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Elite dancers have greater auditory-motor synchronization in tapping task

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Auditory-motor synchronization is an essential element for dancers when they perform dance to music. However, some beginner dancers have a tendency that their actions precede the beat, which is a major obstacle for them. In laboratory setting, a simple finger tapping task with an auditory metronome has been widely utilized. The tendency that tapping precedes sound was called the Negative Asynchrony (NA) (Miyake 1902). A recent study reported that elite musicians had smaller NA (Aschersleben 2002). This might be because 1) musicians have long experience of training in using hand, or 2) they may have good ability of auditry-motor synchronization in general regardless of the body part being used. To investigate this question, dancers are an ideal experimental model because they have plenty of experience in moving the whole body, especially legs, with audio signals. Ten elite dancers and 10 non-dancers participated in this study. All elite dancers have experience in dancing for more than 5 years. Subjects were instructed to perform tasks of 1) right index finger tapping, 2) right foot stepping, or 3) both, to metronome sounds at a tempo of 50 beats per minute (bpm), 100 bpm, or 200 bpm in randomized order. NA was calculated from the time difference between sound onset and tap or step which was detected by force sensors. In all conditions, NA in dancers for tapping was smaller than that in non-dancers. It is possible that dancers were able to improve auditory-motor synchronization by practicing dance to music.