# Melodic Similarity

CS 275B/MUSIC 254

# "Natural history" of similarity

***Concept of similarity*** fundamental to organization of most art music

***Types of similarity*** widely variant

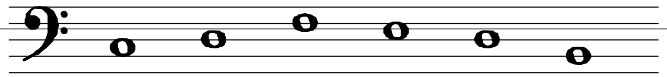
***Roles of similarity*** widely variant

Similarity in *art music* is **intentional**

# Contour matches (accidental)

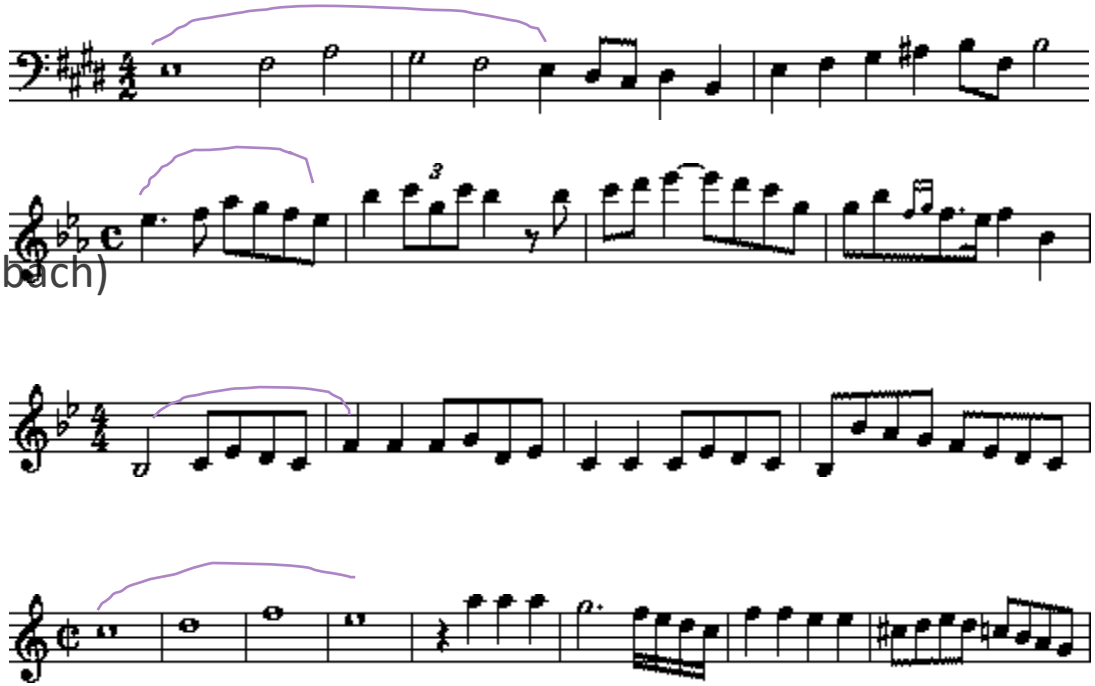
Target:

- Chant: “Lucis Creator”



Some hits:

- Bach *WTC*
- Bizet: *Carmen*
- Saint-Saens: *Carnival* (via Offenbach)
- Mozart: Symphony No. 41, IV

