

Multilevel Modelling of Reading Achievement in Children and Youth

Yifei Fang, Master of Science in Computer Science
University of Dublin, Trinity College, 2019

Supervisor: Bahman Honari

Despite the vast studies on the longitudinal study of Growing Up in Ireland (GUI), little is known about the perspective of the advanced statistical modelling. The study investigates cognitive development and discovers influential factors using GUI data set. The predictors emerged from the literature review are household income, home literacy experiences, expectation of parents and phone ownership. In the analysis, the work involves data preprocessing, feature selection and multilevel modelling with predictors. Iterative generalised least squares algorithm is used for parameter estimation. A multilevel analysis yields the growth rate of the reading development of 9-18 years old. The assumptions of the models are held: linear relationship of variables, normal distribution of residuals and homogeneity of variance.

Two-level multilevel models are built, and the final linear growth model achieves the best score. Linear growth models who have higher intercepts tend to have steeper slopes of books coefficient and flatter slopes of phone ownership. The variance of reading achievement between students increases with more books and decreases with owning phones. So there is a strong negative influence of phone ownership while book is a positive factor. The study, as a part of GUI, starts applying cutting-edge statistical models in three waves of the child cohort. The study could be carried out with more predictors and more cross-level interactions in the future.

Keywords: *Multilevel Modelling, Reading Achievement, Growing Up in Ireland*