# Measuring a Measure: Absolute Time as a Factor in Meter Classification for Pop/Rock Music

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MIDDLE TENNESSEE STATE UNIVERSITY

Ann Arbor Symposium IV
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University of Michigan

*Slides available at:* www.midside.com/slides/

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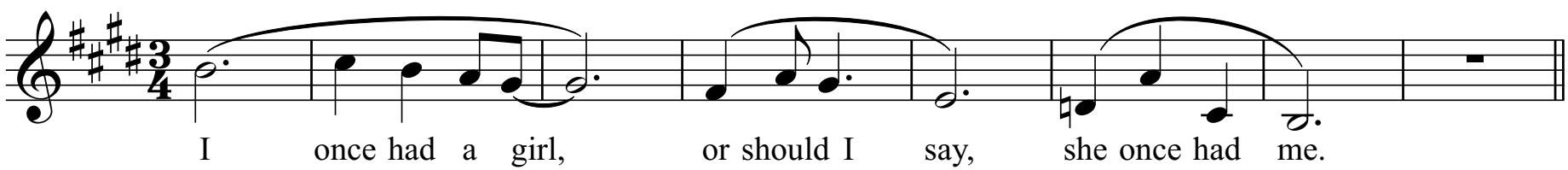
**Three possible readings of meter and bar lengths for "Norwegian Wood" (The Beatles, 1965)**

Pollack 1993

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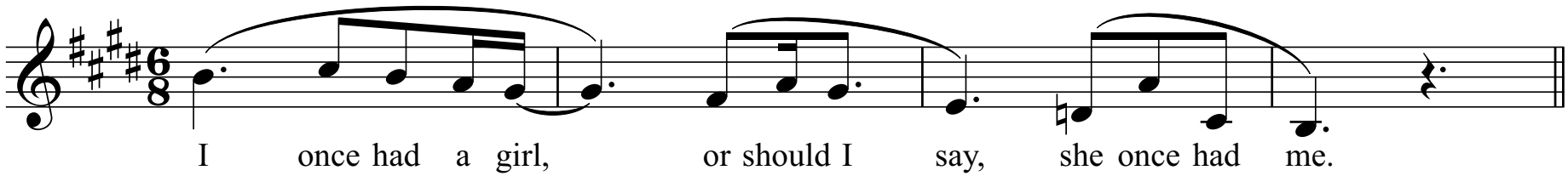


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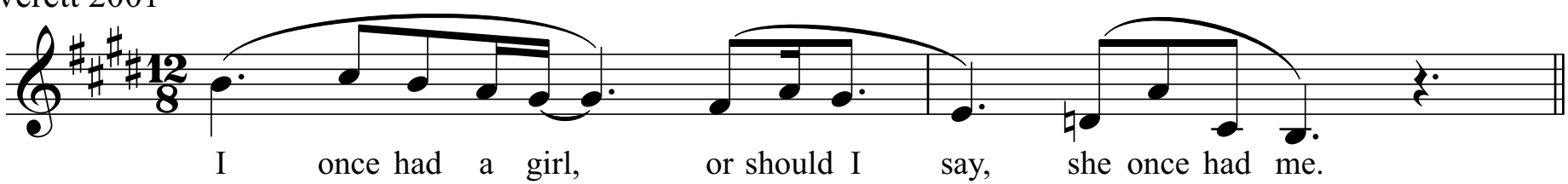
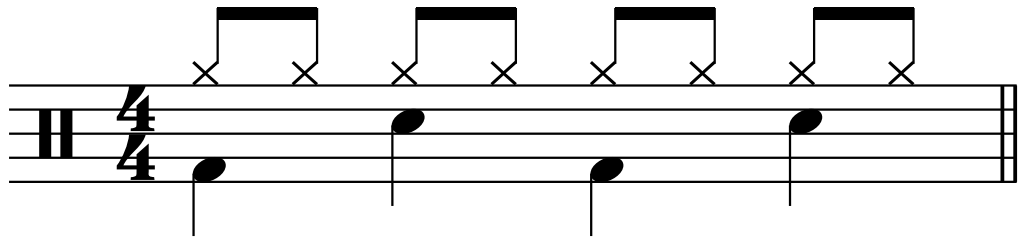


**Kick and snare configurations for a “standard rock beat”**



(Moore 2001; Stephenson 2002)

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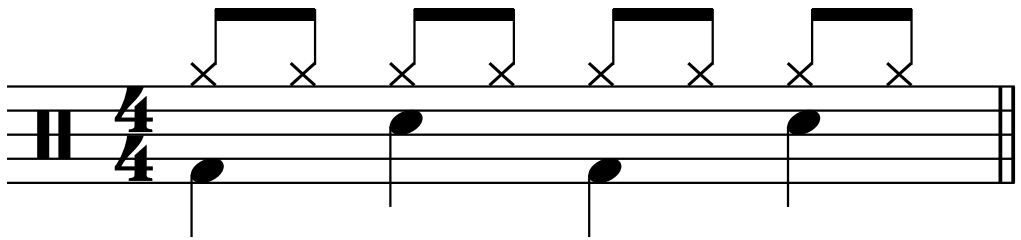

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**Some recent research on rhythm & meter in pop/rock music**

- Butler 2001
- Pieslak 2007
- Osborn 2010
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- Biamonte 2014
- Attas 2015

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**Standard (recent) music theory scholarship on rhythm & meter**

- Lerdahl & Jackendoff 1983
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**Recent scholarship on beat (i.e., *tactus*) perception**

| ***Source*** | ***Ideal Tactus*** |
|---|---|
| Lerdahl & Jackendoff 1983 | 70 BPM |
| Fraisse 1982 | 100 BPM |
| Parncutt 1994 | 100 BPM |
| Semjen et al. 1998 | 100 BPM |
| Moelants 2002 | 120 BPM |
| Moelants & McKinney 2004 | 120 BPM |
| Levy 2011 | 120 BPM |

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**Digital Audio Workstations with a session default of 4/4, 120 BPM**

- Ableton Live
- Apple Garage Band
- Apple Logic Pro
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## Average tempos & measure lengths for songs categorized as 4/4

| | **Covach 2009** | **Burgoyne et al. 2011** | **Temperley & deClercq, 2013** |
|---|---|---|---|
| **Number of songs in 4/4** | 61 | 509 | 168 |
| (as percent of total songs) | 75.3% | 93.2% | 84.0% |
| **Mean BPM** | 121.4 | 119.5 | 119.6 |
| (standard deviation) | 22.2 | 33.6 | 34.1 |
| (median BPM) | 119.0 | 117.9 | 115.5 |
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## Average tempos & measure lengths for songs categorized as 6/8

| | Covach 2009 | Burgoyne et al. 2011 | Temperley & deClercq, 2013 |
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| **Number of songs in 6/8** | 1 | 5 | 6 |
| (as percent of total songs) | 1.2% | 0.9% | 3.0% |
| **Mean BPM** | 50.0 | 64.0 | 62.3 |
| (standard deviation) | (n/a) | 11.7 | 9.9 |
| (median BPM) | 50.0 | 63.1 | 60.3 |
| **Mean measure length** | 2.4 sec | 1.88 sec | 1.93 sec |

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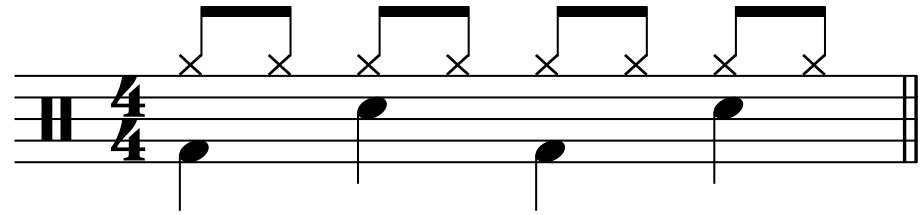
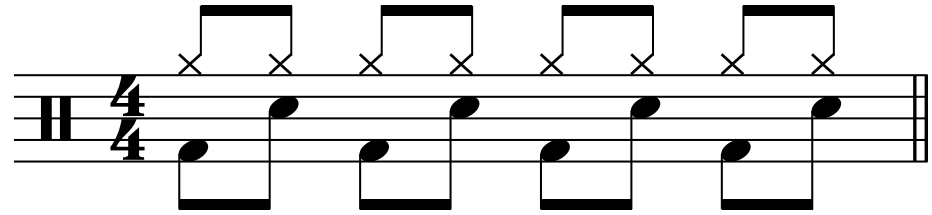
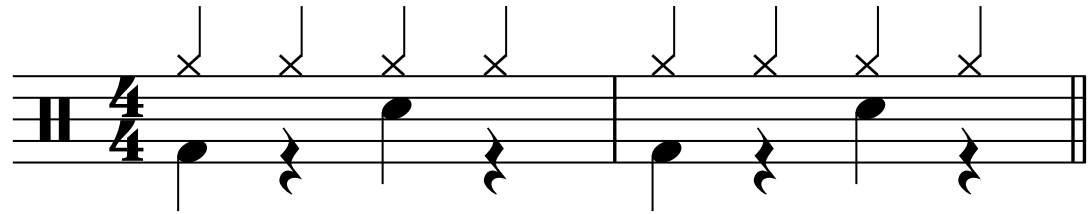


