

Participatory applause: Interactions of audience members clapping at the end of a classical music concert

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Disciplinary background A. According to musicological studies of audience culture, applause is the most overt form of participation allowed to the collections of individuals attending classical music concerts (Brandl-Risi, 2011; Small, 1998; Tröndle, 2020). The final round of applause can exhibit many interesting dynamics related to their collective enthusiasm for the performance (Lupyan & Rifkin, 2003), the local applause culture, and what is on stage during the clapping.

Disciplinary background B. Quantitative empirical study of group clapping behaviours has principally depended on participants clapping on request in laboratory settings or A/V recordings from concerts (Neda, 2000) and presentations (Mann et al., 2013). To study the coordination involved in this collective behaviour, we need accurate measurements of individuals clapping voluntarily in a real concert setting.

Abstract

To describe how the appreciative audience members adjust their clapping to each other and the action on stage during the final round of applause, demonstrating their participation at a concert's end.

After the Danish String Quartet (DSQ) performed their last piece at the Music Lab Copenhagen Concert, the audience clapped continuously for nearly two minutes. During that time, the musicians stood and bowed, had scientific instruments removed from their bodies, left the stage, returned to bow again, and finally left the stage for good. The clapping action of individual participants in this concert experiment was captured by a mobile phone on their chests, and these recordings show how individuals' clapping contributed to the collective effect shared with the musicians.

Through the final applause interval, 70 devices captured clear clap sequences, representing over half of the audience at this chamber performance. In some ways, their applause followed expected patterns for a concert audience. They began to applaud over a very short time interval (Mann et al., 2013), more than half starting within less than a second of each other. After 20 s of independent clapping at rates from under 120 BMP to over 200 BMP, the participants shifted to clapping together on a shared beat, a practice that is common for Danish audiences. This group maintained synchrony for over a minute while steadily accelerating from around 158 BMP to 176 BMP, an expected consequence of mutual adaptation during group clapping (Thomson et al., 2018). The coordinated action was strongest while the musicians were on the stage but a subset of independent clapping broke out while the audience waited for the performers to return for their final round of bows.

Participants' claps were evaluated from two perspectives: the alignment of claps, reflecting the dominant shift from independence to coordination, and the distribution of participants' clapping rates over time. Despite some measurement challenges, the shift from independent to coordinate clapping emerges strongly from participants' movements, with the median rate of clapping slowing until a dominant beat takes hold. Individuals' clap sequences confirm that the independent clapping at the start of the applause is a result of individual participants clapping isochronously at their own rate,

separate in rate and phase from their neighbours in the hall. When the audience claps together, they are voluntarily adjusting to the dominant rate and phase of the people in the hall, with little change in the quality of their isochronous clapping action. Drift in the synchronized clapping rate reflects mutual attentiveness while variation in the number of participants contributing to the coordinated claps suggests differences in applause strategy. Many participants opted to coordinate with their peers while some seemed to prioritize reacting to the musicians.

Interdisciplinary implications. The audience is composed of individuals, each with their own experiences and opinions of a performance. Scientific analysis has often reduced this diversity to a single narrative. Here we observe categories of behaviour that are of interest because of the individuality being negotiated by audience members as they adapt to each other and performers on stage. Their agency aggregates into a familiar collective expression of appreciation, but with the right measurement and analysis tools, we can recognize both the group response and participants' individual choices.

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