

Musical Influences on the Masses and Motets of Cristóbal de Morales and Francisco Guerrero: A Statistical Approach

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Medieval and Renaissance Music Conference

2021 July 5 to 9, Lisbon, Portugal

Composers

- Cristóbal de Morales and Francisco Guerrero were two major Spanish composers of polyphony of the sixteenth century.
 - Cristóbal de Morales was a composer trained in the Cathedral of Seville, member of the Pope Paul III's chapel, *maestro de capilla* of the cathedrals of Ávila and Plasencia, choirmaster at the Toledo cathedral, *maestro de capilla* of the Duque de Arcos at Marchena and of the Cathedral of Malaga.

Composers

- Francisco Guerrero is another Sevillian composer, deeply familiar with the music of the cathedral. After training with his teacher Morales in Toledo, he was appointed *maestro de capilla* of the Jaén cathedral and obtained prebends in the cathedral of Seville.
- He would later become *maestro de capilla* of the Malaga cathedral, after the death of Morales and, in 1574, he obtained the position of *maestro de capilla* of the Seville cathedral.
- He travelled extensively in Spain and Portugal in the service of Emperor Maximilian II, as well as Italy and the Holy Land.

Objectives

- To explore the musical similarities and differences between the masses and motets of Morales and Guerrero by performing a statistical comparison using the jSymbolic software and machine learning.
- To compare works by these two composers with masses and motets by other Spanish and Franco-Flemish composers of the late 15th and early 16th century generation so as to learn about the degree of intergenerational transmission affecting the styles of Morales and Guerrero.

Preconceptions of Morales's musical style

- Stevenson (1961):
 - On Morales's motets, "the treatment of dissonance in most cases is more mannered than Josquin's, and approaches Palestrinian usage" (p. 96).
- Sanders (1999), referring to masses:
 - Morales's interest in Josquin is strongly indicated (p. 11), and "the number of similarities between Morales's masses and Josquin's in terms of subject and type of construction" (p. 312) is significant.
 - "A composer of the first rank is more likely to be concerned primarily with the newest techniques, and Morales was certainly not in step with most of his contemporaries (Willaert, Jacquet of Mantua, Clemens, and the slightly older Gombert)" (pp. 5-6).
 - "His counterpoint is very much in the prevailing Northern tradition" (p. 7).

Preconceptions of Morales's musical style

■ Freis (1992)

- Morales has a greater development of syntactic imitation than previous Spanish composers.
- “Textural contrasts [by Morales], an important structural device in compositions by earlier Spanish composers, diminish and the compositions present a homogeneous picture, interrupted only for specific musical or text-expressive reasons”.
- “The formal structure of motets especially developed along similar lines, and strong formal divisions characteristic of modular counterpoint by early composers diminished in favor of continuous and overlapping, thus homogenous, formal structures [in Morales's Motets]” (p. 336).
- “Peñalosa emerges as the strongest candidate for having been Morales' composition teacher or mentor” (p. 339).
- The frequent use of artifices such as canons and foreign cantus firmi, as well as constructive techniques as *ostinati* and sequences, clearly distinguishes him from any of his Spanish contemporaries” (p. 339).

Preconceptions of Morales's musical style

- Freis (1993)
 - Morales' [*Clamabat autem mulier*] motet also shows correspondences to Escobar's piece in the arrangement of full and partial voice textures (p. 2753)
 - “Ambiguity in modal or diatonic structures is common to both pieces [Peñalosa's and Morales's *Inter vestibulum*]” (p. 2762).
- Wagstaff (2007)
 - Referring to Morales's *Salve Regina* setting, “several textures, some merely suggestive of imitation and some non-imitative, were typical in sacred works before 1520 by Escobar, Anchieta, and Peñalosa, as well as by Fernández de Castilleja” (p. 69), but it may also be “an allusion to Josquin's setting” (p. 71).
 - Similarities between Morales's and Escobar's *Requiem* masses (p. 73).

