Typical Chords in Typical Song Sections: How Harmony and Form Interact in a Corpus of Rock Music

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I. Introduction

II. Methodology

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Typical Characteristics of a Chorus Section

General

- Focal point of song (*Covach 2005*)
- Most memorable section (*Harris 2006*, *Osborn 2010*)
- More energy than verse (*Stephan-Robinson 2009*)

Instrumentation

- Thicker texture than verse (*Everett 2009*)
- Involves the addition of background singers (*Stephenson 2002*)

Lyrics

- More general message than verse (*Burns 2005*)
- Includes the title of the song (*Endrinal 2008*)
- Lyrics repeat on future iterations (*Harris 2006*, *Covach 2009*)

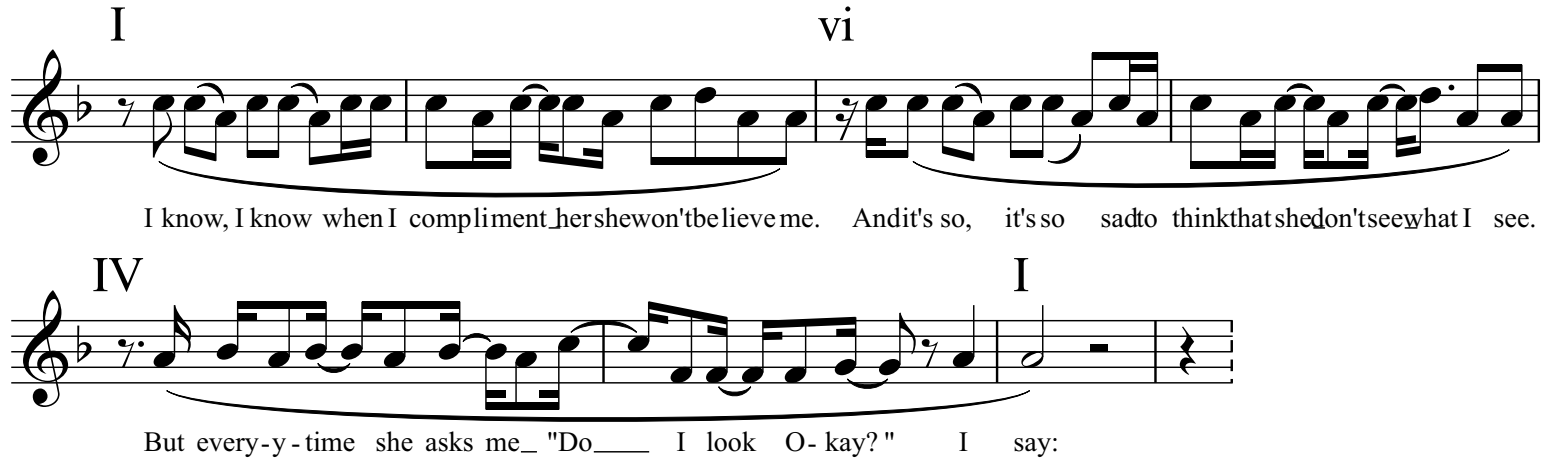
Pitch and Rhythm

- Less pentatonic (*Temperley 2007*)
- Melody more coordinated with harmony (*Temperley 2007*)
- Has slower vocal rhythm than verse (*Stephenson 2002*)

