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Five Perspectives on Musical Rhythm

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Variously defined as 'organized duration' (Kolinski, 1973), 'the many different ways in which time is organized in music' (Bamberger & Hernandez, 2000), 'the language of time' (Lewis, 2007), or simply 'the perception of an order' (Fraisse, 1982), the attribute of rhythm is of central concern to all music studies. In the past few decades, the study of rhythm has been expanded by knowledge and methods from scientific fields other than music, notably experimental psychology and cognitive science, resulting in novel theories of rhythmic organization, such as Lerdahl and Jackendoff's (1983) notion of grouping and meter. Since then other cross-disciplinary interactions have produced rhythm-based computational models that are applicable to music search and discovery, computational musicology, and interactive music systems; as well as new science allowing us to understand the biological mechanisms behind music and rhythm processing, and the effects of rhythm information on human perception and cognition.

Yet, most of this research is still viewed within the confines of specific disciplines, and is notably limited to a few music traditions, mostly European and North-American art and popular music. By providing a forum for the presentation and discussion of research on musical rhythm across disciplinary and cultural boundaries, this issue seeks to expand the horizons of traditional music scholarship. This goal is in keeping with JNMR's interdisciplinary outlook and its mission of 'increasing our understanding of music and musical processes by systematic, scientific and technological means'.

This special issue is a follow-up to the workshop 'Musical Rhythm: Cross-disciplinary and multi-cultural perspectives' that was held in Abu Dhabi, between 18–21 March 2013. This event featured participation from 40 experts in various disciplines, all united by their focus on musical rhythm, with a program including 24 guest talks and several discussion sessions covering topics such as the very definition of rhythm, complexity and syncopation, rhythm similarity, rhythm and trance, free rhythm, pitch and time isomorphisms in music, rhythms of the brain, and cross-cultural and culture-specific approaches to rhythm analysis. A call for papers was released inviting workshop participants and members of the community at large to submit their contributions, with the ensuing review process resulting in the five excellent contributions here presented, each espousing different but complementary views on musical rhythm.

A cognitive view: Schaal, Banissy and Lange compare individual, short-term memory capacity for musicians and non-musicians in the context of musical rhythms. For this they propose a novel rhythm memory span task inspired by similar protocols used for pitch information. Experimental results show better performance for musicians, strong positive correlation between rhythm and pitch memory processes, and increased performance as a function of the amount of musical training, active engagement in musical activities and highly developed listening abilities. Their study confirms previous findings regarding the reliability of the mechanisms musicians use in auditory memory processing, and extends them to the realm of rhythm research.

A performance analysis view: the paper by Sethares and Toussaint examines the role of expressive timing and timbre in recorded performances of Steve Reich's Clapping Music. Their study is based on a detailed quantitative analysis of seven performances of this composition, made possible by its combinatorial nature, lack of pitch, melodic and harmonic structure, and limited timbral variability. The authors show that performances can be organized according to their local tempo variations, and that these variations are a function of the complexity of the performed pattern. They demonstrate that timbral variations are not only possible with hand-claps, but a major structuring element of the piece, necessary for its successful performance despite calls for timbral uniformity in the composer's instructions. More intriguingly, they explore the role of micro-timing deviations between semi-synchronous events, and how the resulting alteration of timbre, pitch and rhythm perception contributes to the expressivity of the performance.

An ethnomusicological view: Holzapfel examines the relationship between rhythmic modes, specifically short *usul* in Turkish Makam music, and the rhythmic information in a large collection of notated pieces sampled from two centuries of this tradition. He proposes a Bayesian approach to robustly discriminate between six different usul based on note position and duration patterns, demonstrating how theoretical accent patterns encode stylistic information. On the other hand, the study shows how usul serve more as guidelines than strict metrical frameworks, resulting in compositions that are less stratified and less accentuated on the downbeat than equivalent rhythmic structures in Western music. Interestingly, these models can be used to show changes in usul preferences and form over time, including trends towards Westernization of this musical tradition that correspond to similar developments in Turkish history.

A music information retrieval view: Esparza, Bello and Humphrey discuss the limits of common assumptions made in the development and evaluation of audio-based rhythm similarity systems. They start with a standard MIR setup, using a combination of signal processing and machine learning techniques to maximize genre classification accuracy on a large dataset of Latin American dance music, a common proxy task for rhythm similarity. Detailed analysis of the algorithm, the recordings used for training and testing, and the specificities of the music traditions in those recordings, shows that, despite high classification accuracy, much of the performance is explained by factors irrelevant to rhythmic analysis, such as recording quality, and by the assumptions made with regards to the equivalency between genre labels and rhythmic content. By highlighting the effect of common simplifications made in system development, the paper draws attention to the need for more musical insight at all stages of MIR research, particularly on rhythm similarity.

A signal processing view: the final paper in the issue, by Sephus, Lanterman and Anderson, discusses the advantages of modulation spectral features for the representation of musical information in audio signals, including rhythm. For a short signal segment, modulation spectral analysis returns a matrix of magnitude coefficients as a function of both acoustic and modulation frequencies. The authors discuss how adding information about temporal patterns at different frequency bands results in representations that are perceptually more meaningful, invariant to noise, and able to encode both short-term temporal behaviour disambiguating multiple sound sources, as well as long-term temporal behaviour characterizing musical rhythm. They provide a comprehensive list of previous uses of modulation spectral features for music analysis, discuss known shortcomings, and present a novel application to unsupervised source identification.

The articles in this special issue are illustrative of the diversity of high-quality research currently being pursued on musical rhythm incorporating different disciplinary and cultural viewpoints. They show how such an approach can yield significant advances and insight in new music research. Yet, this collection is not, and never was intended to be, comprehensive, with much relevant and exciting research inevitably left for presentation elsewhere. The editing and publication of this issue has coincided with a second installment of the original workshop and renewed efforts at a follow-up publication, all of which has met with an enthusiastic response from the research community. We take this as evidence that the efforts resulting in this publication are only the beginning of a long and fruitful conversation of music scholars.

Finally, the guest editors would like to thank the more than 30 experts who contributed their time and expertise to the review process, the editor in chief of *Journal of New Music Research*, Alan Marsden, and the staff at Taylor and Francis that made the issue possible.

References

Bamberger, J.S., & Hernandez, A. (2000). *Developing musical intuitions: A project-based introduction to making and understanding music*. New York: Oxford University Press.

Fraisse, R. (1982). Rhythm and tempo. In D. Deutsch (Ed.), *The psychology of music* (pp. 149–180). London: Academic Press.

Kolinski, M. (1973). A cross-cultural approach to metro-rhythmic patterns. *Ethnomusicology, 17*(3), 494–506.

Lerdahl, F., & Jackendoff, R. (1983). *A generative theory of tonal music*. Cambridge, MA: MIT Press.

Lewis, A.C. (2007). *Rhythm: What it is and how to improve your sense of it*. San Francisco, CA: RhythmSource Press.

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