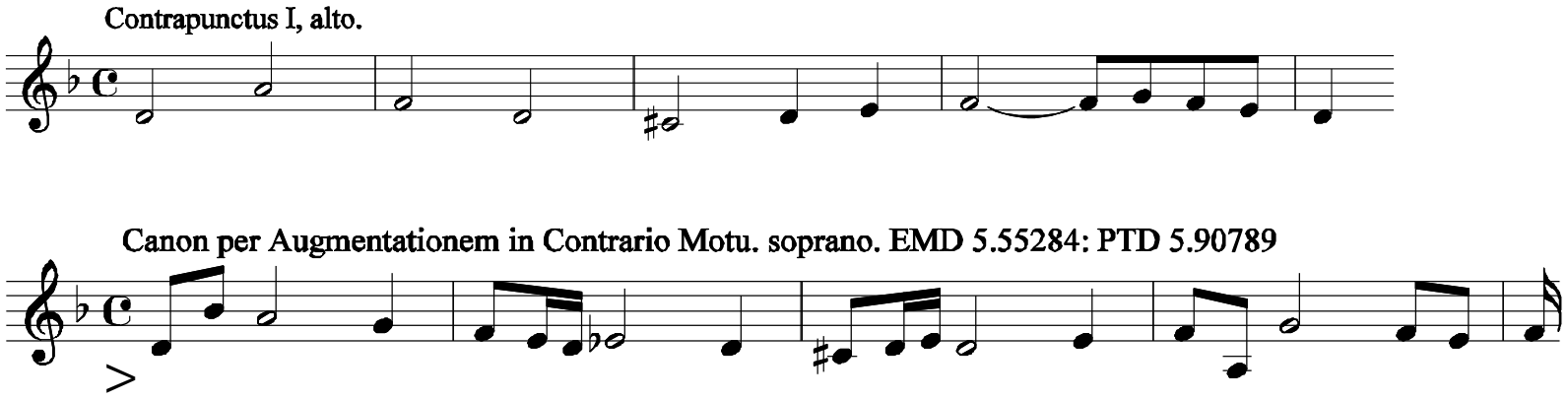


# Melodic "invisibility" factors

- Elaboration of something simple
- Compound melodies (monophonic)
- Psycho-acoustic tricks (polyphonic)
- Rotating melodies
- Ambiguous foreground/background
- Metrical ambiguity

# Elaboration

Bach, Art of Fugue (after Wiering et al.)



# Classic features of melody: *symbols* vs *humans*

Eerola et al, MP (2001): **Statistical vs perceptual** melodic similarity

- Material used: Finnish folk songs

Frequency distributions (symbols)

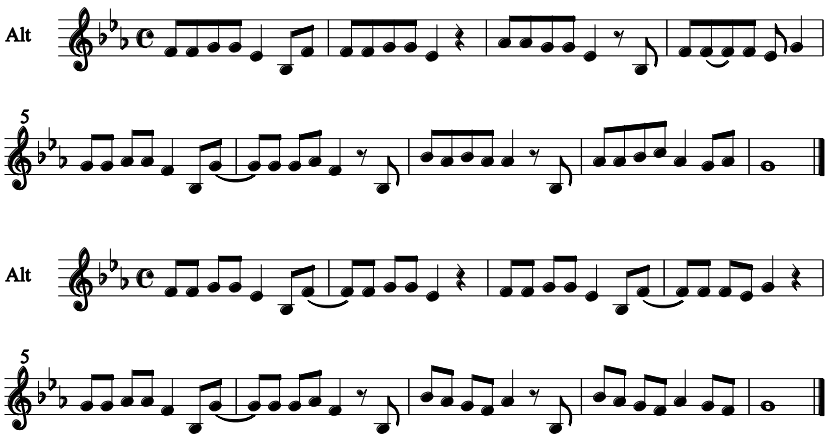
- Tones
- Intervals
- Durations
- Two-tone transitions

Frequency distributions (listeners)

- Tessitura
- Mean pitch
- Rhythmic activity
- Rhythmic variability
- Melodic predictability

# Algorithmic vs Human Judgment
## (Daniel Muellenseifen)

Works by Passion Fruit



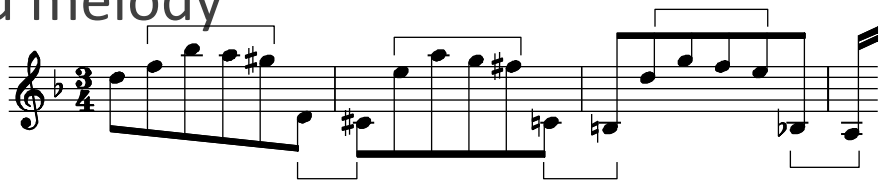

- Repertory: popular
- Data: MIDI
- Processes include:
  - contour generalization
  - aliasing
  - fuzzification

Features:
- intervals
- contour
- rhythm
- harmony
- recurrent motifs

| Class | Intervals | Name |
|---|---|---|
| -4 | < -7 | Big leap down |
| -3 | -7, -6, -5 | Leap down |
| -2 | -4, -3 | Big step down |
| -1 | -2, -1 | Step down |
| 0 | 0 | Same |
| 1 | 1, 2 | Step up |
| 2 | 3, 4 | Big step up |
| 2 | 5, 6, 7 | Leap up |
| 4 | > 7 | Big leap up |

