505	
&		A ²	11.680	0.344		11.699	-0.019		11.665	0.015
uh						11.862			11.825	
5		1	B ^{b2}	12.024						

Table 2. Bass and Snare timings, mm. 5–12, and Reprise, mm. 1–6 [[PDF version](#)]

Bar	Beat	16th notes	Bass note	Bass onset	Bass Timing	Snare onset	Snare timing
5	1	11.999	B ^{b2}	12.024	0.025		
	ee	12.168					
	&	12.337					
	uh	12.506	A ^{b3}	12.512	0.007	12.519	0.014
	2	12.674					
	ee	12.830					
	&	12.985	B ^{b3}	12.979	-0.006		
	uh	13.143					
	3	13.301					
	ee	13.459					
	&	13.616	C ³	13.622	0.006		
	uh	13.769					
	4	13.922	D ^{b3}	(13.927)	0.005	13.927	0.005
	ee	14.077					
&	14.232	D ³	14.247	0.015			
uh	14.404						
6	1	14.576	E ^{b3}	14.592	0.016		
	ee	14.735					
	&	14.894					
	uh	15.053	B ^{b3}	(15.085)	0.033	15.085	0.033
	2	15.211					
	ee	15.382					
	&	15.552	D ^{b4}	15.542	-0.010		
	uh	15.707					
	3	15.862					
	ee	16.009					
	&	16.155	G ²	16.159	0.004		
	uh	16.319					
	4	16.482	A ^{b2}	(16.487)	0.005	16.487	0.005
	ee	16.650					
&	16.818	A ²	16.783	-0.035			
uh	16.971						
7	1	17.124	B ^{b2}	17.144	0.020		
	ee	17.280					
	&	17.436					
	uh	17.600	A ^{b3}	17.626	0.026	17.644	0.044
	2	17.764					
	ee	17.929					
	&	18.093	B ^{b3}	18.078	-0.015		
	uh	18.247					
	3	18.401					
	ee	18.550					
	&	18.699	C ³	18.723	0.024		
	uh	18.866					
	4	19.032	D ^{b3}	19.022	-0.010	19.035	0.003
	ee	19.194					
&	19.355	D ³	19.333	-0.022			
uh	19.506						
8	1	19.657	E ^{b3}	19.675	0.018		
	ee	19.815					
	&	19.972					
	uh	20.130	B ^{b3}	(20.149)	0.019	20.149	0.019
	2	20.288					
	ee	20.452					
	&	20.615	D ^{b4}	20.621	0.006		
	uh	20.774					
3	20.933						

	ee	21.086					
	&	21.239	G ²	21.234	-0.005		
	uh	21.398					
	4	21.556	A ^{b2}	(21.564)	0.008	21.564	0.008
	ee	21.720					
	&	21.883	A ²	21.854	-0.029		
	uh	22.033					
9	1	22.182	B ^{b2}	22.204	0.022		
	ee	22.339					
	&	22.496					
	uh	22.647	A ^{b3}	(22.672)	0.026	22.672	0.026
	2	22.797					
	ee	22.962					
	&	23.127	B ^{b3}	23.135	0.008		
	uh	23.287					
	3	23.446					
	ee	23.603					
	&	23.759	C ³	23.780	0.021		
	uh	23.912					
	4	24.064	D ^{b3}	(24.074)	0.010	24.074	0.010
	ee	24.229					
	&	24.394	D ³	24.401	0.007		
	uh	24.548					
10	1	24.702	E ^{b3}	24.715	0.013		
	ee	24.862					
	&	25.021					
	uh	25.175	B ^{b3}	25.197	0.022	25.202	0.027
	2	25.329					
	ee	25.485					
	&	25.641	D ^{b4}	25.661	0.020		
	uh	25.793					
	3	25.945					
	ee	26.099					
	&	26.252	G ²	26.246	-0.006		
	uh	26.408					
	4	26.564	A ^{b2}	(26.569)	0.005	26.569	0.005
	ee	26.718					
	&	26.871	A ²	26.880	0.009		
	uh	27.025					
11	1	27.179	B ^{b2}	27.205	0.026		
	ee	27.338					
	&	27.496					
	uh	27.652	A ^{b3}	27.665	0.014	27.678	0.027
	2	27.807					
	ee	27.967					
	&	28.127	B ^{b3}	28.131	0.004		
	uh	28.285					
	3	28.443					
	ee	28.595					
	&	28.747	C ³	28.761	0.014		
	uh	28.900					
	4	29.052	D ^{b3}	(29.057)	0.005	29.057	0.005
	ee	29.214					
	&	29.375	D ³	29.361	-0.014		
	uh	29.525					
12	1	29.674	E ^{b3}	29.685	0.011		
	ee	29.832					
	&	29.989					

	uh	30.144	B ^{b3}	30.160	0.017		
	2	30.298				30.303	0.005
	ee	30.451					
	&	30.604	D ^{b4}	30.620	0.016		
	uh	30.764					
	3	30.924				30.924	
	ee	31.077					
	&	31.229	G ²	31.211	-0.018		
	uh	31.370				31.396	0.026
	4	31.511	A ^{b2}	31.568	0.057	31.511	
	ee	31.670					
	&	31.829	A ²	31.815	-0.014		
	uh	31.989					
13	1	32.148	B^{b2}	32.189	0.041		

