

ACOUSTICS2008/2321 Reproducibility of piano playing

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Mechanically, piano playing consists in giving to the hammer a certain escapement velocity at a certain time - t_e, v_e - by means of a traditional keyboard and piano action. Numerous replacement systems for the keyboard, action or even for the pianist's finger have been proposed. They implicitly raise the question of the accuracy with which the (t_e, v_e) information must be coded or reconstructed. The precision with which pianists are able to reproduce their playing sheds some light on this question. At this end we have asked several concert pianists to play several times the same passage with the highest reproducibility level they could achieve. The experiment was done on a traditional grand piano equipped with the Yamaha Disklavier system, used as a measurement tool for the escapement velocity of the hammers. . The beginnings of a fugue by Bach and a study by Debussy were recorded. Results show that the reproducibility varies highly from note to note and can be as good as approximately 1%. Additional tests on auditors show that deviations on note amplitudes are not perceived unless they reach a level which turns out to be significantly higher than the reproducibility level achieved by the pianists.