Preconceptions of Morales's musical style

- Stevenson (1976):
 - “The music of Josquin was admired and known in Spain from the time of the Petrucci prints”.
- Wagstaff (2007)
 - The presence of Josquin des Prez in Spain before the 1540s was minimal (p. 67).
- This was later refuted by C. Diego (2016), T. Knighton and K. Kreitner (2017), and M. Elena Cuenca (2017).
- Diego (2016):
 - Hybrid style or musical bilingualism in Morales' pre-Roman period, where he mixes Spanish and international musical features.

Preconceptions of Morales's musical style

- Sargent (2011):
 - Morales emerges as both adopter and adapter of Josquin's music. The connections encompass at least three spheres of influence: the use of motivic and structural repetition, issues of mode and treatment of the source tune (p. 182).
 - Through a meticulous engagement with Josquin's music, Morales self-consciously positioned himself as the composer's rightful successor (p. 212).
- Nelson (2012)
 - "Morales's debt to Josquin in his parody and paraphrase Masses in particular and in some of his other music, notwithstanding his emulation of such northern composers as Mouton, Gombert, and Verdelot in others of his Masses, is undeniable" (p. 301).

Preconceptions of Morales's musical style

■ Nelson (2012)

- Hypothesis: Peñalosa as a transmitter of Josquin's music to Seville Cathedral, where Morales was a chorister by 1513; "Peñalosa's regular presence there would have been a continual source of inspiration to Sevillian musicians" (p. 303).
- "Morales's music may be linked with Josquin's approach to word setting and word painting, an approach similarly characteristic of music by Peñalosa" (p. 305)

Preconceptions of Guerrero's musical style

- Stevenson (1961):
 - In masses, “Guerrero is less contrapuntal than Morales” (p. 195)
 - In motets, “Guerrero, the most distinctively Spanish of the trinity [Morales, Guerrero Victoria], contrasts sharply with both Morales and Victoria in the frequency with which he introduces formal canon in his motets”. (p. 210).

Preconceptions of Guerrero's musical style

■ Merino (1972):

- “Like his mentor Morales, Guerrero chooses his mensuration signs carefully. For the majority of his Masses, he employs ♩ ” (p. 12).
- “Melodically, Guerrero is rather restrained. His melody moves predominantly by steps, with infrequent leaps larger than a fifth. [...] The same restraint characterizes his treatment of harmony” (p. 14-15).
- Similitudes with Morales: the consistency in which the Masses end their intermediate parts with the same chord that ends the individual movements, or with a chord a fourth or a fifth above it (p. 213).

Preconceptions of Guerrero's musical style

- Merino (1972: 151) and Bruner (1980: 45):
 - Guerrero's extensive use of complete sections of the borrowed plainsong coupled with his predilection for a polyphonic texture, suggests that his music 'represents a continuation of the techniques used by the Spanish masters in the first half of the sixteenth century'.
- Rees (1993: 25)
 - "The resemblance between the two works [Morales's five-voice *Missa L'homme armé* and Guerrero's *Missa L'homme armé* (Oporto version)] is closest".
 - Influence of Gombert's *Veni electa mea* motet on Guerrero's *L'homme armé* mass.

Preconceptions of Guerrero's musical style

- Wagstaff (1995: 561)
 - The most important attribute of Guerrero's [*Missa Pro Defunctis*] setting is that he so obviously maintains the same approach as that of his most important forebears: Escobar and Morales.
- Rice (2007: 150)
 - “There are some points of similarity [chordal treatment, rhythmic material] between Guerrero's setting [*Sancta Maria, succurre miseris* motet] and that of Verdelot, however, which are absent from Morales's piece”.

Preconceptions of Morales and Guerrero's musical style in my PhD (Cuenca 2017)

- Morales and Guerrero borrowed from Peñalosa the melodic material selected for some of his masses, as well as procedures used by both Josquin and Peñalosa: sequences, *ostinati*, imitative designs...
- Guerrero migrated the *cantus firmus* to the voice superius in the *Missa L'homme armé* (Oporto version), as did Peñalosa. He selected the same liturgical melodies from the *Rex Virginum* mass by Escobar / Peñalosa / Hernández / Pérez de Alba, for his *De beata Virgine I* mass.
- Morales and specially Guerrero stand out for the same use as Peñalosa of the reduction or increase of the polyphonic pattern and the use of homophony for expressive and rhetorical purposes.
- Guerrero has more stylistic influences from Hispanic composers than Morales.

