Motor Development in Early Childhood

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Background

As children age, their motor skills develop in a sequential manner, each step being referred to as a developmental milestone. Motor development occurs from head to toe, the head and neck being first to develop, followed by the trunk, then the hands and feet [1]. These acquired motor skills are separated into two groups:

- Gross motor movement (crawling, sitting, walking)
- Fine motor movement (picking up and interacting with objects)

Motor development research in the field of psychology provides parents with information about developmental milestones in their child. Activities that encourage motor development also change over time as the child gets older, so studying the relationship between age and motor movement may aid in healthy development. Additionally, observing which hand the child uses when contacting the cup and what actions they do is an observation that could be looked further into. Observing whether the child uses their right or left hand dominantly to play with the toy could determine which hand the child may use dominantly in the future.

Methods

Datavyu [2] was utilized to code motor movement in two minute videos of children interacting with the same toy (stacking cups). Two subjects were tested from three age groups (12 months, 18 months, 24 months). The variables that were focused on were duration of interaction with the toy and the amount of times the child grasped the toy with his or her right hand, left hand, or both right and left hands. Duration of interaction was recorded from the beginning of interaction to when the child stopped interacting with the toy. Grasp type was recorded each time the child interacted with the toy with his or her right hand, left hand, or both hands.

R Studio [3] was used to code the acquired data which helped organize and visualize the variables.

Grasping

Results and Discussion

Based on the graph and tables, it can be observed that there is no clear bias between the three age groups regarding amount of times the left, right and both hands were used. This data does not support the idea that duration of interaction and grasp type relates to motor development in infants and toddlers. Although these variables do not relate to motor development, several other variables could be studied to further study motor development, such as types of actions the children perform with the toy.

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Figure 1: Grasp durations by type

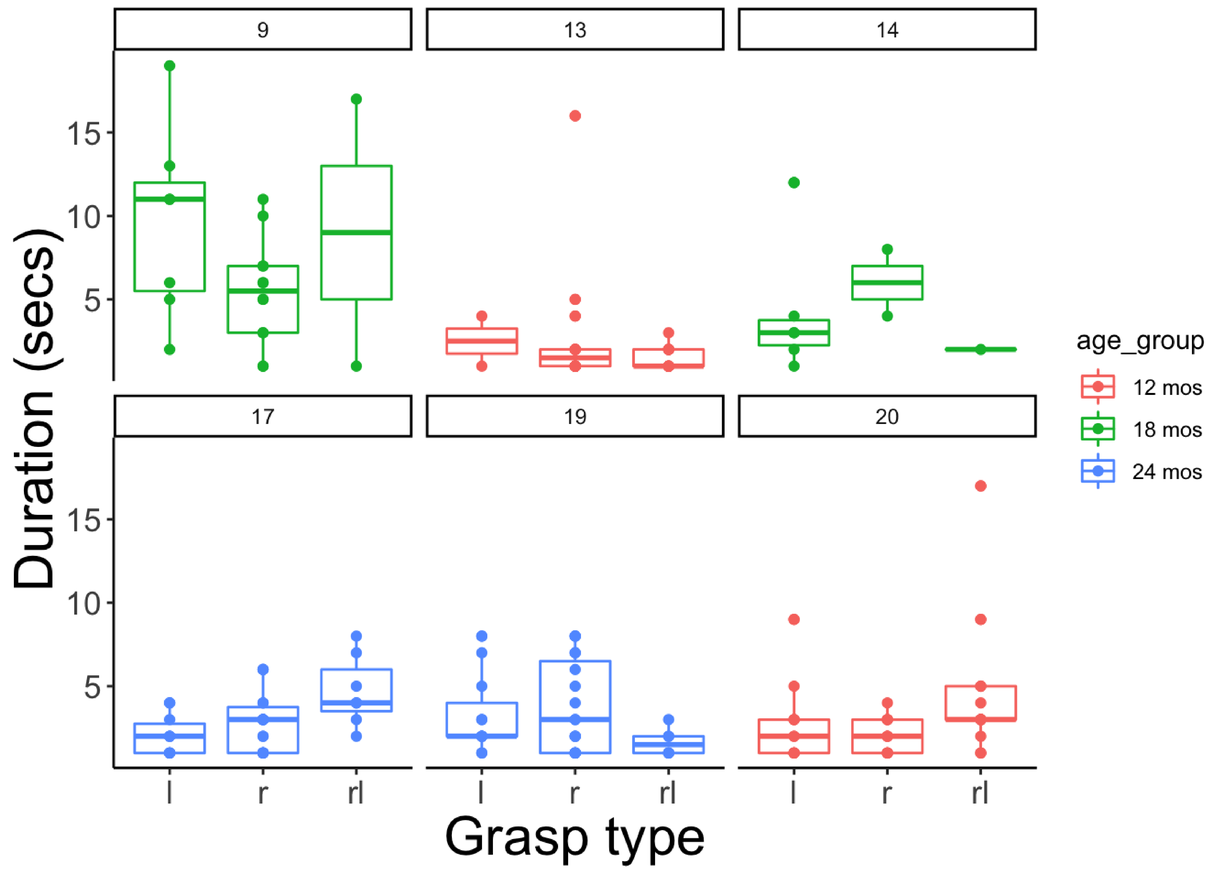

Table 1: Grasp counts by type

grasp type	9	13	14	17	19	20
l	7	2	6	10	11	11
r	12	16	2	18	19	11
lr	2	11	1	7	6	13

Data Sharing

Movies of the displays, metadata about the participants, and raw data files are available at: `https://nyu.databrary.org/volume/444`. This is a private repository. Full reports of our data analysis workflows are available at: `http://github.com/gilmore-lab/psi-chi-2019`

References

[1] S. Bachrach, "Normal and abnormal development in the infant and Pre-School child." [Online]. Available: https://www.nemours.org/content/dam/nemours/wwwv2/filebox/service/health/parenting/seminars/infantdev.pdf

[2] "Datavyu: Video coding and data visualization tool," http://datavyu.org/, accessed: 2019-1-25. [Online]. Available: http://datavyu.org/

[3] RStudio Team, *RStudio: Integrated Development Environment for R*, RStudio, Inc., Boston, MA, 2016. [Online]. Available: http://www.rstudio.com/