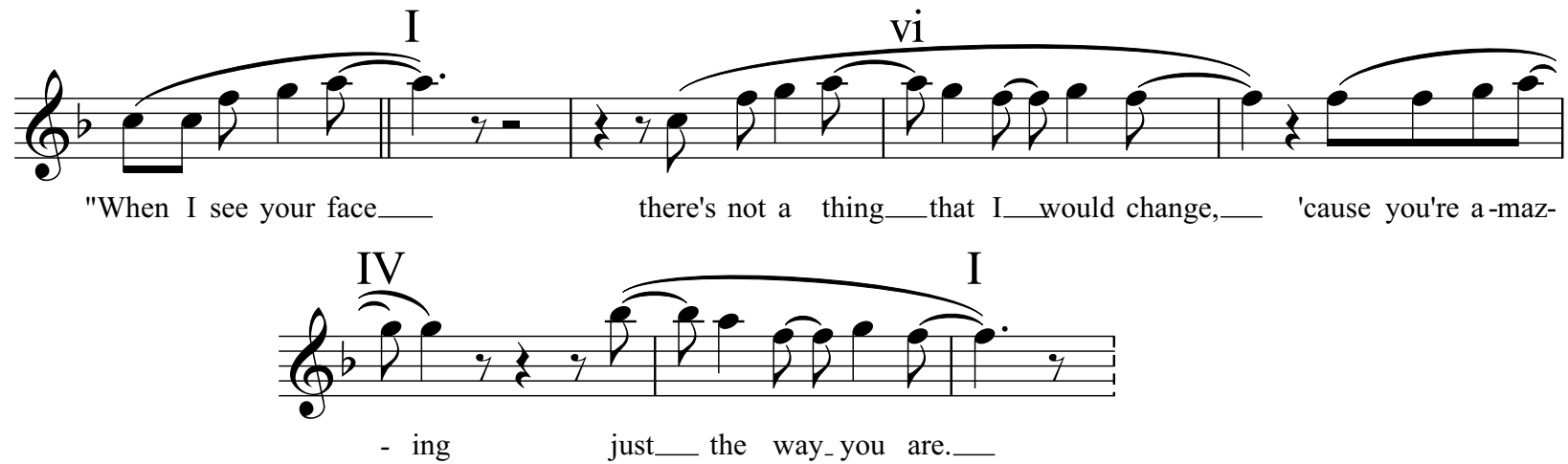
Prototypical Verse-Chorus:

Bruno Mars, “Just the Way You Are” (2010)

Verse:



Chorus:



I. Introduction

Harmonic Characteristics of Song Sections

General

- Chorus has "more dramatic" harmonies than verse (*Everett 2009, 145*)
- Chorus is "relatively stable" harmonically (*Everett 2009, 145*)
- Bridge has "complex" chord changes (*Everett 2009, 147*)

Role of Tonic

- Verse and chorus usually "prolong the tonic" (*Everett 2001, 48-49)*
- Chorus generally "emphasizes the tonic" (*Endrinal 2008, 69*)
- Chorus "reinforces" the tonic key (*Stephan-Robinson 2009, 94*)

Bridge as Departure

- Bridge "frequently explores" the subdominant harmony
  or other "flat-side" keys (*Neal 2007, 45*)

Harmonic Characteristics of Song Sections

Beginnings and Endings

- Verses typically start with tonic harmony;
  other sections, elsewhere (*Stephenson, 2002; 132*)
- Verse can be harmonically open or closed;
  chorus is harmonically closed (*Neal 2007, 45*)
- Chorus typically ends with tonic (*Stephan-Robinson, 2009*)
- Chorus "rarely" ends on dominant (*Everett 2001, 49*)

(*Summach 2012*)

	starts on tonic				ends on tonic		
	A	**V**	**C**		**A**	**V**	**C**
1955–9	92%	92%	84%		100%	84%	100%
1960–4	93%	94%	60%		92%	70%	80%
1965–9	90%	88%	75%		83%	43%	58%
1970–4	83%	78%	70%		83%	52%	67%
1975–9	85%	79%	78%		85%	37%	60%
1980–4	95%	82%	73%		79%	43%	61%
1985–9	100%	91%	74%		75%	29%	55%

Section attributes

I. Introduction

Rolling Stone corpus

Rolling Stone magazine's "500 Greatest Songs of All Time" (2004)

- based on poll of 172 "rock stars and leading authorities" asked to name the greatest songs of the "rock and roll era."

