Inferring Tonality from Note Distributions: Why Models Matter

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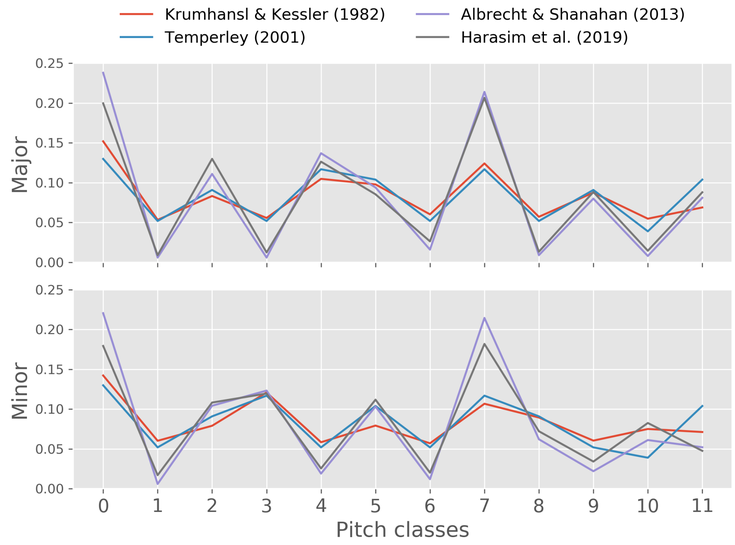
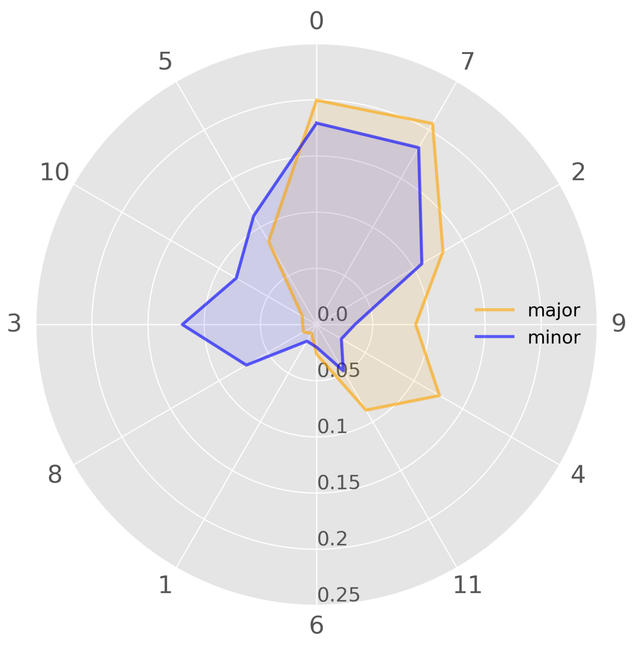
Background

Pitch-class statistics in pieces correspond to **cognitive representations** of tonality [1, 3, 4, 5] and assumed to constitute the basis for statistical learning.