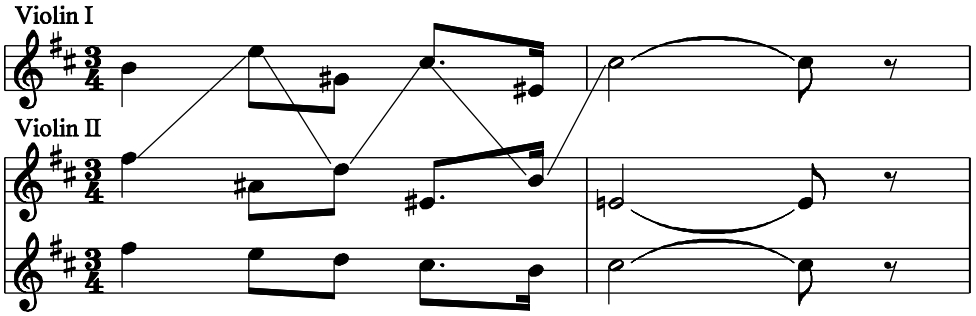
# Composers' perceptual tricks

Compound melody



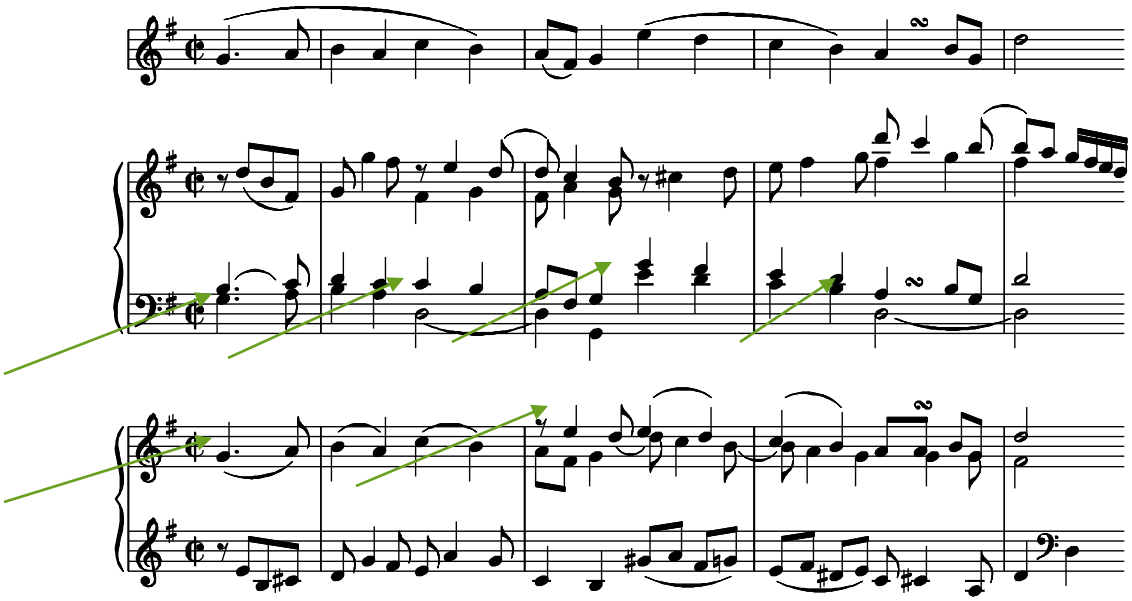
One voice that we hear as two

Distributed melody




Two voices that we hear as one