1: "Like a Rolling Stone" (Bob Dylan, 1965)

2: "Satisfaction" (The Rolling Stones, 1965)

3: "Imagine" (John Lennon, 1971)

4: "What's Going On" (Marvin Gaye, 1971)

5: "Respect" (Aretha Franklin, 1967)

....

30: "I Walk The Line" (Johnny Cash, 1956)

44: "Georgia On My Mind" (Ray Charles, 1960)

256: "Paranoid Android" (Radiohead, 1997)

346: "California Love" (Dr. Dre and 2Pac, 1996)

399: "Enter Sandman" (Metallica, 1991)

Corpus encoding

- Songs individually analyzed by both authors
- Recursive notational system

"Da Doo Ron Ron" (The Crystals, 1963)

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A: I | IV | V | I |

In: I |*4
Vr: $A*2 I | IV | I | V | $A I |*2
So: $A*2
Ou: $A*4

S: [Eb] [12/8] $In $Vr*2 $So $Vr $Ou
```

Distribution of chromatic roots in the 2011 corpus (100 songs)

based on number of instances

(*de Clercq and Temperley 2011*)

Root	Instances	Percent of total	Percent of songs
I	3,059	32.8	100
bII	46	0.5	6
II	338	3.6	39
bIII	240	2.6	18
III	174	1.9	24
IV	2,104	22.6	91
#IV	23	0.2	4
V	1,516	16.2	89
bVI	372	4.0	22
VI	675	7.2	40
bVII	748	8.0	37
VII	36	0.4	7

Distribution of chromatic roots in the RS 200 corpus

based on number of instances

Root	Instances	Percent of total	Percent of songs
I	6,077	33.2	100
bII	56	0.3	5
II	864	4.7	40
bIII	410	2.2	19
III	398	2.2	26
IV	4,143	22.7	92
#IV	43	0.2	4
V	3,121	17.1	88
bVI	662	3.6	20
VI	1,116	6.1	39
bVII	1,347	7.4	36
VII	52	0.3	5

Instances vs. proportions

Hypothetical Verse

I	.	.	.
.	.	V	.

Hypothetical Chorus

I	V	I	V
I	V	I	V

Distribution of chromatic roots in the 200-song corpus

(based on number of instances)

Root	Instances	Percent of total	Percent of songs
I	6,077	33.2	100
bII	56	0.3	5
II	864	4.7	40
bIII	410	2.2	19
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bVI	662	3.6	20
VI	1,116	6.1	39
bVII	1,347	7.4	36
VII	52	0.3	5

Duration of time (in bars) for chromatic roots in the 200-song corpus

Root	Measures	Percent of total	Percent of songs
I	10,348	48.5	100
bII	43	0.2	5
II	756	3.5	40
bIII	287	1.3	19
III	304	1.4	26
IV	3,898	18.3	92
#IV	26	0.1	4
V	3,181	14.9	88
bVI	483	2.3	20
VI	1,048	4.9	39
bVII	952	4.5	36
VII	25	0.1	5

Subjectivity in harmonic analysis

- agreement on chromatic relative root (e.g., I vs. IV): 92.4 %
- agreement on absolute root (e.g., A vs. D): 94.4 %
- agreement on key (or pitch center): 97.3 %

Subjectivity in form analysis

- agreement on section label (e.g., Verse or Chorus): ~ 67%

