

Multilevel and Longitudinal Studies

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Learning Objectives

Define a multilevel and longitudinal study.

Recognize an example of a multilevel and longitudinal study.

Describe how designs with multilevel and longitudinal features have two kinds of correlation among measurements.

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Recall the definition of a longitudinal study

A **longitudinal study** evaluates a research question by analyzing two or more measurements on the same independent sampling unit over time.

3

Recall the definition of a multilevel study

A **multilevel study** involves two or more layers of correlation.

Observations within a level, also referred to as a group or cluster, experience similar influences, which induce correlation.

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Studies with longitudinal and multilevel features have two kinds of correlation patterns

Longitudinal features induce correlations across time.

Multilevel features induce correlations within levels, also known as groups or clusters.

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We examine a study with both multilevel and longitudinal features

Vignette

Researchers conducted a group-randomized, multilevel longitudinal study to test the effectiveness of a preventive alcohol use intervention. The study focused on urban, low-income, and multi-ethnic populations.

Komro et al., 2008

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We examine a study with both multilevel and longitudinal features

Vignette, continued

Sixty-one schools were recruited. Schools were randomized into an intervention or control group.

Komro et al., 2008

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We examine a study with both multilevel and longitudinal features

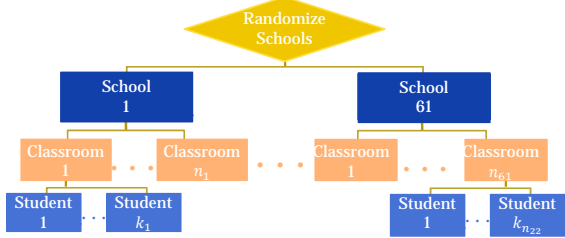
Vignette, continued

Students were surveyed to measure their alcohol use at the end of 6th grade, 7th grade, and 8th grade.

Komro et al., 2008

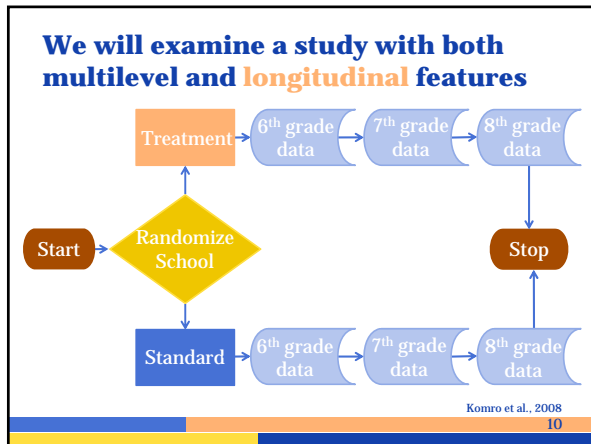
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We examine a study with both multilevel and longitudinal features



Komro et al., 2008

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This study aimed to assess the effectiveness of an intervention

Null hypothesis:
There is no significant difference in average alcohol use between schools that receive the standard of care and schools that receive the intervention.

Komro et al., 2008
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Students were observed within schools in each community

Independent sampling unit: School

Unit of observation: Measurement at one point in time for one student

Komro et al., 2008
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The study investigated the impact of the proposed intervention over time

Within-independent sampling unit factor:
Time, with repeated measurements taken at the end of 6th grade, 7th grade, and 8th grade

Between-independent sampling unit factor:
Assignment to standard of care or treatment

Komro et al., 2008

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The study involved two types of correlation

- 1. Multilevel:**
Correlation within groups or clusters
- 2. Longitudinal:**
Correlation between repeated measurements

Komro et al., 2008

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Recall that sampling units with a level experience common influences which induce correlation

Schools are independent sampling units.

Classrooms within the same school were correlated.

Students within the classrooms were correlated.

Murray, 1998

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Further, longitudinal studies induce correlation between measurements

Measurements from the same student at each time point were correlated.

Rosner, 2010, p. 127
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Unfortunately, Project Northland Chicago was ineffective

Findings revealed the need for sub-population specific interventions.

Komro et al., 2008
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Review Summary

- A **multilevel and longitudinal study** has more than one hierarchical level and collects repeated measurements over time
- These studies induce two kinds of **correlation** among measurements: correlation between measurements over time, and correlation within levels/clusters

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