

K.W. Schiaie's General Developmental Model

- All experimental studies of aging involve three inter-related factors:

AGE
TIME of measurement
Birth COHORT

- In traditional CROSS-SECTIONAL and LONGITUDINAL experimental designs, two of these factors must be “confounded” with one another (more about this to follow).

General Developmental Design Matrix

		Time of Measurement			
		1980	1990	2000	2010
Time of Birth (COHORT)	1930	50	60	70	80
	1940	40	50	60	70
	1950	30	40	50	60
	1960	20	30	40	50

Age →

Cross-Sectional Design

Definition: This design compares two or more groups of individuals that differ in chronological age, at a single point in time (“Age Differences”)

		Time of Measurement			
		1980	1990	2000	2010
Time of Birth (COHORT)	1930	50	60	70	80
	1940	40	50	60	70
	1950	30	40	50	60
	1960	20	30	40	50

Age →

Which TWO FACTORS are confounded?

Advantages of Cross-Sectional Designs

- Quick
- Economical
- Contemporary (techniques & hypotheses)

Disadvantages of Cross-Sectional Designs

- AGE x COHORT confound
- Over-Estimates age-related declines/losses
- “aging” must be inferred since it is never directly observed
- Examines phenomena at the “group” rather than “individual” level (Good for theory; not so good for application)

Longitudinal Design

Definition: This design compares a group of individuals drawn from the same birth cohort, across progressive periods of time (“Age Changes”)

		Time of Measurement			
		1980	1990	2000	2010
Time of Birth (COHORT)	1930	50	60	70	80
	1940	40	50	60	70
	1950	30	40	50	60
	1960	20	30	40	50

Age →

Which two factors are confounded?

Advantages of Longitudinal Designs

- Examines real “age changes” rather than mere “age differences”
- Eliminates the Age x Cohort confound

Disadvantages of Longitudinal Designs

- Systematic loss of subjects across time
- Under-estimates magnitude of age-related change
- Testing effects (due to “repeated measures”)
- Expensive (time and treasure)
- Experimenter(s) age too!
- Professionally risky: research questions become obsolete; publication delay has negative impact

Schiaie's Alternative Designs
for
Developmental (Aging) Research

Cohort-Sequential Design

Consists of two or more concurrent longitudinal designs separated in time; allowing generalization of “age changes” across generations

The diagram illustrates a Cohort-Sequential Design matrix. The vertical axis represents the 'Time of Birth (COHORT)' with years 1930, 1940, 1950, and 1960. The horizontal axis represents the 'Time of Measurement' with years 1980, 1990, 2000, and 2010. The cells contain age values. A diagonal band of yellow cells (40, 50, 60, 70) represents a single cohort being measured at different times. An arrow labeled 'Age' points to the value 20 in the cell for birth year 1960 and measurement year 1980.

		Time of Measurement			
		1980	1990	2000	2010
Time of Birth (COHORT)	1930	50	60	70	80
	1940	40	50	60	70
	1950	30	40	50	60
	1960	20	30	40	50

Time-Sequential Design

Consist of two or more replications of a cross-sectional design separated by time of measurement; segregates Age and Time factors but confounds both with Cohort

		Time of Measurement			
		1980	1990	2000	2010
Time of Birth (COHORT)	1930	50	60	70	80
	1940	40	50	60	70
	1950	30	40	50	60
	1960	20	30	40	50

Age

Time-Lag Design

Holds Age constant and samples at widely separated Times of measurement; segregates the effects of birth cohort and time of measurement (at the expense of Age)

		Time of Measurement			
		1980	1990	2000	2010
Time of Birth (COHORT)	1930	50	60	70	80
	1940	40	50	60	70
	1950	30	40	50	60
	1960	20	30	40	50

Age →