Frequency of section labels

198 songs analyzed by DT have Verse material (99%)
179 songs analyzed by TdC have Verse material (90%)

135 songs analyzed by DT have Chorus material (68%)
118 songs analyzed by TdC have Chorus material (59%)

62 songs analyzed by DT have Bridge material (31%)
76 songs analyzed by TdC have Bridge material (38%)

25 out of 400 songs analyzed by either author have Prechorus material (6%)

Average percent of time for chromatic roots in the RS 200 based on VERSE categorization

Root	Overall	Verse (DT)	*p*-value	Verse (TdC)	*p*-value	Effect
I	48.1	48.0	n.s.	49.5	n.s.	
II	3.9	3.3	< .05	3.0	< .05	Lower
IV	18.4	18.7	n.s.	18.4	n.s.	
V	15.3	14.7	n.s.	14.5	n.s.	
VI	5.3	5.3	n.s.	5.5	n.s.	
bVII	3.8	4.2	n.s.	3.3	n.s.	

Average percent of time for chromatic roots in the RS 200 based on CHORUS categorization

Root	Overall	Chorus (DT)	*p*-value	Chorus (TdC)	*p*-value	Effect
I	48.1	38.8	< .001	41.3	< .01	Lower
II	3.9	5.0	n.s.	4.0	n.s.	
IV	18.4	19.4	n.s.	20.6	n.s.	
V	15.3	17.5	< .05	18.3	< .05	Higher
VI	5.3	7.2	< .01	6.1	n.s.	
bVII	3.8	5.1	n.s.	4.7	< .05	

Average percent of time for chromatic roots in the RS 200 based on BRIDGE categorization

Root	Overall	Bridge (DT)	*p*-value	Bridge (TdC)	*p*-value	Effect
I	48.1	32.0	< .001	31.2	< .001	Lower
II	3.9	9.1	< .01	7.3	< .05	Higher
IV	18.4	20.1	n.s.	24.1	< .01	
V	15.3	21.1	< .01	19.6	n.s.	
VI	5.3	7.1	n.s.	7.0	n.s.	
bVII	3.8	2.8	n.s.	1.4	< .001	

Relationships between section types in the RS 200, given average percent of time for chromatic roots

Root	Bridge to Verse (DT)	Bridge to Verse (TdC)	Bridge to Chorus (DT)	Bridge to Chorus (TdC)	Chorus to Verse (DT)	Chorus to Verse (TdC)
I	<<<	<<<	.	.	<<<	<<
II	>	>	.	.	.	.
IV	.	>	.	.	.	.
V	>	.	.	.	.	>
VI	.	.	.	.	>	.
bVII	.	<	.	.	.	.

. = No significant difference
> = Higher proportion, *p*-value < .05
>> = Higher proportion, *p*-value < .01
>>> = Higher proportion, *p*-value < .001
< = Lower proportion, *p*-value < .05
<< = Lower proportion, *p*-value < .01
<<< = Lower proportion, *p*-value < .001

Example: Verse has higher proportion of tonic than Bridge

The Police, “Every Breath You Take” (1983)

Verse (Ab major)

I	.	vi	.
Every single day		and every word you say,	
IV	V	I	.
every game you play, every night you stay, I’ll be watching you.			

Bridge (Ab major)

IV	bIII	I	.
Oh, can’t you see,		you belong to me?	
V/V	.	V	.
How my poor heart aches		with every step you take.	

