

Marimba, Mallet & Mind

Enhancing the Marimba Sound by Ki-aikido Approach

Henrik Knarborg Larsen^a, Ole Adrian Heggli^b & Bjørn Petersen^{a,b}

^aRoyal Academy of Music Aarhus/Aalborg; ^bCenter for Music in the Brain, Dpt. of Clinical Medicine, Aarhus University

Introduction

- The timbre of the marimba can be varied by use of different playing techniques, thereby modifying the balance of the harmonics [1].
- Mastering these techniques relies on precise imagination of sound and control of the physical actions needed.
- Recently, techniques from the Japanese martial art Ki-aikido have emerged as a promising supplementary element in the education of artists [2, 3]
- This study tested the hypothesis that a specific Ki-aikido physico-mental exercise may significantly improve the quality of the sound from the marimba.

Methods

Participants

- 36 percussion students from three international academies (Amsterdam, Juilliard & Tampere), randomly assigned to an experimental (18) or a control group.

Design

- Participants played a short musical exercise twice (figure 1), before and after a short instruction, using a specific set of mallets and striking the bars at particular points (figure 2).
- Experimental group players were introduced to the “good handshake” and asked to “imagine the hands being glued together and the fingers growing around each other”. Subsequently, they were asked to repeat the exercise with this idea in mind, when holding the mallets.
- Control group players were asked to play the exercise “focusing on the sound and playing with as open and warm a sound as possible”.
- All performances were recorded before and after intervention (72 samples)

Analyses

1. The fast Fourier Transform (FFT) algorithm was used to objectively inspect the energy of the third (ROI1), the fourth harmonic (ROI2) and the tenth harmonic (ROI3), across all samples.
2. Ten marimba soloists, blinded to the nature of the intervention, provided subjective assessment on whether the player’s sound has improved. Rating addressed the quality of three fundamental parameters of sound: *resonance*, *overtones* and *attack*.

Results

1. The experimental group exhibited a significant decrease in the amplitude of the third and fourth harmonic and a trend towards a corresponding increase in the higher harmonics. No significant changes were found for the control group (figure 3). A strong effect size and lack of location or interaction effects suggest that the results are systematically linked to the intervention.
2. The expert ratings showed no effects of the intervention on any of the parameters resonance or overtones. By contrast, we saw an overall effect of the control intervention on the parameter attack. Control group students from Juilliard received significantly higher ratings for progress on the parameters attack and resonance (figure 4).

Conclusion

As indicated by spectrum analyses, the physico-mental awareness provided by the Ki-aikido instruction may significantly change the harmonic distribution in the instrument’s timbre, thus providing room for a warmer, clearer and more open sound. Whereas the objective analysis constitutes a solid and consistent platform for measurements, the subjective approach is flawed by several inconsistencies and thus less reliable. The study highlights the potential of taking Ki-aikido strategies into consideration in the general approach to teaching as well as production of sound on percussion instruments.



Figure 1. The exercise played by all participants before and after either a standard instruction or a Ki-aikido instruction.



Figure 2. The marimba shown from above. White arrows indicate the point at which participants were required to strike the bars.

