

Limb Dominance, Cognitive Processing, and Agility

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Locomotor agility is commonly defined as the ability to rapidly change direction or rapidly stop and start. It is common to find that individuals display differences in left to right agility speed. These differences are often ascribed to leg dominance, but to date there has been little systematic investigations into leg dominance and agility, due in part to challenges in even defining leg dominance. Reactive agility testing, which prevents pre-planned movements, may rely on factors different from leg dominance, such as visual field dominance or left-right brain differences in cognitive processing. The purpose of this research project is to examine reactive agility and its relationship to limb dominance and brain dominance as revealed by eyedness and cognitive processing tasks.

To examine these relationships a correlational research design will be employed. Based on effect sized reported in the literature, a convenience sample of 30 male and female subjects will be recruited. All subjects will signed informed consent as approved by the Ithaca College Institutional Review Board. All subjects will be screened for risk with the PAR-Q form and assessed for lower extremity musculoskeletal injury history via a survey form. Any person responding in the affirmative regarding current lower extremity musculoskeletal injuries will be eliminated. Any athlete participating must be cleared for full practice and game participation.

All subjects be tested over three days for laterality performance in motor skills, posture, balance, strength, power, neural and visual processing, and left-right lateral agility and left-right lateral reactive agility.

On Day 1 each subject will be assessed for handedness and footedness, measurement of visual dominance, and measurement of bilateral and unilateral balance and leg power. Subjects will be introduced to the agility tests for familiarization. On Days 2 and 3, after familiarization, each subject will undergo 40 trials of a seated foot response Simon Effect reaction time test (Simon test), 40 trails of a standing Simon test, 40 trials of a stand and lean Simon Effect test, and 40 trials of a seated hand response Simon test. The Simon test is a reaction time test done on computer that uses spatial congruity and incongruity to tease out left to right side differences in cognitive processing. Following the Simon tests, subjects will perform 10 trails of a left side movement agility test and 10 trails of a right side agility test in which the subjects know in advance the movement direction (COD test). Following these trials the subjects will undergo 20

trials of a reactive agility test (RAT) in which a visual stimulus prompts the subjects to move left or right. The visual stimuli in the RAT will follow a pattern based on the Simon effect.

Data will be analyzed for left to right movement speed differences and their associations to limb dominance, eye dominance, and left-to-right side differences in cognitive processing speed as revealed by the Simon Effect reaction time data.