**Statistical Design Consulting**

**SEMESTER REPORT**

**Spring 2024**

**Client:** Paige Thompson **File Number:** 22-112

**Department:** Health & Kinesiology **Major Prof:** Dr. Laura Claxton

**Consultant:** Sumeeth Guda **First Meeting Date:** 11/29/2022

**Meeting Attendees:** Pratiksha Agrawal, Paige Thompson, Dr. Laura Claxton, Dr. Arman Sabbaghi

**Statement of Problem:** To study the relationships between age, toy size, and toy weight on the bimanual interactions performed by infants in a standard free play setting, and to account for the infants’ postures.

**Goal of This Project:** Journal Publication and PhD Dissertation

**Background:** The client conducted an observational study in which she recorded 40 infants in a free play session. There were 16 infants who were 13-months old and 24 infants who were 24-months old. The study objective is to analyze the manual behaviors of the infants for different types of toys, and to account for the infants’ postures, during the free play session. There were 18 different toys that are specified according to their size (specifically, small, medium, or large size) and weight (specifically, light, medium, or heavy weight). The outcome measures of the study are the counts of the infants’ use of bimanual manipulations of the toys, recordings of the infants’ postures (namely, standing or sitting) when interacting with the toys. It is important to note that the infants were not required to interact with all 18 toys. As such, for each interaction, the client recorded the size and the weight of the toy, in addition to the outcome measures. Another factor of interest in this analysis is the age of the infant and understanding the effect of the infants playing with 2 toys.

As of this point, the client implemented a repeated measures ANOVA on the 2x3x3 data structure (in which the factors are age group, toy size, and toy weight for a particular interaction of an infant with a toy). The client expressed some concern about the distribution of the outcomes, and so her statistical issue is to understand whether the zero-inflated Poisson model would yield a better analysis compared to the repeated measures ANOVA.

**Progress During Current Semester:**

The client is a continuing client from Spring 2023, initially the client used dummy data generated from the pervious consultant to create their models and see how the R code worked while also collecting the data from the infants. As of this semester, the client collected all of the data and wanted to conduct analysis on the data using skeleton code made by the previous consultant, as well as create an aggregated proof of concept visual using the collected data. After reviewing their video data, they noticed 2 new postures, and the phenomenon that the infants played with 2 toys, and they wanted the code to be updated to handle this.

The consultant adjusted and deployed the collected dataset through the skeleton code made by the previous consultant and created a .rmd file containing the explanations and interpretations from the models. Additionally, they adjusted the data to accommodate the 2-toy phenomenon and the 2 additional postures. They met with the client, through several touchpoints, to explain the results of the analysis and gave suggestions of what to do for further analysis. The consultant was unable to create the aggregated visual due to timing. But primarily the client had more concerns with the analysis compared to the visual.

The consultant sent all of the updated R code, and adjusted datasets to the client for their deeper analysis.

**Current Status:** Continuing.