Example: Verse has higher proportion of tonic than Chorus

U2, “I Still Haven’t Found What I’m Looking For” (1987)

Verse (Db major)

I	.	.	.
I have run, I have crawled,		I have scaled these city walls,	
IV	.	I	.
These city walls,		only to be with you.	

Chorus (Db major)

V	IV	I	.
But I still haven’t found what I’m looking for,			
V	IV	I	.
But I still haven’t found what I’m looking for,			

Proportions vs. average durations

Hypothetical Verse

I	.	.	.
IV	.	V	.

Hypothetical Chorus

I	.	IV	.
I	.	V	.

Average chord durations overall, in bars
(averaged by song for TdC and DT)

Chords	Average	Trimmed Average*	Median	Mode
All chords	4.90	1.42	1.23	1.00
Tonic	6.19	2.03	1.59	1.00
Non-Tonic	1.14	1.03	1.00	1.00

* trimmed average excludes top and bottom 10% of values
(e.g., represents middle 80% of data)

Average chord durations, in bars, for songs with VERSE and CHORUS sections

Chords	Verse (DT)	Chorus (DT)	*p*-value	Verse (TdC)	Chorus (TdC)	*p*-value	Effect
Overall	2.08	1.55	< .05	2.26	1.70	< .05	Shorter in Chorus
Tonic	2.25	1.71	< .01	2.35	1.85	< .05	Shorter in Chorus
Non-Tonic	1.08	1.08	n.s.	1.14	1.11	n.s.	

Average chord durations, in bars, for songs with VERSE and BRIDGE sections

Chords	Verse (DT)	Bridge (DT)	*p*-value	Verse (TdC)	Bridge (TdC)	*p*-value	Effect
Overall	1.80	2.58	n.s.	1.58	2.20	n.s.	
Tonic	2.17	2.74	n.s.	1.70	2.20	n.s.	
Non-Tonic	0.98	1.37	< .05	0.97	1.26	< .01	Longer in Bridge

Average chord durations, in bars, for songs with BRIDGE and CHORUS sections

Chords	Bridge (DT)	Chorus (DT)	*p*-value	Bridge (TdC)	Chorus (TdC)	*p*-value	Effect
Overall	3.08	1.64	n.s.	2.66	1.58	n.s.	
Tonic	3.58	1.49	n.s.	2.72	1.49	n.s.	
Non-Tonic	1.56	1.05	n.s.	1.24	1.09	n.s.	

Example: Chorus has shorter tonic durations than Verse

The Cars, “Just What I Needed” (1978)

Verse (E major)

I	V	vi	V/vi
You always knew to wear it well, and...		you look so fancy I can tell	
I	V6	iii	IV
...and I don’t mind you hanging out		and talking in your sleep.	

Chorus (E major)

I V	IV . vi V	I V	IV vi
I guess you’re just what I needed,		I needed someone to feed	
I V	IV . vi V	I V	IV vi
I guess you’re just what I needed,		I needed someone to bleed	

Example: Bridge has longer non-tonic durations than Verse

The Beatles, “I Saw Her Standing There” (1963)

Verse (E major)

I	I6	IV	bVI
She wouldn’t	dance	with another,	Whoa...
I	V	I	.
And I saw her	standing	there.	

Bridge (E major)

