

## Chapter 23

# Developing Multilevel Models for Research

**John Turner**

*University of North Texas, USA*

**Kristin Firmery Petrunin**

*University of North Texas, USA*

**Jeff Allen**

*University of North Texas, USA*

### ABSTRACT

*In the past, a large number of research efforts concentrated on single-level analysis; however, researchers who only conduct this level of analysis are finding it harder to justify due to the advancements in statistical software and research techniques. The validation of research findings comes partially from others replicating existing studies as well as building onto theories. Through replication and validation, the research process becomes cyclical in nature, and each iteration builds upon the next. Each succession of tests sets new boundaries, further verification, or falsification. For a model to be correctly specified, the level of analysis needs to be in congruence with the level of measurement. This chapter provides an overview of multilevel modeling for researchers and provides guides for the development and investigation of these models.*

### DEVELOPING MULTILEVEL MODELS FOR RESEARCH

Researchers analyze hierarchical or nested structures, when conducting applied research in organizations, schools, health care facilities, and family settings. Hofmann (2002) indicated that ignoring these simple hierarchical structures can lead to incomplete and misspecified models. These

hierarchical structures “shape, create, encourage, and reward behavior in organizations” (Hofmann, 2002, p. 248). Including this hierarchical structure into conceptual and theoretical models allows researchers to better capture the level of complexity because hierarchical systems increase our levels of understanding.

In the past, a large number of research efforts concentrated on single-level analysis, primarily

DOI: 10.4018/978-1-4666-7409-7.ch023

studies concentrating on one level of analysis (i.e., personality studies, evaluation of manager's leadership abilities). Researchers who only conduct a single-level analysis are finding it harder to justify because of advancements in statistical software and research techniques. Today, researchers replace the single-level research studies with the more complex multilevel analysis techniques. For example, researchers who study hierarchical systems, such as organizations and schools, want to consider multiple impacts within the system. In these hierarchical systems, when a change is made in one part of the system each adjoining system is also affected, changing the whole system. By concentrating only on a single-level study, researchers ignore the surrounding environment, the effect that the individual has on the group and the organization/school. Alternatively, changes at the organization/school level also affect the team and the individual levels. To better understand the complex nature of hierarchical systems Kozlowski and Klein (2000) proposed that researchers utilize "approaches that are more integrative, that cut across multiple levels, and that seek to understand phenomena from a combination of perspectives" (p. 77).

In theoretical and applied research, the level of analysis is typically ill defined (Kozlowski & Klein, 2000). Literature often contains errors when individual-level data is incorrectly applied to team, organization, or school levels (Kozlowski & Klein, 2000). Some common errors in organizational and school research include misspecification errors, such as:

- Blind aggregation of individual-level measures to represent unit-level constructs;
- Use of unit-level measures to infer lower-level relations (the well-known problems of aggregation bias and ecological fallacies); and
- Use of informants who lack unique knowledge or experience to assess unit-level construct (Kozlowski & Klein, 2000).

This chapter takes a look at some of the key components involved with developing multilevel models. Considerations to the different levels of analysis and the selection of constructs for each level of analysis, including any potential interactions, are discussed. Steps to avoid producing misspecification errors will be presented along with some specific examples from current literature. This chapter addresses the call to researchers, from Kozlowski and Klein (2000), in which the trend toward single-level models "need to be broken" (p. 77), promoting the utilization of multilevel research methods. In conclusion, readers will be better able to build multilevel models and build correctly specified models for their research endeavors. This chapter primarily focuses on building multilevel models conceptually. Readers have a variety of other resources regarding the statistical analysis methods for multilevel research. Additionally, this chapter provides readers with a clearer understanding of when to use single-level models and when to consider multilevel models. Readers will also have a better understanding of how to prevent misspecification errors in their own models, and the benefits for conducting multilevel research as it applies to small group and school research. The materials provided in this chapter are primarily for those who subscribe to the positivists, postpositivists, and some naturalists perspectives. While the material presented in the current chapter may not be applicable to those who follow the perspectives of constructivism or interpretivism, it could, however prove to be highly beneficial to those planning on conducting research using mixed-methods, grounded theory building or case study research methods.

## **THE RESEARCH CYCLE**

"With human observers in the center of the stage, the world is viewed from the human vantage point.... In short, theories serve human purposes; their creation is motivated and their logic organized

25 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/developing-multilevel-models-for-research/120351](http://www.igi-global.com/chapter/developing-multilevel-models-for-research/120351)

## Related Content

---

### Incorporating AI in Educational Leadership: Trends and Innovations

Hala Al Ruheili and Sheikh Ali Salim Al-Buraiki (2025). *Optimizing Research Techniques and Learning Strategies With Digital Technologies* (pp. 239-268).

[www.irma-international.org/chapter/incorporating-ai-in-educational-leadership/370743](http://www.irma-international.org/chapter/incorporating-ai-in-educational-leadership/370743)

### Navigating Career Advancement and Sustainability in the GCC Labor Market: Beyond the Degree

Raed Awashreh (2026). *Improving Doctoral Education and Research Development for Sustainability* (pp. 1-32).

[www.irma-international.org/chapter/navigating-career-advancement-and-sustainability-in-the-gcc-labor-market/384547](http://www.irma-international.org/chapter/navigating-career-advancement-and-sustainability-in-the-gcc-labor-market/384547)

### Implications of Economic Decision Making to the Project Manager

Brian J. Galli (2021). *International Journal of Strategic Engineering* (pp. 19-32).

[www.irma-international.org/article/implications-of-economic-decision-making-to-the-project-manager/269715](http://www.irma-international.org/article/implications-of-economic-decision-making-to-the-project-manager/269715)

### Formation of Invariants of Research Competence of Students: Situational and Contextual Approach

Mariam Iliazova (2018). *Handbook of Research on Students' Research Competence in Modern Educational Contexts* (pp. 342-362).

[www.irma-international.org/chapter/formation-of-invariants-of-research-competence-of-students/196483](http://www.irma-international.org/chapter/formation-of-invariants-of-research-competence-of-students/196483)

### A Bibliographic Analysis of Scholarly Publication in the Emerging Field of Digital Humanities in Taiwan

Kuang-hua Chen and Muh-Chyun Tang (2019). *Digital Humanities and Scholarly Research Trends in the Asia-Pacific* (pp. 140-157).

[www.irma-international.org/chapter/a-bibliographic-analysis-of-scholarly-publication-in-the-emerging-field-of-digital-humanities-in-taiwan/220626](http://www.irma-international.org/chapter/a-bibliographic-analysis-of-scholarly-publication-in-the-emerging-field-of-digital-humanities-in-taiwan/220626)