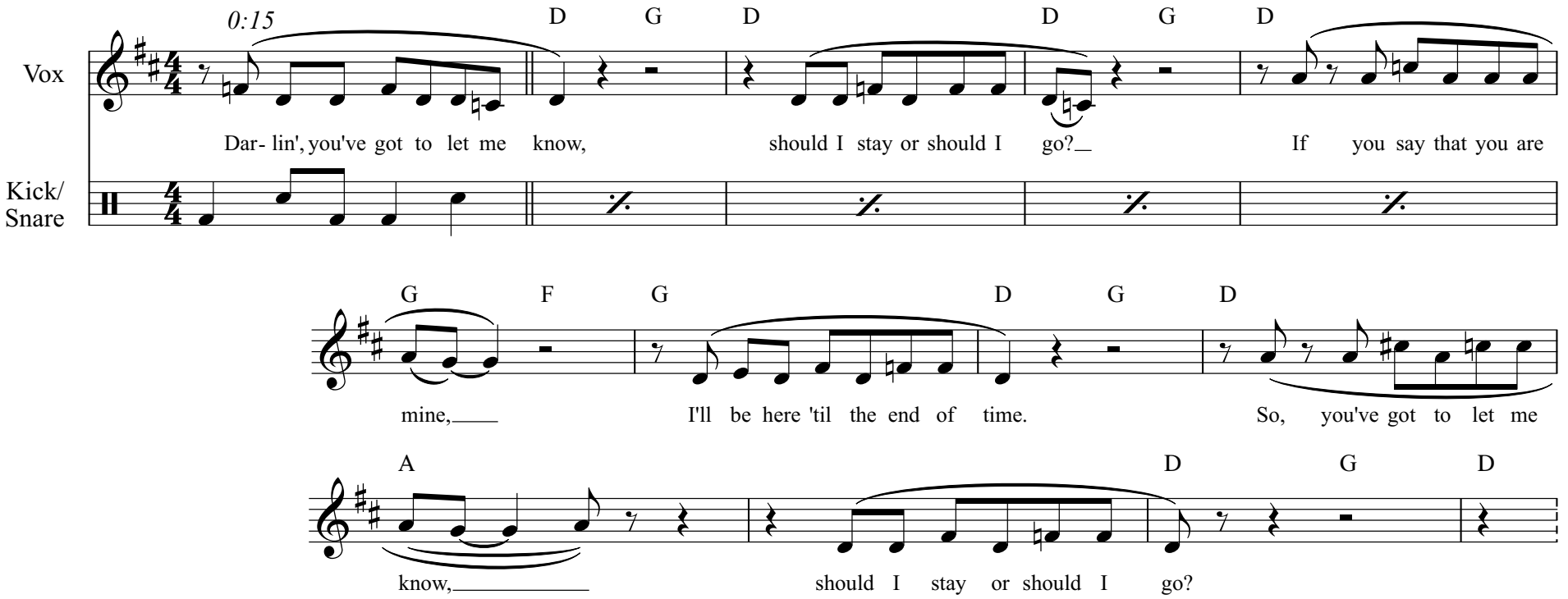
**“Double-time” feel**



**“Half-time” feel**



# Standard rock beat:
# “Should I Stay or Should I Go” (The Clash, 1982), verse




*III. Drum Feels*

# Standard rock beat:
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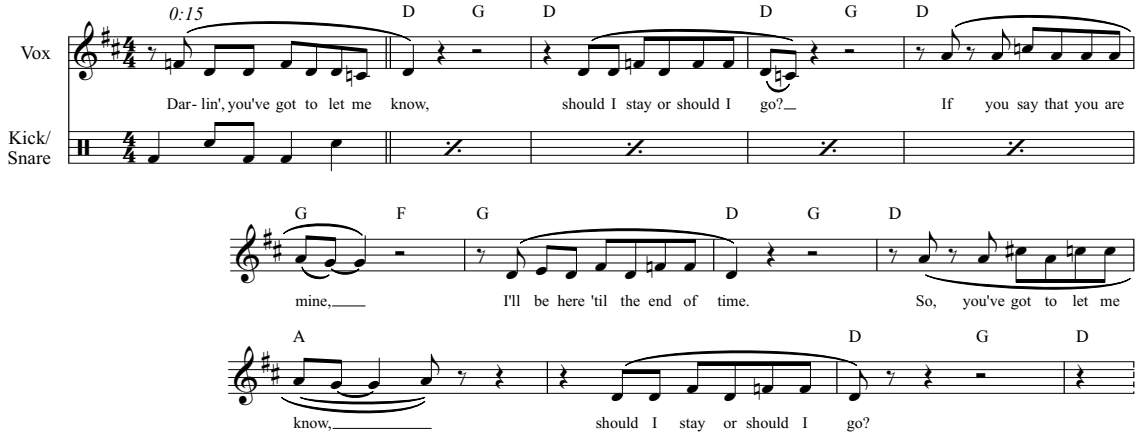
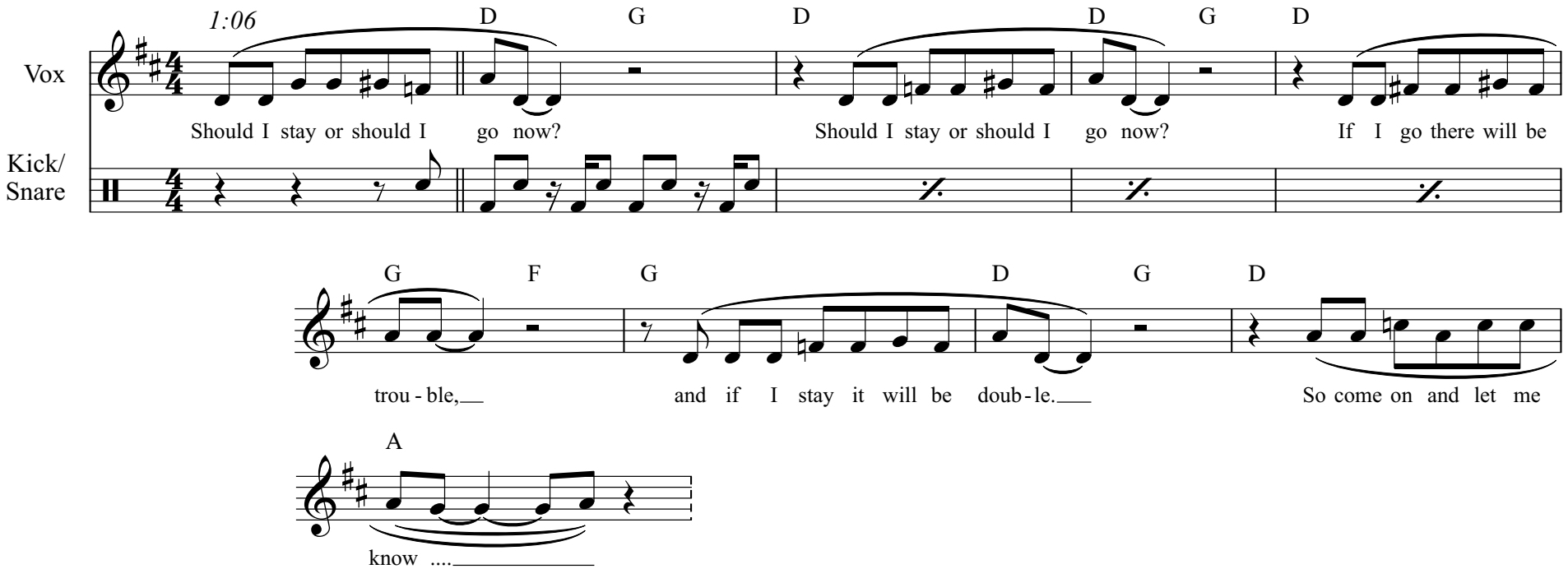



