**Analyzing Melodic Similarity Judgements in Flamenco a Cappella Singing**

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## 1. Background

The perception of melodic similarity is at the heart of music psychology (Schmuckler 1999; Deliège 2001). In the field of music information retrieval, several melodic similarity metrics have been proposed (Hewlett, W. B., and Selfridge-Field 1998). Unfortunately, the psychological and computational approaches have mostly developed independently. Behavioural studies rarely compare human judgments with similarity metrics and most metrics have not been evaluated against human judgments.

Flamenco a capella singing presents an interesting case for the study of melodic similarity with its very rich, complex ornamentation. Two performances can be considered as the same melody if they share certain notes in a given order, regardless of how much ornamentation is interspersed in between. In addition, traditional music has been largely underexplored in previous research.

## 2. Aims

This work has three main goals: first, to study the perception of melodic similarity in flamenco singing with both experts and novices; second, to contrast judgments for synthetic and recorded melodies; third, to evaluate musicological distances against human similarity judgments (Mora et al. 2010).

## 3. Method

We selected the melodic exposition from 12 recordings of the most representative singers in a particular style, *martinete*. Twenty-seven musicians (including three flamenco experts) were asked to listen to the melodies and sort them into categories based on perceived similarity. In one session, they sorted out synthetic melodies derived from the recordings; in the other session, they sorted out recorded melodies. They described their strategies in an open questionnaire after each session.

## 4. Results

We observed significant differences between the criteria used by non-expert musicians (pitch range, melodic contour, note duration, rests, vibrato and ornamentations) and the ones used by flamenco experts (prototypical structure of the style, ornamentations and reductions).

We also observed significant correlations between judgements from non-expert musicians and flamenco experts, between judgements for synthetic and recorded melodies, and between musicological distances and human judgements. We also observed that the agreement amongst non-experts musicians was significantly lower than amongst flamenco experts.

## 5. Conclusions

This study corroborates that humans have different strategies for comparing synthetic and real melodies, although their judgements are correlated. Our findings suggest that computational models should incorporate features other than energy and pitch when comparing two flamenco performances.

Furthermore, judgments from flamenco experts also differed from novice listeners due to their implicit knowledge. Finally, novice listeners –even with a strong musical training- did not substantially agree on their ratings of these unfamiliar melodies.

## 6. Keywords (up to 5)

music similarity, melody, flamenco , singing

## 7. Topic areas (choose up to 3 from the suggested topics from the list)

Cognitive modelling of music, computational modelling of music, pitch and tonal perception, cross-cultural studies of music.

## References

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