Quantitative experiments

- We performed a series of quantitative musicological experiments using **features**, **statistical analysis** and **machine learning**

What is a “feature”?

- A piece of information that measures a **single characteristic** of a musical item in a **consistent** and **precisely-defined** way
- Represented using **numbers**
 - Can be a **single value**, or can be a set of related values (e.g. a histogram)
- Provides a **summary description** of the characteristic being measured
 - Often examines **macro** rather than local characteristics
 - Extracted from pieces in their **entirety**

A basic sample feature: *Range*

- **Range:** Difference in semitones between the highest and lowest pitches in a musical item



- **Value of this feature for this music: 7**
 - G - C = 7 semitones
- In practice, of course, one will wish to compare **many features**, not just one

jSymbolic

- The **jSymbolic** software (McKay et al. 2018) can be used to automatically extract features from digital scores

jSymbolic 2.2's feature types

- Pitch statistics
 - e.g. Range
- Melody / horizontal intervals
 - e.g. Most Common Melodic Interval
- Chords / vertical intervals
 - e.g. Vertical Minor Third Prevalence
- Texture
 - e.g. Parallel Motion
- Rhythm
 - e.g. Note Density per Quarter Note
- Instrumentation
 - e.g. Note Prevalence of Unpitched Instruments
- Dynamics
 - e.g. Variation of Dynamics

jSymbolic

- Extracts **1497 separate feature values**
- Only **551** of the 1497 feature values were used in this particular study
 - Excluded features not relevant to this corpus
 - e.g. dynamics
 - Excluded features subject to encoding bias
 - A problem when music is assembled from sources that encoded the music using different workflows

Other jSymbolic talks at MedRen

- Composer attribution
 - McKay et al. 2017
- Origins of the madrigal
 - Cumming & McKay 2018
- Database search and annotation
 - McKay et al. 2019
- Coimbra manuscripts
 - Cuenca & McKay 2019
- N-gram features
 - McKay et al. 2020
- Ave festiva ferculis
 - Rodriguez-Garcia & McKay 2021

Our corpus: 926 MIDI files

Composers	Mass Movements	Motets
Cristóbal de Morales	122	73
Francisco Guerrero	104	105
Earlier Iberian	77	62
Franco-Flemish	232	151

- All 15th or 16th century works
- Morales and Guerrero (*edited by Nancho Álvarez*)
- Earlier Iberian composers (*from the Anatomy of Late 15th- and Early 16th-Century Iberian Polyphonic Music project*):
 - Alonso de Alba, Juan de Anchieta, Pedro de Escobar, Alonso Mondejar, Francisco de Peñalosa, Antonio de Ribera, Tordesillas, Juan de Urrede and a few others
- Franco-Flemish composers (*from the Josquin Research Project*):
 - Alexander Agricola, Antoine Busnois, Loyset Compère, Josquin, Johannes Martini, Jacob Obrecht, Johannes Ockeghem, Marbrianus de Orto and Pierre de la Rue

Experiment 1:

Iberian vs. Franco-Flemish styles

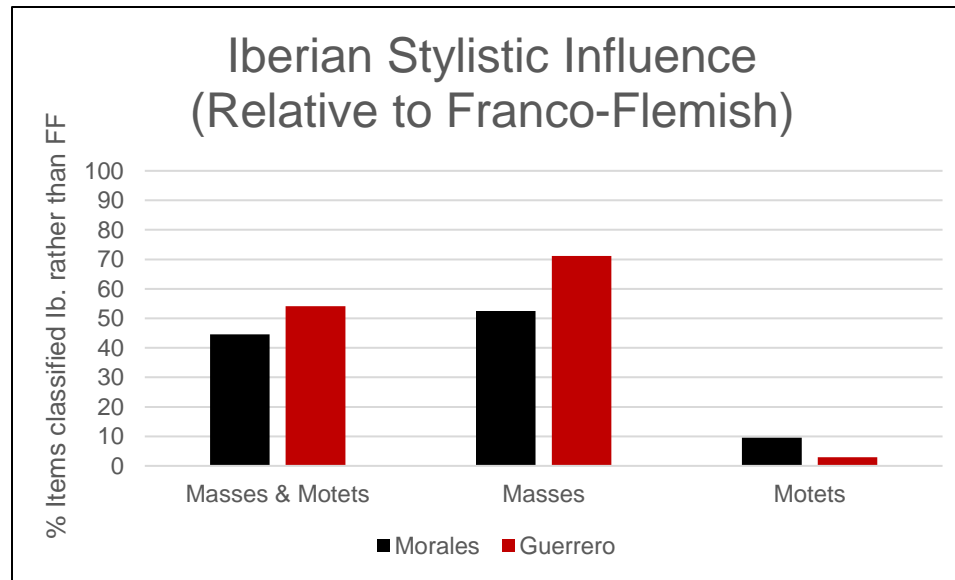
■ Research questions:

- How strong were the relative influences of previous generations of **Iberian** composers relative to **Franco-Flemish** composers on Morales and Guerrero?
- Was there a difference between **masses** and **motets** in this respect?

Experiment 1: Methodology

- Used machine learning to train support vector machine (SVM) classifiers to make **binary distinctions** between the earlier Iberian and Franco-Flemish composers
 - **Not** trained on the music of Morales and Guerrero
 - For each input item, one of two possible outputs is produced:
 - Earlier Iberian or Franco-Flemish
- Trained three separate classifiers:
 - Masses & motets combined + Masses only + Motets only
- Analysis approach:
 - The relative fraction of a composer's items classified to each category serves as a measure of the relative influence of the styles on the composer
 - e.g. 50/50 split for a composer's items would suggest equal earlier Iberian and Franco-Flemish influences

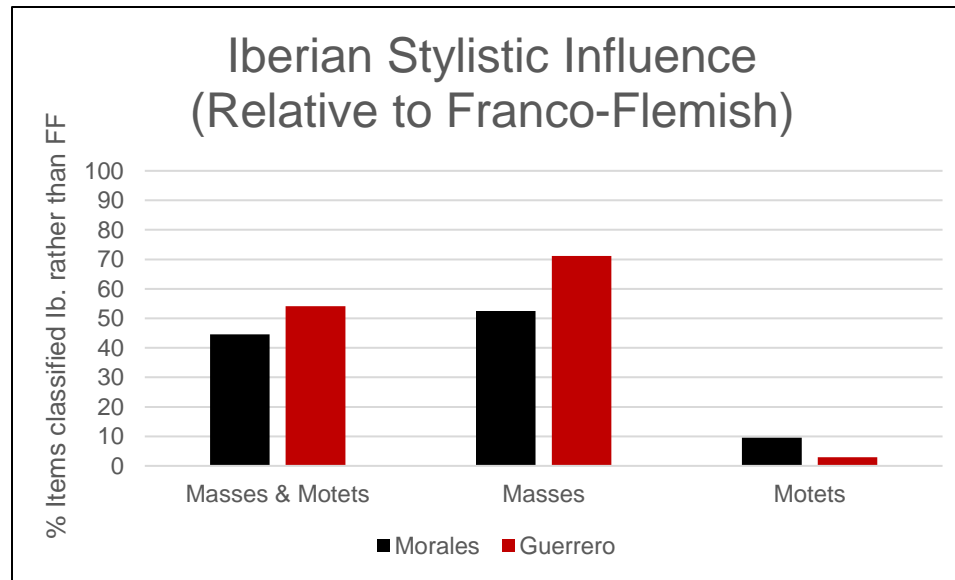
Experiment 1: Results



■ Masses only:

- Iberian and Franco-Flemish influences relatively equal for Morales (52% Iberian)
- Iberian influence substantially stronger than Franco-Flemish for Guerrero (71% Iberian)

Experiment 1: Results



■ Motets only:

- Franco-Flemish influence substantially more apparent than Iberian for both Morales (only 10% Iberian) and especially Guerrero (only 3% Iberian)

Experiment 2:

Intergenerational transmission

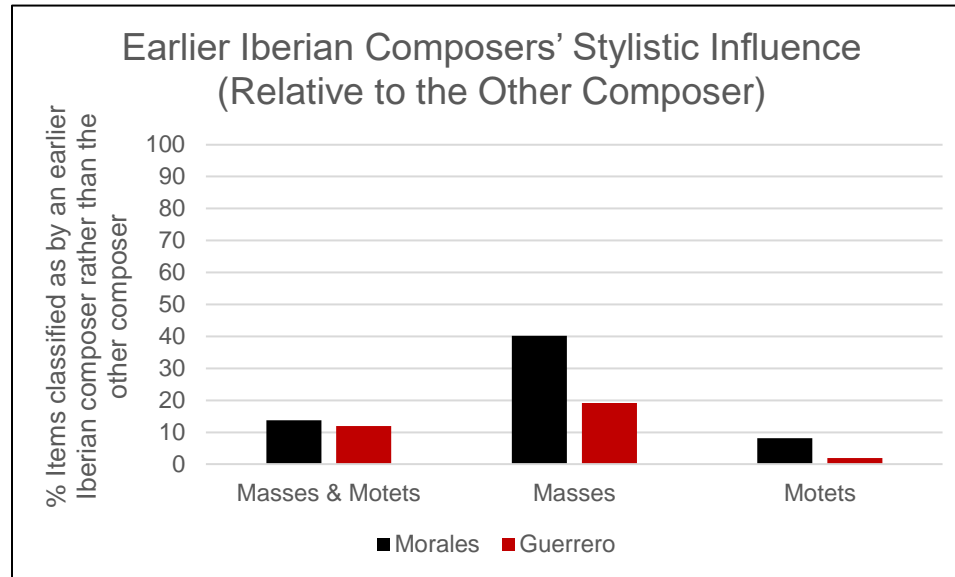
■ Research questions:

- How similar are the styles of Morales and Guerrero to one another compared to the earlier generation Iberian composers?
 - An investigation of intergenerational transmission
- Was there a difference between **masses** and **motets** in this respect?

Experiment 2: Methodology

- Once again used machine learning to train SVM classifiers to make binary classifications
- **Franco-Flemish** music was **excluded** this time
- Trained **two different types of classifiers** this time:
 - Morales vs. earlier Iberian composers
 - **Not** trained on the music of Guerrero
 - **After training**, classified Guerrero's music to see if it was more similar to the music of Morales or to the earlier Iberian composers
 - Guerrero vs. earlier Iberian composers
 - **Not** trained on the music of Morales
 - **After training**, classified Morales' music to see if it was more similar to the music of Morales or to the earlier Iberian composers
- Trained three separate classifiers of each of these types:
 - Masses & motets combined + Masses only + Motets only

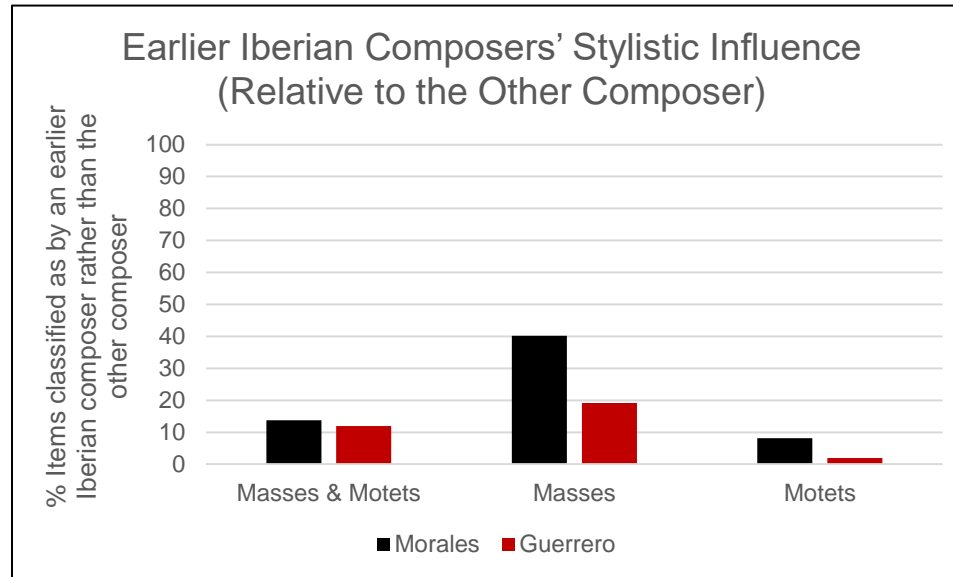
Experiment 2: Results



■ Masses only:

- Morales and Guerrero are more similar to one another than to the earlier Iberian composers
- Influence of earlier Iberian composers is more apparent for Morales (40%) than Guerrero (19%)

Experiment 2: Results



■ Motets only:

- Relative similarity to earlier Iberian composers becomes much less evident for Morales (8%), and tiny for Guerrero (2%)
- In other words, they are much more similar to one another than to earlier composers

Experiment 3:

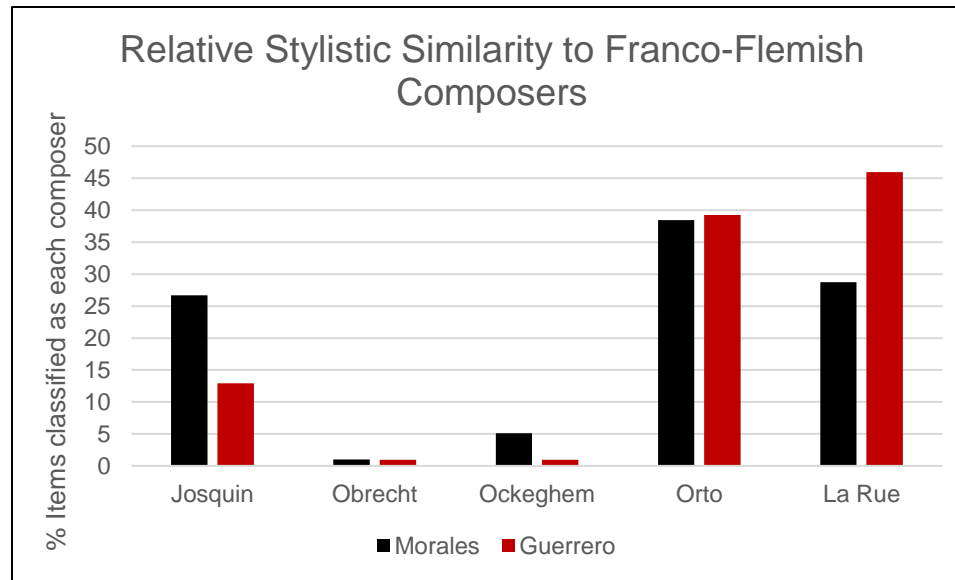
Influence of specific FF composers

- Research questions:
 - How relatively similar are the styles of Morales and Guerrero to the individual styles of Josquin, Obrecht, Ockeghem, Orto and La Rue?

Experiment 3: Methodology

- Used machine learning to train an SVM classifier to distinguish between the five FF composers
 - **Not** binary: outputs one out of five composers for each input item
- Used this classifier to classify the music of Morales and Guerrero
 - i.e. forced the classifier to output one of these five FF composers, even though the music was known to be by Morales and Guerrero
 - The fraction of items classified as a given FF composer provides a measurement of similarity to that composer, relative to the other four
- Only classified masses & motets combined
 - So as to have large enough training data

Experiment 3: Results



- Guerrero (46%) most similar to La Rue, Morales (28%) less so, but still somewhat similar
- Both Morales (38%) and Guerrero (39%) fairly similar to Orto
- Morales (27%) also similar to Josquin, Guerrero (13%) less so

Experiment 4:

Influence of specific earlier Iberian composers

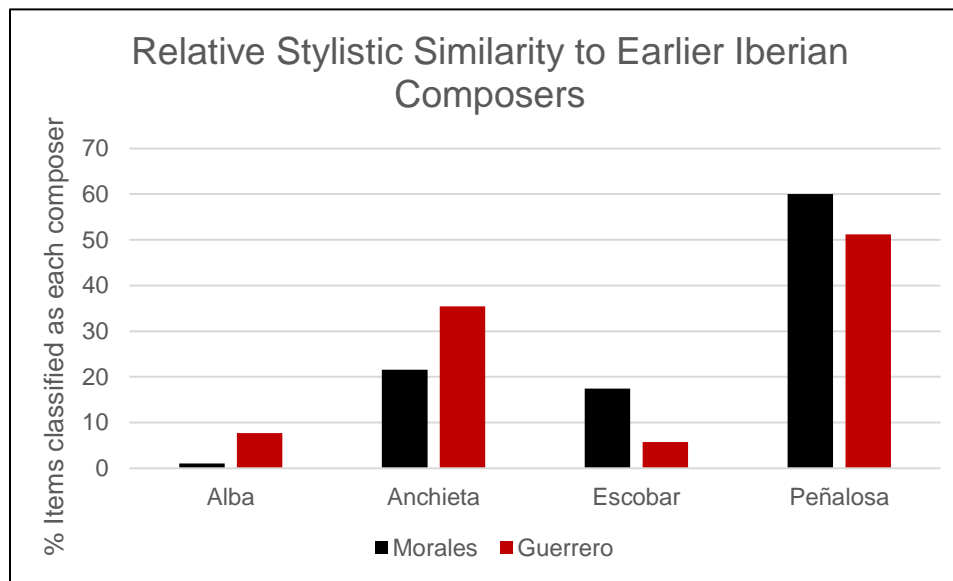
■ Research questions:

- How relatively similar are the styles of Morales and Guerrero to the styles of Alba, Anchieta, Escobar and Peñalosa?

Experiment 4: Methodology

- Trained an SVM classifier to distinguish between these four earlier Iberian composers
- Used this classifier to classify the music of Morales and Guerrero
 - i.e. forced the classifier to output one of these four Iberian composers, even though the music was known to be by Morales and Guerrero
 - The fraction of items classified as a given earlier Iberian composer provides a measurement of similarity to that composer, relative to the other three
- Only classified masses & motets combined
 - So as to have large enough training data

Experiment 4: Results



- Morales (60%) and Guerrero (51%) both most similar to Peñalosa, especially Morales
- Morales (21%) and Guerrero (35%) also somewhat similar to Anchieta, especially Guerrero
- Morales (17%) also has some similarity to Escobar, Guerrero (6%) less so

Conclusions

- Morales and Guerrero with the Iberian and Franco-Flemish styles:
 - Both Franco-Flemish and earlier Spanish influences are clearly present in general for both composers.
 - The motets are substantially more FF in character for both composers.
 - Guerrero's masses lean more towards earlier Iberian composers.
- The styles of Morales and Guerrero are more like each other than either of them are to previous Spanish composers.

Conclusions

- Morales and Guerrero and individual Franco-Flemish composers:
 - A clear influence has been shown between the motets and masses of Morales and those of Josquin, much greater than the influence of this composer on Guerrero's polyphony.
 - Strong influence between Morales, Guerrero, Marbrianus de Orto and La Rue.
 - There is hardly any influence between Morales and Guerrero and composers such as Obrecht or Ockeghem.

Conclusions

- Morales and Guerrero and individual Spanish composers:
 - The predominant influence has also been noted between Peñalosa and particularly Morales and, to a lesser extent, Guerrero, although both composers have him as a clear mentor in the Spanish tradition.
 - Similarities between the masses and motets by Anchieta and those of Morales, but especially those of Guerrero.
 - Morales has some influence from Escobar's work.

Future studies:

- To study the stylistic relationship of French composers such as Mouton, Richafort, Verdelot and Gombert, who are known to have had a fundamental influence on Morales and, perhaps, Guerrero.
- To research the stylistic transmissions between the works of Morales and Palestrina.
- To add the work of Tomás Luis de Victoria to establish more intergenerational stylistic relationships.
- To learn more about the specific characteristics delineating the compositional styles.

Thanks for your attention!

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