Appendix

Multilevel Model Specification

$$\text{ENG}_{ij} = \beta_{0ij}cons + \beta_{\text{BW}j} + \beta_{\text{PCA}j} + \beta_{\text{BASEO2}j} + \beta_{\text{READY}ij} + \beta_{\text{EPIO2}ij} + \beta_{\text{MEANO2}ij}$$

$$+ \beta_{\text{STILL}ij} + \beta_{\text{PH2}ij} + \beta_{\text{PH3}i}$$

$$\beta_{0\,ij} = \text{constant} + \mu_{0j} + e_{0ij}$$

Let ENG_{ij} denote the proportion of engagement for the ith feeding episode within the jth

dyad. The regression coefficients included a constant together with explanatory variables

measured at two levels (β_0, $\beta_{1\text{-}n}$). These coefficients combined to define the average line

across all episodes in all dyads and were considered fixed effects. The model was made

multilevel by allowing each dyad's summary line to vary from the average line by an

amount μ_{0j}. The ith episode in the jth dyad also varied from its dyad's summary line by

an amount e_{0ij}. The random variations between dyads (one μ_{0j} for each dyad) were the

dyad level residuals; the random variations between episodes (one e_{0ij} for each episode)

were the episode level residuals. Together the residuals constituted the random effects of

the model. Residuals were assumed to be normally distributed with a mean of zero.

Model assumptions were assessed by examining the residuals. The residuals were

approximately normally distributed, falling between -2.1 and 2.1 and randomly

distributed about zero. There were no distinct patterns of variation in the plots. There

were no major violations of the assumptions, therefore, the parameter estimates can be

considered with confidence.