# Double-time feel:
# “Should I Stay or Should I Go” (The Clash, 1982), chorus

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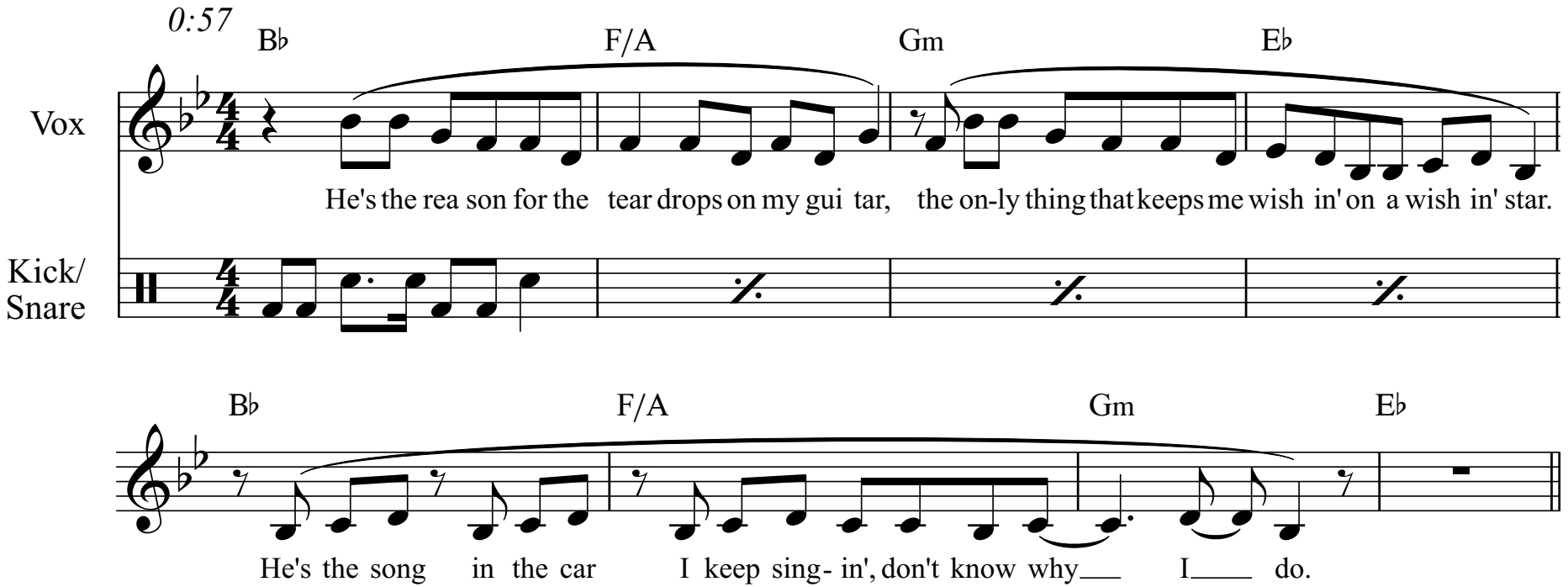


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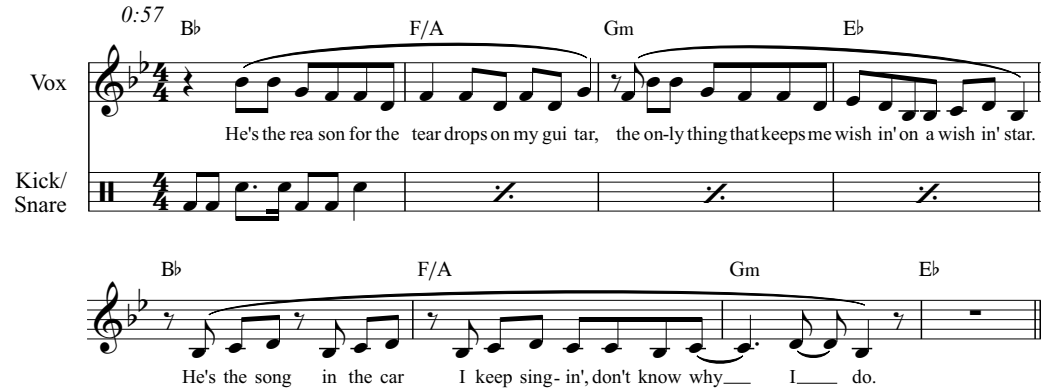
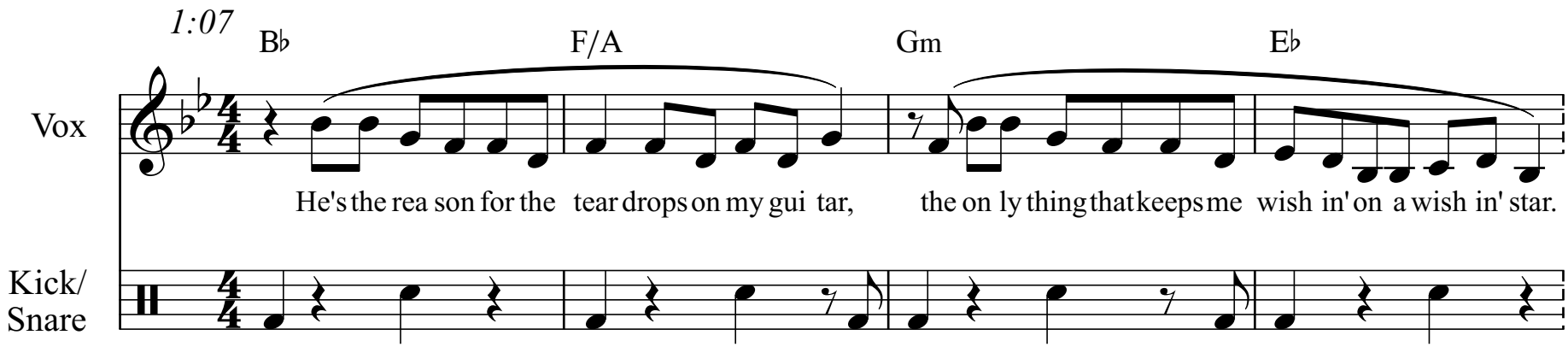



