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Effect of Leadership Change on Microtiming Patterns in String QuartetMaciek Tomczak,^a Min Susan Li,^b Maria Witek,^b Jason Hockman^a^a Birmingham City University, Sound and Music Analysis (SoMA) Group in Digital Media Technology (DMT) Lab, Birmingham, UK;^b University of Birmingham, Birmingham, UK;

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This study investigated the effects of changes in leadership on microtiming patterns of different players within a string quartet. By quantising note onset positions within eighth-note metrical structure of bar-length rhythmic patterns, it is possible to extract, visualise and analyse microtiming patterns of each musician over time. The majority of previous studies have focused on microtiming patterns of percussion instruments, and relatively few have explored analysis of string instruments.

In Tomczak et al. (2022), we showed that onset annotations from multiple annotators typically exhibit some variation. To limit the extent of the measurable annotation variation, we use the output of automatic onset and downbeat detection methods (Böck et al., 2012; 2016) manually corrected by an expert.

Here, we examined the synchronisation of musicians to a designated leader (i.e., first or second violinist) in a string quartet using a computational approach presented in Rocamora et al. (2019). The stimuli included expert-verified onset and downbeat annotations from 72 performances of Haydn's Op. 74 No. 1 Finale played in three different performance styles, which totalled 288 individual recordings from the Virtuoso Strings dataset (Tomczak et al., 2022).

Our results revealed reduced microtiming accuracy of each player when new leader's downbeat annotations were used. Specifically, when the musicians were instructed to follow the second and not the first violinist, they played significantly late on every metrical position. Conversely, in a familiar performance context, their synchronisation to the leader's timing was more precise for each metrical position under the leadership of the first violinist.

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