Applying *Normalised Pairwise Variability Index* to musicology

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The relationship between music and language and their shared elements have been at the focal point of academic research as well as being discussed in everyday situations for a long time. Both language and music are quite complicated research objects because of the number of elements they consist of. The amount of analysable data in music or language research is huge, even in short segments of written or spoken texts, musical scores or recorded performances. It is not very common to analyse music using quantitative methods, which are very limited in comparison with the emotional experience music listening offers and which take into account only a limited number of elements. But if the analysis of a musical work remains only on a descriptive level, it loses its objectivity due to the countless ways in which it can be interpreted. In addition to descriptions of musical works, it could be useful to apply some more concrete methods to make objective comparisons of different works.

This article provides an overview of *Normalised Pairwise Variability Index* (*nPVI*), a method which, originating in linguistic research, has been applied to musicology since the 2000s and become quite popular, being used also by Estonian musicologists (Raju, Asu and Ross 2010). *nPVI* is a quantitative method which allows a large amount of data to be analysed. In linguistic research, *nPVI* has been used in prosody research. *nPVI* provides an alternative to the traditional view of rhythm, isochrony, according to which languages are divided into "syllable-timed" and "stress-timed". *nPVI* enables the rhythmic differences between languages or varieties of the same language to be quantified by capturing the difference between adjacent linguistic units (*e.g.* syllables). The method was originally devised in order to compare the rhythm of two varieties of English: Standard Southern British English and Singaporean English (Low 1998; Low, Grabe and Nolan 2000). Subsequently, the use of the index has been extended for the comparison of rhythmic differences between languages (*e.g.* Grabe and Low 2002; Nolan and Asu 2009), in first language studies (*e.g.* Grabe, Watson and Post 1999) and in second language research (*e.g.* White and Mattys 2007) as well as in research into speech pathology (*e.g.* Knight and Cocks 2007).

For music analysis *nPVI* shows the inner rhythmic contrast for the musical work; in other words, it shows how much rhythmic variability there is. Studies (Raju, Asu and Ross 2010; Raju and Ross 2010) show that the rhythmic contrast in music, as expressed by *nPVI*, is not sensitive to differences between score and performances of the same musical work or stylistic differences between various performances of the same work. Rhythmic contrast seems to be one of the key components in the identity of the music and allows us to perceive different performances of the same compositions as the same musical works.

nPVI method, of course, has its limitations, which have to be considered when using it in music analysis. But used, for example, with descriptive analyses and being careful when drawing widespread conclusions, it offers an interesting objective opportunity for comparing different musical works.