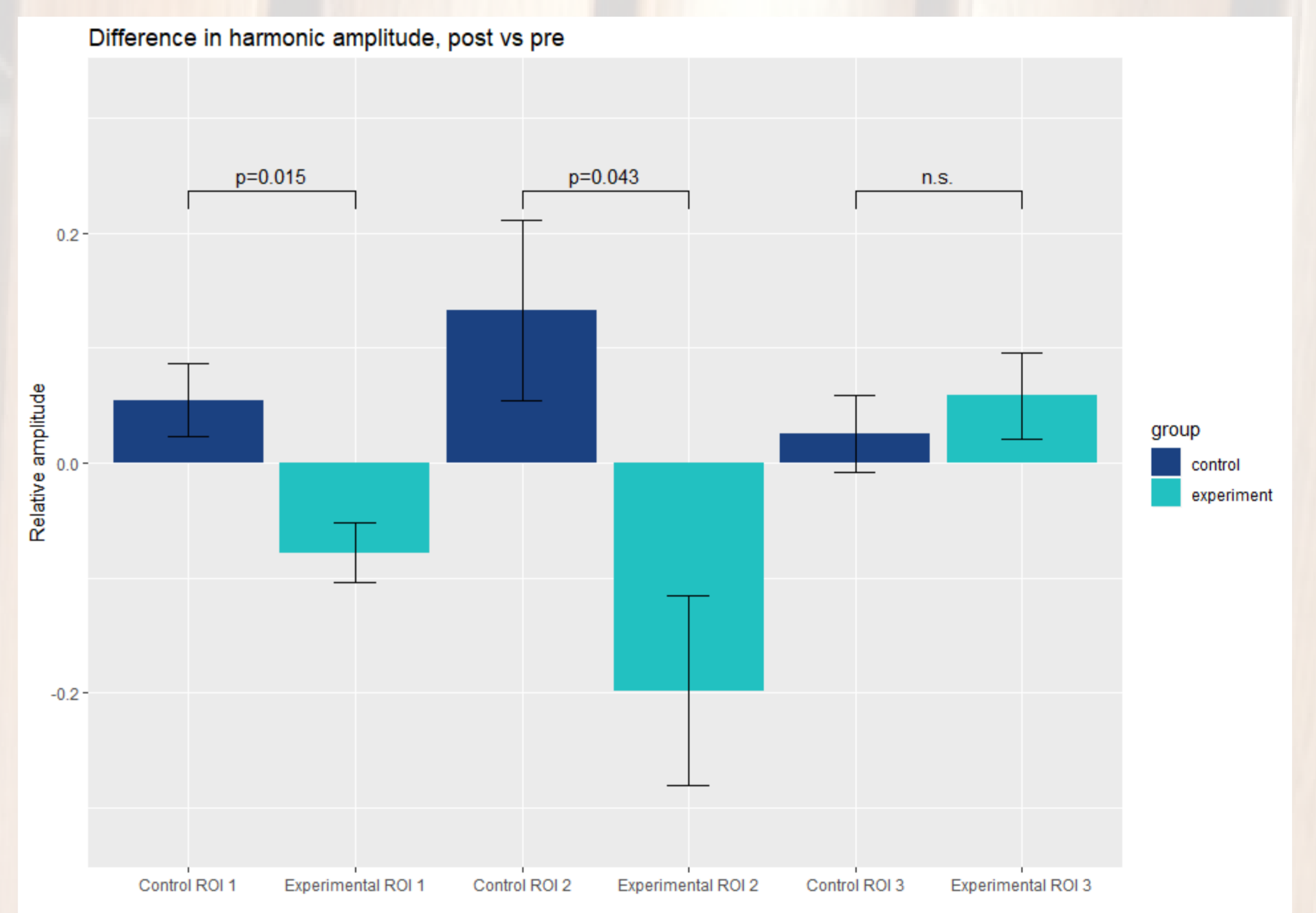


Figure 3. Mean difference in amplitude of the three inspected harmonics after the intervention for the control (blue) and the experimental (green) groups. Whiskers indicate standard error. ROI1=3rd, ROI2=4th, ROI3=10th harmonic.

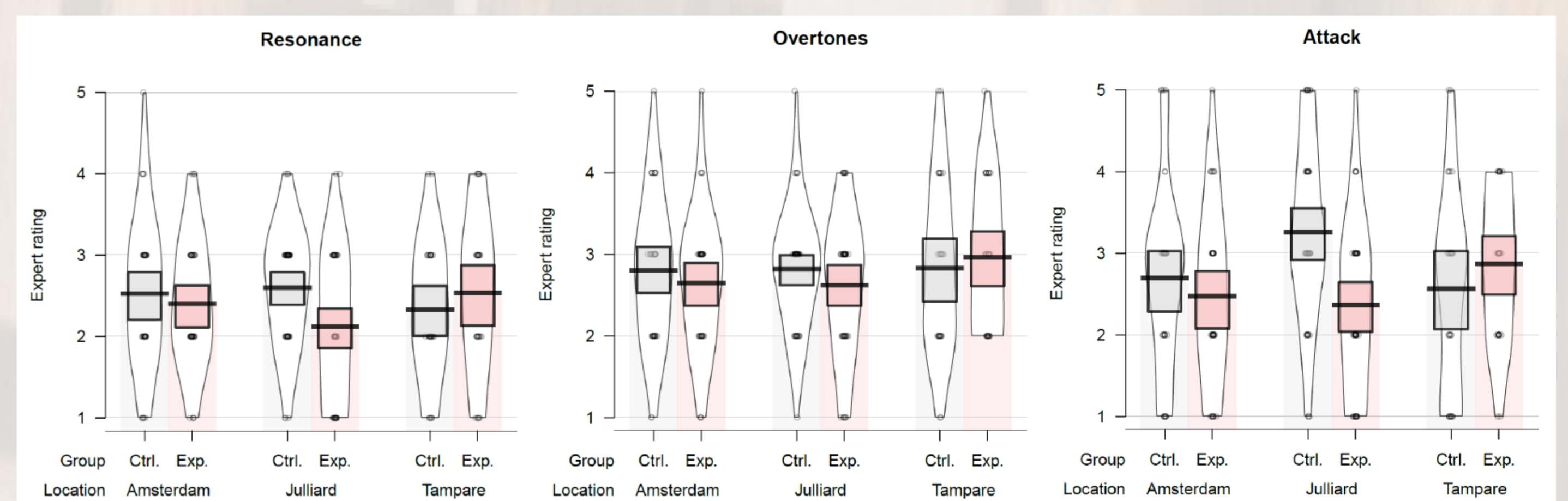


Figure 4. Violin plots showing the results of the expert improvement ratings of the parameters Resonance, Overtones and Attack for control and experimental groups at the three locations.

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