## Half-time feel:
## “Teardrops on My Guitar” (Taylor Swift, 2006), album version (chorus)

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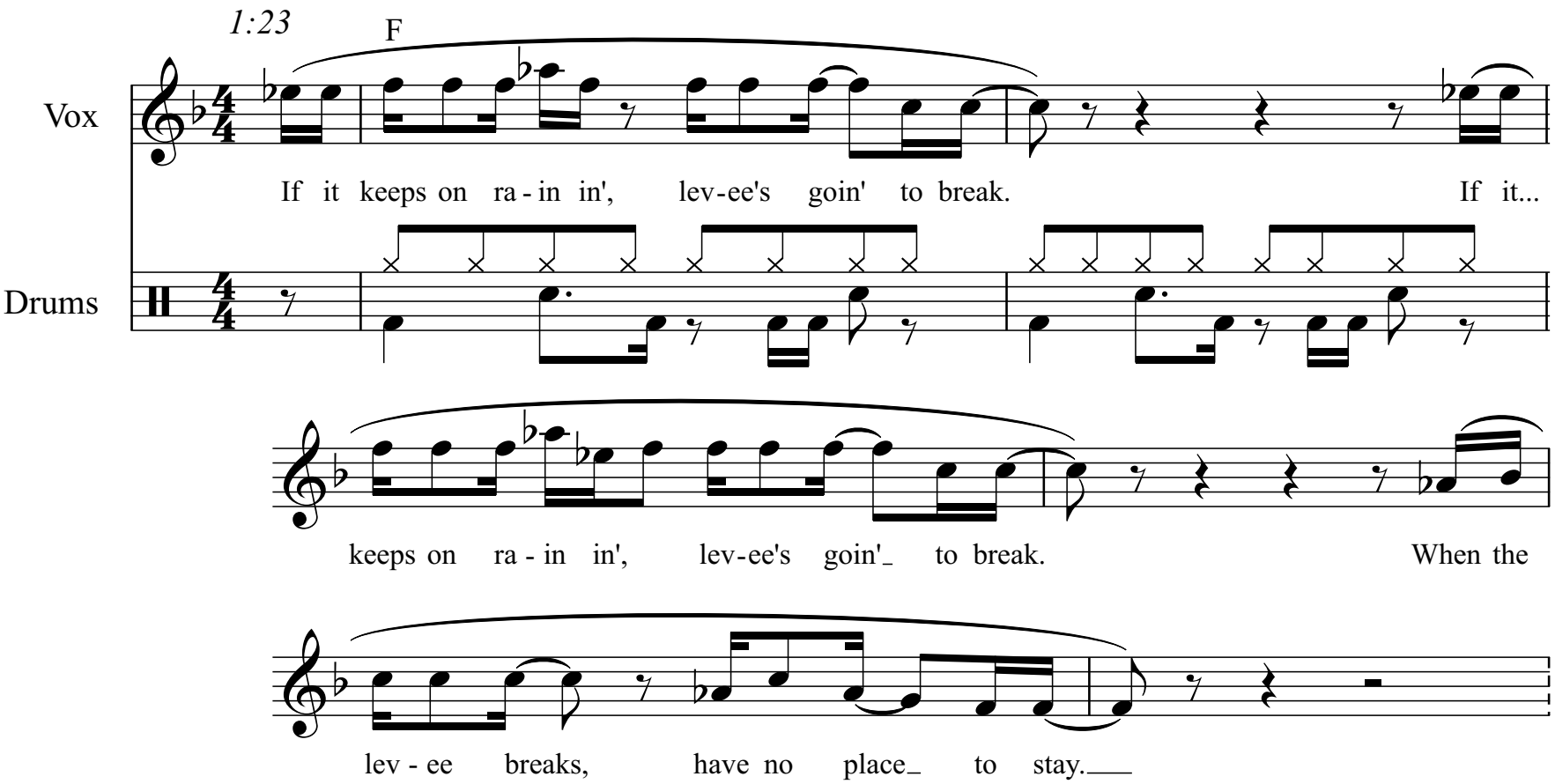
# “When the Levee Breaks” (Led Zeppelin, 1971), 6-bar reading of opening material




***IV. Analysis***

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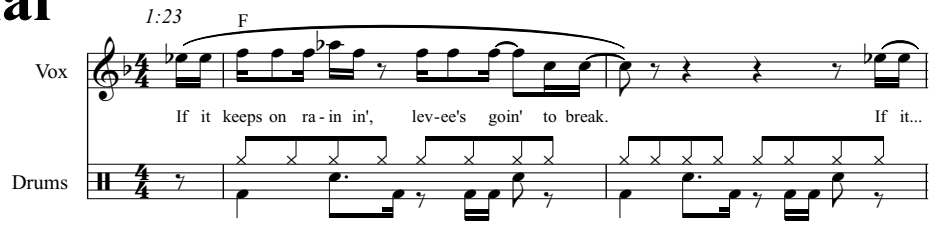
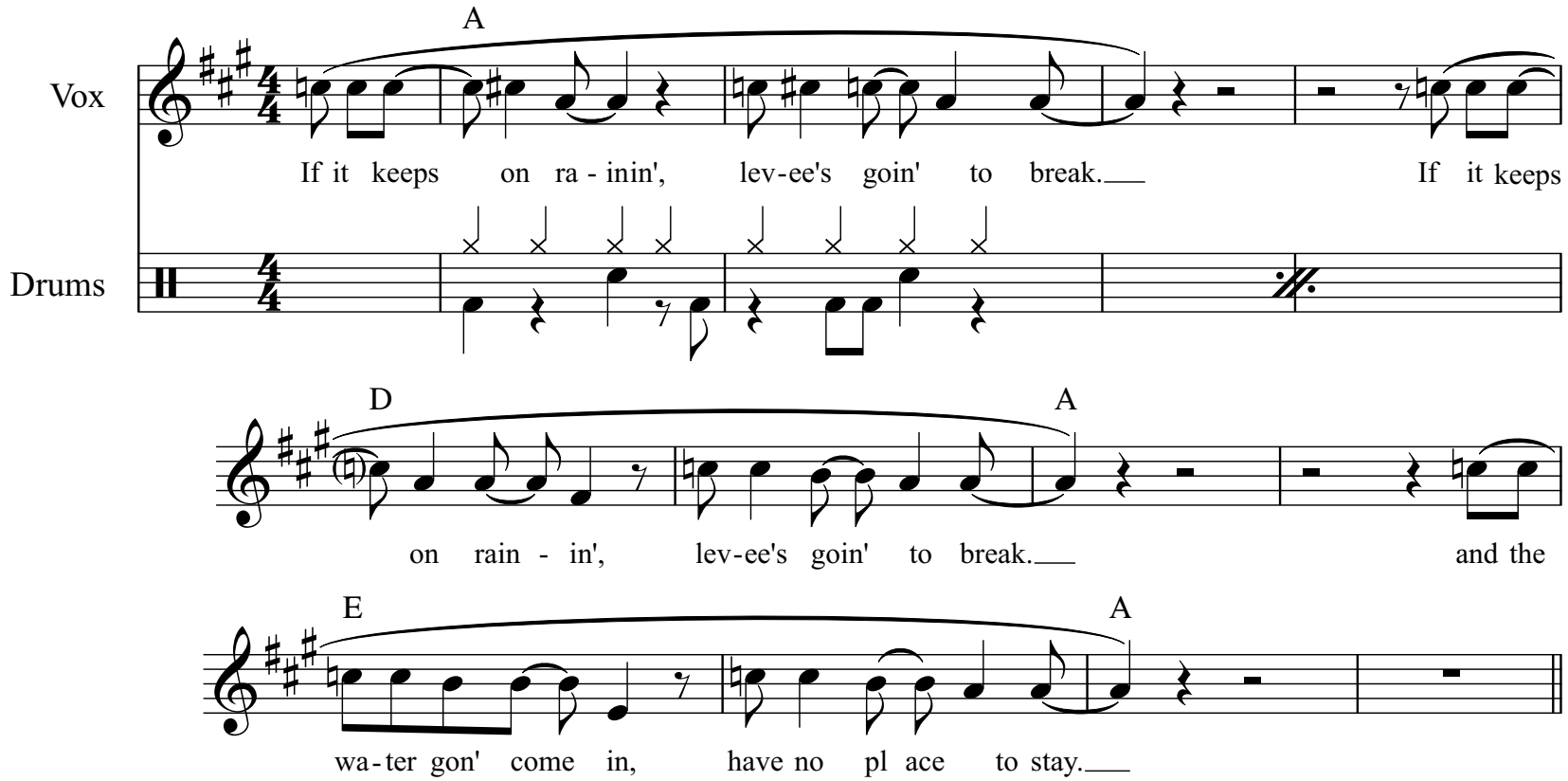
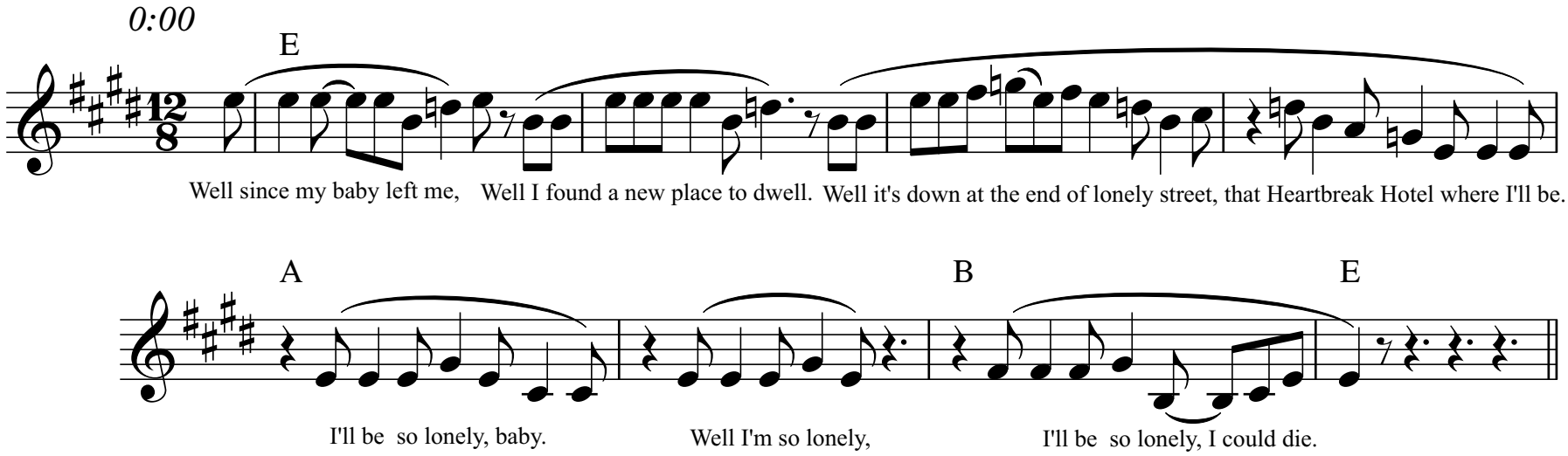



