

THE POWER OF DETECTING DEVELOPMENTAL CHANGES IN INFANT STUDIES

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In developmental studies of human social cognitive skills theories predict that certain social cognitive skills emerge at different periods of age and one skill may be a necessary precursor of another skill. Research is usually done by longitudinal experimental studies: An experimental set-up aims to induce a response that allows the conclusion about the emergence and development of a social skill. However, sample size is usually small and the subjects can only studied during a certain numbers of times (e.g. 10 weekly sessions). I developed computer software written in R to analyse the power of typical developmental studies in infancy and child research to determine and compare the ages of emergence of social-cognitive skills of infants using Monte Carlo simulations. The simulation software allows assessing the following questions:

- What are the limitations of a longitudinal study?
- How accurate are estimates of mean age of emergence?
- What kind of differences between emergence of behaviour can be detected:
- Which factors influence the power of a study?
- Is it possible to improve the sampling design (assuming that the number of subject is a limited resources)
- How does increasing sample size influence the power to detect differences in age of emergence?

The simulation studies based on typical developmental studies in infancy research revealed that reasonable well designed studies will only have the power to detect differences of 4 weeks between the ages of emergence of two different social cognitive skills. This resolution is far lower than researchers assumed. Recommendations about the design of future studies and their limitations are presented.