# Rotating melodies

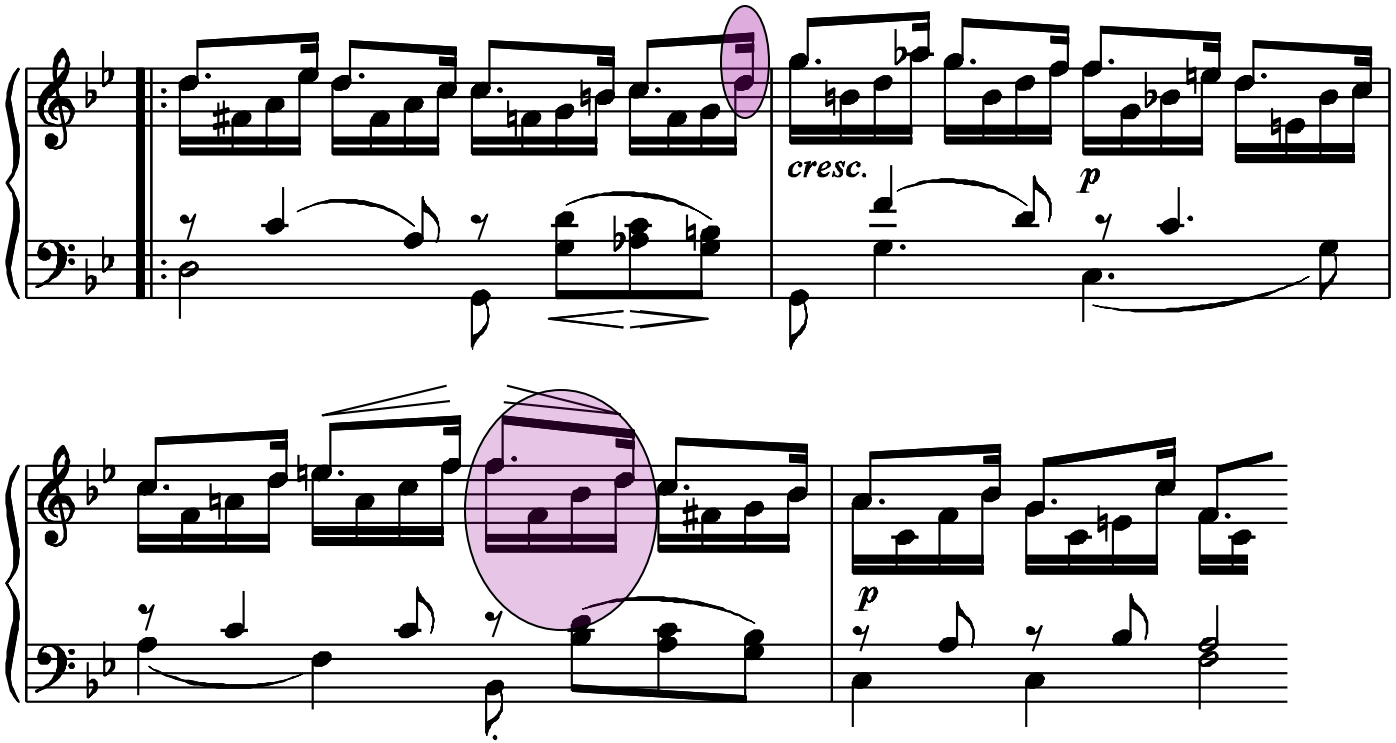


B, T, B, T; A, S

Haydn: “Archduke” String Quartet

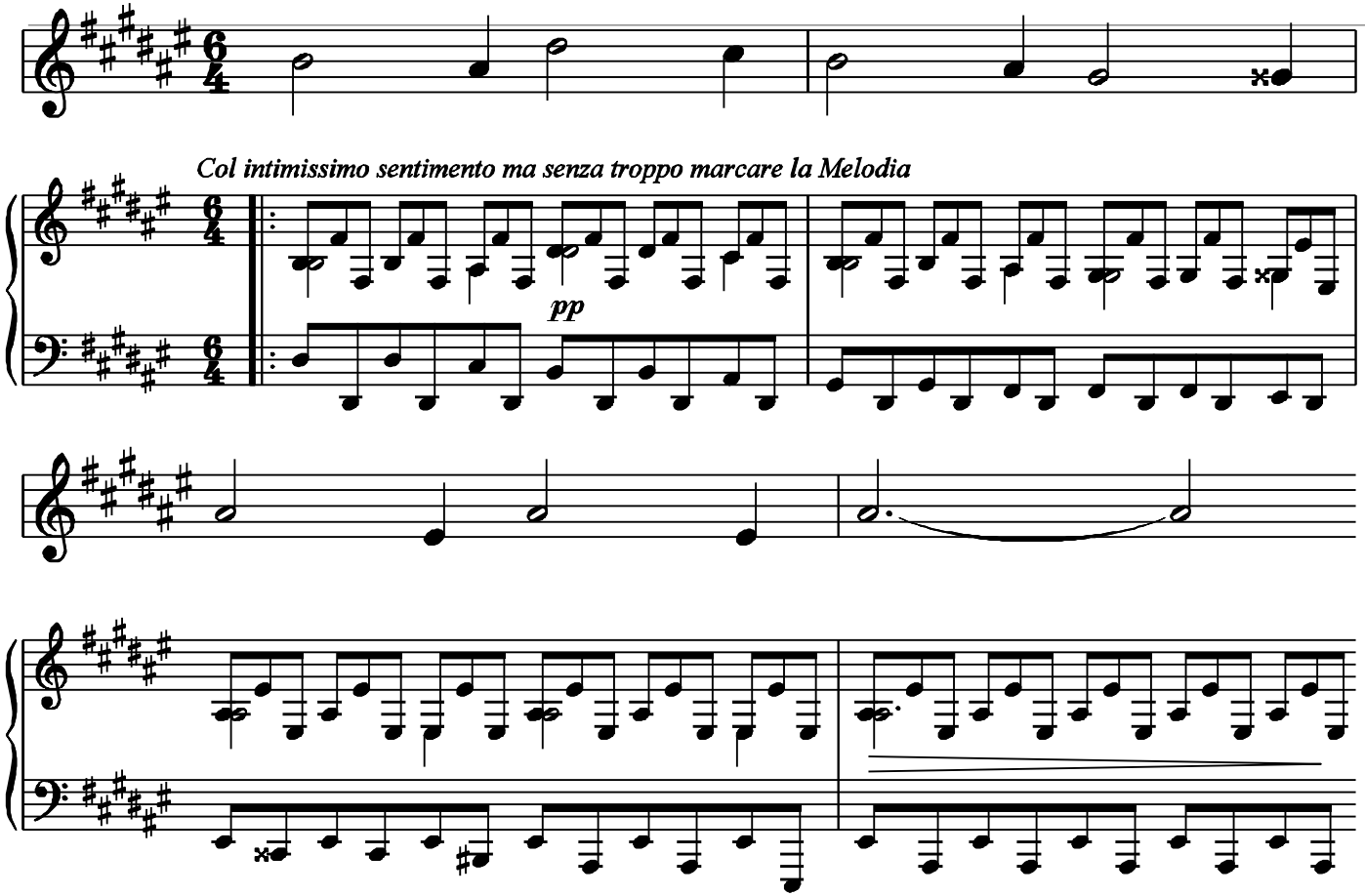
Perceptual tricks:

# Ambiguous foreground/background




Schubert

