

Reaching Kinematics in Infant Rhesus Monkeys (*Macaca mulatta*)

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The structure of reaching has been well characterized in human infants using motion analysis. Over the first years of life, reaches become smoother, straighter, and decrease in average speed. Data on reach kinematics in nonhuman primates are limited, particularly in infant samples. The goal of this project was to conduct the earliest assessment of reach kinematics in any nonhuman primate species. Rhesus monkeys (*Macaca mulatta*) were chosen because they are one of the most widely studied primates, particularly in the motor domain. The onset of successful reaching in rhesus monkeys is approximately 3 weeks of age. In this study, monkeys ($N=26$) were presented with a ball on the end of a stick over 8 trials and encouraged to reach for it. Reaches were digitized offline with the motion analysis software program MaxTRAQ 2-D, and dependent variables were calculated with Matlab. Given prior work in 4.5-month-old rhesus monkeys that found that left hand reaches were smoother than right hand reaches, we hypothesized that there would be a difference between hands in 3-week-old monkeys, and we predicted that any differences would favor the left hand. Linear mixed effects models were used to examine the effect of hand (left or right) on average reach speed, smoothness, and straightness. Satterthwaite approximation for degrees of freedom was used to calculate p-values. Preliminary results found a significant effect of hand use on reach straightness ($\beta=-0.166$, $SE=0.048$, $t(95.53)=-3.44$, $p<0.001$). Left hand reaches were straighter than right hand reaches (Left= 1.162 ± 0.020 ; Right= 1.332 ± 0.043). No hand differences were found for reach smoothness or average reach speed (all $ps>0.05$). These results may provide insight into the evolution of reaching and grasping, as well as the evolution of laterality in motor control in primates.

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