Studying Child Development: The Scientific Method

- Treat beliefs about development as hypotheses (educated guesses) that need to be tested.
- Test them using the scientific method:
  - Choose a question to be answered.
  - Formulate a hypothesis regarding the question.
  - Develop a method for testing the hypothesis.
  - Use the data yielded by the method to draw a conclusion regarding the hypothesis.

The Importance of Appropriate Measurement

- Measurements must yield reliable and valid results.
  - Reliability: Independent measurements of a behavior are consistent with each other.
  - Validity: The test or experiment measures what it is intended to measure.

Reliability

- Reliability: Consistency of measures
  - Inter-rater reliability: The amount of agreement between different observers or testers. Agreement should be high.
  - Test–retest reliability: Results should be similar over repeated testing.

Validity

- Internal validity: Are the effects observed attributable to conditions the researcher intentionally manipulated?
- External validity: Do the conclusions allow generalization beyond the particulars of this experiment?
Studying Child Development: Contexts for Gathering Data

- Interviews
  - Structured interview: Collecting self-reports from all people being studied.
  - Clinical interview: In-depth focus on each subject.

- Naturalistic observation: Study children in their usual environments—home, play, school.

- Structured observation: Research based on studying children engaging in designed tasks or situations, usually in a laboratory.

Correlation and Causation

- Variables are attributes that vary across individuals and situations.
- Behavioral research is concerned with determining if and how many of these variables are related.
- Correlational and experimental designs are the two main ways of doing this.
Correlational Designs

- Correlation is the relationship between two variables.
- Correlations can be either positive or negative in direction.
- The direction and strength of a correlation are indicated by a statistic known as the correlation coefficient.

\[ r = 0.56 \]

Correlations—Five Variations

Correlation vs. Causation

- **Correlation does not equal causation.**
  - Correlation does not tell you if one variable causes another.
  - There may be a third variable.
- Finding causation requires an experiment.

Experimental Designs

- Experiment can prove causation if the participants are similar enough to one another and are tested in same situation.
  - **Random assignment** ensures that comparable research subjects submit to same experimental setting.
  - **Experimental control:** One group is tested in the experiment and one group—the control group—is not.
Experimental Control

- Independent variable: The experience that the experimental group is exposed to.
- Dependent variable: The behavior that is affected by exposure to the experiment.

Designs for studying development

- Cross-sectional - compare children of different ages on a given behavior
- Longitudinal - follow group of children over substantial period of time
- Microgenetic - follow group of children closely as behaviors appear.