# *Perceptual tricks:* **Metrical ambiguity**




Ratner

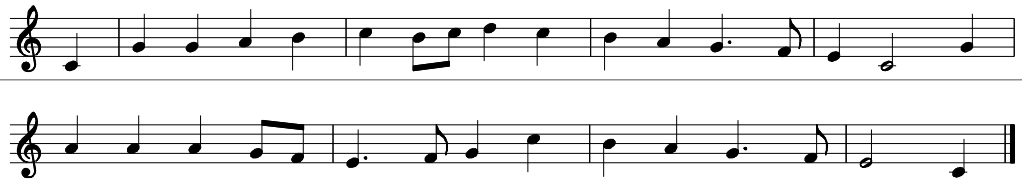
Brahms

# Tune-family studies
## (social cognition)

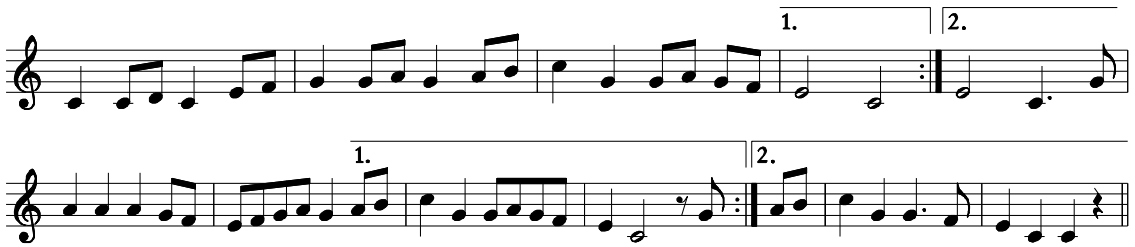


"Morris tune"