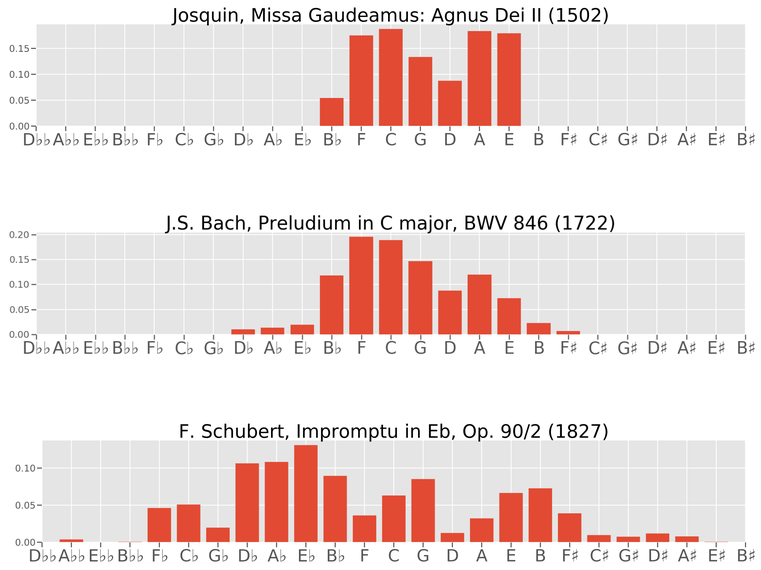
Model 1: Circle of Fifths

Reordering pitch classes by $x \mapsto 7x \mod 12$ and arranging them on the **circle of fifths** emphasizes differences and similarities of the major and the minor mode [3]. IMPORTANCE OF THE FIFTH



Model 2: Line of Fifths

Using **spelled pitch classes** enables the distinction between diatonic, chromatic, and enharmonic pieces [2] and indicates a historical trend towards expansion of the tonal material (see "Historical Development") EXPANSION IN FIFTH-DIRECTION.



Conclusion

The often implicit or unconscious **modeling assumptions about tonal spaces** underlying both pitch-class distributions in musical pieces and cognitive schemata greatly affect research outcomes. Making these assumptions explicit as well as incorporating music-theoretical knowledge about the structure of tonal spaces incorporates modeling as an integral part to the research on the history of tonality.

References

[1] J. Albrecht and D. Shanahan. "The Use of Large Corpora to Train a New Type of Key-Finding Algorithm: An Improved Treatment of the Minor Mode". In: *Music Perception: An Interdisciplinary Journal* 31.1 (2013), pp. 59–67.

[2] Z. Gárdonyi and H. Nordhoff. *Harmonik*. Wolfenbüttel: Möseler Verlag, 2002.

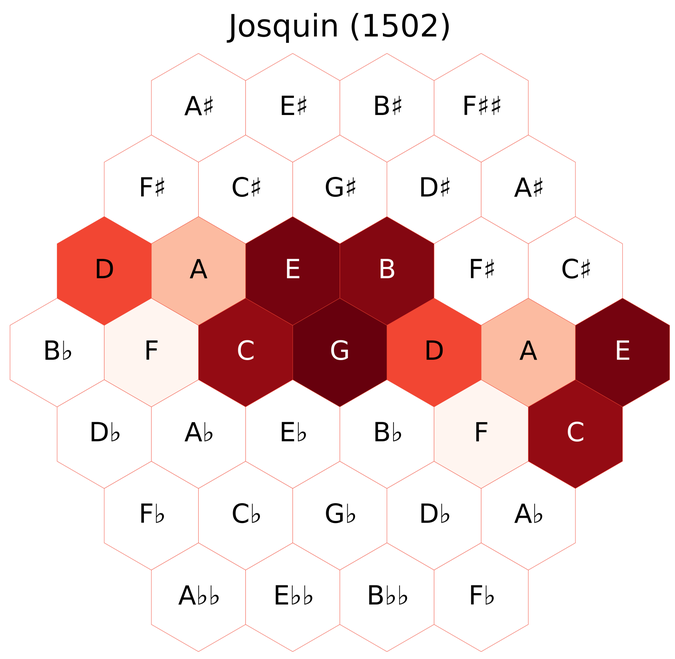
[3] D. Harasim, F. C. Moss, M. Ramirez, and M. Rohrmeier. "Cognitive modeling reveals history of major and minor in Western classical music". Submitted.

[4] C. L. Krumhansl and E. J. Kessler. "Tracing the dynamic changes in perceived tonal organization in a spatial representation of musical keys.". In: *Psychological Review* 89.4 (1982), pp. 334–368.