Reprise at 13:20.08

	1	1	0.005	B ^{b2}	0.023	0.018	
		ee	0.136				
		&	0.266				
		uh	0.398	A^{b3}	(0.411)	0.013	0.411 0.013
		2	0.530				
		ee	0.660				
		&	0.790	B ^{b3}	0.858	0.068	
		uh	0.932				
		3	1.074				
		ee	1.204				
		&	1.334	C ³	1.339	0.005	
		uh	1.474				
		4	1.614	D ^{b3}	1.608	-0.006	1.617 0.003
		ee	1.755				
		&	1.895	D ³	1.895		
		uh	2.031				
2	1	2.166	E^{b3}	2.190	0.024		
		ee	2.306				
		&	2.446				
		uh	2.590	B ^{b3}	2.618	0.028	(2.618) 0.028
		2	2.733				
		ee	2.880			2.900	0.020
		&	3.027	D ^{b4}	3.027		
		uh	3.151				
		3	3.275				
		ee	3.412				
		&	3.548	G ²	3.565	0.017	
		uh	3.685				
		4	3.821	A^{b2}	(3.827)	0.006	3.827 0.006
		ee	3.961				
		&	4.101	A ²	4.122	0.021	
		uh	4.237				
3	1	4.373	B^{b2}	4.390	0.017		
		ee	4.513				
		&	4.653				
		uh	4.791	A^{b3}	(4.818)	0.027	4.818 0.027
		2	4.929				
		ee	5.069			5.095	0.026
		&	5.209	B ^{b3}	5.232	0.023	
		uh	5.338			5.355	0.017
		3	5.467				
		ee	5.605				

	&	5.743	C ³	5.747	0.004		
	uh	5.879					
	4	6.015	D ^{b3}	(6.013)	-0.002	6.013	-0.002
	ee	6.153					
	&	6.291	D ³	6.301	0.010		
	uh	6.428				6.447	0.019
4	1	6.565	E ^{b3}	6.582	0.017		
	ee	6.704				6.720	0.016
	&	6.843					
	uh	6.969	B ^{b3}	7.006	0.037	6.986	0.017
	2	7.095					
	ee	7.237				7.235	-0.002
	&	7.379	D ^{b4}	(7.379)	0.000	7.379	0.000
	uh	7.510				7.560	0.051
	3	7.640				7.667	0.027
	ee	7.783				7.820	0.038
	&	7.925	G ²	7.916	-0.009		
	uh	8.055				8.062	0.007
	4	8.185	A ^{b2}	8.206	0.021		
	ee	8.321					
	&	8.457	A ²	8.475	0.018		
	uh	8.599				8.605	0.006
5	1	8.740	B ^{b2}	8.753	0.013		
	ee	8.880					
	&	9.019					
	uh	9.161	A ^{b3}	9.157	-0.003	9.190	0.030
	2	9.302					
	ee	9.443					
	&	9.583	B ^{b3}	9.574	-0.009		
	uh	9.706				9.714	0.008
	3	9.829					
	ee	9.966					
	&	10.102	C ³	10.115	0.013		
	uh	10.245					
	4	10.387	D ^{b3}	(10.390)	0.003	10.390	0.003
	ee	10.528					
	&	10.669	D ³	10.666	-0.003		
	uh	10.803				10.804	0.002
6	1	10.936	E ^{b3}	10.939	0.003		
	ee	11.077					
	&	11.218					
	uh	11.352	B ^{b3}	11.361	0.010	11.379	0.027
	2	11.485					
	ee	11.626				11.649	0.023
	&	11.767	D ^{b4}	11.780	0.013		
	uh	11.900				11.903	0.003
	3	12.033					
	ee	12.171					
	&	12.309	G ²	12.297	-0.012		
	uh	12.448					
	4	12.587	A ^{b2}	(12.591)	0.004	12.591	0.004
	ee	12.728					
	&	12.868	A ²	12.869	0.001		
	uh	13.001				13.007	0.007
7	1	13.133	B ^{b2}	13.158	0.025		