- Weelkes (1608)

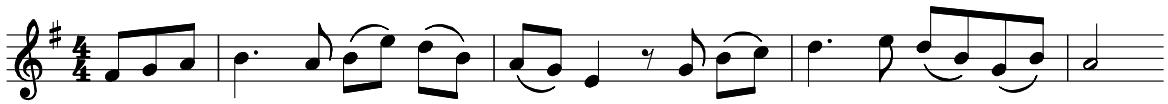


- Jones (1802)

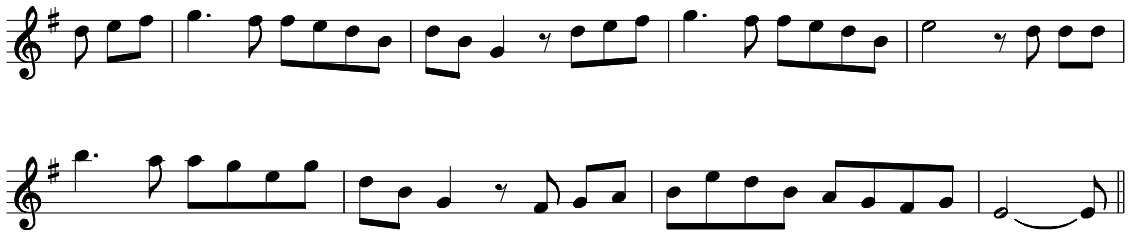



"Londonderry air"