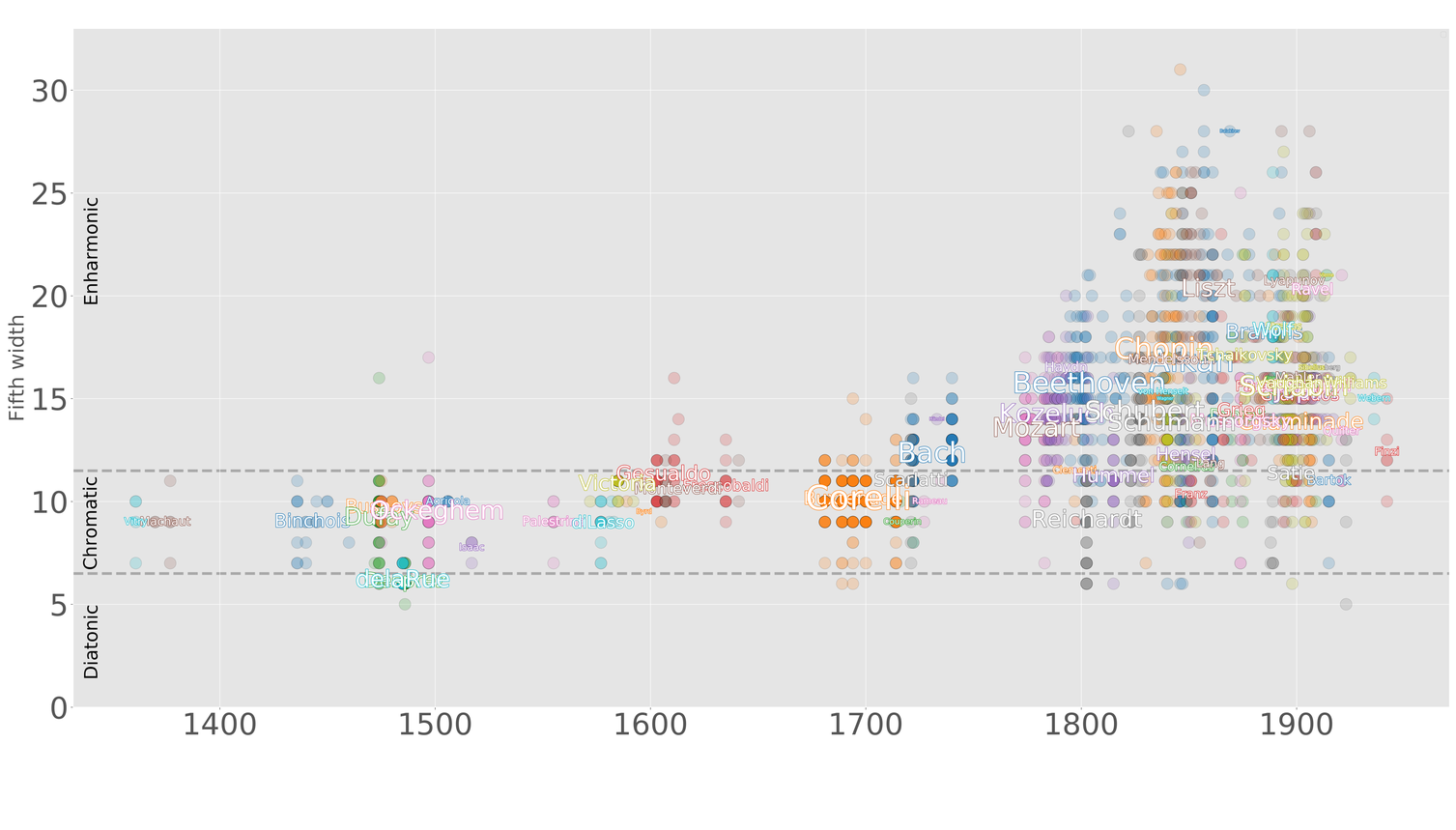
[5] D. Temperley. *The Cognition of Basic Musical Structures*. MIT Press, 2001.

Model 3: Tonnetz

More general models of tonal space reveal further developments in tonality. EXPANSION IN THIRD-DIRECTION



Historical Development



Acknowledgements & Contact

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