## “When the Levee Breaks” (Joe McCoy & Memphis Minnie, 1929), 12-bar reading, mashed-up with Led Zeppelin drumbeat




***IV. Analysis***

# “Heartbreak Hotel” (Elvis Presley, 1956), main material

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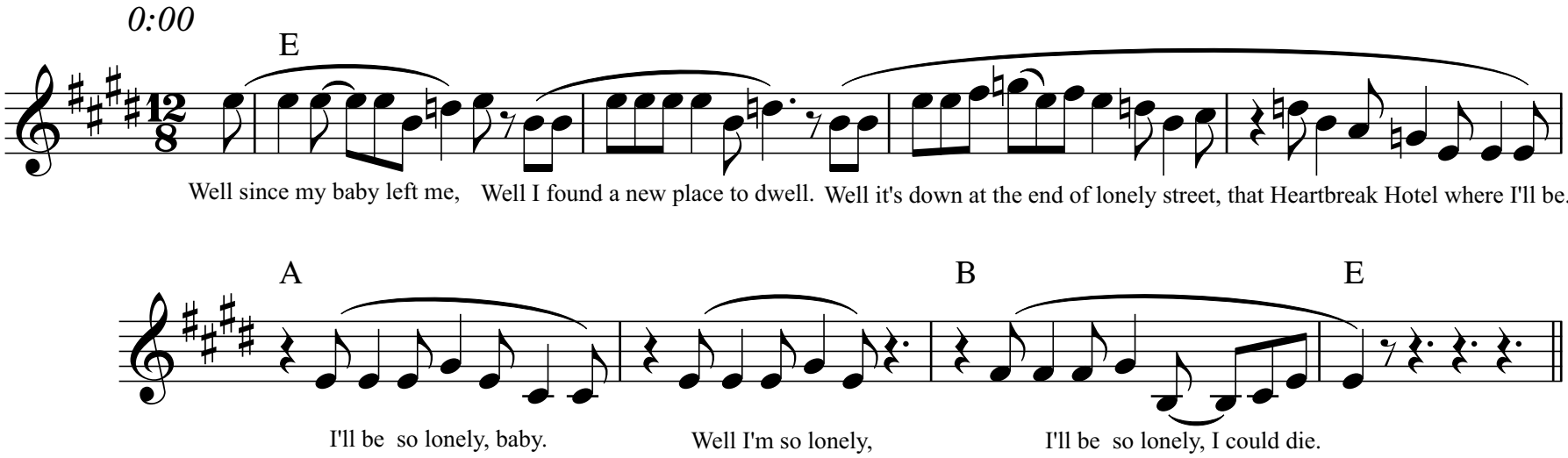
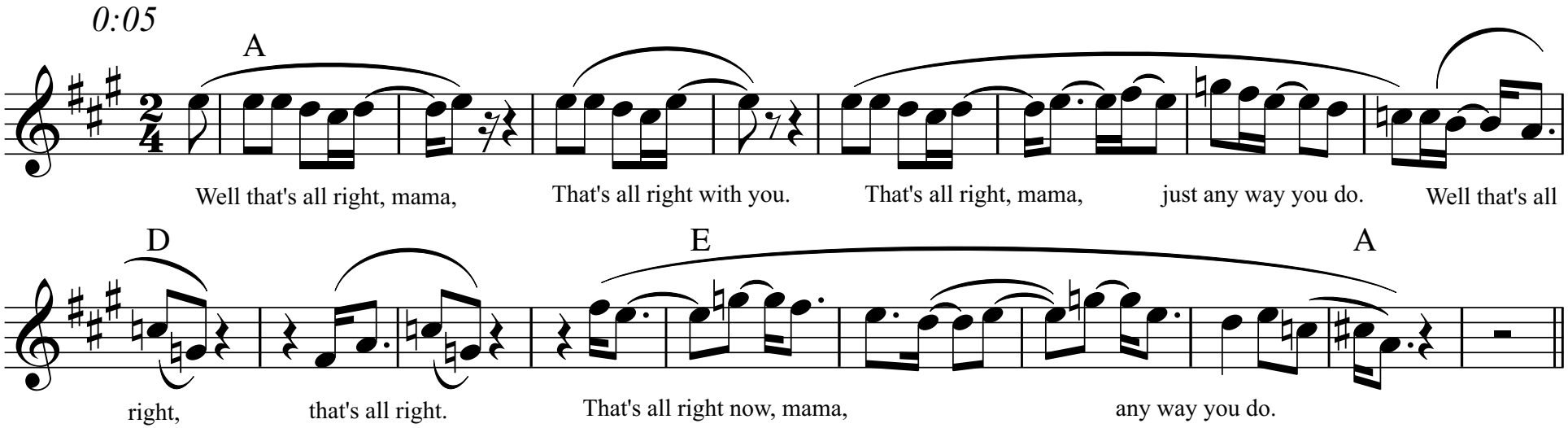



# “That’s All Right” (Elvis Presley, 1954), main material

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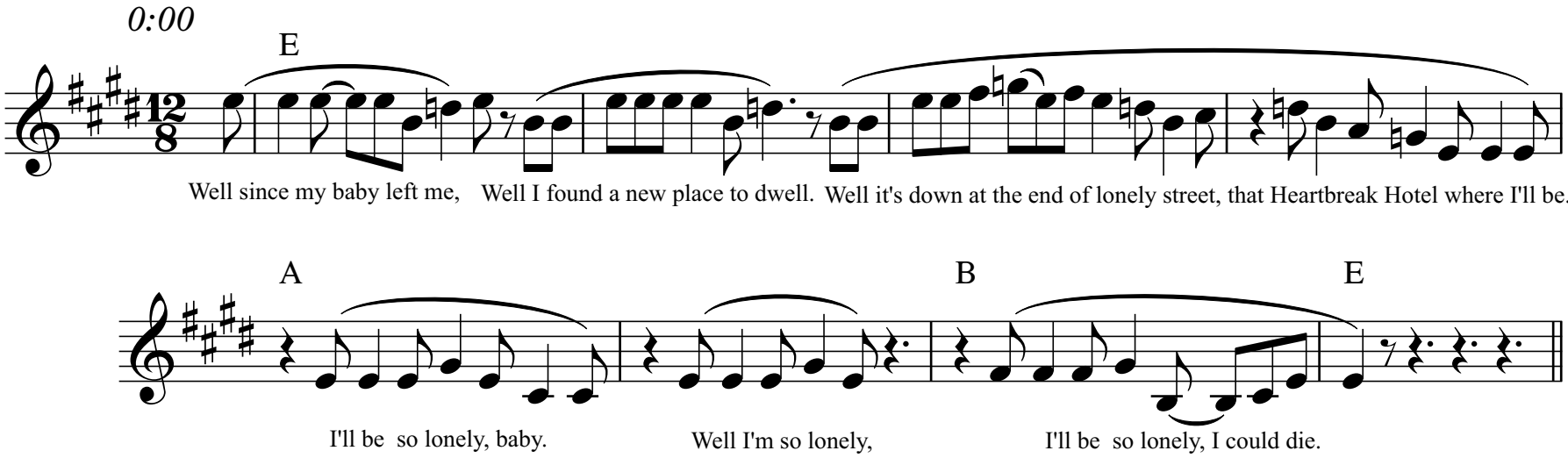


