

LONG-TERM MONITORING OF TRUMPET PLAYERS' PERFORMANCE TO DOCUMENT THE SKILL ACQUISITION AND PSYCHOPHYSIOLOGICAL FACTORS OF THE MUSICIANS

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Background

Practicing is necessary to acquire artistic and fine motor skills for playing any musical instrument. Getting professional, the demands on physiological but also psychological aspects are even exceptional higher, but objective evidence of these proficiencies are difficult to measure and to compare. There are hard-to-tell levels to pass the entrance examination at music universities just as well the level to master the final exam concerts. While some teachers can partly follow the development of their students, there is no real documentation of the process of learning an instrument up to top professional level.

Aims

This project is an approach to document the development of trumpet players' skills using multiple measuring tools available at the Motion-Emotion-Lab. Establishing a test procedure is an important step, before the results can be included in the main research after collecting data through at least 5 years. The final aim is a multidimensional report of the variability of education patterns from the advanced beginner (age 12) through his studies (age 18-22) until his professional engagement.

Method

The monitoring system used in the Motion-Emotion-Lab consists of multiple components, focusing on different aspects. Some measurements can be done simultaneously and synchronously, like the Noraxon MyoResearch 3 System, (MR3) which integrates and synchronizes multiple biomechanical assessment technologies under the umbrella of a single software.

MR3 includes MyoMuscle (8-channel EMG of muscles involved for holding and breathing), MyoMotion (6-channel 3D Motion-Capturing of the torso, upper limbs, head) myoFORCE (high-res force plate) MyoVideo (Audio-Video-recording). Additionally, a biosensor is monitoring heart rate, EKG and breathing pattern. These bio-kinetic data acquisition allows the analysis of posture, motion and psychophysiological aspects while playing given four music examples on the trumpet. Since the artistic creativity of the music is also taken into further analysis, it's important to mention, that the players are free to any interpretation these tasks. A PONY FX Spirometer is used to reveal maximal exhalation pressure (MEP) while Sound Pressure Meter are used to measure maximal length some notes can be played. The Bonsai LiPr System is used to measure the pressure of the mouthpiece on the lips. Questionnaires are included to get data of educational and practicing aspects, as on personal aspects like an anxiety factor. Recording and Analysis of maximal single, double and triple-tonguing tempo, as on maximal playing ability of very loud and high notes are recorded.

Results

First tests have been successfully done with some (N=6) first-semester trumpet students. It could be shown that the demands and tasks can be fulfilled in 90-120 minutes. The Performance data shows a huge variation of individual strength. Some Parameter will be excluded in further studies, since reproducibility is hard to achieve.

Conclusions

Documenting psychophysiological data of music performance is tricky, and many aspects and techniques have to be taken into account. The presentation of the engaged setup is fundamental to discuss further options of method improvements before gathering more long-term data. Cohort studies and 4-8-year longitudinal analysis are promising and can reveal new information for objective evidence on playing abilities and its variabilities.

Keywords

Trumpet-Playing; Long-Term-Monitoring; Training-Effects; Technical Skills; Lip Pressure

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