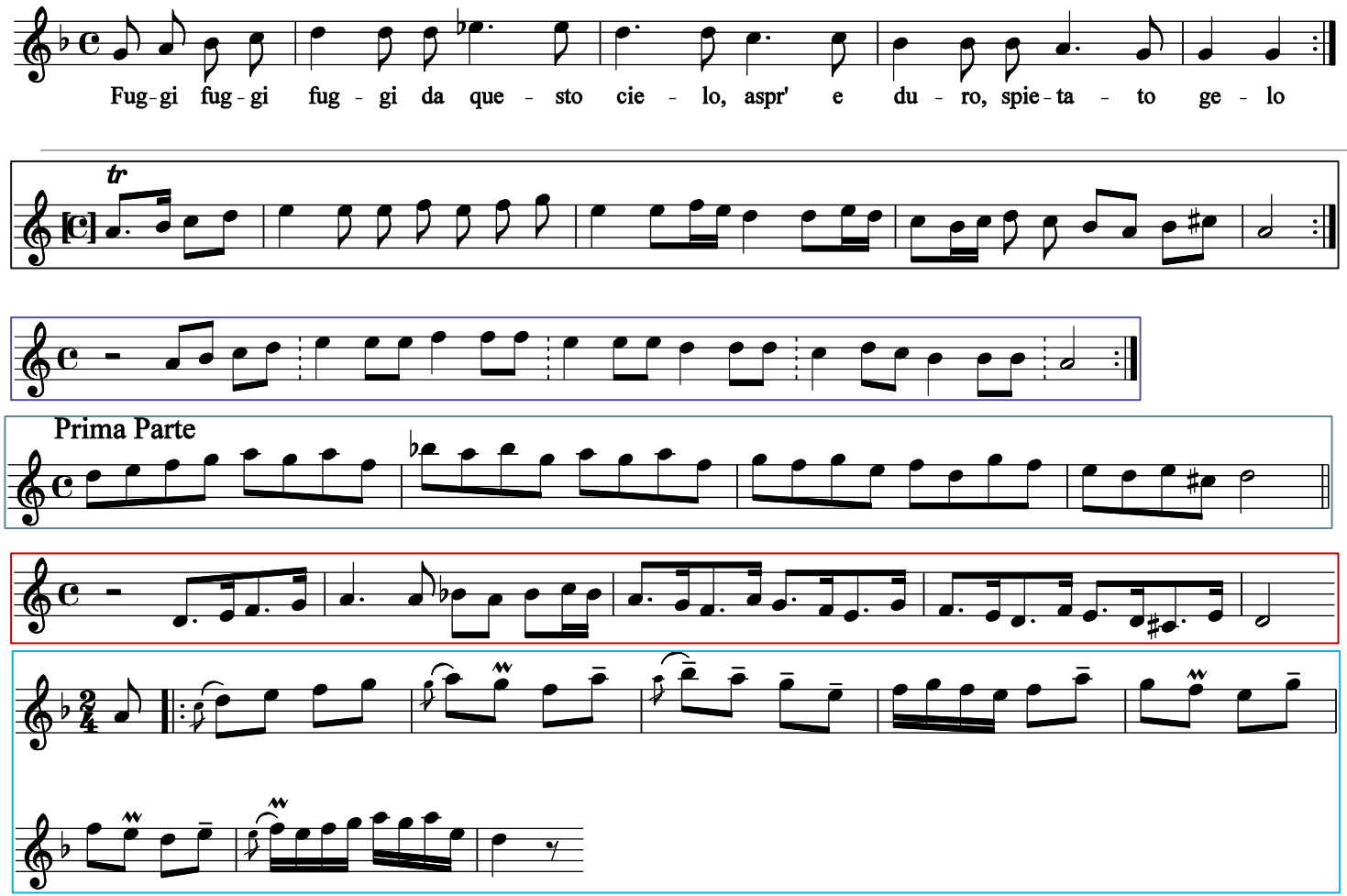
- Verse part: 1704



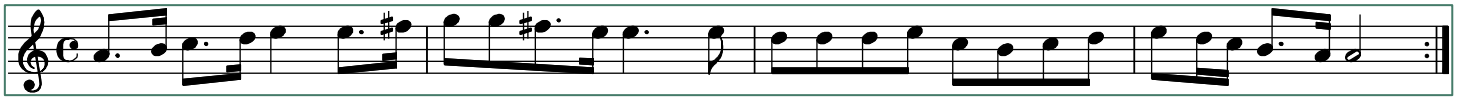
- Chorus part: 1850

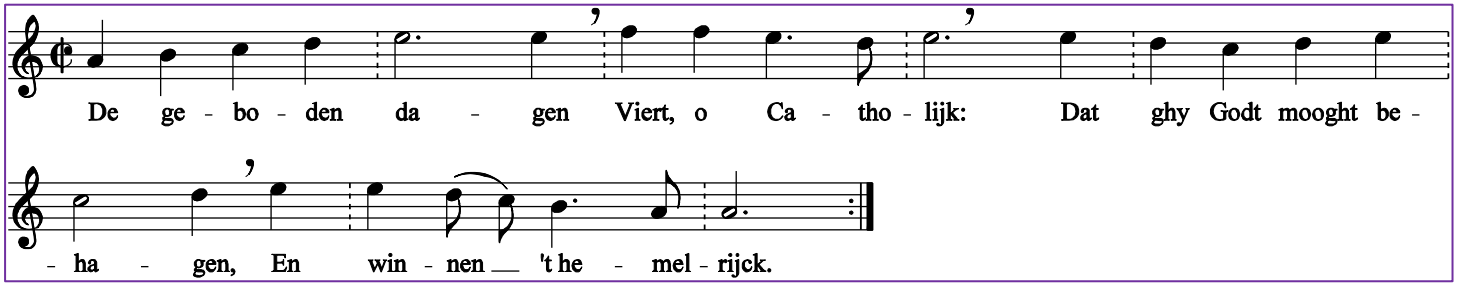


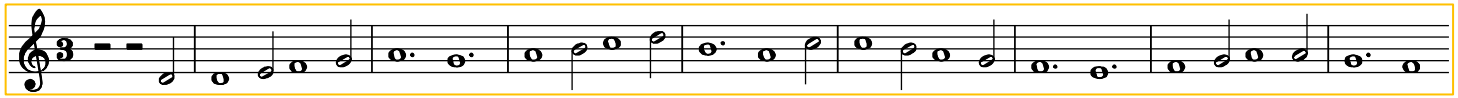
# *A similarity study:* The Ballo di Mantova