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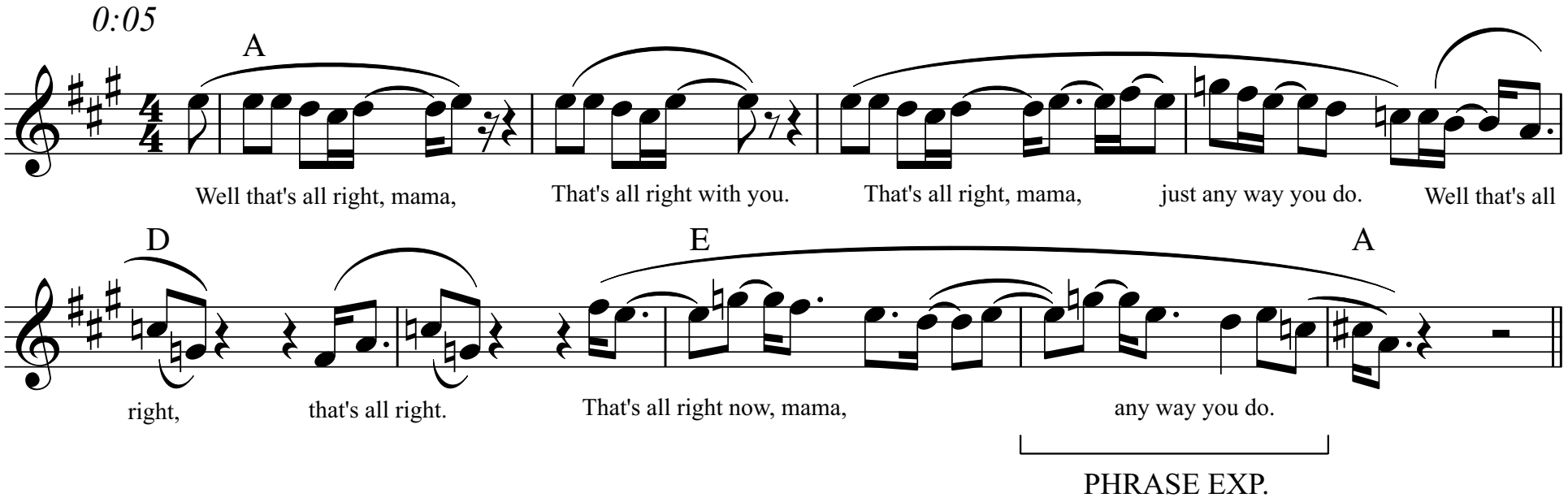


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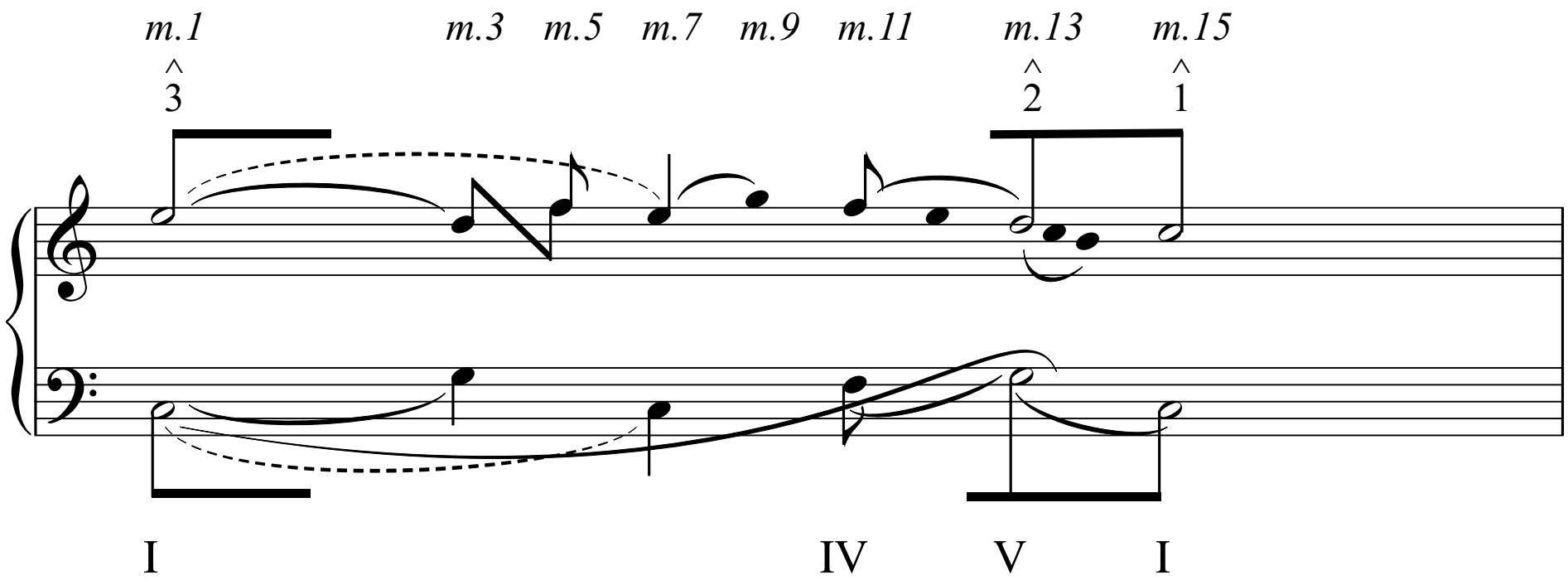
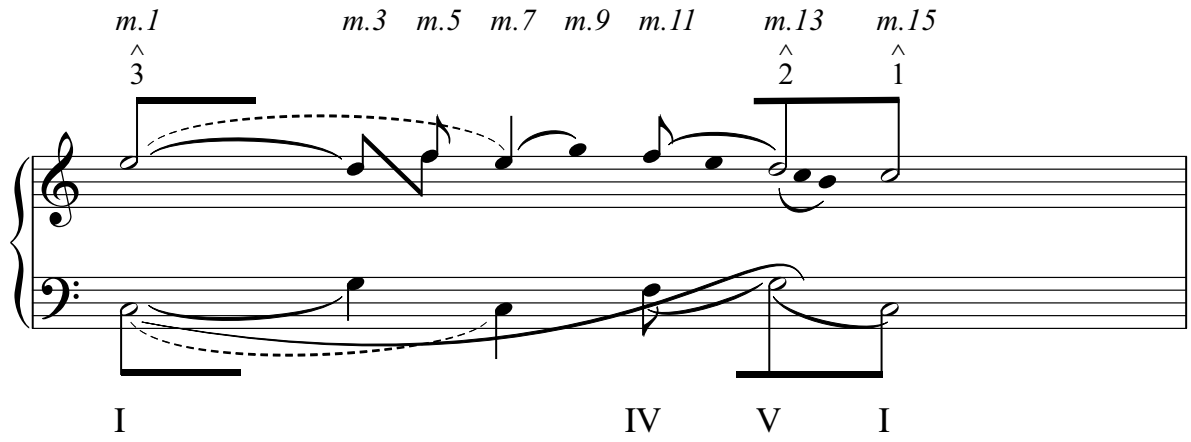
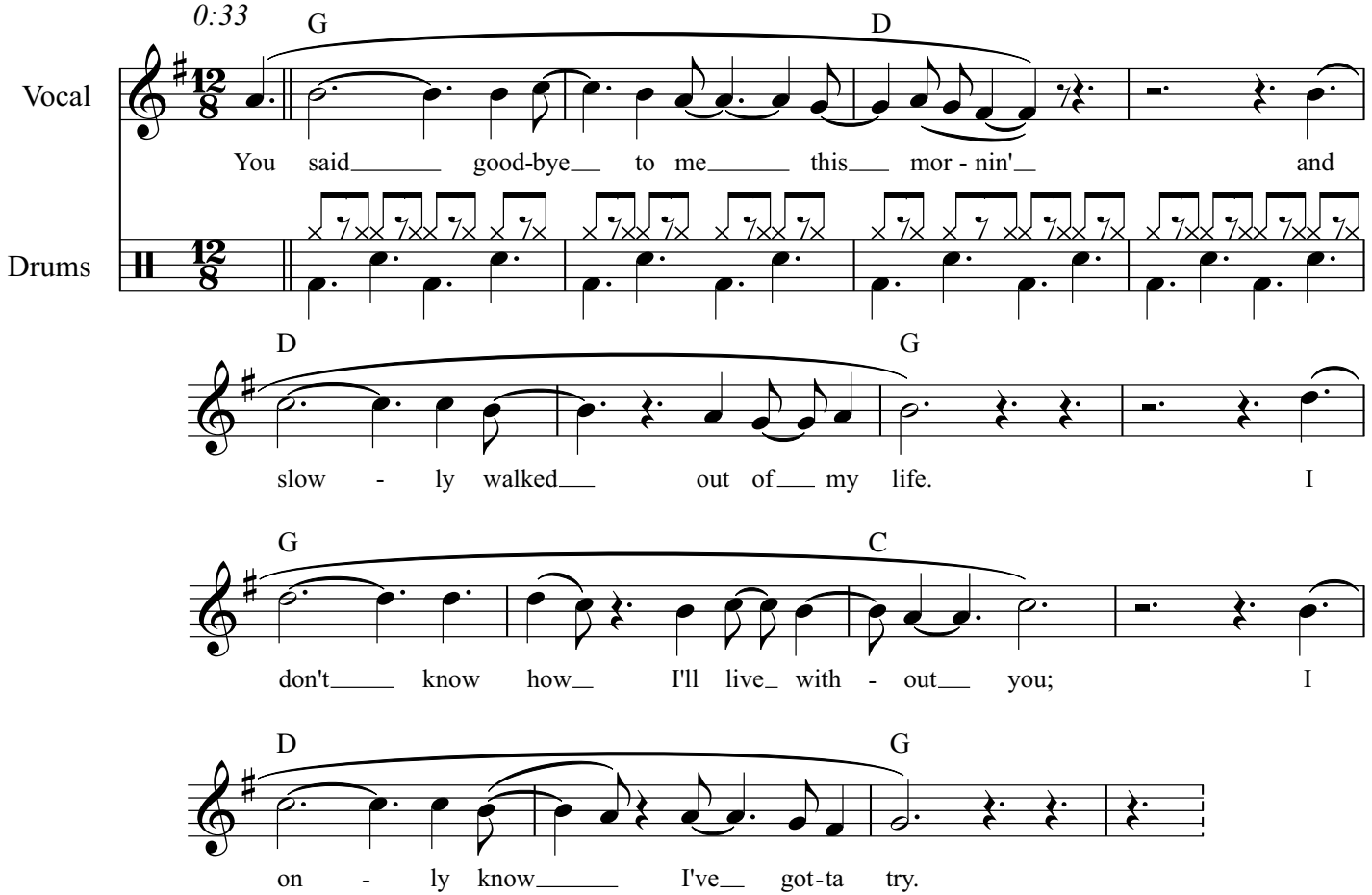
## Buck Owens voice-leading schema