IV	.	.	.
Well my heart went “boom”		when I crossed that room,	
.	.	V	.
And I held her hand		in mine.	
IV	.		

III. Results

Frequency of chromatic roots at beginning or ending of typical sections (by analyst)

Section	Location	Analyst	Most Common	%	Second Most Common	%	Third Most Common	%
Verse	Start	TdC	I	89	IV	4	V	3
		DT	I	88	IV	6	V	3
	End	TdC	I	48	V	24	IV	12
		DT	I	47	V	24	IV	14
Chorus	Start	TdC	I	63	IV	19	V	7
		DT	I	56	IV	20	V	9
	End	TdC	I	44	V	31	IV	14
		DT	I	46	V	25	IV	14
Bridge	Start	TdC	IV	38	I	36	VI	10
		DT	I	40	IV	26	II	13
	End	TdC	V	58	I	22	IV	12
		DT	V	58	I	23	IV	11

Distribution of chord qualities and positions in the RS 200, overall and with respect to typical sections

Quality	% of overall instances	% of verse instances	% of chorus instances	% of bridge instances
Major	76.8	78.7	80.5	76.5
Minor	22.6	20.7	19.2	22.9
Diminished	0.4	0.5	0.2	0.5
Augmented	0.2	0.1	0.0	0.1
Inverted	6.0	6.5	4.6	4.9
Root	94.0	93.5	95.4	95.1

Main Findings

Proportions

- Strong evidence that verse sections spend a greater proportion of time on tonic than chorus or bridge sections
- Some evidence that bridge sections spend a greater proportion of time on II than verse sections
- No evidence of differences when comparing chorus and bridge sections

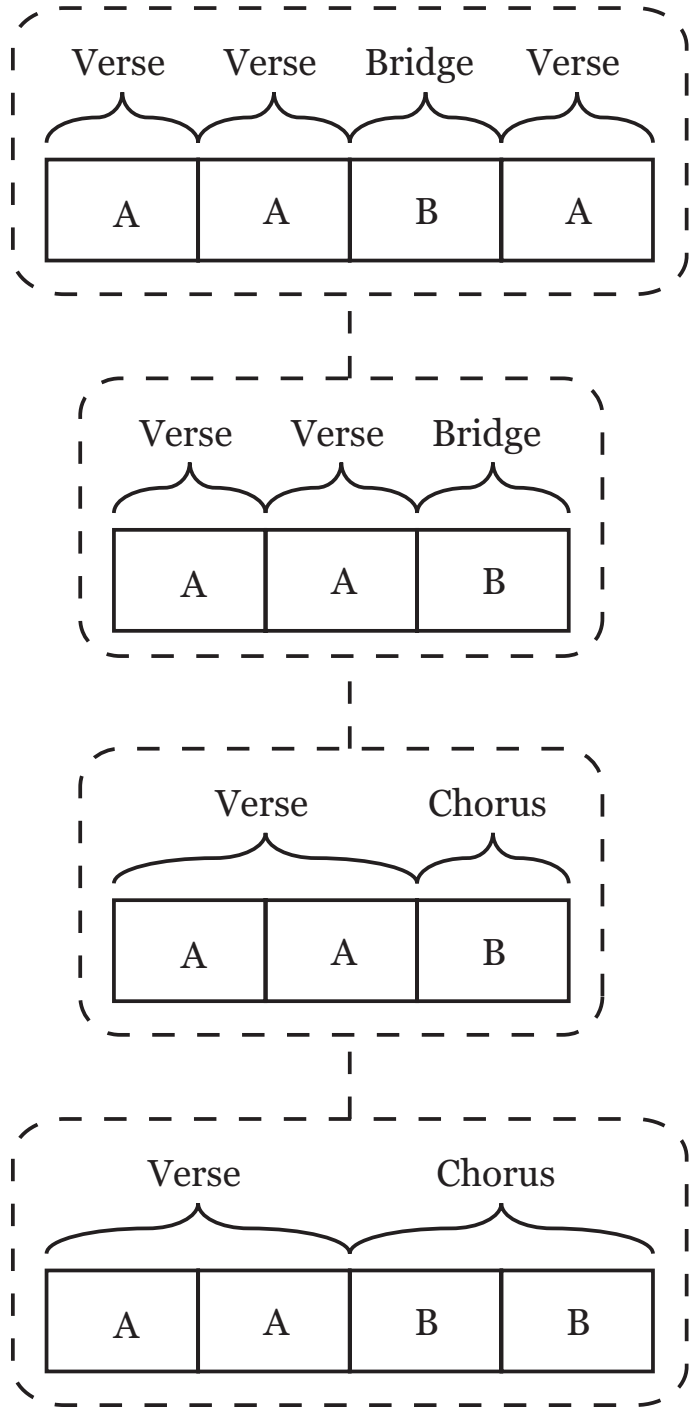
Average durations

- Evidence that tonic chords have shorter average durations in chorus sections than verse sections
- Evidence that non-tonic chords have longer average durations in bridge sections than verse sections
- No evidence of differences when comparing chorus and bridge sections

Beginnings and Endings

- Strong majority of verses begin on tonic; about half end on tonic
- Most choruses begin on tonic; about half end on tonic
- Most bridges begin off-tonic; strong majority end on dominant

AABA to Verse-Chorus



IV. Discussion

Example: Section ambiguity

The Beatles, “Can’t Buy Me Love” (1964)

Verse (C major)

| I | . | . | . |
I’ll give you all I’ve got to give, if you say you love me, too.

| IV | . | I | . |
I may not have a lot to give, but what I got I’ll give to you.

| V | IV | . | I |
I don’t care too much for money, ‘cause money can’t buy me love.

Bridge or Chorus? (C major)

| iii | vi | I V | I |
Can’t buy me love, everybody tells me so.

| iii | vi | ii | V |
Can’t buy me love, no, no, no, no.....

IV. Discussion

Thank You!

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