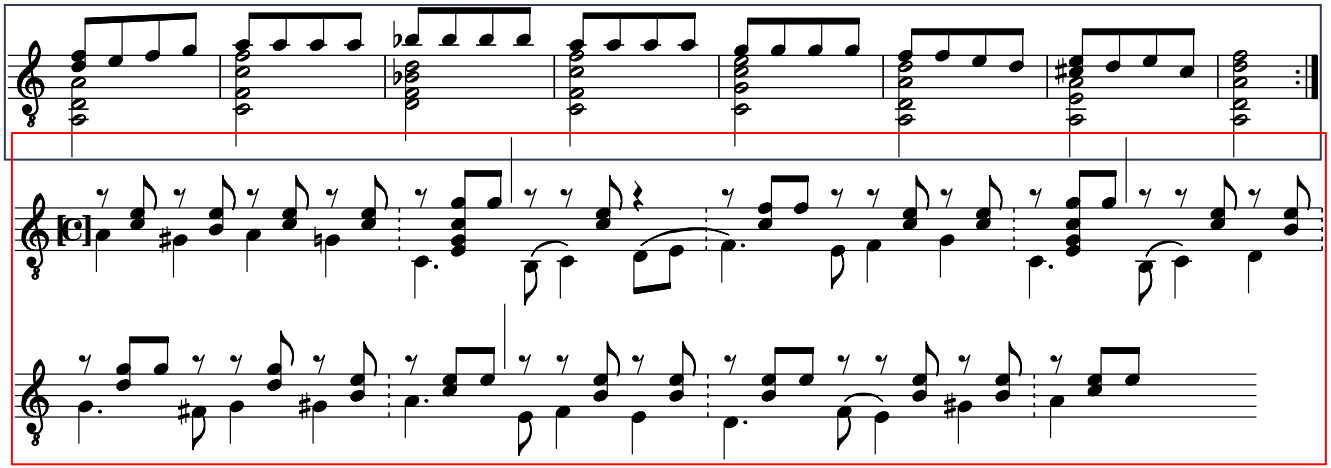


# The “Ballo di Mantova,” cont.



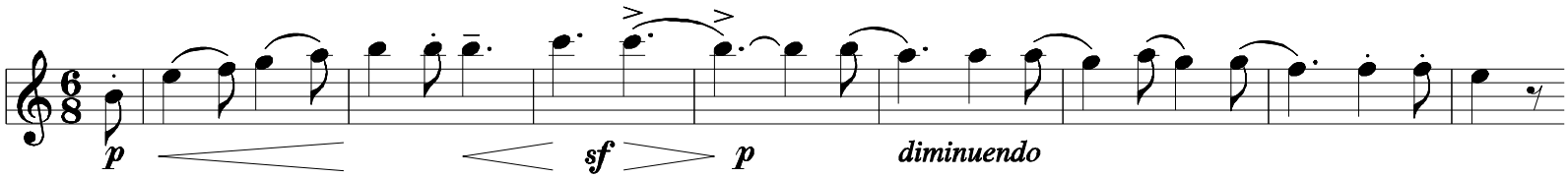


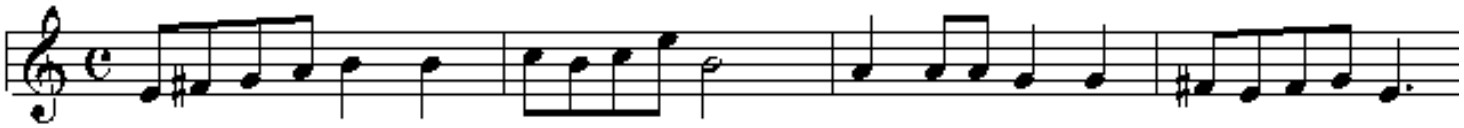


# *Same melody, different social contexts:* The "Ballo di Mantova," cont.

Dance of Mantua (17th c.) as Dvorak's "Moldau" theme (19th c.)




As "Hatikva" (Israeli national anthem)



# What makes “similar” melodies recognizable?

- **Meter** (except compound adaptations)
  - Especially rhythmic patterns associated with particular dance steps
    - Residues of motor memory?
- **Mode** usually (not always) preserved
  - Are major > minor equivalent to minor > major?
- **Social convention**
  - Properties external to music itself