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## INTRODUCTION

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**This book can be used in formulating and testing** theoretical assertions about variables (performance, satisfaction, and climate) and entities at any level of analysis (persons, dyads, groups, collectivities). For example, a theorist may have a hunch and therefore hypothesize that a particular variable (such as leadership) refers to entities at one level of analysis (such as persons). The *variant* approach to variables and entities presented in this book allows an individual to test such an assertion with data. Empirical results may be in line with a theorist's hunch, or the variable may be associated with a different level of analysis (such as leader-follower dyads) than originally hypothesized. The idea that one should allow for the disproof of hypotheses is compatible with approaches in the physical sciences and is, of course, the key to theory testing—unless a theory can fail by being replaced by another theory, it is untestable. To incorporate into our field the excitement and fun of not knowing before data analysis which of several theories (if any) will be supported, we created a paradigm.

As suggested by Masterman (1970) the term paradigm has been defined in a number of ways. We define a **paradigm** as a cognitive framework that can serve to initiate and guide scientific investigation (Barrett, 1972; Behling, 1978; Roberts, Hulin, and Rosseau, 1978) through multiple-hypothesis generation and testing (McGuire, 1973). To call an approach a paradigm, we require that a cognitive framework must be specified; it must be possible to use the framework to formulate theories and analyze data in such a way that theoretical formulations and data analytic techniques are aligned and an inferential system for drawing conclusions about theory and data must be specified. In addition, we require the inferential system specified in a paradigm to be compatible with the approach used in the physical sciences to test hypotheses. Specifically, a hypothesis of interest should be viewed as passing a critical test when it is not replaced by an alternative hypothesis, and as failing when it can justifiably be replaced by a competing hypothesis. A classic example of this

testing process can be found in physics, where Newton's theories were replaced by Einstein's.

We believe the variant approach satisfies the requirements of a paradigm because: A basic cognitive (variant) framework is presented in Chapters 1 and 2; the way in which theories are formulated when the paradigm is used is presented in Chapters 3 and 4; data analytic techniques and theoretical formulations are aligned as presented in Chapters 5 to 7; and an inferential system is summarized and illustrated in Chapters 8 to 15. The variant approach also incorporates the physical science approach to theory or hypothesis testing. As an illustration, consider two substantive hypotheses about three variables and two levels of analysis. One hypothesis may include an assertion that two of the variables are related, independent of a third variable, and applicable to groups but not collectivities. An alternative hypothesis may include an assertion that these three variables are all related and that they are applicable only to collectivities. The first, or group, hypothesis suggests that multiple interpersonal processes underlie the three variables and their relationship. The second, or collectivity, hypothesis suggests that collectivized or large-scale social movements, rather than small-group processes, may underlie variables and relationships. The variant paradigm can be used to formulate these two theories in such a way that an empirical analysis can be performed to test the probable validity of each competing hypothesis.

The following four analytical procedures comprise the variant paradigm:

1. Single-level analysis
2. Multiple-level analysis
3. Multiple-variable analysis
4. Multiple-relationship analysis

Single- and multiple-level analyses are used to specify and test assertions about entities. Multiple-variable and multiple-relationship analyses are used to identify and test assertions about variables. These four analytical perspectives on variables and levels of analysis are considered in every chapter of this book. Thus the entire book has been used as a vehicle for presenting and illustrating the variant paradigm. Our point of departure in Chapter 1 is, of course, traditional and contemporary approaches to theory testing, since these approaches are the basis of the variant paradigm.