mance may have received higher scores on other criteria, the criteria related to these aspects were likely to be more dominant.

As for the results from the external-evaluation, two performers evaluated their recordings to be better than other performers did; in contrast, the other two performers were likely to perceive that their recordings were inferior to others. Statistically, the criteria for self-evaluation and for external-evaluation highly overlapped for each performer (Kendall Coefficient of Concordance, w=0.75, p<0.001).

Conclusions

It was noted that even professional pianists did not always consistently evaluate their own performance as others did. In terms of the relationship between the role of self-evaluation and external evaluation in the same performer, the tendencies evidenced within self-evaluation could be found in the context of the role of external evaluator. These interactions indicated that a self-constructed tendency of evaluation could form specific and individual attitudes towards deciding the comparative quality of musical performances.

Keywords

criteria; self-evaluation; external-evaluation; piano performance

Thematic session
Performer-audience dynamics I

VISUAL AND AUDITORY CUES IN MUSIC PERFORMANCE AND THEIR ROLE IN ATTRACTING ATTENTION FROM THE AUDIENCE

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Background

Traditionally, music performances are mainly regarded as auditory events. However, recent research emphasized the importance of visual cues in the judgment of music performance. It has even been suggested that the visual component is more important than the sound production and that visual expressivity and the ability to attract attention from the audience are main skills for a successful performer.

Aims

In this study we want to investigate the respective importance of visual and auditory cues in expressive music performance and in the judgement of these performances by audience members.

Method

We designed two related experiments: In experiment 1, 10 duos of experienced musicians were invited to perform in a motion-capture studio. They were asked to perform two pieces from their repertoire. Each of the musicians needed to have a clear solo part in one of the pieces and a clearly accompanying part in the other. We asked them to perform these two pieces in two versions: one in which they acted as if it was a normal performance, and one in which they mentally switched roles: the accompanist pretending to be the soloist and vice-versa. Their movement style was analyzed based on their head and hip movements. In experiment 2, 34 participants watched video recordings of these performances while their gazing behavior was tracked by an eye-tracking system. We investigated at which of the performers of the duo they looked most frequently.

Results

The results of experiment 1 showed that musicians behaving like a soloist move more than those behaving as accompanists, and that this effect is rather exaggerated when they switch roles. Thus their 'acting' role is more significant in determining their visual behavior than their actual musical role. Experiment 2 shows that people tend to look more at musicians that move more. Here the effect is larger in the normal performance compared to the performance in

which they switched roles, which suggests that the musical content still has an influence in guiding the attention of the audience.

Conclusions

This study shows that musicians' physical behavior, and particularly the amount in which they move, is a crucial factor in attracting the attention of the audience. While current music education almost entirely focuses on improving the auditory result of the performance, these results suggest that the performer's motion behavior might deserve more attention in education.

Keywords

music performance; performance evaluation; movement; action-perception coupling; audio-visual perception

VISUALIZING PERFORMER-AUDIENCE DYNAMICS

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Background

Live performances involve complex interactions between a large number of co-present people. Performance has been defined in terms of these performer-audience dynamics, but little is known about how they work. One reason for this is the empirical challenge of capturing the behavior of performers and large audiences. Video-based approaches do not scale, and interest in audience response has led to diverse techniques of instrumentation being explored. Another reason is the difficulty of interpreting the resulting data. Discovery of phenomena as successfully practiced with video data becomes problematic when starting with numerical data sets—you cannot watch a spreadsheet, after all.

Aims

A method to facilitate inductive analyses of performer-audience dynamics is presented. Key to the approach is "experiencing" the data without losing the context of the live performance.

Main contribution

This paper presents a tool to enable the integration and interpretation of multimodal datasets. The tool updates the video paradigm to draw together diverse data streams. A computer graphic three-dimensional scene representing the live event is produced that visualizes the data in-situ. This three-dimensional representation is then registered onto video recordings, providing augmented reality views of the event. Or it can be freely navigated using a roving camera, allowing the researcher to view the event from any angle, or adopt the literal point of view of a performer or audience member.

The quality of the visualization matters. In the example presented, head pose via motion capture, facial display via computer vision, and chest expansion via medical sensor needed to be aligned. Each had their issues—wandering time base, off-axis motion capture fixtures, etc.—and only through this method could confidence in their accuracy be attained. Augmented video was essential to see the raw data in context, and notice pernicious errors in the capture. Live control over the synchronization and calibration parameters was essential to nudge the disparate sources into alignment.

In the example presented, interpretation also required interactive visualization. Having integrated the raw data sources, quantitative measures suitable for inferential statistics were required. With the visualization, the kinds of geometric tests necessary to determine who could be seen to be looking at whom could be compared, and parameters iterated until a contextually appropriate measure was judged—*seen*—working.

This method of interactive visualization links the challenges of integration of multimodal datasets, inductive discovery of phenomena, and production of qualitative and quantitative measures.

Implications

Get the performer-audience dynamics right as a street performer, and you will be financially rewarded when it comes time to pass around the hat. Get the performer-audience dynamics wrong as a storyteller, and the narrative quality of your story will suffer. The impact of performer-audience interaction in these cases was established through the use of audio-visual recordings. The method and example presented here is a step towards replicating the methodological success of such work while meeting the particular empirical challenge of live performance events.