# “Down to the River” (Buck Owens, 1962), verse

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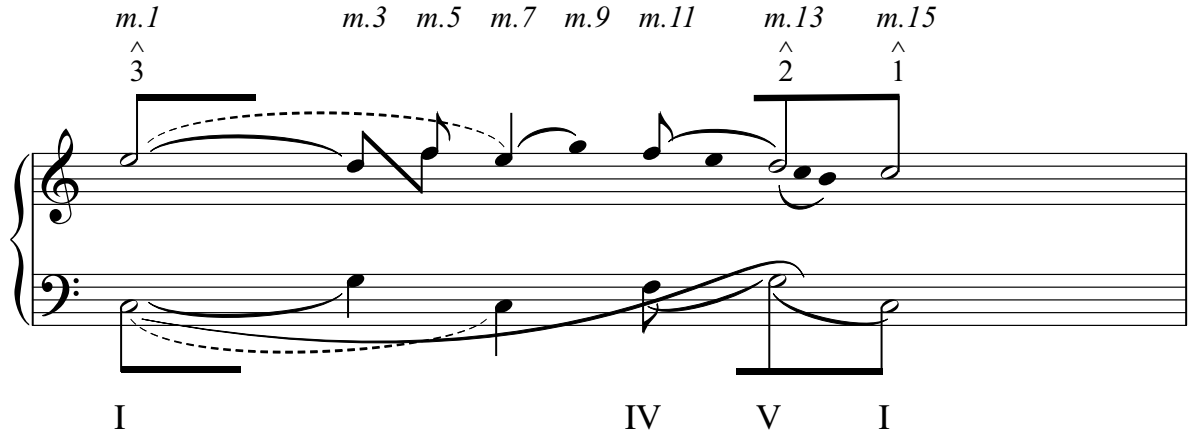
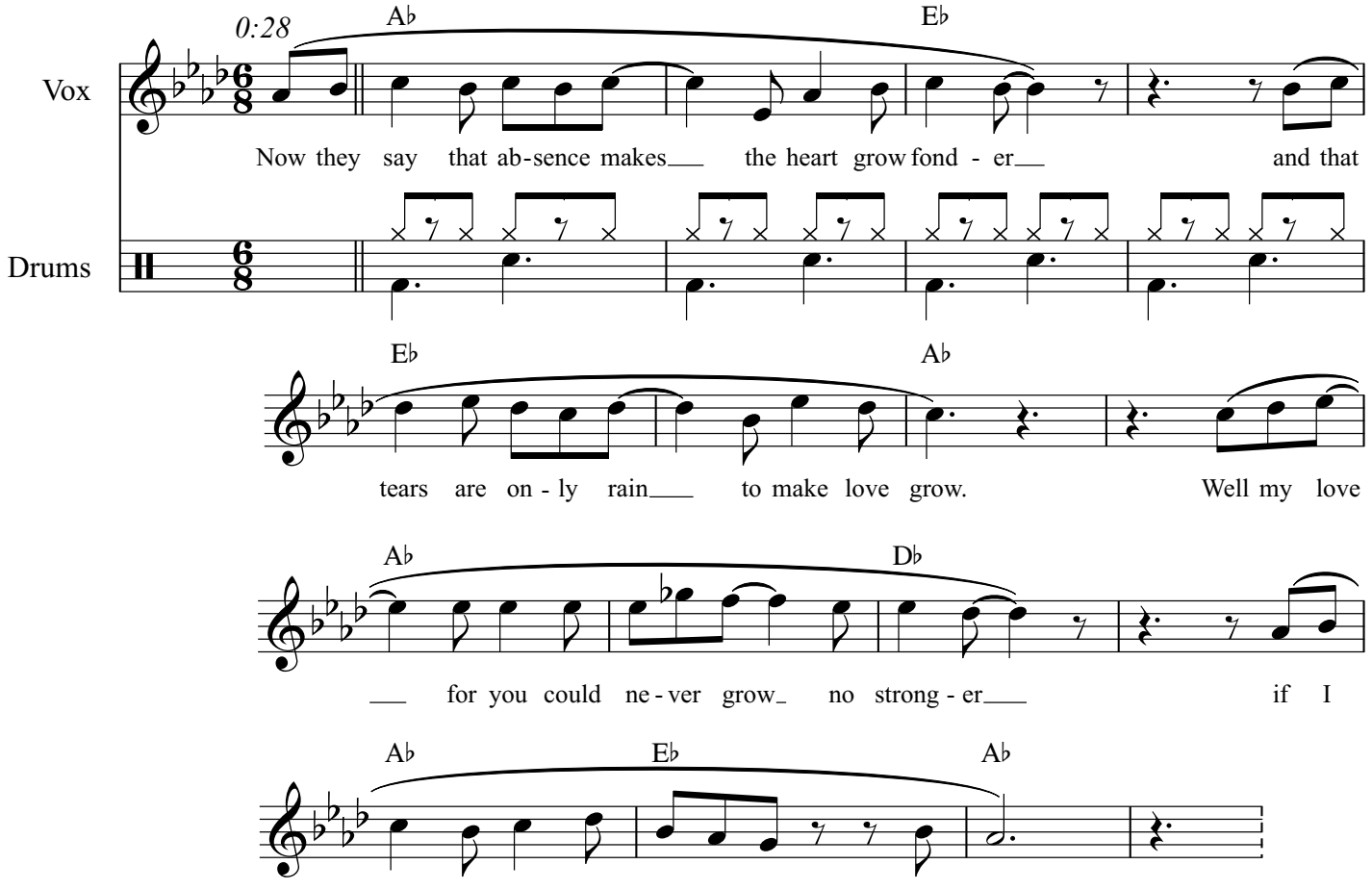



# “Cryin’ Time” (Buck Owens, 1964), verse




## *IV. Analysis*

- The drum pattern is not a reliable guide for measure lengths
- Absolute time should be considered in bar length decisions
- The 2-second measure may be the ideal perceptual reference

## Three possible readings of meter and bar lengths for "Norwegian Wood" (The Beatles, 1965)

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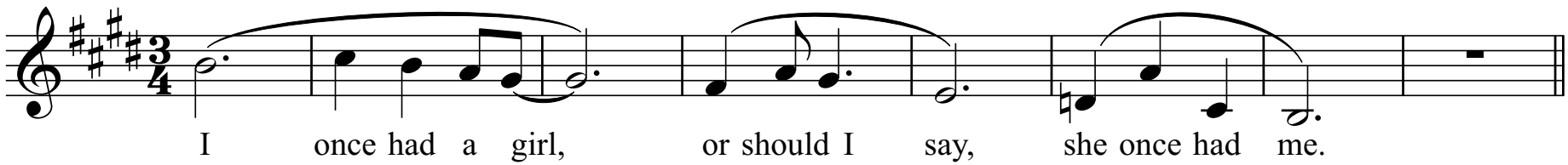


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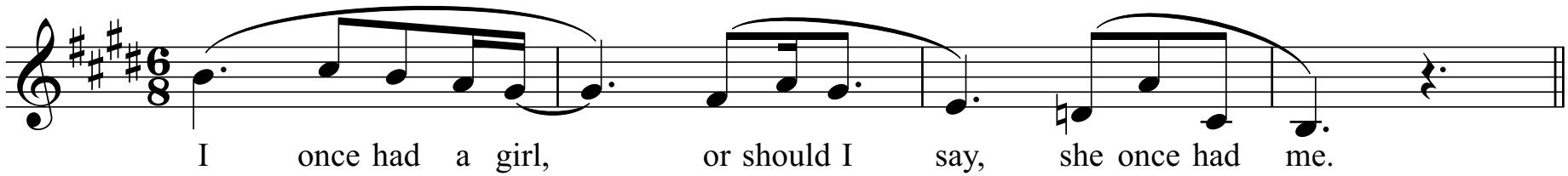


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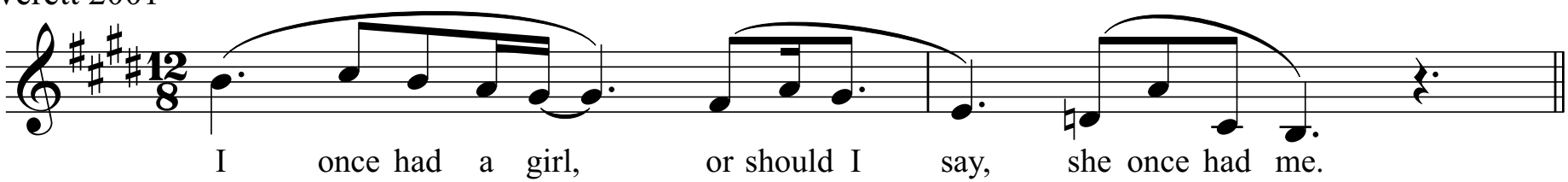


***V. Conclusion***

# Select Bibliography:


Biamonte, Nicole. 2014. “Formal Functions of Metric Dissonance in Rock Music.” *Music Theory Online* 20/2.

Burgoyne, John, Jonathan Wild, & Ichiro Fujinaga. 2011. “An Expert Ground-Truth Set for Audio Chord Recognition and Music Analysis.” *12th International Society for Music Information Retrieval Conference (ISMIR)*.

Butler, Mark J. 2001. “Turning the Beat Around: Reinterpretation, Metrical Dissonance, and Asymmetry in Electronic Dance Music.” *Music Theory Online* 7/6.

Caplin, William. 1998. *Classical Form: A Theory of Formal Functions for the Instrumental Music of Haydn, Mozart, and Beethoven.* Oxford University Press.

Covach, John. 2006. “From ‘Craft’ to ‘Art’: Formal Structure in the Music of the Beatles.” In Kenneth Womack and Todd Davis (eds.), *Reading the Beatles: Cultural Studies, Literary Criticism, and the Fab Four*. Albany: SUNY Albany Press, 37-53.

———. 2009. *What’s That Sound? An Introduction to Rock and Its History* (2nd ed). New York: W. W. Norton.

Everett, Walter. 2001. *The Beatles as Musicians: The Quarry Men through Rubber Soul*. Oxford: Oxford University Press.

Fraisse, Paul. 1982. “Rhythm and Tempo.” In D. Deutsch (Ed.), *The Psychology of Music*. New York: Academic Press, 149-180.

Hasty, Christopher. 1997. *Meter as Rhythm*. Oxford University Press.

Headlam, Dave. 1995. “Does the Song Remain the Same? Questions of Authorship and Identification in the Music of Led Zeppelin.” In Elizabeth W. Marvin and Richard Hermann (eds.), *Concert Music, Rock, and Jazz Since 1945: Essays and Analytical Studies*. Rochester, NY: University of Rochester Press, 313-363.

Krebs, Harald. 1999. *Fantasy Pieces: Metrical Dissonance in the Music of Robert Schumann*. Oxford University Press.

Lerdahl, Fred and Ray Jackendoff. 1983. *A Generative Theory of Tonal Music*. Cambridge, MA: The MIT Press.

Lester, Joel. 1986. *The Rhythms of Tonal Music*. Pendragon Press.

Levy, Mark. 2011. “Improving Perceptual Tempo Estimation with Crowd-Sourced Annotations.” *12th International Society for Music Information Retrieval Conference (ISMIR)*¸ 317-322.

London, Justin. 2012. *Hearing in Time: Psychological Aspects of Musical Meter*. 2nd ed. Oxford University Press.

Mattingly, Rick. 2006. *All About Drums: A Fun and Simple Guide to Playing Drums*. Milwaukee, WI: Hal Leonard.

Moelants, Dirk. 2002. “Preferred Tempo Reconsidered.” *7th International Conference on Music Perception and Cognition*, 580-583.

Moelants, Dirk and Martin McKinney. 2004. “Tempo Perception and Musical Content: What Makes a Piece Fast, Slow, or Temporally Ambiguous?” *8th International Conference on Music Perception and Cognition*, 558-562.

Moore, Allan. 2001. *Rock: The Primary Text: Developing a Musicology of Rock* (2nd ed.). Aldershot, UK: Ashgate.

Parncutt, Richard. 1994. “A Perceptual Model of Pulse Salience and Metrical Accents in Musical Rhythms.” *Music Perception* 11/4: 409-64.

Pieslak, Jonathan. 2007. “Re-casting Metal: Rhythm and Meter in the Music of Meshuggah.” *Music Theory Spectrum* 29/2: 219–45.

Pollack, Alan. 1993-1999. “Notes on... Series” Available at http://www.recmusicbeatles.com/public/files/awp/awp.html

Rosenberg, Nancy. 2011. “Popular Music in the College Music Theory class: Rhythm and Meter.” In *Pop-culture pedagogy in the music classroom*, ed. Nicole Biamonte, 47-71. Scarecrow Press.

Rothstein, William. [1989] 2007. *Phrase Rhythm in Tonal Music*. Musicalia Press.

Semjen, Andras, Dirk Vorberg, and Hans-Henning Schulze. 1998. “Getting synchronized with the metronome: Comparisons between phase and period correction.” *Psychological Research* 61/1: 44-55.

Stephenson, Ken. 2002. *What to Listen for in Rock: A Stylistic Analysis*. New Haven, CT: Yale University Press.

Temperley, David. 2001. *The Cognition of Basic Musical Structures*. The MIT Press.

Temperley, David and Trevor de Clercq. “Statistical Analysis of Harmony and Melody in Rock Music.” *Journal of New Music Research* 42/3: 187-204.